Report of the Sanitary Commission of New Orleans on the epidemic yellow fever, of 1853.

Contributors

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E. H. Barton

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REPORT

OF THE

SANITARY COMMISSION

OF

NEW ORLEANS

ON THE

EPIDEMIC YELLOW FEVER,

OF

1853;

PUBLISHED BY AUTHORITY

OF THE

CITY COUNCIL OF NEW ORLEANS.

COLLEGE OF PHYSICIANS

——Quod sol atque imbres dederant, quod terra crearat
sponte sua.

Lucret. lib. v.

NEW ORLEANS:
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REPORT

OF THE

SANITARY COMMISSION

TO

HIS HONOR J. L. LEWIS,

MAYOR OF THE CITY OF NEW ORLEANS;

AND THE

HONORABLE THE MEMBERS OF THE BOARDS OF ALDERMEN AND ASSISTANT ALDERMEN.

GENTLEMEN:

You will be pleased to accept herewith a Report embodying the results of the labors of the Sanitary Commission, upon the special and various matters committed to their charge by the Council. The delay in presenting it, is ascribable almost entirely to the comprehensiveness and thoroughness aimed at, in gathering from all sources of sanitary intelligence, here and elsewhere, the facts and phenomena deemed useful in tracing and attesting the origin and causes—the atmospheric and terrene conditions—the transmission—duration and expulsion of that formidable disease—the yellow fever. No opportunity has been slighted—no toils have been spared to push our explorings and researches throughout the vast realms of the yellow fever zone, in both South and North America, and the West Indies, and the voluminous sanitary data prefixed to our Report, are our vouchers for the magnitude and extent of our labors. Even since our Report has gone to press—most valuable accessions, in response to our circulars, have been received from abroad; and we are still farther assured of valuable testimony on the way to us from distant fever regions worthy of all consideration and respect.

Out of these data, together with the experience of many years, have grown the materials which form the opinions and principles put forth in the Report, as to the origin and causes of yellow fever, of which no more may be said at present, than that two of these principles will be found of inestimable value after experiment and experience shall have fully tested their soundness and infallibility.

The one is that yellow fever is and always has been, here and elsewhere a *preventable disease*, and

The other is, that the presence of two general hygienic conditions are absolutely indispensible to the origination and transmission of the disease —the one of them, atmospheric—the other terrene. These must meet *in combination*, or there will be no result. The absence of *one*, as to *this* disease, is as the absence of *both*, and as one of these conditions is almost wholly within the control of man and the other partially so, it must follow that his power extends to its prevention and expulsion.

These two principles constitute the bases of all the preventive and remedial measures with which the Report closes, and which were specially devised for practical execution through the minstrations of the city authorities.

Throughout the several Reports we have constantly endeavored to avoid speculative opinions—to adapt all our principles and suggestions to practical ends, having the great object of our appointment—utility to our stricken city—ever before our eyes—as a polar star for our guidance.

With the presentation of this Report, the authority of the commission ceases. Its labors and its functions end together, yet its members cannot part with the voluminous record of their toils, without an expression of their entire and unwavering confidence, that, if the preventive and remedial measures they have recommended, shall be fully carried out, rigidly enforced and perseveringly maintained by the city authorities—it would be altogether impossible, for the yellow fever to originate here, or to be disseminated as an epidemic, if brought from abroad.

THE

JOINT AND SEVERAL FUNCTIONS

OF THE

SANITARY COMMISSION

During our late great epidemic, the subject of the sanitary condition of our city became a theme of deep concern and anxious scrutiny. The great malignity of the fever—its unparalleled spread, visiting places heretofore exempt from its ravages, all tended to arouse public attention, and the conclusion was at an early period arrived at, that the subject merited the most thorough and careful investigation.. Prior to this period the sanitary condition of the city had not received the attention its great importance required. We have had occasional Boards of Health, whose existence continued two or three years, with large intervals intervening, and being mere boards of record with little authority or means, but partial benefits resulted from them. Divers opinions had been expressed in the city journals with regard to the salubrity of the city. The public had been pretty steadily assured, by the authorities and others, that "the city was one of the healthiest in the Union, although subject to occasional epidemics." Confiding in these assurances, the great mass of the citizens took little part in the subject, being quieted and lulled into security by these representations. Our reputation abroad, however, from occasional exposures by Boards of Health and other sources, and above all, the great calamity of 1853, fully aroused the public, and induced the determination to look thoroughly into the subject, and through the urgent promptings of public sentiment, the Board of Health, (the only body then acting that had the power —the City Council having adjourned for the summer,) appointed the Hon. A. D. Crossman, Mayor of the city; Drs. E. H. Barton, A. F. Axson,

S. D. McNeil, J. C. Simonds, J. L. Riddell, to constitute a Sanitary Commission.

To this Commission were deputed special instructions for inquiry and investigation, viz:

1st.—To inquire into the origin and mode of transmission or propagation of the late epidemic yellow fever.

2d.—To inquire into the subject of sewerage and common drains, their adaptability to the situation of our city, and their influence on health.

3d.—To inquire into the subject of quarantine, its uses and applicability here, and its influence in protecting the city from epidemic and contagious maladies, and

4th.—To make a thorough examination into the sanitary condition of the city, into all causes influencing it, in present and previous years and to suggest the requisite sanitary measures to remove or prevent them and into the causes of yellow fever in ports and other localities having intercourse with New Orleans.

The Commission immediately organized and proceeded with due diligence to the fulfillment of the important task confided to it. It issued circulars embracing all the points suggested for examination, and distributed them among the medical faculty and citizens here and the adjoining States, and to every quarter of the yellow fever region, whence information could be expected to enlighten its judgment on the subjects to be considered. It sat as a Court of Inquiry in this city daily for about three months, eliciting and inviting information from every accessible source.

When this field had been sufficiently explored, it deputed its various members to visit different parts of this and the adjoining States where the epidemic had existed, to institute inquiries upon like matters and report upon them. One member was sent to visit the various Eastern cities, to obtain information of their sanitary condition, ordinances and usages. He was likewise instructed to visit Washington, to apply to the Government of the United States for aid in obtaining through our Diplomatic and Consular agencies throughout the yellow fever zone, whatever information our circulars called for, or that would advance the cause we were engaged in.

The readiness and courtesy shown by the Government of the United

States, the efficient aid and co-operation of the medical profession, and others here and elsewhere, the intelligence and readiness manifested by those gentlemen to whom our circulars were addressed, are sources of gratification to the members of the Commission, and it is our desire to state emphatically, that although much diversity of opinion existed, not only in the profession, but among others, whose evidence we have procured, from nearly every part of the yellow fever zone, as at present existing—we have conceived it our duty to receive and promulge them, and let the public judge of the propriety of the deductions drawn from them. The ample success which has followed our efforts to procure information is attested in the evidence and documents accompanying this. The reports on the subjects presented to our consideration, must speak for themselves, they are all herewith presented to the Mayor, City Council and the public, and we tender our kindest acknowledgments to the Secretary of State, (Mr. Marcy,) for the facilities he has furnished us in acquiring most valuable information from abroad from the highest and most valuable sources; and

To Mr. R. G. Scott, U. S. Consul, and Drs. Pennell, Lallement and Candido, at Rio Janeiro; Mr. W. Lilley, U. S. Consul, at Pernambuco; Mr. J. Graham, U. S. Consul, and Dr. H. W. Kennedy, at Buenos Ayres; Dr. W. Jamieson, at Guayaquil; Mr. S. Grinalds and Dr. Lacomb, at Puerto Cabello; Mr. N. Towner, U. S. Consul, and Dr. J. W. Sinckler, at Barbadoes; Drs. Amic and Chapuis, at Martinique; Mr. J. Helm, U. S. Consul, and Dr. Pretto, at St. Thomas; Dr. W. Humboldt, at Mexico; Mr. J. W. Dirgan, U. S. Consul, and Dr. Lafon, at Matamoras; and Mr. Pickett, U. S. Consul at Vera Cruz; and J. W. Dana, U. S. Consul at Lucre, Bolivia.

The duty of investigating the various subjects referred to this commission under the instructions has been duly distributed among the different members—to Drs. Axson and McNeil, the first; to Dr. Riddell, the second; to Dr. Simonds, the third; and to Dr. Barton, the fourth.

INTRODUCTION.

The Sanitary Commission, in fulfillment of the important trust confided to it, has deemed it one of its most urgent duties thoroughly to examine into the past state of the health of the city, so far as records could be procured to attest it. These have extended beyond half a century—although the records of many of the years have been sparse and imperfect. With occasional exceptions the results have proved very unfavorable to its health in the past; yet, as sanitary guides and beacons, they are regarded as full of promise for the future.

There must exist some cause for the great insalubrity shown in the mortuary returns. It certainly does not arise from its *cleanliness* and the absence of those sources productive of disease in every country. Then it must derive its origin from those conditions in which it differs from other places that are healthy. It must proceed from those circumstances which the uniform experience of mankind has found to be the cause of insalubrity elsewhere. Or shall we abandon as useless, all the dear bought experience of our race, and remain as we are despite our recent severe and bitter afflictions? Are we forever to turn our face upon the past, and to be made no wiser by its valuable teachings? The problem thus presented to us to solve is not a new one; it has been solved a thousand times before; we give it again, with the special experience derived from our locality and circumstances, and with the same uniform results.

The value of general hygienic regulations has been extensively commented upon in a subsequent report; that of personal hygiene is hardly less important; upon this depends mainly not only our personal comfort, but health; and it is in many cases the only substiute for sanitary regulations of a more general nature, affecting the entire community; and is of special value to us here where the latter have been so much neglected. That they are more appreciated than formerly, is shown by the remarkable fact that about half a century

ago leprosy existed to such an extent in New Orleans, that it was deemed necessary to erect a hospital for its special treatment, (a quantity of land in the rear of the city having been appropriated for the purpose,) and there are still surviving among us those who have a lively recollection of that loathsome malady. It too, has yielded to the ameliorating hand of civilization and modern comfort, or climatic changes, and is now confined to the inferior grades of society in Cuba and Mexico. When the general principles of hygiene shall have been as widely extended over the city, our epidemic and endemic fevers will in like manner disappear, and we may again enjoy that salubrity which was once our wont.

The *causes* of this insalubrity have been most carefully scrutinized, and it is our deliberate conviction that they are fairly ascribable to local conditions which are mainly removable. A reference to some of them here, the principles applicable to them, and the recommendation for their removal or abatement, will not be inapplicable in anticipation of the Reports themselves.

Throughout the vast period to which this investigation has extended, commencing when the population did not exceed 8,756, (in 1796,) *no epidemic* has occurred that has not been preceded and accompanied by a great disturbance of the original soil of the country, (in digging and clearing out canals, basins, &c.,) although other local causes doubtless had their influence. This has been so unequivocal and so constant, and *without exception*, that it seems to the Commission to bear the relation of cause and effect. The proofs of it are furnished in the following pages, and might have been greatly extended in its more local influences. This disturbance seems to have generally taken place with great recklessness, manifestly preferring for the purpose the warm season, during which it is most dangerous.

We have to make the same remark in relation to the clearing and draining the neighboring swamps, both of vast public utility, and when done in a suitable season and proper manner, under enlightened advisement, not injurious to the public health; but most disastrous, when these are not faithfully observed, as medical annals for hundreds of years past fully attest.

The numerous undrained, unfilled lots and squares dotting the

surface of the city, becoming muddy pools in the rainy, which is always the sickly season, and common receptacles for filth and garbage of all kinds, are exhibited in our *sanitary map*, and should be early abated.

The numerous low, crowded and filthy tenements, many of which are also indicated on the map, are probably as disastrous in the production of yellow fever as any other; they are common "fever nests," and are denominated "nuisances" of the deepest dye. They constitute the ordinary hotbeds of disease and death at every *epidemic period*, (yellow fever, cholera or what-not.) They have been signalized by a most fearful mortality. They conduce much to impair the reputation of the city for salubrity and they demand therefore the firm cauterizing appliances of the city government.

The extensive livery stables in the heart of the city, and vacheries near the thickly populated districts, and the vicinage of slaughter houses should be abated, as they strongly tend to impair the purity of the city atmosphere.

The present cemeteries within the city limits should by all means be closed against future use.

The kitchen offal and back yard filth, including the bad system and neglect of the privies, constitute some of the greatest sources of vitiated air, and require the most active agency and timely surveillance of the Health Department.

The system of sewerage set forth in the second report is confidently recommended as well for its economy as its promised efficacy.

The present mode of cleansing the streets is most defective; the time is inappropriate. It should be done, at least during hot weather, when the sun is no longer present to distil the poison into the atmosphere. The carts should in all cases *immediately* follow the scraper and remove the gathered garbage, in covered carts, and that taken from under the bridges should never be spread upon the streets. It had better be left where it is, protected from the sun.

None but the most superficial disturbance of the soil, or cleaning out of canals and basins, should be permitted during the hot season.

The bank of the river, the levee, wharves, and filth from the shipping, require a special police; they constitue some of the most pregnant sources of disease.

The effect of these various nuisances and others on the disastrous fever of last year, is fully set forth on the sanitary map with its accompanying exposition.

After the ample detail of local causes for our summer and fall fevers under a high temperature and the great humidity incidental to our position, it is scarcely necessary to say that we have a sufficiency of them, without looking abroad for the sources of our insalubrity. Nevertheless, in relation to the subject of QUARANTINE, although the Commission is unanimous in the belief that no system, however rigid or successfully carried out, can ever be a substitute for the sanitary or preventive measures we have recommended, and which if properly enforced, would be at once a protection against both the origination and spread of yellow fever and cholera among us, yet in the imperfection that must attach to all such measures, we unite in recommending the establishment of a quarantine station below the city, under the surveillance and control of the "Health Department," thereby preventing *all foul vessels* from entering the port with *diseased passengers or crew, placing the restriction only where it is a measure of safety*, and furnishing character and security abroad to our intercourse with other nations.

We are sensible there is great difference of opinion among the members of the profession and in the community in relation to the communicability of yellow fever, and have investigated the subject with great care in the following pages; and the conclusion we have come to, is that yellow fever is not a disease personally contagious, that its infectious properties are only communicable in a foul or infectious atmosphere; that is, that a foul vessel or individual with the disease, will only propagate it, under atmospherical and local conditions similar to that which furnished its nativity. That although vitiated or infectious air may be conveyed in goods and in various ways to distant places, ventilation speedily dissipates it, and that if disease results, when it is much concentrated, or with very susceptible individuals, it extends no farther, except under the conditions above specified. The occurrences of the last season, and we believe, all antecedent years, supply us with innumerable illustrations in the establishment and corroboration of these important principles.

But farther than this, the Commission has not remained satisfied with theoretical presumptive evidences. Most careful scrutiny into the

actual occurrences of the first eruption of the fever, its spread, the character of its localizations, the persons most liable and suffering from whatever class and country, have converted presumptive proof* into positive certainty, that the fever originated with us, that its fatal malignity and spread was justly attributable to a very remarkable concurrence and combination of atmospheric and terrene causes, always peculiarly fatal to human health and life. These have been most amply examined and fully pointed out, and the gratifying fact is shown, that at least one of these causes is entirely under our control, and that it is in our power greatly to diminish the other, and hence by *disseverance*, the fatal union is prevented.

The Commission has taken great pains to investigate the climatic condition, to which our latitude and position peculiarly expose us, so far back as meteorological records would permit. It is impossible to overlook the fact that the meteorology of a place, is, in other words, its *climate*, and upon this mainly depends the character of its diseases, for these special liabilities are dependant upon conditions which constitute the difference between one climate and another. Were it otherwise all climates would have similar diseases, nor would varieties of season alter them. We have become impressed with the conviction, that much error has existed on the subject, and that the evils incident to our location can be greatly ameliorated. It may be probably premature at this early day of the practical application of meteorology to etiology, to venture into much very precise detail, with regard to the elements essential to the existence of the two great scourges of our city, (yellow fever and cholera.) But in the infancy of meteorological inquiry, as at all beginnings, there must be a starting point. The testimony we offer to the scientific public, is submitted with great diffidence, but as pioneers, we make our humble offering at the shrine of science, to be corroborated or refuted by subsequent observations. If true, we cannot over value their importance, if not, the experiments to disprove them will lead to valuable results.

We have essayed to show what are the precise meteorological or climatic elements, necessary for the existence not only of epidemic yellow fever, but of cholera; that is, to show what are the meteoro-

* The undersigned members of the Sanitary Commission, dissent from this assertion, denying the positive certainty alledged.

J. L. RIDDELL,
J. C. SIMONDS.

logical conditions under which they prevail, at each stage of their commencement, progress, maximum intensity and declination. The difference in the combination productive of yellow fever and cholera may be comparatively small, although the effects are so different, nor is this very uncommon or wanting in illustration in various departments of science or medicine. A change of wind, with a difference of five or ten degrees of temperature may produce the most fatal pleurisy, pneumonia or laryngitis. So, the same apparent condition produces a great diversity of effects on individuals of different physical susceptibilities, and a difference of one or two grains of moisture in a cubic foot of the air we breathe may, and often does result in the occurrence ot the most fatal maladies.

The results we have come to, after a careful analysis of the records in this climate, at least, during the several years through which these are reliable, (and they have been made with great minuteness during the last twenty-one years, and corroborated as far as they go by those of every epidemic yellow fever and cholera that has existed in this country, of which there are any records; the more special details embracing nine epidemics of yellow fever and six of cholera,) are embraced in the following table.

CLIMATIC OR METEOROLOGICAL ELEMENTS OF EPIDEMIC CHOLERA AND YELLOW FEVER AT NEW ORLEANS,

AND COMPARISON OF THE METEOROLOGICAL CONDITIONS WHICH HAVE PREVAILED, DURING THE THREE EPOCHS OF COMMENCEMENT, ACME OR MAXIMUM, AND DECLINATION, OF THE EPIDEMICS OF CHOLERA AND YELLOW FEVER, ON AN AVERAGE OF SIX OF THE FIRST, AND FIFTEEN OF THE SECOND.*

	No. of epid's examined	Average duration of epidemic influence, in days.	Average Ratio of mortality for each epidemic, to the population, per 1000.	TEMPERATURES IN THE SHADE. GENERAL AVER. AT			TEMPERATURES IN THE SUN. GENERAL AVER. AT			TEMPERATURES of the Dew Point. GENERAL AVER. AT			BAROMETER; GENERAL AVER. AT			WINDS. Predom nt at			HUMIDITY. General avr. at			DRYING POWER. General avr. at		
				Commencement.	Maximum.	Declination.	Commencement.	Maximum.	Declination.	Commencement.	Maximum.	Declination.	Commencement.	Maximum.	Declination.	Com'nc'ment	Maximum.	Declination.	Commencement.	Maximum.	Declination.	Commencement.	Maximum.	Declination.
From Cholera,	6	37. 66/100	21.99	72.84	66.95	69.73	81.36	84.59	80.31	66.71	56.79	61.14	30.109	30.060	30.075	S E & E	N.E & E&c	N & S W	.850	.796	.791	5.06	7.08	7.24
From Yellow Fever,	15	58. 33/100	18.30	80.14	79.60	65.72	106.91	117.07	99.11	75.82	74.34	62.12	30.108	30.024	30.074	N. NE S E	E. & NE.	NE N& E.	.888	.865	.755	3.79	4.53	8.02
Difference	..	.....	-----	7.30 more.	12.65 more.	4.01 less.	25.55 more.	32.48 more.	18.80 more.	9.11 more.	17.55 more.	6.98 more.	.001 less.	.036 less.	.001 less.	m NE	But l'tle dif.	m NE &E	.038 more	.069 more	.036 less	1.27 less	2.55 less	0.78 more

* The investigation to reach the positions in the Table, have extended as far back as records have existed, reaching from 1817 to 1854, inclusive. During the earlier epidemics, the meteorological materials found have been very scanty, but constantly increasing as we approach the present period. During the nine yellow fever epidemics embracing most of the date in each of the columns of the Table, it is remarkable that, although the results stated are but an *average* of the whole, the *extremes*, or variations from it, in any year, are very small. For instance, that most important one, the *Dew Point*, the *minimum* at which the *epidemic* yellow fever passed off, has required, to destroy that character, has been noted at 58° 26; and the *maximum* in any year, under which it ceased its ravages, was 66° 64, being a difference of a fraction over 8° only; of course, the temperatures in each case was much higher, and the remarkable fact is shown that *no epidemic in that long series has required that the temperature during which it has ceased its ravages* should descend to the *limit of frost*, and that actually the minimum at which any *epidemic* ceased was a small fraction over 60°. This corresponds, so far as we know, with what we find of it in more Southern countries. This refers exclusively to its character as an *epidemic*. It has never been known to have ceased entirely at once. But the cases occurring after the disease has lost this character, must be considered as *endemic* or sporadic and to arise from strong local causes and great personal susceptibility. Time has not been allowed us to extend this investigation fully to a comparison with other places and climates, but it is in active progress and we hope to communicate the results hereafter.

This table shows what an examination of the details of which it is but the concentrated result would more than justify; viz:

1.—What are the several meteorological conditions of yellow fever and cholera at the *commencement*, *maximum intensity and declination* of these two diseases when existing in their *epidemic* grades.

2.—In comparison, it shows that cholera exists in a greater range of temperature and humidity than yellow fever.

3.—That these diversities constitute the pabulum for its support, so far as the mere climatic condition is concerned.

4.—That a higher solar radiation and atmospheric pressure exists during yellow fever periods than during cholera. Although the atmospheric pressure under which these two diseases prevail are shown by this average table to be about the same, the barometer continuing at a permanently higher grade, more regularly and constantly in yellow fever than in cholera, yet in this latter the fluctuations are much greater; indeed, it is so under all its climatic relations, as is abundantly shown in the large detailed table too extensive for this summary, of which this is a very condensed abstract.

5.—That for the existence of yellow fever a higher range of temperature and of dew point for its commencement and maximum intensity, and that a declension of the former (temp.) to less than 70°, and the latter (dew point) to near 60° puts a speedy end to its *epidemic* existence.

6.—That a larger quantity of rain usually falls, on an average, during the existence of yellow fever than during cholera.

7.—The "drying power" is more variable during cholera than during yellow fever.

8.—The average duration of *epidemic* yellow fever has been 58.33 days, and the period of its influence decreasing, while the average duration of *cholera* has been 37.66 days, and the period increasing.

These experiments are fully borne out by what we see daily verified of the ravages of these two very different diseases in the various climates that have been subject to them.

If subsequent observations shall prove the correctness of these statements, the future occurrence and continuance of *epidemic* yellow fever will be ascertained with great probability by referring to a well

kept meteorological register; it will show what valuable information is to be derived from connecting accurate and extensive meteorological experiments with the Health Department, recommended in a subsequent report.

There are but two practical remarks which we deem it necessary to draw from this table, and from the reasoning in the reports: the first is, that although it is easier to keep free of yellow fever than of cholera, we can exercise much influence on the causation of both, even in their climatic relations; and secondly, the *combination* of the terrene and meteorological conditions which is *absolutely essential* to the existence of either, we *certainly* have it in our power greatly to control, because, by proper policeing and regard to other hygienic measures, that condition is clearly under our influence.

If then, we have demonstrated, as we trust we have, in the subsequent pages, these important truths, and shown what are the meteorological elements necessary for the existence of EPIDEMIC yellow fever, and even of cholera, and pointed out the conditions in which they decline, its great value will be appreciated, not only by the scientific public, but far beyond this, its importance for the practical purposes of life will be inestimable. The ability to make the announcement that an epidemic exists; and again, that it suspends its ravages, and that all danger is over; in the first case warning the accessible population to speed to a place of safety, and in the second enabling us to invite back the flying citizens to their deserted homes; to open the public thoroughfares to the resumption of business, and the ordinary purposes and pursuits of life, will be of incalculable practical value to the community. This principle is held forth for our guidance throughout our report; nay, it is the basis on which is founded, the object sought—PREVENTION, saving the community from the *infliction of disease.*

We state these as the result of our experience *in this climate*, and let us be understood to mean that by the meteorological elements of these diseases, (consisting of a very high range of temperature and saturation, and great solar radiation,) we intend to express the limits within which they have prevailed here *epidemically*, which are essential to their existence as such, and beyond which they soon cease. Now, whether these views will be borne out elsewhere, we believe there is, as

yet, no recorded (certainly no published) statements to show. We are perfectly sensible that climatic conditions and national susceptibilities differ in different countries, and produce often diversified results, and that cholera has prevailed in great apparent diversity of climates, and that the meteorological elements would seem not to apply to it. Statements are recorded of the prevalence of cholera when the EXPOSED thermometer was near zero—this is not at all incompatible with an *inside* temperature of between 70° and 80°, with filth, the peculiarly noxious effect of crowding and most defective ventilation, (and of course, a high dew point,) all of which, we know, exists in Russian dwellings, where this disease prevailed. The incongruity then no longer exists, for it is *the condition to which the individual is exposed that is to be estimated.* Nevertheless, we acknowledge that it will take time, observation and experiment in different climates to show where and what may be the variations, if any, from the views laid down. There is little doubt, however, that if they are not precisely the same elementary or atomic (if we can use the expression) combination, yet the *principle* is the same; to-wit:—a union of meteorological and terrene conditions for the production of either of these epidemics.

The principles set forth in the reports, the facts commented on, the important and necessary combination of meteorological and terrene conditions, the places and sources of infection pointed out in our map, with their constant consequences, have been most impressively and accurately illustrated and corroborated by what has occurred during the present summer, (1854.) Fever has again been *manufactured in* the depots pointed out, (under the combination alledged) the filthy wharves and river banks have again cast their noisome odor to poison the atmosphere, and the additional aid from corrupted bilge water and filthy vessels from abroad, the dirty back yards and unfilled lots and overflowing privies have added their mite, the cleansing out of canals and the disturbance of the streets for laying down water and gas pipes have continued throughout the season, and although the streets have been better attended to than heretofore, they form a very small portion of the necessary policeing of a great city, and the result has been that yellow fever has again swept off its numerous victims and will ever do so until we become wiser by the lessons that have been so often furnished us.

But again, this position has been farther confirmed by what has occurred in other cities during the present year. In the city of *Savannah*, the epidemic of this year is with great probability attributable to the exhumation of a large number of vessels sunk just below the city during the revolutionary war and that of 1812, to the filthy land and other debris derived from the city and the tide, which was thrown upon the bank near the town and even spread upon the streets, over which the wind constantly blew, and to the excavation of the soil of the streets (at least a mile) for the purpose of laying down water pipes.

The epidemic at *Augusta*, was as fairly owing to the cleaning out of filthy canals in the city, and exposure of the offensive mud to the hot summers sun, to the emptying the city filth on the bank of the river, which was unusually low, and to the disturbance of the soil of the city for the purpose of laying down gas pipes.

Since the special reports were written, and even gone to press, some, indeed most of the foreign reports, highly valuable as they all are, have been received through the State Department at Washington, and it is no slight gratification for the Commission to compare their experience and observations in relation to the etiology and contagiousness of yellow fever with their distinguished confreres in other regions of this zone, and to see the remarkable harmony in our views; it furnishes a strong corroboration of the opinions and principles announced, and presents a new claim on public confidence.

For the purpose of carrying out in a full manner the views herein set forth, we earnestly recommend the project of a Health Department in a subjoined report. Such an organization we deem indispensable to the condition and character of the city; special requisites are demanded, with experience, science and skill. It should be constituted a special Consultative Department, to be advised with in all cases by the city government, affecting the health of the city, and it will be seen, hereafter, they are very numerous. No enlightened large city is without one, and here it is more demanded than in any other.

It is recommended to State, city and corporate authorities, that whenever disease of an *epidemic* character exists to an unusual extent or malignancy, that special commissions be instituted to investigate their ori-

gin and causes. Such action is in consonance with the philosophic spirit of the age, and we are proud that the first Commission for this great philanthropic purpose, should have the honor of having been originated in New Orleans.

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ERRATA.

Page 3, line 2d, for 26th read 27th.
" 3, " 5th, for two days read 28th.
" 4, see Appendix for Dr. M. M. Dowler's evidence.
" 6, see Appendix for Clark's and Pashley's evidence.
" 7, read Rahaze for Rohanson, in Dr. Browning's testimony
" 8, see Appendix for Dr. Shuppert's evidence.
" 8, read in evidence of same, 23d for 28th May.
" 11, read Josephine for St. Josephine.
" 14, read where for were, in line 14th.
" 25, read seven for seventeenth, in line 28th.
" 33, read dammed for damed, in line 10th.
" 88, read around for aroung, in line 10th.
" 104, read nauseated for neuseated, in line 15th.
" 215, read Condition for Commission, in heading
" 215, read precipitation for precepitation, in line 2d.
" 215, read effluvia for affluvia, in line 11th.
" 216, read separability for seperability, in line 30th.
" 216, read separation for seperation, in line 31st.
" 217, read separable for seperable, in line 11th.
" 226, read seeds, line 2d.
" 226, read flourished, in line 8th.
" 237, read hygrometric, in line 21st.
" 216, 14 lines from top for "passee" read *passu.*
" 216, 11 lines from bottom for "condition" read *conditions.*
" 217, 6 lines from top—on margin, for "postulata" read *probata.*
" 217, 13 lines from bottom for "reasonably" read *seasonably.*
" 218, 17 lines from bottom for "members" read *numbers.*
" 224, 6 lines from top—insert *not* between "I" and "think."
" 235, in 4th line from bottom for "thermometer" read *barometer.*
Page 237, 11 lines from top—attach note after 50.3* "on the 23d after epidemic had declined, and at the very period marked for its declination, evidently producing it."
" 303, 5 lines from bottom for "productions" read *production.*
" 318, in note at bottom for "same" read *I am.*
" 319, 18 lines from bottom after "offensive" insert "and the cutting down the bank of the river, and spreading the materials on the streets."
" 321, 9 lines from top for "causing" read *producing.*
" 394, 16 lines from bottom for "lethal" read *lethalè.*
" 412, 19 lines from bottom for "nature" read *influence.*
" 412, 2 lines from bottom for "fellow" read *fever.*
" 419, 15 lines from top for "renewal" read *removal.*
" 423, 12 lines from top after "amount," insert *of moisture.*
" 436, 4 lines from bottom for "secured" read *severed.*
" 440, line at top for "gradual" read *gradually.*
" 451, in 8th line from top for "monaxysinal" read *monoxysmal.*
" 453, in 7th line from top after "fifty" insert of.
" 453, omit two lines beginning at "16th," 13th line from bottom.
" 459, in 2d line from top for "men" read *even*
" 459, 14 lines from bottom for "200,000" read 2,000,000.
" 460, in 11th line from top for "on the" read *as a.*
" 461, in 9th line from top after "burthens" insert *respectively.*
For table "H," read table G.
" 485, read from that of McGuigan's sickening instead of with the death of McGuigan.

REPORT

OF THE

SANITARY COMMISSION,

OF

NEW ORLEANS,

1853.

TESTIMONY

GIVEN BEFORE THE

SANITARY COMMISSION,

OF

NEW ORLEANS.

TESTIMONY OF MR. VANDERLINDEN, CLERK OF THE CHARITY HOSPITAL.

Case 1.—The first case of yellow fever this year in the Charity Hospital was that of a man named James McGuigan, who came in on the 26th of May; had been sick four days; was an Irish emigrant from Liverpool; had been in the city one week previous to being sick; had not been attended by any physician; died in two days after his admission, with black vomit.

This patient came from Orange street, First District, and had been employed on the ship Northampton in discharging said vessel.

Case 2.—Gerhardt H. Woette, a sailor, born in the Grand Duchy of Oldenburg, twenty-five years of age, in New Orleans fifteen days, came from Bremerhaven; was employed on board ship Augusta, from the said port of Bremerhaven; came to the Hospital on the 30th of May, 1853, being then sick five days; died on the 30th of May, 1853; yellow fever with black vomit.

Case 3.—John Allen, a seaman, born in Scotland, aged twenty-four, in New Orleans seven months; came from Boston; admitted June 4th; sick since seven days; discharged June 12th.

Case 4.—Thomas Hart, laborer; born in England; aged twenty-five; in New Orleans four months; came from New York; admitted June 5th; sick three days; died June 10th, of yellow fever.

Case 5.—Michael Mahoney, laborer; born in Ireland; aged sixteen; in New Orleans four weeks; came from Liverpool; admitted June 6th; sick three days; came from ship Saxon; died June 7th, of yellow fever.

Case 6.—Barbara Berg; born in Germany; twenty-three years of age; in New Orleans five months; came from Havre; admitted June 6th for intermittent fever; died of yellow fever, June 19th.

TESTIMONY OF DR. M. M. DOWLER.

Case 1.—The Dr. stated that a man named Kein, living on Gormley's Canal, was taken sick on the 6th of May, and died on the 10th.

The woman, his wife, was taken sick on the 11th, and died on the 15th.

The Dr. derives this information as to dates from Mr. Ebbinger, who was Kein's landlord, and Dan. Hubert, having lost his memorandum book about the 15th of August, in which it was noted. The man died with black vomit, and his case was clearly and unequivocally one of yellow fever. The woman did not throw up black vomit, and the Dr. gave a certificate, in both cases, of bilious malignant fever, not wishing to create alarm. The Dr. subsequently attended cases in the same square; he saw many cases afterwards, as late as the 3d of August, in the same neighborhood. Has never seen the same individual have yellow fever a second time. Knows many instances where unacclimated persons were exposed who did not contract it: infers from this that the fever did not subside for want of subjects, but thinks it ran its course. Has seen three cases this year of recovery from black vomit, out of perhaps fifty. Has noticed that in cases other than yellow fever a similarity of symptoms presented themselves in acclimated subjects. There are several soap factories in that part of the town. Has not observed that occupations, except where there is exposure to the sun, influence the disease. Had four cases of black vomit: one boy of four, one girl of eight, one of eighteen, and one married woman of twenty-five years.

TESTIMONY OF MR. EBBINGER, GORMLEY'S BASIN.

Mr. Ebbinger states that the man named Kein, mentioned by Dr. M. M. Dowler, was buried in the Washington Cemetery. Daniel Hubert was with Kein when he died. Kein was sick four or five days; died with black vomit. Kein's wife was taken sick one week after his death. Mr. Ebbinger thinks Kein's sickness occurred early in May. He lived on Gormley's Basin, in Mr. Ebbinger's house. Dr. Dowler saw him two days previous to his death. This was the first case of fever in the neighborhood. Kein worked in the swamp at shingle making. Went out at four o'clock in the morning and returned in the evening. Not likely to have any communication with the levee or shipping. Other persons worked in the swamp who remained healthy. Gormley's Canal ordinarily four feet in depth. The drains from certain streets empty into it. Kein was a temperate man.

At a meeting of the Sanitary Commission, held October 24th, Dr. Axson made a statement concerning the period of Kein's death: he called upon Kein's brother, who stated that Kein died on the 2d of June, and was buried on Saturday, the 4th of June, in the Lafayette Cemetery. Kein's brother lives with Christian Wiltz, who corroborates Kein's statement as to the actual date of Kein's death, (June 2.) Says he is certain of this date

because Kein's brother and children left the house in which these persons died immediately after. Kein's brother referred to an almanac and showed the date of his brother's death, the 2d of June.

There is no record of this man's burial or that of his wife on the book of interments for the Lafayette Cemetery. The certificate was lost, and consequently no entry was made, although it is morally certain that both man and wife were buried there.

TESTIMONY OF DR. MEIGHANS.

Case 1.—Dr. M.'s first case of yellow fever occurred on the 27th or 28th of May, in Tchoupitoulas street, in a boarding-house kept by Mrs. Edwards; sent the man, who had been in the city ten months, and who had black vomit at the time, to the Charity Hospital.

The second case seen by Dr. M. occurred on the 28th of May, in Race street, one door from Tchoupitoulas street, immediately adjoining the house of Mrs. Edwards, mentioned above. The locality is filthy and the buildings crowded with occupants.

The third case was on board the ship Evangeline, lying at post 14, First District, a laborer who worked on vessels; he had recently arrived here. Drs. Davidson and Rhodes had case on board the Evangeline.

The Dr. thinks the disease transmissible. The Dr.'s wife had fever this year; she is a creole and has always resided in the city.

Has seen three or four cases of recovery from black vomit. Has noticed that in crowded localities the fever is most malignant.

The Dr. had cases in his own house. The first, a man named Henry Grattan, five days after, his brother John, who was sent to the Hosptial. Then a lad, named Albert Smith, then the Doctor's driver, named Patrick, then Mrs. Meighan. Only one person in the Dr.'s family escaped; this person was susceptible.

TESTIMONY OF MR. FARLEY.

Bark Siri.—Mr. Farley states that the bark Siri arrived here on the 10th of May, from Rio. The captain informed him that he had lost his wife and two sons in Rio, from yellow fever.

Ship Home.—The ship Home, from Rio, arrived here on the 3d of May. No vessel from Rio except the Mary Kendall, which arrived on the 25th June, had fever on their voyages. She lost many of her crew. The captain's wife died with the disease. She put into Kingston, Ja., where she recruited her crew; there was no sickness afterwards. The Kendall lay above the Triangular Buildings.

DATE.	NAME OF VESSEL.	MASTER.	DATE.	NAME OF VESSEL.	MASTER.
April 1st	Bark Prescott	Spear.	May 21st	Schr. Clara Burgess	Jefferson.
" 3d	Brig Bernhardine	Hanson.	June 1st	Brig Hringhorn	Kremer.
" 4th	Bark Escoriaza	Pope.	" 5th	Bark Plymouth	Cohen.
" 16th	Brig B. T. Martin	Ford.	" 5th	Bark Linda Stewart	Slimmer.
" 18th	Bark Martha Allen	Burdett.	" 7th	Bark Hollander	Broome.
" 23d	Bark Jno. Murray	Clapp.	" 16th	Ship Sophia Walker	Weston.
" 24th	Brig Atalaya	Nash.	" 17th	Bark Utah	Stetson.
May 2d	Bark Home	Hoffman.	" 22d	Brig Bernhardine	Outhouse
" 10th	Bark Siri	Higgins.	" 25th	Bark Mary H. Kendall	Tolman.
" 12th	Bark Rhone	Carlisle.	" 28th	Brig Uranus	Church.
" 17th	Bark Wm. V. Bowen	Dyer.			

The above vessels arrived in this port from Rio de Janeiro, from the 1st of April to the 28th of June, 1853.

TESTIMONY OF MR. CLARK.

Ship Northampton.—This vessel was loaded by my gang of hands. One of the men, named Thomas Hart, was taken sick two days after we commenced loading. He lived in the Third District; was sent to the Charity Hospital; must have been sick about the 1st of June, and died on the 8th of June, with black vomit. He doubts if Hart ever passed a summer in the city. He was temperate in his habits.

He did not observe any offensive smell on board; she had been discharged and cleansed previous to commencing to load. He resides in the Third District. Some of his men were in the habit of riding up in the morning, and returning in the evening by the omnibus.

TESTIMONY OF MR. PASHLEY.

Ship Northampton.—Mr. Pashley states that the first cases of yellow fever seen by him, occurred on board the ship Northampton, direct from Liverpool, with between three and four hundred passengers. This vessel arrived here on the 9th of May. On the 10th, hands were sent on board to cleanse her; this work was arrested by discovering what they supposed to be black vomit in the hospital of the ship. It was understood that several persons died on the voyage, and one man, a steerage passenger, whilst coming up the river. The ship lay at the first wharf above the steamboat landing, in the Fourth District. Charles Lanness, one of the men sent on board to cleanse, was taken sick with yellow fever two or three days afterwards. *James McGuigan, one of the steerage passengers, also took the fever, was sent to the Charity Hospital, and died there. The boy of the ship was taken sick. The remark of Dr. Thrope was, that the case, had it occurred later in the season, would be considered undoubted yellow fever.

Of the second gang, employed five days afterwards in discharging the

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* See first cases in Hospital.

vessel, several were taken sick; among them Mr. Pashley's confidential man, although he was acclimated. Mr. Clark, foreman of the gang employed in loading the ship. A man under his charge, living in the Third District, sickened and died with black vomit. Mr. P. describes the water used on board as smelling badly, and when emptied from the casks, and containing a black ropy sediment. Mr. P.'s wife and child were taken sick a few days after this with yellow fever; the child, nine months old, had black vomit, and recovered.

Can remember six of the hands employed in discharging this vessel, who afterwards had the fever. Coleman, one of these laborers, boarded subsequently at Conrey's.

The ship National Eagle lay in the neighborhood of the Northampton; this vessel was bound to New York. She lost, after her departure, so many hands from fever, that she was compelled to put into the Capes of the Delaware in distress. Many of the passengers were reported sick with fever. No other vessel came up in tow with the Northampton, neither was she in company with any other at the Pass. The Siri, from Rio, lay one-fourth of a mile distant from the Northampton.

Statement of the Captain of the ship Northampton concerning the previous voyage of his vessel.

The ship left Liverpool on the 24th March for New Orleans, with between three and four hundred emigrants; six or seven deaths occurred among the children during the voyage, from bowel complaint. The first death was two weeks out from Liverpool. Has carried emigrants for seven years, and considers he had less sickness on that voyage than usual. He is well acquainted with yellow fever, having seen much of it in Havana and various other parts of the world; had not a single case during the passage.

A German died off Abaco, with some chronic disease; was troubled frequently with bleeding at the nose.

Richardson, a hand on board, was taken sick three weeks after the ship arrived in port.

Water used on the voyage was better than that usually obtained in Liverpool. The ship was kept very clean.

There was nothing like black vomit in any part of the ship on her arrival here.

The mate died on her return trip to Liverpool; sickened after leaving the bar; was sick four days with yellow fever; no other person contracted the disease.

TESTIMONY OF DR. BROWNING.

Case 1.—His first occurred on Old Levee street, near the Mint. The man's name was Rohanson, a native of Germany, had been in the city seven months, first visited him on the 21st June, taken on the 18th June,

died on the fifth day; turned yellow as soon as dead; had no communication with the shipping; was the first case in the vicinity; five or six cases occurred in the same locality shortly afterwards; the neighborhood was densely populated; thinks some of these cases may have visited the upper part of the city; a case occurred in the adjoining house within five days after the first one spoken of, cases followed each other in the same locality until the last of June.

TESTIMONY OF DR. W. B. LINDSAY.

Case 1.—First case occurred on the 13th day of June, in St. John the Baptiste street, near St. James, the patient was Mr. Donnell, who was a stevedore, and discharged the ship Northampton, which arrived from Liverpool on the 9th of May, she came direct and lay near the Waterworks. It was said that nine persons died with black vomit on board of her, when near here, one died after the ship had arrived in the river. Pashley the stevedore who discharged the ship, informed Dr. L., that five of his hands out of twelve became sick with the fever, five others were taken sick in the same house with Donnell a few days afterwards, the first case on the fifth day; these cases were visited by numerous friends. The locality rather a clean one, but crowded; cistern and hydrant water were used.

Case 2.—Second case Henry Grubbel, St. John the Baptiste street, between Orange and Richard streets, sent to the Charity Hospital, 12th June.

Case 3—An ostler, four months in the country, had never been from the stable yard in Orange street, no other case seemed to follow the German ostler.

Dr. Lindsay mentioned the case of Dr. Hughes fifteen miles from Port Gibson, who was taken after a carpenter who came from Port Gibson and sickened, then a young lady, and one other person besides Dr. H.; the carpenter died. There were two weeks interval between the first and second cases. The Dr. thinks the disease milder generally in the country than in town, cannot say if the disease is contagious, thinks the weather has little effect in producing it.

A son of Mr. Deacon, a Creole, aged 17 years, had fever this summer.

TESTIMONY OF DR. SHUPPERT.

Case 1.—Saw a case of yellow fever on the 28th of May, on board of the ship Augusta, from Bremen. The Augusta came up in the same tow with ship Camboden Castle, which ship stopped at Kingston, Ja. The Augusta lay opposite the Bull's Head, in the Fourth District, the case was that of a sailor who recovered after an illness of fifteen days, he remained on board the ship during the time. On the 24th of May, a butcher by the name of Kelterning, who had resided two years in the city, and was

then living on Chippewa, between Seventh and Eighth streets, with a wife and two children, took the disease; neither his wife or children were attacked; this was his second case. The third case was John Haar, the cook on board the ship Augusta, (already mentioned) he died on the third day with black vomit; on the 27th, three more cases occurred on board the same ship, their names were G. Wootte, F. Lowber and Herman Brunt, Wootte and Brunt went to the Hospital and died, Lowber remained on board and recovered. The ship Augusta was very clean, she had no sickness until some days after her arrival, was sixty-six days on the passage. Dr. S. has seen five cases of recovery from black vomit. Has practised in the city two years, Dr. Shuppert thinks his cases were the first in the city. The Dr. heard that much sickness occurred on board the Camboden Castle.

TESTIMONY OF DR. LEMONIER.

Case 1.—The first case seen this year of yellow fever was on the 4th of July, at the Bull's Head, Religious street, near Celeste, in Mr. Ahern's family, saw two cases there, one a boy of thirteen years and subsequently his sister, a girl of fifteen. The Dr. does not think these cases were caused by importation of fever from abroad, but by the locality. The neighborhood being wet, without drainage, containing many small tenements, crowded with destitute emigrants.

Ahern's family arrived on the 25th of Dec., 1852, from Ireland. The Dr. has not come to the conclusion that the disease is communicable, he considers yellow fever rather allied to bilious than to typhoid or typhus.

Near the last of Sept., Dr. L. attended the Nunnery below the city, one of the nuns being sick with yellow fever. This was her second summer here. The Dr. is confident she had not in any way been exposed to personal contagion, although the disease was epidemic in the neighborhood. Thinks quarantine useless with respect to yellow fever. Does not think it would spread here if brought from the West Indies. Has known no instance in his pratice of recovery from genuine black vomit. Knows of no instance where the same person had more than one attack of true yellow fever—never has known Creole children from Creole parents, in this city, to have yellow fever. Never in his whole practice saw a child under ten years of age with genuine yellow fever. Recognizes a peculiar specific odor which emanates from yellow fever patients during the latter stage.

TESTIMONY OF DR. WARREN STONE.

Contagion.—Dr. Stone states his belief to be decidedly against the contagious nature of the disease. Saw his earliest cases this year in the Charity Hospital. Has known instances where cases coming here from the West Indies early in the season, which recovered or died, caused no spread of the disease at the time, although at a subsequent period the dis-

ease prevailed in the city. Dr. Stone thinks that yellow fever does not produce its kind as is the case with small pox, measles, &c. In 1833, the fever prevailed in the Hospital; the nurses generally escaped until late in the season, when its progress was more extensive. The Hospital usually contains cases brought there early in the season, but the neighborhood and vicinity escaped until the disease became epidemic. The epidemic influence, or that condition of the atmosphere favorable to the development of the disease, prevailed to a much greater extent than usual, and in consequence spontaneous cases arose. The majority of cases in the country were spontaneous ones. The Dr. mentioned Mrs. McCausland's case as in point. He took pains to inquire, and learned that this lady had not seen a sick person anterior to her attack. Heard it remarked that in the country animals did not thrive as well as usual this summer. He considers the poison of the disease analogous to that of other years: there was something in the atmosphere which rendered the system more susceptible. Thinks there is nothing in the locality of New Orleans more obnoxious to yellow fever than any other place under the same influences of climate.

The Dr. knew cases which came from Baton Rouge; no fever spread from them. One case at Duplantier's, occurred of this character. Many cases reported as having been caught from others are proved not to be so on inquiry.

Many old creoles in that parish secluded themselves entirely and would not go out at all; they seemed to have the disease as fatally as others. The Dr. mentions the fact, that frequently portions of families equally susceptible, and as much exposed as those who had the disease, escaped. Thinks that quarantine, so far as yellow fever is concerned, would be perfectly useless; it might be serviceable in relation to other diseases. Thinks that fever might be brought here without extending, unless there should be an epidemic influence. Mentions the case of Miss Lumer, five or six squares above Jackson street, in which the patient had not been exposed to any fever: thinks the fever generally originates here.

TESTIMONY OF DR. S. D. CAMPBELL.

Case 1.—Dr. Campbell's first case of yellow fever occurred on the 6th of June, in Jacob street, between Thalia and Erato; the patient died on the 12th; threw up black vomit. The man had been in the country six months; his habits were good; rarely left the house, and had not been exposed to the disease; lived with a tailor named Bent, who was unacclimated. Bent's wife had the disease three weeks after. The Dr. inquired at the time, and satisfied himself that he had had no communication with the shipping.

On the 14th of June, Dr. C. visited a young German woman, in Jacob street, one block nearer the Basin, laboring under fever; from the 14th to the 19th, saw five cases in this house; two of these cases died, the remainder recovered. The men were carpenters. The Dr. ascertained that none of them had been exposed to the disease. The dwellings in Jacob street

are chiefly shanties, built of flatboat materials. Dr. Campbell does not thinks the disease communicable. Has seen no instances of recovery from black vomit; has seen many cases among children; no deaths. The children were mostly natives.

TESTIMONY OF DR. MATHER.

Case 1.—The Dr.'s first case occurred at the corner of Tchoupitoulas and Orange streets, on the 11th day of June. The man was dead when the Dr. arrived; he was an Irishman, who had been in the city six weeks.

About the middle of July, was called to see a case on Nayades street. Dr. Mather observed a peculiar malignancy in the disease near the corner of St. Josephine and Carroll streets, not a single house escaping within two squares of that neighborhood: this was the last of July and beginning of August. The cases terminated generally in from twenty-four to seventy-two hours. The houses are built, as a general rule, directly upon the ground, of flatboat materials, and were much crowded. Laborers generally reside there, those men who work in the swamps, and have no communication with the shipping. Has seen no case which he considers a second attack of yellow fever. Has seen one case of recovery with black vomit, a girl of twelve years of age. Thinks the intemperate more likely to die. Among the unacclimated all fevers have assumed the type of yellow fever. Mentioned a case at the Lake end of the Shell Road, the wife of the light-house keeper, who had not visited the city for eight weeks. Her son died five days previously; does not know if he had been exposed. Has seen many facts this year which would induce him to believe the fever more contagious than formerly.

TESTIMONY OF DR. McGIBBON.

Case 1.—The first cases seen were in the Charity Hospital, (*vide* Vanderlinden's statement.)

The first case in private practice was Thomas Murray, residing at the corner of Bacchus and Fourth streets, on the 24th of June. Six unacclimated persons resided in the same house, who did not take the fever until one month afterwards, say the 23d of July. The fever was very severe in this locality during the latter part of July. Murray worked in a milk stable; does not think he had any communication with the shipping.

On the 15th of July, John Cribben was taken with the fever; his wife, son, and sister-in-law, soon after. His father and brother, although unacclimated, and residing in the same house, did not contract it.

An old man and his wife, residing at the corner of Perdido and Adelaide streets, had the fever, although they had no communication with persons abroad.

He has seen no case of fever occurring twice in the same individual.

Dr. McG. does not think the disease contagious. He mentioned the case of Daniels, who was carried to the Charity Hospital on the 29th of May, 1848, and died without communicating it to others in the same ward.

Has seen no case of fever this year in acclimated persons which assumed a yellow fever type. The disease, when fatal, terminated on the fifth to the eighth day. Thinks the recently arrived emigrant, if robust, has the disease more severely. Has little doubt but that the intemperate fall more readily victims to the disease. Has seen many children have the fever: has not seen any case of black vomit among negroes: has seen two cases of recovery from black vomit.

TESTIMONY OF DR. WOOD.

Case 1.—Dr. Wood stated that his first case of yellow fever occurred on the 9th of June, he saw the man the 12th, and death ensued on the 14th. He was an Irishman and worked on the levee, a week previous to his illness he made a trip on the steamer Dr. Bates as a deck hand. Knows no other cases emanating from this, although his wife and others of his family who were with him, were unacclimated.

Case 2.—Dr. Wood's second case was a clerk in a cotton press, it occurred on the 20th of June.

All Dr. Wood's early cases were between Magazine and the river, and below Felicity Road.

Dr. Wood believes the disease is not contagious, has never seen a second case in the same individual, his cases of remittent and intermittent fevers did not assume the appearance of yellow fever, has seen one recovery from black vomit, a girl of twelve years of age; thinks an intemperate person more susceptible, and the case more apt to terminate fatally.

The majority of fatal cases terminated on the fifth day, has never observed any peculiar odor from yellow fever patients, does not remember any fatal cases among the negro population, has seen cases among *Creoles* generally under seven years of age.

TESTIMONY OF DR. MEUX.

Case 1.—The Dr. saw his first case about the 20th of July, near the waterworks, a child, a native of the city; has seen many cases and one-fourth of those seen by him this summer, were children born here. The children from ten to fifteen months up to as many years; some of them had passed through several epidemics without taking the disease; has treated this year ten or twelve negroes with the fever.

Dr. Meux thinks the disease communicable, especially in an epidemic condition of the atmosphere; thinks irregularities of living and dissipation, causes creating susceptibility to the disease; he has seen cases of yellow fever here every year nearly. The Dr. does not consider the disease

as necessarily a contagious disease under all circumstances; he thinks the poison æreal not personal; thinks fear a powerful agent in promoting susceptibility; saw one case of recovery from black vomit; thinks the disease worse in crowded localities.

In Attakapas, a certain family had the disease, with the exception of a lady, who had had it in the city, in 1847. The son came from Last Island (on the gulf shore) to visit his father, and died in four days, this occurred about the 24th of September. This family had attended the funeral of a lady, who died after nursing a man who came from New Orleans; has heard in former years of similar instances, where the disease has spread from a *focus;* thinks that a quarantine would be effectual in excluding the disease, except in an epidemic condition of the atmosphere.

TESTIMONY OF DR. WHITE.

Case 1.—Has resided in the city two years. His first cases occurred on the 1st July, near Felicity Road, in St. John Baptiste, Pacanier, Religious and Second streets. Draymen and stevedores were his principle patients. His wife, and self, had the fever this summer.

Has not seen any cases this year which would induce him to believe that yellow fever was contagious. He has observed a peculiar smell in yellow fever patients.

Madisonville.—Went to Madisonville early in September. The first case heard of there was Dr. Jones' child. Mr. Love, of Covington, attended the funeral of Captain Smith, in Madisonville; returned to Covington, was taken with fever, and died in four days. Fever prevailed in Covington previous to this case.

There is a large swamp near Madisonville; one-quarter of a mile from Captain Smith's was a stagnant pool, which was very offensive.

In the month of September, the days were warm and the nights cool, so much so that fires were comfortable.

Noticed much electricity; this appeared to have no influence in promoting the disease.

Has seen two cases of recovery from black vomit in private practice; both boys, about 6 and 8 years of age. Knew of six cases of recovery in the Charity Hospital; they were generally middle aged men. Thinks the intemperate have less chance of recovery than the temperate.

In one case of an acclimated subject, suffering with fever, saw no symptoms of the disease. Has seen cases of yellow fever in creole children. Observed the peculiar odor spoken of above, in his own person, previous to his attack.

TESTIMONY OF DR. J. B. HENDERSON.

Case 1.—Dr. Henderson states that his earliest case was Margaret Russel, residing in Tchoupitoulas street. She was taken sick on the 5th

of June; was sent to the Charity Hospital on the 10th, and died on the 11th with black vomit. Had seen earlier cases in the hospital, which were considered yellow fever cases by some. Dr. H. does not consider they were such; certain symptoms were wanting, such as yellowness of the skin; considered them as cases of gastritis.

Case 2.—The first case the Dr. saw in private practice, was an Irishman, living on St. John Baptiste street. He was a steamboat hand on a Coast packet; had black vomit on the 15th of June. No other persons were taken sick in the house until eight or ten days after. The location was filthy and crowded with emigrants.

Case 3.—The third case seen was Miss Baker, who resided on Religious street near Race street. She was taken on the 22d of June, and recovered. Her family were in good circumstances, but their residence was surrounded by filthy tenements. Saw but one instance of escape in a family were all were susceptible. Knew three cases of recovery from black vomit; all males. Never saw a second case of fever in the same individual. Miss Pearsall slept in the same house with Miss Baker; returned to Terpsichore street, and, ten days afterwards, sickened and died. None of the family, or those who nursed Miss Baker, took the disease until several weeks after, although they were unacclimated.

Yazoo.—The first case in Yazoo was a Mr. Humphries, who died after a week's illness, on the 1st of September. He was a trader on the river, above Yazoo, and might, possibly, have been in Vicksburg. During the summer he lived on board his flatboat, three or four hundred yards above the Steamboat Landing.

Case 2.—An old resident, who lived in a warehouse at the Steamboat Landing. Goods from New Orleans might have been stored there. The disease did not spread from these cases; but next appeared, simultaneously, in different places, in the town remote from them. J. W. Fetty, an early case, died on the 13th; he was ill one week; had no communication with sick persons. The disease appeared on a plantation on the river; those remote from it escaped; negroes died with black vomit. Dysenteries prevailed in the beginning of the summer.

The summer in Yazoo was very sultry. Mr. Sessions' plantation, four miles below the town escaped the disease; one case was carried there, but it did not spread.

On the opposite side of the river, three miles below Yazoo—on Dr. Mills' plantation—the disease spread, and many cases occurred among the negroes as well as whites; many white persons on the plantation escaped. The Dr. saw many cases a few miles in the country; from which, the disease did not spread.

TESTIMONY OF DR. G. W. CROSS.

Case 1.—Dr. Cross states that his first case occurred near Gormley's Basin, about the 20th July.

The greatest portion of cases treated by the Dr. this year, were in the

vicinity of Dryades, Market, Julia and St. Mary streets; and thence, backwards toward the swamp. The deaths occurred most frequently on the third and fourth days. Has never seen a second case of yellow fever in the same individual.

Did not observe that occupation had any influence in causing the disease; or, that temperance or intemperance influenced its attacks.

When on the coast of the Mississippi, he found that the negroes from Kentucky and Virginia suffered most severely. The Dr. has known cases at the Lake end of the Railroad, which he believes originated there.

Dr. Cross states, that there were no cases of fever in the Penitentiary of Louisiana, up to the 29th of September.

TESTIMONY OF DR. PORTER.

Case 1.—Dr. Porter's first case was on the 28th or 29th of July; it occurred in Robinson street; there were several persons in the house; the rooms were small, (ten feet square) five persons in the room, and three in bed. At that time fever prevailed exclusively in the city. Dr. P. considers the intemperate less likely to recover.

Dr. P. visited Thibodeauxville the latter part of the season. The weather was warm during the day, and cool at night. The fever prevailed through the neighborhood to the distance of fifteen miles from Thibodeaux, without communication with it or with each other.

The first case in the neighborhood of Napoleonville was the servant of Dr. Kitridge, living one and a half miles distant; he had never left the plantation; is positive the negro had yellow fever, although he saw him but once, and then no black vomit had occurred; thinks the negro had been sick four or five days. Dr. Kitridge's child was taken. The next case seen by Dr. P. was a negro man at Mr. Webb's, six miles below Thibodeaux; there was positively no communication between the patient and the sick, except through the medium of physicians. The plantations were guarded with much care and strict non-intercouse established. Steamboats pass Mr. Webb's and discharge freight; wagons are frequently sent to town from the plantations.

Maj. Nelson isolated himself with care, he took the disease notwithstanding.

TESTIMONY OF DR. WM. P. SUNDERLAND.

Case 1.—His first case occurred on the 10th of June, in the person of an Irishman, who had been in the country six months. This man lived in Race street, between Tchoupitoulas and Religious streets; had been sick six days; found the man dead; had the black vomit. The second case was a warehouseman who worked on Tchoupitoulas street; had not been exposed to the sun; inquired and learned that he had not been exposed to the disease, nor had he visited the shipping.

The next case was a woman in a neighboring house, who was sent to the Charity Hospital. (It is believed that this woman was Margaret Russell). The Dr. observed that the disease radiated from the locality above mentioned in every direction. When it reached St. Andrew street, a servant girl, living on that street, was taken with fever, and carried to Chippewa street, above Eighth street, amongst her friends; none took the disease from the girl, nor did they have it until it had reached that locality in its regular progress. Another servant girl, from Chesnut, corner of Seventh, visited her friend in the infected district, returned, and two days after had the fever. It did not spread from her, nor did other cases occur in the neighorhood until two weeks after, when the progress of the disease embraced the locality. Many persons who were buried by the corporation from this infected district, were carried to the Washington Cemetery, the unacclimated persons employed there in burying the dead, did not take the disease until it reached the ground in its progressive march.

Dr. Sunderland saw the first case in Gretna (opposite the upper part of the city). A boy had visited his parents who were sick in New Orleans; he returned to Gretna, was taken sick and died. No other case occurred until four or five days afterwards.

Fort Adams.—When the Dr. arrived, there were eleven cases in Fort Adams, and entirely among those who took most pains to seclude themselves.

Considers fear a predisposing cause; cannot believe the disease to be communicable. With regard to rain, this year was similar to that of 1847. Mr. Bowen stated to the Dr. that an unusual number of cows had died during the summer. The negro race generally had the disease lighter. The Dr. gives three cases of recovery from black vomit out of twelve. Thinks he has seen this disease in New Orleans every year since 1845. Thinks it originates here, and that the only difference between the fever of this, and previous years is in its malignity.

Dr. Sunderland was at Fort Adams on the 16th October; there were then eleven cases of a mild character. The first case in the vicinity occurred one mile from the river, and two miles from Fort Adams. The people had not been in Fort Adams for two months previously; they resided on a hill; were poor, and their diet meagre. Three or four died, one after the other. The fever must have arisen among them spontaneously, as they had no communication with either the steamboats or the town. The next case happened on the Monterico Plantation, six miles from Fort Adams, and three from the river. The first case was the wife of the overseer; was pregnant, and could not well leave the house; she told the Dr. she had not left the house for two months previous to her attack. This, also, was a high elevation; the highest in the country; two children, six and ten years of age, next took sick on the same place. Forty-three (43) negroes sickened after the children, and then the overseer, who died. Dr. Sheppard, who came from Pickneyville, professionally, was the next case. There was no communication between Fort Adams and Monterico, at the time the first cases occurred at the latter place.

The first cases in Fort Adams were in the family of a Dutchman, who never suffered any of his family to approach the Steamboat Landing.

TESTIMONY OF DR. S. W. DALTON.

Case 1.—Dr. Dalton saw his first case on the first of July; thinks the disease of domestic origin. Assisted Dr. Fenner in the examination of the first cases which occurred, and ascertained that they had no connection with importation; heard there were undoubted cases of yellow fever in May; so stated by Drs. Fenner and Choppin. He next heard of it in the neighborhood of St. Mary's Market; early in July, it was at its height in that vicinity. Dr. D. thinks the disease not contagious; thinks it communicable, infectious, but not contagious. It may be transmitted from house to house. In an ordinarily healthy year it would not spread from a sporadic case. A certain meteorological condition of the atmosphere is necessary to cause the disease to spread. The fever of this year differs from former years in an exceeding expansion of caloric upon the capillary system, producing hæmorrhage; did not observe this year any approach to typhoid symptoms; there was more febrile excitement. Thinks a case imported here in ordinary years will not give rise to an epidemic; thinks there is some electrical condition of the atmosphere which gives rise to an epidemic. Has seen two or three cases of recovery from what is called black vomit. The Dr. thinks the matter ejected was blood which had been swallowed. Has seen the disease twice in the same person. Attended a man named Bowman this year for yellow fever whom he had attended in 1847, for the same disease; knows a case of the same nature; a man named Kavanaugh, who was attended by Dr. Stone; knew a case of a mulatto, who had a second attack after an interval of three weeks; has known unacclimated nurses to escape. In a family named Lyons, four were sick; a brother, who nursed them, escaped; he was unacclimated.

The fever this year did not subside for want of subjects, but ran its course, the epidemic condition ceasing to exist. Many creole children, more than usual, were taken generally between six and nine years of age. No children of creole parents were noticed as having the disease; observed a peculiar odor emanating from yellow fever patients; thinks that crowding emigrants into small spaces in this latitude will produce yellow fever. Thinks that quarantine, as far as yellow fever is concerned, would be useless; thinks that emigrant ships should sometimes be quarantined. Every person living in the city should have a room including a space of eight hundred cubic feet. Thinks that crowded lodgings are one of the prolific sources of disease at present existing in the city.

TESTIMONY OF DR. JOHN J. KERR.

Case 1.—Dr. K.'s first case of yellow fever was in Spain street, in the house of a German named Melchert; there were three cases in one family,

father and two sons; the youngest first, the eldest second, the father last, who died. The disease was general in the Third District. The Dr. was unable to trace cases from house to house. Only some members of families where all were susceptible, took the disease. The gutters in the locality were generally filthy. Many persons who said they had had yellow fever had it again this year; were found to have had it in 1848 or 1849, and not in epidemic years. Thinks the fever of this year more malignant, but differing in no other way.

TESTIMONY OF DR. B. H. MOSS.

Case 1.—His first case of yellow fever occurred on the tenth of July, near Gormley's Canal, in the person of Mrs. Holland. The patient was a German, who had been in the city one year; was not much in the habit of going out of the house; thinks she had not been exposed to the disease. On the 17th, the Dr. saw three cases, all Germans, living near Gormley's Basin, one of whom died without black vomit. There was no communication between these and the above-mentioned. He knew of no cases near Gormley's Basin, earlier than the above..

Case 2.—His second case occurred on the twelfth of July, the subject a Mr. Boyd, a book-keeper, employed in Tchoupitoulas street, but who resided on St. John street. On the thirteenth, saw three cases on Tchoupitoulas street; Irish people; two girls and one man. On the fourteenth, a case occurred on Hevia street, in a shoe store; on the same day, a lady on Terpsichore street. There could have been no communication with the shipping in the latter case.

Dr. M. thinks it possible that yellow fever may be transmitted from one person to another, and refers to the case of Mr. H. R. W. Hill as confirming this opinion. Dr. Milano, an Italian, who came from over the Lake, passed through the city and the town of Carrollton, on his way to Hill's plantation. At this time yellow fever was prevailing in both places. Five days after his arrival he was taken sick, and died in five days. Mr. Hill was constantly with Milano during his illness, and was present at his death, and supported him. Mr. Hill was taken the next day, and died the twelfth of his sickness. This was his only exposure, having confined himself to the plantation, nineteen miles above the city, during the summer. Bilious and remittent fevers, and dysenteries during the early part of the season prevailed among the negroes of Hill's plantation, and some cases existed up to the time of his sickness. At this time, Mr. Kenner's son, living on the opposite side of the river, died with black vomit. Mr. Hill's overseer was not much with him during his sickness, but was in the room when he was laid out: up to this time, (October 19,) has not had the fever.

Mississippi City, Miss.—Col. Pleyer, of Mississippi City, was taken sick on the fifth of October; threw up something black two days after, and died with black vomit. Col. P. had had no communication with any

sick persons, but probably went on board the boats from the city, and was frequently with gentlemen who came from town. Mrs. Pleyer has not yet had the fever. A Mr. Martin died in July, with black vomit, in a room below that occupied by Col. Pleyer.

TESTIMONY OF DR. RUSHTON.

Case 1.—My first case was a boy of seventeen years of age, living in Benjamin street, between Constance and Tchoupitoulas streets, on the 23d July. He was carried to Jackson street, between Claiborne and Derbigny, the house of his brother; at this time there were no cases of yellow fever in the locality to which he was carried; five days after, his brother's wife contracted the disease, and two days more, his brother likewise; the former died with black vomit.

Dr. Milano came to Mr. Harry Hill's house, above Carrollton, was taken sick, having passed through that town on his way, and died with black vomit. Within twenty-four hours after his death, Mr. Hill was taken, and died in five days with black vomit. Mr. Hill had not been exposed in any other way to the disease than by contact with Milano.

Mr. Leech, who was the overseer on Waggaman's plantation, visited a house on the opposite side of the river; was exposed in no other way; took the fever and died. His brother, who had never been in the vicinity of the sick, visited him, and took the fever five days after.

Two negroes, who assisted in burying him, died with the fever. The yellow woman who nursed him had the fever also, but recovered. Several negroes died on the same plantation about this period with congestive fever.

Dr. Rushton thinks the disease contagious; thinks so in consequence of Mr. Hill's case; he recollects a case in 1833, which confirms this opinion: Mrs. George came to the city from Plaquemines, spent a few hours here, returned to the country, and died in a few days. The fever prevailed here at the time; several acquaintances, living in the house to which she returned, had the fever. Dr. R. thinks the disease imported this year, and identical with the African fever; thinks it doubtful if it ever originates in this place; thinks an efficient quarantine would be effectual in keeping it out; has known fever to attack those who previously had bilious remittent and intermittent fevers, and has known those diseases to follow; every case of fever the Dr. has seen this year among acclimated persons has assumed the typhoid form. Thinks the intemperate have the fever more severely than the temperate. Black vomit is sometimes thrown up in gastric affections.

TESTIMONY OF DR. RIDGELY.

Case 1.—The captain of the steamship Daniel Webster was the first case seen by the Dr.; it was a slight one; the vessel had been in port

three or four days from Aspinwall or Nicaragua; the Captain was unwell previous to his arrival; did not learn if there was any yellow fever in the port from which they sailed; knows of no other case occurring on board this vessel.

The second case was at Mrs. Filkins' boarding-house in Magazine street; this was also a slight case; he was a steamboat carpenter; does not know if he had been exposed to the disease.

The third case was a barkeeper, boarding in Magazine street, also, a young man who had no intercourse with the shipping.

The next case was the wife of a beer bottler in Religious street; this was ten days subsequently; this case died with black vomit. Saw three cases near Gormley's Basin, from the 20th July to the 20th August; saw, during the season, four or five cases of bilious remittent fever; they did not assume the type of yellow fever. Yellow fever, this year, late in the season, frequently assumed a typhoid character.

Four unacclimated persons in the Doctor's family escaped the fever entirely; does not think the disease contagious. Has practiced here since 1831, and has seen cases of yellow fever every year; thinks it decidedly of domestic origin. Had two servant girls in the family; one had it, the other escaped; his family escaped; his wife was born here. The Dr. had the fever in 1833; had one case of black vomit this year which recovered; saw eight or ten cases during the summer; death ensued generally on the fifth day; convulsions usually terminated the fatal cases among children; saw no cases among children born of creole parents; those of American parentage more susceptible than usual.

Never noticed any peculiar smell in yellow fever patients; thinks he noticed an unpleasant smell in the atmosphere; observed bubbles and much green matter in the gutters and stagnant pools; sees the same thing every year. The Dr.'s daughter, then eight months old, had yellow fever in 1833.

TESTIMONY OF DR. J. R. S. ZEHENDER.

May 22d, 1853.—The first well marked case I saw—Jean Trahen, aged 32 years, married—was on Third street, between Rousseau and Levee streets, Fourth District. The patient had been residing more than one year in the city; of sober habits; worked as a cabinet-maker. He assures me he never went among the newly arrived emigrants, or on board of any ship for months previous. This patient had hæmorrhage from the gums and nose; became yellow; recovered very slowly.

June 3d.—The second case, on Live Oak street, between Josephine and St. Andrew. Patient, three years in the city; had never been ill previously. No hæmorrhage, but became yellow on the fifth day; recovered.

June 22d.—Third case, on Sixth street, between Live Oak and Jersey streets; a female, two years residing in the city. Hæmorrhage from bowels; recovered slowly.

July 12th.—A German girl, aged 16; resided on Pleasant street, between Chippewa and Fulton; seven months in the city. Had not been among newly arrived emigrants, nor among sick persons. On the 13th, hæmorrhage from the bowels; died on the 17th; black vomit. Three members of this family died, all with black vomit.

From this date, the disease spread with fearful rapidity. The most cases which terminated fatally were in the *unpaved and unimproved streets, and, particularly, in the small over crowded rooms occupied by emigrants.*

I attended more than 300 persons during the epidemic; and have practised in the Fourth District during the last twelve years.

TESTIMONY OF DR. FENNER.

The first case of *black vomit* that occurred, happened in one of my wards, at the Charity Hospital, on the 28th of May; and, although so very early in the season, it excited my apprehensions, and caused me to inquire whether anything like yellow fever had been seen by others. On the same day I found another case in my wards that bore a strong resemblance to yellow fever. I then commenced a scrutinizing investigation; being well aware that if the facts and circumstances were not *then* ascertained, it would be vain to search for them after the lapse of even a few months. Wherever *rumor* had pointed to the existence of a case of yellow fever or anything like it, I at once repaired in person to the spot, or sought the attending physician for the purpose of getting the most authentic information. I shall now proceed to give *the first cases*, somewhat in the order of their occurrence *as to date*, and state all the attendant circumstances as far as I could ascertain them.

The disease made its first appearance among the crew of the ship "Augusta," which arrived here *direct from Bremen*, on the 17th day of May, and took position at the foot of Josephine street, in the Fourth District. On inquiry, I learned that this ship brought over 230 European emigrants, who enjoyed good health on the voyage, having only lost two children, which died of diarrhœa. The vessel was out fifty-two days, passed on the south of Cuba, but did not approach more than thirty-five or forty miles of that island. The emigrants arrived here in good health, remained but one day, and then proceeded up to the West. The ship Augusta was brought up from the mouth of the river by the same towboat that brought up the "Camboden Castle," a British ship, direct from Kingston, Jamaica. On the passage up the river there was free communication between the two ships across the towboat.

Having heard there was a great deal of yellow fever at Kingston, and that the "Camboden Castle" had there lost her captain and several of her crew with that disease, I took occasion to call on the consignee, in company with Dr. Dalton. We there had the good fortune to meet with the captain of the vessel, who was just clearing her for departure, and

politely gave us the following information relative to his vessel and yellow fever :

Memorandum of the "Ship Camboden Castle."—Captain Chaplin, of the ship "Camboden Castle," says he entered on duty as captain of this vessel at Kingston, Jamaica, on the 1st of May last, the late Captain McDonald having a short time previously died there of *delirium tremens*, at *private lodgings*—says there was a great deal of yellow fever at that time among the shipping at Kingston, and the Camboden Castle had lost seven of her crew by that disease. This vessel had been in that port six or eight weeks—was last from Newport, Wales. Says he obtained seven new sailors to supply the places of those who had died—they were English and American, and he thinks they were unacclimated, though he cannot assert this positively. He sailed from Kingston, *in ballast*, for New Orleans, on the 2d day of May. Says that before leaving Kingston his vessel was *thoroughly cleansed*, and *well springled with chloride of lime*, to guard against the danger of sickness at sea. Says he arrived at the Balize on the 16th of May, and at New Orleans on the 17th, took position at post 27, (which is in the upper part of the First District, nearly opposite Robin street.) The ship "Augusta" was brought up the river by the same towboat that brought up the "C. Castle," one on each side, and there was free communication between the two ships, across the towboat. Captain Chaplin says *there has been no case of fever on his vessel since he left Kingston, either at sea or since he has been here.*. He is now loaded with cotton and will leave this evening.—*Given June 8th*, 1853.

Case 1.—On the 23d of May, Dr. Schuppert was called on board the ship Augusta, to see G. S——, a sailor, aged 21, whom he found laboring under symptoms which he supposed indicated gastro-duodinitis—skin hot and dry, pulse 100, violent headache, pains in the back and limbs, tongue coated, breath fœtid, nausea and vomiting of bilious matters. On the fifth day his skin and eyes turned quite yellow. He recovered, and was discharged on the fourteenth day.

N. B.—It will be shown presently that the first case that entered the Charity Hospital must have been attacked on the same day of this.

Case 2.—On the 25th of May, another sailor on the same ship was attacked with symptoms similar to the first, though more violent. He died on the 30th, in a state of delirium. Soon after death the body turned yellow, and there were ecchymoses in the dependent parts. No hæmorrhage before death. No *post mortem* examination allowed.

N. B.—It will presently be shown that another case, about half a mile off, and having no connection, was attacked on the same day as this.

Cases 3 *and* 4.—On the 27th of May, two more sailors were attacked on the same ship, and with the same symptoms. One of them recovered; the other, G. Woetle, was sent to the Charity Hospital, and died on the 30th of May. He did not throw up black vomit before death. I witnessed the *post mortem* examination of this case. The body was yellow; lower parts livid. The stomach contained about two ounces of *black vomit.*

Case 5.—H. Bruntz, aged 21, on the same ship, Augusta, was attacked on the 30th of May. Had pains in the head, back, legs and epigastrium, but without nausea or vomiting; pulse full and strong, face and eyes injected, eyes shining and prominent. On the third day, the eyes began to turn yellow. On the fourth day, he was carried to the Charity Hospital, where he died on the evening of the 7th June. *Autopsy* on the morning of the 8th. The body was yellow; stomach contained about two ounces of *black vomit* and a small worm; liver of a bronze color, parts of it yellow.

Case 6.—W. K., a butcher, aged 26, had lived in New Orleans *one year;* resided on Chippewa street, Fourth District, *three squares from the river and eleven squares above the ship Augusta;* had no connection with this ship that could be ascertained; was taken sick on the 25th of May, with high fever, severe pains in the head, back and limbs, great thirst, tongue coated, costiveness, &c., &c., Dr. S. had him copiously bled, and ordered an active cathartic. On the following day, petechiæ appeared over the body, but chiefly on the extremities, hæmorrhage from the nose and gums, bowels torpid, skin and eyes slightly yellowish. Croton oil and strong enemata had to be used before the bowels could be moved. When they were opened, the evacuations were dark and very offensive. At the same time he vomited a large quantity of *black matters.* The bleeding from the gums continued for several days, and the skin became quite yellow. The hæmorrhage and petechiæ gradually disappeared, and he was discharged cured on the 12th day.

Memorandum of the Ship Northampton.—Captain Reed says, that on his voyage from Liverpool to New Orleans, last spring, he brought three hundred and fourteen emigrant passengers, and arrived here on the 10th of May; that he passed to the North of Cuba, not nearer than fifty miles, and having fine winds, he passed along there quite rapidly: that there was not much sickness on board; there were six deaths, four children and two adults; the former died of bowel complaints: one of the adults from hæmorrhage of the nose; says the emigrants all left his ship within three days after arriving here. Captain R. says his ship was in better order, as to cleanliness, when he arrived here than most vessels; that on the voyage she was swept every day, washed three times a week, and fumigated twice a week with burning tar; says there was no occasion to use the two rooms called "*the Hospital,*" as such, and they were filled with square rigging, stores, &c.; says he left here for Liverpool with a load of cotton, on the 14th of June; that during his entire stay here he had but one case of fever on board his ship, and that was a boy, who was attacked on the 10th of June, and was attended by Drs. Austin and Thorp, who pronounced the case *yellow fever.* He recovered. That after leaving here on the 14th of June, his mate was attacked with yellow fever, and died on the 18th. The Captain was attacked on the 20th, but very lightly, and was never confined to bed; says he had had yellow fever before in Havana; says he recollects the man James McGuigan; that he came over with him in May last as passenger, steward or cook, and was

numbered among the crew of the vessel; says he left the ship with the passengers, but thinks he went into the employ of Mr. Parshley, and was engaged in discharging her when he was taken with yellow fever; heard of his death before he left in June.

Yellow Fever on Board Ship Niagara.—I am indebted to Mr. John O. Woodruff, ship agent, on Magazine street, for the following facts, which were furnished by his clerk, Mr. Moulton, on the 7th of July, 1853:

"The American ship Niagara arrived here on the 30th of April, direct from New York; took position first at post No. 3, near the foot of St. Joseph street. Afterwards moved up to post 26, where she was laden with cotton, and left for Liverpool on the 4th of June. *Had no sickness up to this time.* On the morning of the 5th she was at the mouth of the river, where she was detained two days getting over the bar."

"On the morning of the 8th she got outside, and the Captain, Livermore, telegraphed Mr. Woodruff that 'he was quite sick and had a doctor to see him.' In the evening Mr. W. replied by telegraph, that if he was much sick he had better return to the city, and let another master be sent to take charge of the ship. This message was not received, and the ship set sail. The next we hear of this vessel was through one that went into Galveston, the captain of which reported that he had spoken the ship Niagara, and was informed that '*the captain had died of yellow fever on the 10th of June, and two men on the 17th; one more case on board.*' This was about the 30th of June. Heard nothing of her since."

N. B.—It must be remembered that the ship laid in the immediate vicinity of the "Camboden Castle," "Saxon" and "Harvest Queen."

We will now proceed with the cases at the Charity Hospital.

Case 8.—John Allen, a Scotchman, aged 24; had resided in the city two years, with the exception of two months last summer spent on a trip to Boston. Never had yellow fever; was admitted into ward 17 on the 4th of June, then sick seven days, and was discharged cured on the 12th. This young man was in one of my wards, and I had no hesitation in pronouncing the case yellow fever the first time I saw him.

I learn from Dr. Benedict that this young man slept at No. 17 Religious street, but worked on the Levee. He told me he was engaged for nine days immediately before he was taken sick, in loading the ship "Harvest Queen" with cotton. This ship laid at post No. 26, nearly opposite Robin street, in the upper part of the First District, and left here for Liverpool about the 31st of May.

P. S.—Nov. 18th.—I learn from Dr. Benedict that Allen is still living, and has had no other attack of yellow fever this summer.

The ship "Harvest Queen" laid very near the "Camboden Castle," but Allen said he had not been on board of the latter vessel. At first he gave a somewhat different statement, when his mind was confused, but when entirely relieved he stated as above.

Case 9.—Michael Mahony, Irish laborer, aged 16, from Liverpool, four weeks on the ship "Saxon;" admitted into Hospital, ward 19, Dr. Haile, June 6th; then sick three days; died on the 7th; body turned yellow; large quantity of *black vomit*, with sediment like coffee-grounds, in the stomach; liver yellowish. This young man had not been able to find employment in the city, and was allowed to sleep on board the Saxon every night.

I called on the consignee of the ship Saxon, Mr. Giffney, and ascertained the following facts: "The ship Saxon, Captain Crosby, from Liverpool, *direct*, arrived at New Orleans on the 10th of May, after a long passage, brought Irish emigrants; took position at post 27, in the immediate vicinity of the Camboden Castle. Has had no sickness on board since the vessel arrived here, excepting the case of the boy Mahony."

At Algiers, four squares from the river, and the same distance from the railroad, lived Anthony Howe, whom I visited in company with Dr. Dumont, an intelligent French physician, residing and practicing in Algiers since 1847, and who was in attendance on Howe in his illness. Howe is a day laborer; has lived in Algiers the last three years, and has never had yellow fever before; says that for fifteen days before he was taken sick he was engaged in unloading the ship Jas. Titcomb, which had railroad iron. This ship was direct from England, and was lying at Slaughter House Point, in Algiers; after working about a week on the vessel, she was removed to the steamship landing at Lafayette; Howe still working on board, taking in ballast. She lay there three days, and was again taken back to Slaughter House Point, where Howe finished working on board. On June sixth, having some business in Jefferson City, a municipal corporation, adjoining Fourth District; Howe walked up there, a distance of at least two miles. In this walk he passed through the district where the first fever cases appeared; was much fatigued by it; on the seventeenth of June, the day following, was attacked with chill, soon followed by hot fever, pains in head &c.; sent for Dr. Dumont. At this time, Dr. D. did not regard his case as one of yellow fever; but now thinks it, and the first case in Algiers. Howe had hæmorrhage from nose, turned yellow, and was sick fourteen days. Not long after Howe fell sick, his wife and child were taken, but both recovered. On June 26th, in the same house with Howe, but occupying a different room, a man named Gill was taken sick; Dr. Dumont saw him, but did not consider his a case of yellow fever; Gill threw up no black vomit, but turned yellow.

About the time these cases were happening, a Swede, living in the next house, was attacked with fever, and died; soon afterwards, a Mrs. Nelson, in an adjoining house, fell sick with fever, and died of black vomit. Three of her children were also attacked, and one died. Dr. Dumont says the disease now spread from this one spot throughout the entire village of Algiers. Howe stated that during his sickness there had been scarcely any communication with his family by any of these persons. On the 25th and 29th of June, Eliza Lacey and Rose Tumer, two Irish girls,

who had lived in Algiers six and nine months, were admitted into the Charity Hospital, and both died.

Dr. Langenbacker, resident surgeon in Luzenberg Hospital, Third District, saw his first case of yellow fever in that District on the fifth of July, on Moreau or Victory street, between Desirè and Elmire streets. It was the wife of a tailor, German by birth; she recovered; and a day or two after the husband was taken with fever and died, throwing up black vomit. Shortly after his death, seven other cases happened in the same house among the inmates, who were all Germans, and living together; the house was crowded and filthy. They had all arrived here in the spring previous.

FORM OF CIRCULAR.

To.....*of*.....,.....

Please furnish to the Sanitary Commission of New Orleans, any information you may possess with regard to the following subjects, adding such other particulars, as you deem useful.

Received.....1853. Answered.....1853.

Answer received.....1853.

I.—With regard to the locality, concerning which you can report.

The name of the locality is.....

Its limits and boundaries are.....

.....

The surface soil is (state whether sandy, clayey or calcareous).....

What kind of drinking water is used in your neighborhood, specifying whether well, cistern or spring water, and whether freestone or limestone.....

.....

There (has or has not) been recently extensive clearing of lands in the vicinity, or disturbance of the soil from the digging of wells or canals, making levees, improving roads, draining or paving of streets or any other upturning of the soil.....

.....

State its position with regard to rivers, bayous, swamps, marshes, stagnant lakes or pools of water, &c.....

.....

State its condition as to drainage, does the water run off freely or does it accumulate, and if so, how near your place?.....

.....

II.—As regards the meteorology of your locality.

Please furnish if practicable a detailed statement of the meteorological observations of your neighborhood for the entire year, if this cannot be obtained state as nearly as possible the condition of the weather as to dampness or dryness, the temperature whether hot or cold, whether very hot in the sun, or cool in the shade, the prevalence of rains and fogs, the electrical state of the atmosphere as evinced by the occurrence of thunder, lightning, &c., and the prevalence and direction of winds during the existence of the fever, and for a month or two previous.....

.....

III.—Please state if you have observed anything remarkable in the Animal or Vegetable Kingdoms, prior to, or during the epidemic, such as the blighting of fruit, the inordinate prevalence of flies, mosquitoes, &c., the death of animals, or the unusual occurrance of mould, stating its color.

.....

IV.—Give an approximate estimate of the population of your town or place, previous to the commencement of the epidemic.

Whites, over 10 years, Males .....
Do. do. do. Females .....
Do. do. do. Both .....
Do. under do. .....
Total Whites .....
Of whom are natives of the place .....
Do. do. do. of the United States .....
Do. do. do. of Foreign countries .....
Stating of what Countries .....
Number of colored .....

V.—Fill up the following blanks of deaths from yellow fever.

Whites, over 10 years, Males .....
Do. do. do. Females .....
Do. do. do. Both .....
Do. under do. .....
Total Whites .....
Of whom are natives of the place .....
Do. do. do. of the United States .....
Do. do. do. of Foreign Countries .....
Stating of what Countries .....
Number of Colored .....

VI.—Furnish the same information with regard to the cases of Yellow Fever.

Whites, over 10 years, Males .....
Do. do. do. Females .....
Do. do. do. Both .....
Do. under do. .....
Total Whites .....
Of whom are natives of the place .....
Do. do. do. of the United States .....
Do. do. do. of Foreign countries .....
Stating of what Countries.
Number of Colored .....

VII.—Early cases.

Give the date at which your first case of yellow fever occurred, with as many particulars thereof as possible .....
Give the same as far as practicable of the next ten, fifteen or twenty cases .....
Had any of these cases been in a locality where yellow fever was prevailing? .....
Are any believed by you to have arisen from the handling of goods, clothing, &c., or from direct intercourse with other cases? .....
Do you know of any case which appeared to have originated spontaneously without even the suspicion of intercourse with other cases of the disease? .....
.....
If you can trace the spread of the early cases of the disease from house to house or from person to person; or, their relations to any local cause of disease—such as, vicinity to streams, ponds or swamps, or, the direction of the wind—please do so .....
.....

VIII.—Social condition.

What classes of your population, with reference to their personal and social habits—whether temperate or intemperate, occupying isolated dwellings or crowded lodgings, have suffered most from this disease—both with regard to attacks and mortality? .....
.....

IX.—Character of the Epidemic.

Give the prominent symptoms, progress, duration and termination of the cases occurring under your observation .....
In what proportion of the cases was there black vomit? .....
Do. do. do. do. yellowness of skin? .....
Do. do. do. do. Hæmorrhage? .....
Did other types of fever prevail at the same time; or, did all assume the type or peculiarity of the prevailing epidemic? .....

Assuming the propagation of the disease from exposure—either to an infected atmosphere, to personal communication with the sick, or contact with goods or clothing either of the sick or transmitted from a locality considered infected: what time intervened between the said exposure and the appearance of premonitory symptoms, and also the developement of the disease?.....

Do you regard the epidemic as true yellow fever?.....

Have you ever seen this disease before?.....

If you have, state where?.....and when?.....

Please state the whole number of cases of black vomit which you have seen.....

Also, number of recoveries thereafter.....

State the number of cases alledged to be the second or third attacks; and the evidence thereof.

.....

State, as nearly as possible, the number of persons attendant on the sick or otherwise exposed to its possible causes, and liable thereto from never having had it, have entirely escaped during the epidemic.....

[Official.] H. D. BALDWIN,

SECRETARY SANITARY COMMISSION.

LOUISIANA.

TESTIMONY OF MR. GOURLAY, STUDENT OF MEDICINE IN CHARITY HOSPITAL.

Madisonville, La.—Arrived in Madisonville on the 30th August, from New Orleans; went to remain in the family of Dr. James Jones. Dr. J.s' daughter was taken sick on the 21st of August, and Mrs. Smith, a neighbor, on the same day.

The residence of Dr. Jones was near the wharf, and the children frequently amused themselves upon it.

A schooner from New Orleans having on board a man sick with fever, arrived at the wharf eight or ten days previous to the attack of Miss. Jones; the wharf is about thirty yards from the house occupied by the family. Miss. Jones died with black vomit.

Captain Smith, who resides one-quarter of a mile distant from Dr. Jones, and whose children were also in the habit of playing on the wharf, and of visiting Dr. Jones' family, had two of them taken three days subsequent to the attack of Miss. Jones. These were the first cases which occurred in Madisonville.

A Mr. Terry, who resided some distance from Madisonville, at a place called Pine Grove, visited New Orleans, and returned on the 20th August; was taken sick on the 22d and died with black vomit. The black woman who nursed him was taken sick on the 7th of September, had black vomit and recovered. Mr. Terry sickened on the 10th, and died with black vomit. Mr. Sherman's child, aged two years, sickened on the 13th, and recovered. He was taken on the 28th, and died with black vomit in six days. Dr. Jones' family removed from Madisonville into the Piney Woods. The seamstress of the family was taken sick two weeks after removal, and recovered.

TESTIMONY OF DR. JAMES JONES.

Case 1.—Dr. Jones' first case on the 15th July; saw others previously; his was a gentleman living in Camp street, a few doors above

St. Joseph street. Dr. Jones has always noticed a peculiar odor in yellow fever patients, never noticed the same smell in other fevers.

Has several reasons for believing the fever of this year to be contagious, or communicated from one person to another. His mind is not quite made up on the subject. His own family consisted of twenty unacclimated persons; had one case only in the family after their removal to the Piney Woods. Is not certain whether his child took the fever from the sick sailor or the vessel.

Has seen the disease carried over to Madisonville in former years without spreading; thinks there is a difference in type in the fever of this year; the disease of former years more paroxysmal, more secondary fever this year, and more disposition to typhus. In several fatal cases the course of the disease was very rapid.

The majority of cases terminate on the seventh or eighth day; knows of ten cases of recovery from black vomit in the Charity Hospital, these were adults.

Two cases of recovery occurred in private practice; these were children; cannot say that more children have been attacked this year; but they have had the disease more severely. Heard Mr. Harper give an account of Terry's case; Terry, who was a resident of Pine Grove, came to town during the epidemic, was taken sick on his return, and died with black vomit. The nurse who attended had black vomit and recovered; his wife took it, and died with the black vomit; then his grandchild, who recovered; then his step-son, who died. Dr. Jones' servant also took the fever in Madisonville.

Dr. J. says that the fever of this year indicates characteristics exhibited by that of no previous year; yellowness after death is one of them. Thinks favorably of quarantine as an experiment; thinks the fever of this year may have been exacerbated by the introduction of cases from abroad; there may be black vomit and no yellow fever. Did not notice that it was more lenient in one portion of the city than another; it was more so in Madisonville. Dr. Jones freely concurs with others in the opinion that crowded localities, want of cleanliness, &c., will promote susceptibility to the disease; knows of no instance of a second attack in the same individual. Has attended upon some who considered themselves acclimated by long residence or by being born here, and who had passed through previous epidemics, who had the fever this year.

A remarkably singular feature is a second attack or relapse, after an interval of a week; has seen cases of transmissibility in typhus, never knew a case of typhus occur twice in the same individual; knows of no instance of insanity having been produced by quinine.

TESTIMONY OF DR. THOS. COTTMAN.

Donaldsonville, La.—Case. 1—Dr. Cottman has seen the yellow fever at Donaldsonville, since 1830, nearly every year, in the month of

September. In the country it is first seen in densely populated places, and is mostly confined to the white population. The first cases this year occurred about the 1st of August; the first case seen by the Dr. was a Frenchman who arrived from France last spring; saw him on the second day of his illness, he died with black vomit on the fourth day; he was a man who was active and took much exercise. On the 20th of August, four or five cases occurred in different parts of the town, no communication had taken place; this locality was thickly settled with creoles; there is no reason for supposing that any of these persons had communicated with the city. Boats from the city arrived three or four times daily, but the landing is in a different part of the town from where the disease appeared, and no case occurred near the landing up to the 1st of October. No cases of fever arrived on board from New Orleans, prior to the 15th August. No cases occurred in the public houses, although people from the city lodged in them; the servants were generally white and many of them had the fever in 1852; the fever was severe in Donaldsonville in 1852, more so than in 1853.

The weather was pleasant during the summer; no mould observed; heat not as oppressive as last year; there was no belief either this or last year, that the fever was other than of domestic origin; negroes are not very susceptible to the disease, knew of but two fatal cases among negroes this year, both had black vomit; has seen creole children of creole parents have fever; one creole child died of black vomit, only five days old.

The hospital at Donaldsonville received twenty cases per day; only three deaths occurred in it during the season. Dr. Cottman had fever in 1837, and again in 1853; does not remember to have seen similar instances of second attack in the same person; has never seen any thing in yellow fever to induce him to believe in its contagiousness; observed nothing peculiar in the animal or vegetable kingdom this year.

Dr. Cottman noticed that delirium frequently appears in persons who have taken quinine; has never seen hiccough when quinine has not been administered; the intemperate and habitual frequenters of grog shops about Donaldsonville, have not had the fever this year; observes always a peculiar smell in yellow fever; could detect a case with his eyes closed. Ten or twelve Kentucky mule drivers came to Donaldsonville and remained during the epidemic; remittent and intermittent fevers prevailed among them; they occupied the same room and slept two in the same bed, in a house where there was yellow fever, and two deaths from it; only one of these men took the yellow fever, his bed-fellow had intermittent only.

Dr. Cottman mentioned that the settlement at New River, twenty eight miles from the Mississippi, was invaded by yellow fever, and one entire family died with it.

These people had no communication with the coast or New Orleans.

COMMUNICATION FROM ANDREW GENGRY, ESQ.

Donaldsonville, La.—Donaldsonville consists of about twenty squares, each three hundred feet each way, and intervening streets sixty feet wide, and contains about two thousand inhabitants; it is well drained, and has large canals to carry off the water quickly, so that it does not accumulate anywhere within two miles of the town during this year.

There are neither swamp lands, stagnant waters, nor marshes within several miles of the town, and although the fields are making constant encroachment upon the *woods*, yet by the enlargement of the commons around the town, the plough does not approach as near as formerly, there being now a space of near half-mile between the town and ploughed lands. The soil has not been materially disturbed this year.

Peaches, figs, blackberries, &c., were more abundant and finer than usual; garden vegetables were also finer in the early part of the year; but later in the summer and fall could not be grown; gardens were almost a barren waste.

The common house fly, and mosquito were very numerous and annoying in May and June, but after that less so than usual. In September, a fly much like the common fly in its appearance and habits, except that it does not enter your house, and only about a sixth of its size, made its appearance in small numbers, it is known as the cholera fly, from its having appeared in such swarms during cholera, in 1849.

The yellow fever made its appearance as indicated, towards the latter part of August, it did not visit our town in the form of an epidemic; all who died of it were, without exception, persons who had not resided a year in the place. The total number of deaths in the town, from the 1st day of August to the 31st of October, was about twenty, of which probably fifteen were of yellow fever.

COMMUNICATION FROM GEORGE A. PIKE, ESQ.,
BATON ROUGE, LA.

Baton Rouge is bounded on the West by the Mississippi, on the North by a small Bayou draining a strip of swamp land. The town is mostly located on a bluff, fifty feet above high water mark, the lower limit subject to overflow.

Surface soil, a thin stratum of alluvion, on a bank of red clay.

The water used is almost exclusively limestone; well water found plentifully, at all seasons of the year, about thirty feet from the surface.

No rain water used; such as have not wells use river water. There has been no disturbance of the soil, save that which annually takes place on the river banks when the river falls.

The Bayou, above referred to, in high water, sweeps round on the Northwest limit of the town, and remains standing during

high water, amidst large trees and other vegetable growth, common to such places in this State.

There is but little standing water in this locality during the months of August, September, and October.

The first case was Jessee Butner, aged about 40, a native of Kentucky, who came to this place, on the 17th of August, in an open buggy, with a wife and child from Texas, via Alexandria, on Red River. The next fifteen or twenty cases occurred in a different part of the town : viz, on Front street near the river, in low boarding houses, amongst dissipated laborers. Some of the cases had been in a locality were yellow fever was prevailing.

None are believed to have arisen from the handling of goods, clothing, &c., or from direct intercourse with other cases of the disease.

I know a number of cases which have occurred in this vicinity which appeared to have originated spontaneously, without even the suspicion of intercourse with other cases of the disease.

I cannot trace the spread of the early cases of the disease from house to house, or from person to person, or their relations to any local cause of disease; such as vicinity to streams, swamps, or the direction of the wind. The greatest mortality has prevailed on the river bank, under the bluff upon which the town is located. If an hypothesis may be indulged in, I should attribute the mortality to causes beyond the ken of observation; perhaps the disturbance of the electric forces.

COMMUNICATION FROM THOMAS C. BROWN, M. D., OF BAYOU SARA, LA.

Bayou Sara is an incorporated town, containing nearly 320 acres; but owing to the wet character of the Eastern part of the town, the buildings are confined to the front of the river, and the Bayou Sara, extending to the front of the hill. Its boundaries are the Mississippi on the South, Bayou Sara on the West, Bayou Fountain on the North, and a straight line on the East, running from the Mississippi due North, till it strikes Bayou Fountain. St. Francisville lies on the bluff adjoining Bayou Sara on the North, and runs out on a ridge about a half mile, and is surrounded by deep hollows or ravines, except on the side next to Baton Rouge, which terminates in an elevated bluff.

The surface soil of Baton Rouge is alluvial, flat, and swampy, with some ponds and sloughs. The drinking water is mostly cistern, though some few use spring water; tasting of rotten limestone.

There have been no extensive clearing of lands in the vicinity.

Messrs. Ball & Latham put up a *saw mill* (the Atlantic,) in the lower part of town, on the bank of the Mississippi, and run it near

two years; the saw dust was spread over several acres, filling some low places, a foot or eighteen inches deep; a levee was thrown up around the town in 1850, and some work was done on it in 1851 and 1852. The levee surrounding the town, makes a kind of basin of the town, which makes it very disagreeable and sultry in the summer. The streets and gutters, *alias* ditches, were worked in the spring, and early part of 1853; some little work done on the streets just at the breaking out of the epidemic.

Bayou Sara is surrounded on three sides by the Mississippi. Bayou Sara and Bayou Fountain being damed up by the filling up and grading of the *Public Road*, to where it crosses over the levee, it forms a stagnant lake on the North side of Bayou Sara; and on the East of the town, it with other streams, form an extensive marsh for five or six miles below the town; the Cat Island Swamp extends on the West, from Bayou Sara to the *Tunica Hills*, a distance of near thirty miles. The levee on the Eastern boundary for all the water drained from the rest of the town, and as the earth was taken out of a ditch inside the levee, there is a pond and marsh, which in the spring and fore part of summer covers more than ten acres, whose only outlet was a culvert, passing under the levee into the Mississippi, and when the rise of the Mississippi prevented, it was pumped out by Messrs. Ball & Latham, with whom the corporation had contracted to keep the water pumped out for ten years. The Mill is now burned down. The water stood in the lower part of the town, gradually drying up during the summer.

The population of Bayou Sara was probably six hundred, that of St. Francisville about half as many.

The deaths in the two towns are estimated at a little over one hundred; in the whole Parish of West Feliciana, including the towns, at about one hundred and thirty.

Early Cases.—The first I saw was Dr. P. P. Whicher, on the 27th of August; the next two cases occurred in St. Francisville, on the 1st of September; the next four cases occurred in Bayou Sara, on the 4th, 5th, and 6th of September; from this time, cases steadily multiplied in Bayou Sara, and gradually extended up into St. Francisville, where it became very malignant in October.

Dr. Whicher had been in attendance upon the son of Ex-Governor Johnson, who came up from New Orleans with the disease, and was taken out to the plantation. *My* first two cases occurred in St. Francisville, the 1st day of September; they were Mr. Charles Beard and David Hamilton. I have not learned that either of them had been where the disease existed previous to their attack, nor can I learn that my two cases occurred in Bayou Sara on September 4th, had any opportunity of contracting the disease from others. Mr. Henry M. Cobb's wife, child, and servant, took it five miles above Bayou Sara, without being able to trace it to others.

Mr. David Austin's family, in all, eight; did not have the disease though it was all around them; but they did not nurse or visit the sick. Mr. L. T. Maddox, his wife, and his brother Robert, did not contract the disease, though they nursed his brother George, and his son William, who both died of black vomit; they reside in a spacious brick house fronting on the levee, and sleep in the upper story. Mr. Thomas Garnet escaped, though he lost five children whom he carefully nursed. Mr. William Town, nursed in his own family, and in that of others, and did not take the fever.

In the above mentioned cases the families lived well; were temperate and industrious; though the fever exempted no grade of society; yet, the poor and intemperate suffered most.

In the commencement of the epidemic, and throughout its continuance, occasionally we had pure cases of intermittent and remittent fevers, and a few cases of protracted typhoid fever. You ask, "Do you regard the epidemic as true yellow fever?" Answer, I do. Because it is a continued fever, attended with yellowness of the skin, and generally, when fatal, attended with black vomit. It was not intermittent, nor remittent fever; it was not typhus nor typhoid fever; yet it partakes of the high grade of an intense fever of one paroxysm attended with great prostration. It is a true typhus icterodus. "Have you seen this disease before?" I have seen yellow fever before, say at Woodville, Mississippi, in 1844, but not characterized as this, with symptoms of typhus. The epidemic in Woodville was characterized by inflammatory symptoms.

I had the yellow fever in 1844, and I had it again here. The chill followed by one intense paroxysm of fever lasting twelve hours, going entirely off, leaving me quite feeble for three days, when I left my bed, and had no return of fever.

In some cases there were all the pains of the *dengue*. Some cases were attended with a rash; and most, after their recovery, shed the cuticle of the hands and feet. Nausea and a disposition to retch, was a constant attendant on the fever. The intensity of the fever was perceptible before the hand touched the skin. The perspiration had a musty, sour, cadaverous smell; the fæces had the cadaverous smell which ceased with the improvement of the patient. The urine was suppressed in only a few cases; but was generally high colored and ropy. The attacks of children were generally attended with worms, and frequently proved fatal.

TESTIMONY OF DR. RICHARDSON.

Grand Ecore, La.—Case 1.—The first case of yellow fever occurred two miles below Grand Ecore, on the 20th of August, and was attended by Dr. Williams. He was a citizen who was supposed to have contracted the fever from the steamboat. Two young men, recently from California, and coming from Alexandria, were the first

cases seen by Dr. R., on the 29th of August. One of them died. There were more recoveries, proportionably, among blacks than whites. The weather was unpleasant, and very warm, with much rain; winds generally from the Southeast. Thinks yellow fever cannot be strictly considered a contagious disease. This yellow fever was imported from New Orleans to Natchitoches. Natchitoches escaped until late in the season, in consequence of its being less accessible than Grand Ecore. The Dr. has seen equally as unpleasant years as the past, without any accompanying fever.

Bilious fever seemed to be supplanted by yellow fever. Bilious fever, near the time that yellow fever made its appearance, exhibited gastric symptoms, and sometimes patients turned yellow; when fatal, generally terminated on the 5th day. Does not think the fever which prevailed this year anything unusual, nor does he think it spread either by infection or contagion. The fever this year assumed the Typhoid form; late in the season it became milder. Observed a peculiar smell in the fever this year, which he considers characteristic. No stagnant water in the vicinity which would account for the malignancy of the disease; knows of no case of recovery from black vomit. On Prothoes' plantation, several persons who were creoles took the disease and died. It is not known that they had any communication with the boats or the town. Knows two other localities, having no communication with infected districts, where the disease prevailed. Negroes might have walked to the river, a distance of two miles, during the night. Thinks that if Natchitoches could have been cut off from all communication with infected places in the neighborhood, it might have escaped the epidemic. It is the belief in the vicinity that after the invasion of a disease, it might break out spontaneously in places not exposed. The Dr. has not noticed whether the intemperate are more subject than the temperate from attacks of yellow fever.

COMMUNICATION FROM FRED. R. HARVEY, PARISH OF EAST FELICIANA, LA.

The incorporated limits embrace an area of one square mile; population 1,300 to 1,500.

Soil.—Surface uneven; parts sandy, parts clayey.

Free stone well water almost universally used; a few springs in the suburbs, but very little depended upon.

No clearing of land within some miles of town, for some years past. The soil has been much more than usually disturbed by working the streets and cleaning of back yards; and that, too, all through the months of August and September, to the middle of October.

Pretty Creek is one-half mile West of town, and the Comite one mile; both streams overflow their banks, and inundate their swamps, for more than a mile in width. No stagnant pools, lakes, or marshes in the vicinity. Water runs off very readily.

Season was unusually wet, from the 1st July; frequent rains, accompanied with severe thunder and lightning.

Vegetation very rank; fruit of all kinds very abundant. Musquetoes uncommonly numerous, both night and day.

September 30th.—None, so far as I can ascertain, had been in a locality where yellow fever was prevailing; none have arisen from the handling of goods, clothing, or direct intercourse with other cases of the disease. Persons of intemperate habits, if attacked by the disease, almost sure to die; although there are some old soakers still walking about in our midst, apparently as good as new.

All cases of fever seemed to assume the same type of the prevailing epidemic.

Two deaths occurred within forty-eight hours of the attack, but most succumbed on the 5th and 7th days.

Cases of Yellow Fever—175 to 185.

Deaths—50.

TESTIMONY OF DR. BALL.

Case 1.—Dr. Ball's first cases occurred in the first week of July, near Gormley's Basin; a week afterwards, saw cases in Hercules street, near Melpomene street; a few days afterwards, cases below Melpomene street. The disease then seemed to extend towards the New Basin. Saw cases there the third week in July. Knows no communication to have taken place in these cases. Thinks his first case had no intercourse with shipping; they were laborers, some of them working in the swamp, others on the levee, as draymen. The first cases he saw lived in crowded apartments. Did not learn that the intemperate were more liable to the disease than others. Many children were attacked, who generally recovered. Knows of three cases of recovery from black vomit—one adult and two children.

Lake Providence, La.—Went to Lake Providence on the 24th September; the mortality there was very great. The fever appeared at Lake Providence the last week in August. Mr. Odell, of New Orleans, was sick a week earlier than the 1st of September. Mrs. Selby, was the first person who died; her death took place on the 1st September, with black vomit. She lived one-half mile from the house in which Odell resided; she seldom left her house. Mrs. Campbell, died on the 11th of September, in the hotel in which Odell stopped. The disease was the same, but more fatal there than here. It was confined to the town; did not spread into the country, although often carried out by persons visiting the town. Does not consider yellow fever a communicable disease. Has seen much of it; formerly practised in Savannah, and subsequently in Mobile. The population of Lake Providence is about 600. At the time of the Dr.'s departure, the number of deaths amounted to 130.

In Fort Adams, the first case occurred the second week in October. There were cases of fever on a plantation in the neighborhood of

Fort Adams, two weeks before it appeared in Fort Adams. No communication existed between the plantation and the town, except by physicians. The communication between New Orleans and Fort Adams has been uninterrupted this year.

TESTIMONY OF MR. ODELL.

Lake Providence.—Resides in New Orleans; on the 12th day of August, arrived at Lake Providence, La.; was in good health. Yellow fever occurred on board the steamer Memphis, which left the city on the 9th of August. Mr. O. has passed three summers at New Orleans. On his arrival at Lake Providence, he stopped at the Sparrow House—the principal tavern. Was taken sick two days after arrival. Two physicians and a negro hired boy attended him. Sickened five days after leaving New Orleans. Six days after, a little girl named Kimball, a boarder, was taken sick and died in three days. The next case, was that of the mother of the little girl, who died a few days after the child; next the landlady, Mrs. Campbell, who died ten days after the death of Mrs. Kimball. The house stands on the front row, about 100 yards from the river. There is a marsh three-fourths of a mile wide in the rear. The banks of the river cave in yearly more or less. The weather was fine, but warm and sultry. No other person got off the Memphis. The next person taken sick was Mrs. Selby. Mrs. Selby did not visit the hotel. She died seventeen or eighteen days after my attack; had black vomit. During my sickness, twelve persons sat up with me at different times; recognizes some names among them in the printed list of deaths.

There were several cases of yellow fever on board the Memphis, and one death—Wm. Worsham, the first clerk and part owner of the boat. The boat arrived in New Orleans on the 6th of August; he was attacked on the 7th; she left on the 9th, and he died with black vomit on the 11th August. Mr. O. helped to nurse him and lay him out. Had been absent two months; had not been in New Orleans but three or four days previous to his trip to Lake Providence.

TESTIMONY OF MR. WM. H. PARHAM.

Case 1.—Mr. Parham resides in New Orleans. On the 15th of July, he left the city; on the 15th of September, when 14 miles below Lake Providence, he was taken sick. Had yellow fever in 1847; considers his attack of this year identical, from the similarity of symptoms. Frequently visited steamboats from the city, and was informed fever existed on board. Thinks he took the disease in consequence of these visits, although his last visit was three weeks previous to the attack. Two negroes were sick with the fever, and treated by the overseer, who did not contract the disease. One negro was nursed

by the other; the first died, the second recovered. It is probable that they visited the boat.

Locality.—The situation was high and dry.

Mrs. Haines, residing one mile below Dr. Bowman's, sickened and died; the physicians unacquainted with the disease. Mr. Parham mentions the case of the Mayor of Vicksburg. He left the town and was taken sick at Editor's Depot. No other case appeared there. Mr. Scarborough, suffering with fever, was visited by his brother, who was attacked forty-eight hours after his return home.

The weather was not unusually rainy, but very hot; not much thunder; not more mould on leather, &c., than usual. The blight in cotton in the hills this year was very bad; heard old planters say (among others Mr. Isaac Selser) it was as bad as in 1828. Mr. S. resides in Raymond, Hinds County, Miss.

COMMUNICATION FROM LEWIS SELBY, OF LAKE PROVIDENCE, LA.

Lake Providence is situated some four hundred yards upon the Mississippi river coast, and from two to three hundred deep or back. But many who have offices, and do business entirely in town, live as far as two miles from the Court-house, in it.

The ordinary alluvial soil on the Mississippi river banks.

The Mississippi water, and cistern water, the former used in a greater degree; no well water.

Disturbance of soil.—None.

Position with regard to rivers, swamp, &c., &c.—The Mississippi is on the East, and Lake Providence nearly as wide and deep as the river, on the West, and eight miles long; none else.

Drainage.—The water runs immediately into the lake.

Condition of weather and winds.—At the commencement of the epidemic, hot and dry; little fog; rain thunder and lightning; winds South and East, or South and West.

Fruits not as good as usual; animals were sickly, and many had swellings upon them. Fowls not fit to eat, and many of them died; musquetoe stings more violent, and they of a different color and ten-fold more numerous. I never saw the twentieth part of mould, but did not notice its color; fungi vastly more plentiful.

Case 1.—Mrs. Selby was the first case; and I am satisfied that she had not been out of the village; out of sight of her dwelling, or on any steamboat, for at least six months before her sickness. She having been in bad health, and from all the information I can get, I believe she had not been in the "Sparrow House," or nearer it than on its side-walks, in passing it, and very seldom there for more than a month before her death.

From the information I have been able to get, no freights or merchandize arrived here till after the death of Mrs. Selby, and

her's was the first death known to have been caused by yellow fever here.

I have learned that two deaths by fevers took place a day or two after her's, one at the Sparrow House, and one directly opposite.

COMMUNICATION FROM DR. A. R. KILPATRICK, OF BLACK RIVER, CONCORDIA PARISH, LA.

Black River, Concordia Parish, Louisiana, is bounded indefinitely; bordering on Black and Tensas Rivers, about thirty-one and a half degrees latitude, and fourteen degrees forty minutes and twenty seconds longitude West from Washington, D. C.

The whole country is pure alluvium.

The most of families use cistern water, contained in wooden cisterns; but some use well water, which is quite brackish and unpleasant.

The country is comparatively new and entirely agricultural—new fields are opening—immense deadening made annually; and the soil constantly upturned by the plough. The region is markedly paludal, being cut up with sloughs, ponds, lagoons, large lakes, and much stagnant water; besides the two rivers above mentioned. The water does not accumulate in winter; and runs off slowly; probably as much disappears by evaporation, as by transpiration. The year was wet.

There was more rain than usual during the summer months; the spring months were dry; a more detailed account is appended.

We have but few fruit trees here, but those bore well and healthily. We had an unusual quantity of house flies early in the spring, which continued till the summer ended; musquetoes not as troublesome as usual; no disease or fatality was observed amongst animals; mould less than common.

There was no epidemic here, but a good deal of ordinary fever, such as intermittent and bilious remittent fever; some citizens contracted yellow fever in New Orleans and Natchez, but all recovered; although their convalescence was slow, with frequent relapses, attributable to dietetic irregularities, and foolish exposure to sun and night air; no fatal cases.

I treated this disease in Woodville, Mississippi, in 1844; and had it myself; and a full history of that epidemic you can see in the second volume of the New Orleans Medical Journal.

Trinity, La.—Trinity is a village of two hundred and eighty inhabitants, at the junction of Ouachita, Tensas and Little Rivers; and steamboats from New Orleans land there at least every week, and in busy seasons every day. Several cases of yellow fever were put off there last July and August, all of which died; and some corpses were put off there and buried.

No particular precautionary measures were taken to prevent the

spread of the disease. No one contracted the disease from those cases.

COMMUNICATION FROM WM. B. WOOD, OF CENTREVILLE, ST. MARY, LA.

Centreville is situated on the South bank of the Bayou Têche, ten miles above the entrance of Bayou Têche into the Atchafalaya, and five miles below the town of Franklin. The Bayou at this point running from West due East.

The surface soil is a mixture of sand and clay.

The only water used here for drinking purposes is cistern water.

There have not been any extensive clearings; some however near the village; together with a considerable opening of ditches, and stirring of mud in the principal streets or roads of the village, late in the summer.

The Bayou Têche, at this point, generally, is low upon its banks; being mushy near the waters edge; the land rising at from fifty to six hundred feet back, to the height of several feet; a North wind blows directly from the Bayou into town.

The Bayou being affected by tide water, the current is always slow; at one time running up, and at another down. The difference between high and low water, being only about three feet in extremes; but generally not more than one or two feet.

The past summer was unusually wet; great quantities of rain having fallen in June and July. The heat of the sun was very great.

There appeared to be more musquetoes, the past summer, than I ever noticed in any previous year; also an increased number of flies; mould, of a drab color, was abundant during the summer and fall.

Centreville contains not over two hundred inhabitants.

Case 1.—The first case occurred on the 15th of September, in the person of a mulatto; a cooper by trade; which terminated fatally on the ninth day, from relapse occurring on the fifth day; this was a well marked case; having hiccough, bleeding of the gums and nose, and terminating in spasms, with deep yellowness of the eyes and skin. He worked and slept in a cooper shop, immediately on the bank of the Bayou, from which shop, from time to time, for several years, large quantities of chips and shavings have been thrown into the edge of the Bayou, thereby forming a wharf, some forty to fifty feet into the Têche, all of which bank so formed is in a rottening state. This boy slept in a room in the corner of the shop nearest the Bayou, and immediately over this rotting bank of chips and shavings; he had had no intercourse with any person having yellow fever, nor any place where that disease was supposed to prevail; no other case originated here until after the 1st of October.

I do not believe any case to have arisen from the handling of

goods, clothing, or from direct intercourse with other cases of the disease.

The case detailed above, occurred on the 15th of September; on the 18th of September the wind changed, from Southwest to North, and for two weeks blew steadily from that quarter, passing directly from the Bayou, over this bank of chips, &c., into the village. It did not seem to spread from person to person, and showed no disposition to contagion, as a majority of those who attended the sick escaped the disease altogether.

All classes of our population seemed alike susceptible; the only exception being in favor of children; very few children having had the disease.

During the summer and fall we had bilious intermitting and remitting fevers, but after the 15th of September any such cases occurring at Centreville, appeared to run into, and assume the type of yellow fever.

I consider the epidemic, as true yellow fever.

I have seen the disease before, in Baton Rouge and on the coast in 1843 and 1847.

I have seen no case recover from black vomit.

Out of thirty-five cases I have treated this fall, two alledge that they have had yellow fever before.

I think at least three to one of such who were exposed to the disease, have escaped; the fever showed no disposition to spread into the surrounding neighborhood; none took it, unless exposed to the common causes in the village. One went into the country and died with black vomit, but communicated it to none of his attendants.

TESTIMONY OF DR. J. S. COPES.

Case 1—Dr. Copes' earliest case was on the 12th of July, in Tchoupitoulas street, near the Waterworks. There were so many cases at that time in the immediate vicinity, that it was impossible to say if the disease passed from one person to another.

Point Coupée.—The Dr. was in the Parish of Point Coupée, while the fever prevailed there. Many old creoles secluded themselves entirely from their sick neighbors, but did not escape, notwithstanding.

Jackson, Miss.—The first cases in Jackson were Germans, who came from Vicksburg; they stopped at a Porter-house, and the disease seemed to radiate from that point. In 1841 and 1844, the fever was very bad in Vicksburg, and there was constant communication with Jackson; the railroad cars making three trips daily. Only one case occurred at the latter place; this case came from Vicksburg; no other cases seemed to emanate from it.

A Mrs. L. recently from Kentucky, stopped a few days at Brandon, (12 miles East, by railroad, from Jackson) in a hotel in which a young man, who had contracted the disease in Jackson, had died of black

vomit. She came to Jackson on Friday, and the succeeding Tuesday took the yellow fever.

Dr. Copes thinks the disease contagious under certain circumstances. Cannot say if the disease of this year differs from that of other years in being so; observes a peculiar smell in yellow fever; saw that the musquetoes were apparently driven out of a house in Prytania street by it. Has seen no case of recovery from black vomit. The disease in the country was worse; there was no disposition in the bodies to turn yellow. Saw very few cases besides yellow fever, except a few cases of intermittent. Intemperate persons, and those who neglect hygeinie rules, more susceptible.

TESTIMONY OF DR. CHARLES DELERY.

Parish of St. John Baptist.—Knew of no case earlier than the 28th of May in the Charity Hospital. First private case in latter part of June or 1st July. The Dr. is not prepared to say if the disease is contagious. Has not made up his mind whether it is of domestic origin, or whether it is imported. In the Parish of St. John the Baptist, which he visited, he had a better opportunity of scrutinizing the disease. The first cases occurring there were in the lower part of the Parish, in a hut in which many persons resided. The neighborhood is densely settled for a mile in extent, on the banks of the river. The occupants are chiefly woodsellers, and they are daily in communication with the steamers from New Orleans. The next case occurred in the house next above; seven or eight died; and it continued to extend up the coast. Up to the 11th of October, it had not crossed the river, although a few isolated cases appeared there. Doctor Delery heard Doctor Fortino, from whom much of this information was obtained, and who resides in St. John's, remark that, most of the nurses and friends of the sick were taken with the disease. The Doctor observes that most of the negroes whose cabins are placed thirty or forty acres from the river bank, had very little sickness. Knows of no locality which was perfectly free from communication with the sick; negroes who are placed remote from the river are less liable to attack than those immediately on the bank. The vicissitudes of temperature were great; the days were warm and the nights cool. Heard many cases of blacks who recovered from black vomit; knew of one isolated case, which had no communication with any other, or with New Orleans.

COMMUNICATION FROM T. P. RICHARDSON, TRENTON, ON THE OUACHITA RIVER, LA.

Soil of surface generally sandy.

In our village the water mostly used is that of the Ouachita river, though several families have used cistern water; difference not notable.

No clearing in our immediate vicinity; the soil has been greatly dis-

turbed by the improvement of the streets; soil has been brought from a distance and spread over our main street; several new cisterns dug; all in May and June.

Position of Trenton: it has the Ouachita river on the East, a bayou on the North and South, with considerable marsh on the West, filled with pools of water.

The water does not run of freely, but does not accumulate under several hundred yards of the inhabitable portion of our village.

Case 1.—The first case occurred about the first of August; lasted some five days, and terminated fatally; and so did the first three.

Next 15 *Cases.*—The cases grew milder from the first to the last; these cases had not been in a locality where yellow fever was prevailing.

One among the first cases, was a merchant, who was taken while opening goods from New Orleans.

Several families were attacked about the same time, in different parts of the village.

But little difference was manifested in regard to social relations.

The proportion of cases of black vomit, was ..... $\frac{1}{3}$

Yellowness of skin,..... all.

Hæmorrhage, ... $\frac{1}{2}$

Few other types prevailing.

I regard the epidemic as true yellow fever.

I have seen it before, in New Orleans, and Mobile, in 1847—'48.

The number of cases of black vomit which I have seen, is 15 or 20

The number of recovery,..... 1

Alleged cases of second and third attacks, ... 0

The number of persons attendant on the sick, or otherwise exposed to its possible causes, and liable thereto, from never having had it, who have entirely escaped during the epidemic,.....4 or 5

Deaths occurred from the 5th to the 7th day.

COMMUNICATION FROM DR. JAS. S. GRANT, OF PATTERSONVILLE.

DR. E. D. FENNER, New Orleans:

Dear Sir:—Your favor of the 19th inst. was duly received, but in consequence of pressure in business I could not answer you by return mail, I therefore employ the earliest opportunity to comply with your request, though I must do so very briefly.

The first cases of yellow fever that occurred in this vicinity last season, were three persons landed from the steamer P. Miller, on the night of the 8th of August. I was called on the morning of the 9th, to visit them at the place they were landed, about three miles above our village. They compose a part of a family just emigrated to the place, from one of the Northern States. They arrived in the city of New Orleans, as well as I recollect from their statement, on the 1st of August, and were necessarily detained until the 5th or 6th. On

the night previous to leaving the city, the son, a young man of 17, was taken suddenly ill with a violent chill, followed by violent fever, delirium, &c.; in the morning his father thought him somewhat better, and decided upon pursuing his journey. About 9 o'clock the eldest daughter was taken in a similar manner; and about 12 o'clock, M., a younger daughter of 13 years of age was also taken with symptoms like the others. The parents horror stricken; as I can well suppose, at what they saw and heard in your devoted city; decided on leaving at all hazard. They arrived at their destination, as I before stated, on the night of the 8th, and I saw them on the morning of the 9th. I have not time to go into a detailed description of these cases; suffice it to say, that on the second day the eldest daughter, a young lady of 19, was taken with black vomit, but lingered for forty-eight hours, and died. The young man was taken with black vomit some twelve hours after it commenced with his sister, and died in ten or twelve hours after that symptom supervened. The younger sister recovered after a serious and protracted illness.

In six or seven days after the death of these persons, a man servant belonging on the same premises was taken with violent chill succeeded with great heat, delirium, redness of eyes, &c. The delirium was so great that it required five or six strong men to hold him. His case terminated speedily and favorably; having no fever after the first twenty-four hours; complaining only of extreme weakness after that time.

The father and mother of the above cases and two other of their sons, had subsequent attacks, I understood, but they did not come under my observation.

The next case that occurred was a young man who was permitted to pass our quarantine station on the 16th August, on a visit to a gentleman about four miles above our village, upon his promise that he would remain with his friend and not visit any other place until the term of quarantine was completed. He remained with Captain M. until the evening of the 22d, when he was seized with chill, succeeded with violent fever, pains in the head, back, and limbs, injected eyes, &c. The next morning (the 23d) his symptoms being somewhat mitigated, he concluded to leave his friend's residence and was brought to our village.

He called at my office about 3 o'clock, P. M., of the 23d, stating that he had had a singular chill the night before, though he had had frequent attacks of intermittent fever previously, he had never experienced any thing like the present one. He had not a violent grade of fever at the time I first saw him, but complained of considerable headache, pain in the back of the neck, back, and limbs, particularly the calves of his legs; eyes suffused, conjunctiva injected, considerable debility or rather prostration of strength, nausea, with frequent efforts to vomit, spirits depressed.

To my inquiries whether he had been in any place where the yellow fever was prevailing, he answered that he had been in no place

where it prevailed as an epidemic; stated that he got aboard the mail boat at Carrollton, where he heard there had been two or three sporadic cases, but had seen none of them. After I had prescribed for him he returned to the hotel, and I saw no more of him until the next afternoon, when, passing the hotel, I saw him sitting on the gallery, apparently much worse than the preceding day. Being in haste at the time, I simply directed him to retire to his bed and remain there until I returned. When I saw him next, some five or six hours after, I found my last injunction an unnecessary one, for he was scarcely able to turn in bed; on entering the room, I readily perceived that my fears were groundless. The symptoms could not be mistaken; his nails at this time were purple, his skin livid, his eyes of a reddish yellow hue, and above all other diagnostic symptoms, the peculiar odor on entering the room, was almost suffocating.

This patient recovered after a protracted illness, with almost every unfavorable symptom, such as hæmorrhage from the gums, bowels, and scarified surfaces. During the illness of this man no person entered his room, except myself, the landlord, and a black man who nursed him, and my friend, Dr. Day, who was in with me once for a few minutes.

The next case was an elderly lady, whom I saw frequently passing the house while the above patient was sick. She was taken ill I think on the 30th of August, and died on the 1st of September. I cannot speak positively of the time of her attack, as I did not attend her.

On the 6th of September, a blacksmith, whose shop stood about one hundred feet North of the hotel; the black boy who nursed the above patient, and a boy from a neighboring plantation, who had a wife at the hotel, were all taken about the same time. The blacksmith and one boy died on the 6th; the other, I think, on the 7th day of their illness. The other boy recovered. Upon a moments reflection it has occurred to my mind that previous to the last mentioned case, an infant of my own was attacked in the manner above described, I think the last day of August. Her case differed somewhat from the preceding ones in this particular; the fever continued for seven days without the least intermission, and was attended with more cerebral symptoms than generally occurred. This child's recovery was extremely slow.

The blacksmith was a patient of my partner, Dr. Sanders, consequently I saw but little of him, until the close of the fifth day; he being taken suddenly worse, I was called in in the absence of Dr. Sanders. I found him almost unconscious, with hæmorrhage from every spot where scarification had been made. He survived about twenty-four hours after I first saw him. This man occupied a room above a dry goods store; the family of the merchant lived on the same floor, every member of which were frequently in his room, and every one had a subsequent attack of fever, (six in number.) I requested his friends to make preparations and have him buried

without delay, and exclude every one from his room but those necessary to bury him; but instead of taking my advice, the house was thronged the whole time of the interval between his death and burial.

On the day previous to his death, the clerk in the store fell sick; he had devoted much attention to his friend; being in his room a large portion of his time, especially during the night. This man had a severe attack, with one or two relapses.

From the time of the death of the blacksmith, the disease spread rapidly; so much so that by the 21st of September we had seventy-five cases in our vicinity. It extended to nearly every plantation for several miles above and below our village; respecting neither age, sex, color, or condition in life. On some plantations, every white person, with nearly every slave, passed through the ordeal; while some intermediate places enjoyed complete immunity. These last, however, were restricted to non-intercourse with supposed infected districts.

In our little village, nearly every individual had the disease during some period of its prevalence; which continued here from the above dates until late in December. Whenever it made its appearance in a family, it generally, sooner or later, extended to every member, in what we considered the infected region. Many persons who visited this place contracted the disease; but in no case that I learned, did they communicate it to their friends, or attendants, when they lived beyond certain limits. The range of country, from about six miles above this place, to nine miles below, along the margin of the river, composed our sickly region, many of the intermediate plantations, however, remained healthy. The number of cases during its prevalence here, as near as I can calculate, exceeded five hundred, of which number there were forty-five deaths.

I know of no local cause to produce such a disease here; indeed our place was never more healthy at the same season of year than at the time the above cases were introduced, and I believe it might have continued so, but for the *leaven* they imported. This leaven, I think, from what I have observed, may be inert, unless deposited in a suitable atmosphere or locality. Some alterations in the constituents of the atmosphere, are necessary to render the morbific matter active, whatever that may be. We have never had the disease in this place since my residence here, which is eleven years. In 1839, the fever prevailed in various parts of the Parish. Some cases occurred here at that time, but were contracted in Franklin, or some place above, where it prevailed with much severity. I lived at that time between Franklin and New Iberia; two places of its greatest ravages at that time; and saw much of it there; mostly cases, I thought, contracted in one of those places.

With regard to the communicability of yellow fever, I believe, had a subject with small pox landed here, and there had never been one person vaccinated, that disease would not have spread more extensively. I can not now produce facts to prove my assertion, as the mail

closes in a few minutes, and I have scarcely time to make an apology for giving so imperfect an account of the cases. You will excuse the imperfection in every respect, I have not time to look over and correct.

I give you thanks for your favor accompanying your letter.

LAKE PROVIDENCE, Carroll Parish, La., December 24th, 1853.

Dr. James G. Wyly.—I have been practicing medicine in this plcae (Providence) since the 10th of this month. Previously I had been practicing for months in Swan Lake.

There have been, to my knowledge, several cases of yellow fever carried from this place into the country; but none of these cases have spread in those places to which they were carried. I know of no cases which originated spontaneously. During the epidemic, as far as my observation went, there was no ague and fever, remittent, and very little of any kind of fever except the yellow fever. Attest: W. P. R.

E. Terry, Editor of the Carroll Watchman, Mayor of Providence.—I know Mr. Odell, who was sick here and recovered—said to have been the yellow fever. (By reference to the list of arrivals at the Sparrow House Hotel, Providence, La., for the 12th of August, 1853, we find the following entry of the name of Mr. S. W. Odell, Camp street, New Orleans, room No. 13. He is marked as having left on the 6th day of September, following.) He came to Providence about the 15th of August, being unwell at the time. No other sick passengers were landed in this place at the same time with Mr. Odell. It is my opinion that Odell did not have the yellow fever. He was sick about three weeks. About that time the D. S. Stacy arrived here from New Orleans; snagged; and had cases of yellow fever aboard. She lay some time at the landing. Four days previous, the carpenter had died aboard her, and was buried at Milliken's Bend.

I regard the case of Mrs. Selby (wife of Judge Louis Selby), as the first we had of yellow fever. She was taken, I think, about the 25th of August, and died near the 2d of September. She resided in the upper part of the town. Was very seldom away from home. Do not think there was any possibility of her having caught it from the Stacy. The Judge had a negro boy who was in the habit of going to the boats every day and selling peaches, &c., and it may be that he carried it in his clothing; but he did not have the fever until after Mrs. Selby had it. All that I know of her going from home, was to do shopping.

The second and third cases of the fever were those of Pat. Feely and Lula Kimble. Feely had been in the country preparing to burn bricks. He caught cold, and was somewhat unwell when he came to town, and was taken with the fever about the 27th of August. He died about the 2d of September. I consider both these cases as spontaneous in their origin, for there was no reasonable chance for them to have taken it from others.

Nobody landed from the Stacy. She staid here about ten hours.

Nobody was brought from her. Nobody went aboard her except Mr. Campbell, Dr. Bowman, and the persons connected with the wharf-boat.

I do not think that the disease was communicated from person to person.

I had a very good opportunity of observing and knowing the movements of individuals from the place—both those who went away, and were subsequently taken with the fever, and those who were carried away after being taken; and I do not know a single instance in the Parish where the disease was contracted, without the individual having come to town.

Of these cases which went and were carried to the country, I know as many as thirty or forty, reaching out in every direction. If any such a case of communication had occurred, I am sure I should have known it.

I know that Mrs. Selby did pass by the hotel (shopping) at least once while Mr. Odell was sick.

On Mr. Geo. G. Wilson's plantation, which joins the town below, there are fifty negroes. Their quarters are within (150) one hundred and fifty yards of houses in which the yellow fever occurred. Non-intercourse was established, and no yellow fever occurred on Wilson's plantation.

During the epidemic, a peculiar smell pervaded the atmosphere of the town—should have prevailed here more than in any other swampy and damp country. Boats came from New Orleans.

Attest: W. P. R.

Dr. Benj. H. Bowman.—I have practiced in this place (Lake Providence) since 1849. Was here when the fever commenced. Mrs. Selby was the first case. No physician saw her except Dr. Larche, who was in the habit of making some parade in telling circumstances, and apt to make a large story of a small one.

On the 28th of August, a little girl, the daughter of Mrs. Kimble, was taken sick at the hotel, with the ordinary symptons of chills and fever. These shortly disappeared, and I ordered medicines to be given to prevent a return; but the child was somewhat spoiled, and refused to take them. The chills and fever consequently returned on the next day, but in like manner passed off. On the third day they returned again, and that morning at about two o'clock, the child died; with some appearance of black vomit. On the 31st of August, I was called to see Feely, from the country, but through pressure of business, ceased making minute records; I cannot name the precise dates.

Mrs. Kimble was also taken with chills and fever the day the child died, 31st August. On the second day she had another chill, and on the third day she also had another chill, and then improved so decidedly that I considered her nearly well; but the second day afterwards she exhibited some appearance of jaundice, and on the next day, she also died.

The first case occurred at Judge Selby's, as before mentioned. He resides some little distance from the hotel, and is so situated in a retired locality as to involve necessarily no very free communication with the

business part of the place, nor with boats landing at the levee. Do not know whether Mrs. Selby really had yellow fever or not, though it had been pronounced so by Dr. Larche, who attended her, and was the only physician who saw her. Dr. Larche has since died with the fever.

I doubt, very much, whether Mr. Odell had yellow fever. He was very badly frightened, and sick three or four weeks. He had been to Arkansas, on a collecting tour; and, knowing that many clerks had left New Orleans; determined, contrary to the advice of his friends, to go there and get employment. On arriving, he paid no attention to the sickness, until seeing a notice in the paper concerning the condition of the cemeteries; he concluded to go and see them for himself; where, finding things worse than he had anticipated, he became suddenly frightened, and called on Dr. Fenner for advice, concerning the propriety of his remaining in the city. Dr. Fenner, finding that he had not staid over night in the city, advised him by all means to leave, as soon as he could possibly get away. He was delayed in getting a boat up the river, and became more and more alarmed and excited. He went to his hotel, and locked himself in the highest room he could obtain, and remained till next day; when he took passage for this place.

He arrived here on Friday. He and Capt. Smith ate a large watermelon; after which, about four o'clock, Clark was taken with yellow fever—September 5th—and died, 9th September. And Cook, Odell and myself still ate more; making in all, for Odell, about one large watermelon. He was still much frightened about the fever; said he had been exposed to it, and was bound to have it; and, if he did have it, was sure to die; also, said he felt bad. Every body told him it must be the fever coming on him; and asked him, in jest, if he did not feel pain in the head? He said, yes! And, if he had not pain in his back? He said, he had. They then advised him, also in jest, to send for me. This was August 14th, I saw him. His pulse was high, yet his skin was moist and in good condition, and there was no unusual heat. I told him there was nothing the matter with him, except that he was excited; but advised him to go home, and take some rest; and I would call and see him in the evening. In the evening, I saw him again; he was in a gentle perspiration, and had no pain in the head. To gratify him, I, however, gave him some oil and a little calomel, which operated finely. For four days he lay there in his blankets, and could not be induced to get up, though his pulse was regular and his tongue clean. I think his case was first brought on by over eating, excitement, fear, &c. Do not believe it was yellow fever at all. On the eighth or ninth day he had copious hæmorrhage from the bowels.

The fever did not spread anywhere in the country in this vicinity. The farthest cases were not more than six or eight hundred yards from the river. I should say that the usual population of this place is eight or nine hundred. Of those, about three hundred remained during the prevalence of the epidemic.

I saw no recoveries after black vomit had occurred; though I did see

some who recovered after throwing up mucus, slightly tinged with reddish streaks resembling blood. Saw some children who had the fever. Adults were most subject to it. Some negroes died; none, however, that I saw, who had proper care, but that recovered. They seemed to suffer from it very little more than from ordinary chills and fever. Mulattoes suffered from it somewhat more than the full-blooded negro. Think it was of spontaneous origin with us.

Mrs. Kimble was a mantua-maker, and had a room in the hotel where Odell was sick. It was said, that Mrs. Selby was in her room during the illness of Mr. Odell. In going to her room, she would have (during the first part of Odell's sickness) had to have passed by the room in which Odell was sick. Feely was taken, fourteen miles from town, with what was called congestive fever. I never met with a case of yellow fever which had a complete remission, like the ordinary ague. I am satisfied that Mrs. Kimble had such a remission.

Mrs. Kimble did not come into Odell's room. Odell had two rooms: while he occupied one, the first, it was necessary to pass it, in following the staircase to Mrs. Kimble's room; when he was removed to the second room, it was not so.

I have known of several who had the fever after leaving Providence; in no case, however, did it spread in those places to which they had gone. For instance, Mr. Graves and Mr. Hayne, clerks in Mr. McFall's store, left in the beginning of the epidemic. Graves, on the day that Mrs. Kimble died, went to Bunche's Bend, fourteen miles from this town; he was there taken with the yellow fever; yet no one else in that place had it. Hayne left Providence the same day and went in an opposite direction, to Joe's Bayou, fifteen miles from this town; he there took the fever and died; yet not a single case occurred there.

I am satisfied that the disease is not contagious. Not a solitary case which went out from this place spread. Boats in July and August, from New Orleans, stopped here every day; goods, bales and parcels were also received every day. It is possible that the fever might have in this manner been brought and introduced here; yet many of those persons who had it first, had no connection nor communication with the boats.

Q.—Do you know of any cases of yellow fever originating out of the limits of the town, and in no communication with it?

A.—I think I do. Mr. Wood, an overseer on Mr. Sanford's plantation, who kept a wood yard some miles above, and had no communication with the town, is perhaps one. He may have been on board of boats, and may not. I think he was selling wood at the time. During the prevalence of the epidemic at Vicksburg, a trader went to Ira J. Manning's plantation, was taken with the fever and there died; but there was in this case also no spreading of the disease on or in the vicinity of the plantation.

Q.—During its prevalence here, did fever of any other type occur within the limits of the town?

A.—No. Everything seemed merged into the yellow fever. As an instance; I know an Irishman, who in endeavoring to mount a horse, fell

and hurt himself, and he went straight into the yellow fever. Two young men were in a wrestle, when one of them got a little hurt, and he too went off into the yellow fever. So of other cases; all seemed to tend and merge into yellow fever.

I should think that about two-thirds of the fatal cases were attended with black vomit. Mrs. Campbell, wife of the proprietor of the hotel, was taken with the yellow fever, 7th September. The last case of yellow fever in this place (Providence) was Sarah, an Irish girl, taken 28th November. Attest: W. P. R.

Dr. Nathaniel Houghton.—I have practiced in this place since 1845. Was absent on the first breaking out of the epidemic. Arrived from the North on the 13th of September. There had then been ten or eleven deaths. I do not know of any cases which originated out of the limits of the town, spontaneously. Mrs. Selby never exposed herself to the fever as any one knows of; she had no communication with any steamboats; was in the habit of going out very little. Pretty much all I know regarding her case is by report. I did not attend her. I saw no cases which led me to suspect contagion. I know of no local cause which should predispose this town in particular to those severe attacks of yellow fever; yet, like most other places similarly situated, it is dirty and filthy. Do not think there were any stagnant waters in the place at that time of the year. The lake, which lies about half a mile off, is clear. There was no yellow fever on either of its sides, except single cases which had been carried there from the town. Most of them were persons who usually resided in the town, but were temporarily in the country. I saw a good many cases of black vomit, and I saw children who had the fever; but adults seemed to be most subject to it. Saw in the meantime very little of any kind of disease; they all seemed to run into yellow fever. We had a remarkable season; a very pure, dry atmosphere, with a prevalence of North winds, both before and during the rage of the fever. I noticed no particular change in the health or condition of animals, except, perhaps, I may mention that the musquetoes were more numerous than was ever known before. During my stay at the North, my books were locked in my office, which remained closed. On my return I found them in good condition, as free from mould as is usual. I did not notice anywhere any unusually tendency to mould. I do not regard the fever of the past season as contagious in the proper sense; yet, for ought I know, it may have been infectious in bales of goods, &c.

I am not prepared to express any opinion in regard to the question as to whether the fever was of domestic origin with us or otherwise. As an opinion, I may say that I do not think that a quarantine would have protected us from it, and am rather inclined to the opinion that it originated with us, and was not imported. The fever has not been so severe and fatal on negroes as with whites. Mulattoes were more subject to it than negroes. Adults were more subject to it than children. I have not noticed that habits have had anything particularly to do in determining or predisposing an attack or spread of the fever. The disease did not spread

in the neighboring country, even where cases were carried out from town and died. On the case of a negro mentioned by Dr. Ball, I think it most probable that he had been in town; though I do not know the particular case indicated. The fever subsided at this place about two or three weeks ago. I know of no case which originated unquestionably spontaneously in the country. Should say the infected district extended three-quarters of a mile up and down the river, and about half a mile back.

Attest: W. P. R.

Judge Louis Selby.—My wife, Mrs. Selby, had not, to my knowledge, been exposed to bales of goods or anything of the kind, coming from New Orleans, previous to her sickness and death. She died on the 2d September; on the fifth day of the fever; though she had been unwell, and had been complaining of illness for some time previously. She had been in feeble health for a long time. A short time before the fever she had been eating green apples and what we call maypops (fruit of the *Passi Flora incarnata.*) I had previously received via the city, I think a couple of books and a little stationery; I should say one-half ream of paper; but they were carried directly to my office, about one hnndred and fifty yards from the house. I do not think my wife ever saw them. I have a negro man who frequently goes to boats when they land—he sleeps some six or seven rods from the house. I think Mrs. Selby did not call on Mrs. Campbell (the landlady) previous to her attack of the fever, for I am of opinion that Mrs. C. was absent at the time. During Mrs. Campbell's absence, I do not think that Mrs. Selby ever called at the hotel; yet I think it probable that she might have passed by it. Mrs. Selby had black vomit previous to her death; copious and abundant; seven hours after which she died. I did not notice any particular yellowness of her skin, though I did notice some post mortem purplish spots. Am not certain whether I noticed them before she died. I am as certain that Mrs. Selby did not *catch* the fever of anybody as I am of anything of which I am not absolutely sure—in other words, that is my firm belief. I think the fever was not contagious, but that certain localities may have become infected in a manner to induce the disease; but when cases have been carried out of the infected district into other localities it did not spread.

Q.—Have you, during the prevalence of the epidemic, or before, observed any local causes to which you could attribute the rise or continuance of the disease?

A.—I think I have, and I have given particular attention to this matter:

1. During the winter there was a large quantity of sawdust spread in the streets, in some portions of the town. In summer, this mixed with the mud, and produced a very disagreeable smell.

2. In certain parts of the town there are filthy localities—for instance, I know an Irishman who has a cow and calf, a horse and a hog, and they all live pretty much in common with the family.

3. The high water mark of the river has been considerably lower this season than is usual, and thus a greater depth and larger surface of the

bank has been exposed than is common. I have lived here since 1829, and do not remember a season which has not had higher water than the past one. I do not know that on the shore any portions of fresh earth have been exposed by excavations; no new clearing up of land. The season has been remarkably dry.

Q.—For a short time preceding, and during the prevalence of the epidemic, did you observe anything remarkable, as to the occurrence of mould upon books, furniture, &c.?

A.—I did. I have observed, I think, that these articles moulded twenty times, I might say one hundred times more during the epidemic, even notwithstanding the remarkable dryness of the season. I called the attention of Dr. Larche to the abundance of the toadstools in my yard; almost covering it entirely; they were white, and of all sizes, domed and shaped like an umbrella.

Q.—Did you observe any peculiarity in the growth of vegetables?

A.— The fig trees did not produce so many figs as usual, nor were those which did grow of so good a quality as is usual. The grass in some places, especially the Bermuda grass, grew remarkably fast. I mentioned the circumstance to Dr. Larche, and he had also observed the same. I may also mention that my yard is generally almost alive in the spring, &c., with mocking birds; but I thought it a little singular that during the whole time of sickness, I noticed only one—about the time when the sickness commenced I saw plenty of them. My wife was taken first, then my oldest son. When he was getting better, I killed a chicken for him, but he could not eat it. I tasted it, and it had a peculiar disagreeable flavor. On examining the rest of the poultry, which appeared in pretty good condition, I found them poor and lean, and even some of them dying. In 1829, I was in New Orleans, and owing to the prevalence of the yellow fever, I went to Bay St. Louis, and found the fever there also very bad. I then went fifty or a hundred miles away into an old camp, where I was sick for a little time. Whether I had the yellow fever, I do not know. If I had it, it was very slightly. I do not think that the disease was really very bad here this year, under proper treatment; not near so bad as I saw it in 1829. I think that many killed themselves with medicines which would have killed a well person. I had several cases in my family, but lost none except my wife (the first case.) I know nothing in regard to the circumstances connected with Pat Feely's case. He died about the time my wife did.

APPROXIMATE ESTIMATE.

Population of Providence, near.....1000
" during the epidemic reduced to near.....400
Number of deaths about.....165
Whole number of cases of fever about twice as many, viz—near....330.

Attest: W. P. R.

December 25th.

Mr. Robert Campbell, landlord of the Sparrow House, Providence, La.—My wife returned, on the 26th of August, from ——. She was

taken with the fever on the 6th of September. Mr. Odell staid in room No. 13 two days, then went to room No. 8, in the Sparrow House. Any person going to Mrs. Kimble's room by the front way, would have to pass by No. 13. Do not think that Mrs. Selby was here during the time of Odell's sickness at all. The Stacy came about a week after Mr. Odell arrived. She stopped, I should think, about eight hours. Dr. Bowman and myself went on board of her. Others might have gone on board, for ought I know; though I saw none go aboard. It is my opinion that the fever originated here with us. I have seen nothing to make me believe it was contagious. I have reasons for believing that it was not contagious —for instance, Mr. W. T. Curry and Mr. Frank Pennington nursed patients here for a month; then went out to Drew's plantation, on Lake Providence, where their families were. There they found as many as thirty-two persons crowded together in a house, or in three small rooms. Curry and Pennington both had the fever there, yet no one there took it from them. People were going aboard the boats which were stopping here every day, and goods were also received from the boats as usual.

Attest: W. P. R.

JOHN MAXWELL, (Surveyor).—My opinion is that the fever was brought here through the Orleans mail. Some think it was brought by the D. S. Stacey. I did not go aboard of her. The mails were left aboard the wharf-boat; generally from one to two and three hours, and sometimes all night. The wharf-boat sunk about the 1st of November or the last of October. Think the inhabitants were not in the habit of going aboard of the wharf-boat much. We were not at the time receiving a very large quantity of goods; yet, we were receiving regular shipments of ice, cigars, &c. Do not know of the reception of any bagging or rope. There was some bagging aboard the wharf-boat when it sunk. I think that certain localities became infected and were infectious during the epidemic; but when the disease was carried away to other localities it did not spread. I keep a barometer and thermometer, and observe both. At no time in the summer did I observe the thermometer above 74 deg., i. e. at about sunrise, or a little after; being the usual time of my observation. This has been the dryest fall we have had for years.

Do not know the precise date of the first frost that occurred here. In another portion of the township it occurred, I learn, on the 24th of September. On the morning of that day my thermometer indicated a temperature of 46 deg. I have not observed that books and clothing have been more apt to mould during this season than in other years. I know of no local causes which should have induced the fever at this place. There was some saw dust spread in some of the streets about twelve months ago, not, however, in very large quantities, that I am aware of. My servant girl told me that Mrs. Selby did visit Mrs. Kimble (the mantua-maker), at the Sparrow House, previous to her illness and death.

Mary, (servant girl, colored,) called in, and says: that she does not know whether Mrs. Selby did visit Mrs. Kimble or not. Said she washed for Mrs. Kimble. Mrs. Selby's maid (colored girl) said that Mrs. Selby

had *not* been to see Mrs. Kimble for a long time previous to her having the fever.

Mr. Maxwell, (continued).—At high water the river did not rise so high as usual by some inches, though the difference was less than one foot; but taking the whole season together, I do not think the river bank was left more exposed than usual. My opinion that the fever was imported by the mails is partly founded on the fact that the postmaster and his family were among the earliest (though not the first) to have the disease. The two negroes who were in the habit of carrying the mail from and to the wharf-boat, were taken sick first about the 5th or 6th of September; one of them died on the 11th. Mr. Miller, the postmaster, was taken about the 9th or 10th, and died on the 13th. His two daughters were sick at the same time. They had all of them assisted in opening the mail. The postoffice is in the West side of the town. These were the first cases in that vicinity, except one, Mr. Clark, who was in the habit of going frequently to the boats as they landed. Mr. Dunn, the son-in-law of Mr. Miller, then also took the disease and died. His family then went to Greenville, Miss., and there had the fever; but did not communicate it to the people of Greenville. Our Eastern mail comes by way of New Orleans. A great many New Orleans papers are received, and some of them distributed throughout the surrounding country. In the country where these papers were received the fever did not occur. We had cases of fever and deaths therefrom after several light frosts.

The first killing and freezing frost occurred on December 8th. This I take from a record kept by myself. Since that we have had no cases of fever.

Population of Providence when the epidemic commenced, say	550
The epidemic commenced, say 10th or 12th of September, all had left but, say	280
Total number of cases in or near Providence	260
Total number of deaths (up to Dec. 25),	152
Number of citizens escaping the epidemic, all supposed to have had it before, white and black	19

On the Mississippi side of the river, immediately opposite to Providence, are the cotton plantations of Mr. Parkes and Mr. Duncan. During the prevalence of the epidemic, no intercourse with Providence was permitted, and no case of yellow fever occurred on these plantations.

Attest: W. P. R.

Mr. W. T. Curry, (Curry & Pennington,) wharfmaster:—*Extract from the Register:*

August 1st.—By the Frank Lyon were received 11 bales India bagging, with a large freight of groceries, &c., (worth, say $15,000 or $20,000.)

August 7th.—By the Golden Gate were received a large lot of sundries.

August 8th.—Frank Lyon—every kind of plantation supplies.

August 9th.—By the Swamp Fox—44 bales of rope, &c. Boat lay here three or four hours—had been run into below while coming up; and

waited here to make out a protest. Many people went aboard of her. She had fever on board.

August 12th, 6 o'clock, P. M.—The Memphis staid one hour—left 20 bbls. lime, 10 bbls. cement, 1 bbl. plaster, and 5 bags plaster hair.

August 15th.—By the Frank Lyon, usual supplies; including India bagging, rope, Lowell cloth, &c.

August 22d.—Received lot of miscellany from Vicksburg; shipped while the fever was there.

August 24th.—At 3 o'clock, P. M., the D. S. Stacy arrived, snagged—left a large lot of all kinds of things. Must have remained here six hours. Some people went on board.

It is my opinion that the yellow fever must have originated here, and was not imported. Attest: W. P. R.

December 27th.

George J. Hook, dry goods merchant, Providence.—I know of about one dozen persons in this place, who were exposed to the fever, that did not take it. I am one; Mr. Pennington is another; Mrs. Kauffman and three children.

I received dry goods during the continuance of the epidemic. When I opened my store I noticed that my shoes were unusually musty and mouldy, my other dry goods also.

Dry goods were being received all along during the fever in August and September, &c. I also distinguished the peculiar odor mentioned by some others; a very unusual and remarkable odor; which I cannot describe. It seemed to run in veins through the town. I think that the fever originated here. Do not believe it was contagious.

Attest: W. P. R.

Hercules Hillman.—I am a resident of this place, but own a small plantation below, but do not live at it. I am knowing to the fact that Mr. John Tucker, brother of Gov. Tucker, lived on the river bank, some seven miles above Providence. He was taken sick with the fever, and died in October. There is no boat landing at his place. He did not come to town. He was sick seven or eight days, but had been complaining before the time of the decided attack of fever. He had black vomit. He was a planter; and it is thought that he was not at all exposed to the fever. If any of his negroes came to town, they did it unbeknown and secretly. He was very scary and careful not to expose himself at all. Would not touch anything which came from this town; not even the smallest rag. There are some pools of water back of this place, very close to him.

Old Mr. Triplet, who lived off from this place, died with the fever. It is, however, said that he caught it from town.

I believe that feathers, or bagging, or cloth, transport the fever from one place to another. I would not, myself, for anything, sleep on a bed on which a man had died of, or had yellow fever; although I am inclined to think that I had the fever in 1839. I think it came to this place by being brought by the steamboats.

For some particulars inquire of my brother, George Hillman, master warden, New Orleans. Attest: W. P. R.

TESTIMONY OF H. B. SHAW, Vidalia, La., Dec. 31, 1853.

DR. J. L. RIDDELL, New Orleans:

Dear Sir:—As requested by you, I will now answer the questions relative to the yellow fever epidemic in Vidalia and its vicinity, during the year 1853, as well as I can from recollection, and by reference to memoranda made by me during the time of the epidemic.

Vidalia is a small village on the right bank of the Mississippi river, nearly opposite Natchez. Its population is somewhere between fifty and sixty persons, about two-thirds white, and mostly adult males. It is situated in a planting region, and has no commerce; its inhabitants being principally officers of court, or connected therewith. The residences are not crowded together, but occupy separate lots of ground, and have open spaces around them. Above and below the village on the river, and in the rear, are extensive cotton plantations, which have been cleared up and settled a great many years since. The soil is of the ordinary alluvial character, somewhat intermixed with fluviatile sand. The face of the country is the same as is common on the Western bank of the river, and the rain water falling on it flows freely and rapidly off. There are no marshes near, and there are but few ponds of stagnant water, and those of but small extent. The plantations are very well drained. There has not been any recent clearing of land, or disturbing of the soil, in the neighborhood, otherwise than by ordinary cultivation of the fields. The drinking water used is obtained exclusively from underground cisterns; no wells are used. This locality has long been considered to be healthy; more so, indeed, than most of similar places on the river. I have not known any case of yellow fever to originate here during fourteen years of constant residence, until this year, and am informed by persons of undoubted veracity; who have resided in the immediate vicinity for over fifty years; that they have never known of any such. Certainly, that disease has never, within the knowledge of living man, been epidemic in Vidalia until 1853.

No register was kept here, and I cannot give any precise information as to the meteorology of the past summer. I can only state from recollection that the early part of that season was dry and hot, and the months of July and August were wet and hot. The quantity of rain which fell during those two months by far exceeded their average. For some time previous to the epidemic, and during its prevalence, the course of the winds was generally from easterly points.

I do not recollect to have observed anything unusual or remarkable in the animal or vegetable kingdoms prior to or during the epidemic; certainly none other than was due to the character of the weather.

The population of the village during the epidemic was between fifty and sixty persons, including those who were temporarily there. About

two-thirds were whites; mostly adult males; very few being under ten years of age. Of this number, there died of yellow fever, five white adult males, and three females; four children, males, and two females; and two blacks. There were in the neighborhood, one white male adult, one child, and several blacks, who also died of yellow fever. There was but one white resident of the village, and three or four blacks, who did not have the fever. In the village and its immediate vicinity there were over forty cases of yellow fever among the whites, and over thirty among the blacks. Of the adult inhabitants, none were natives of the place, but all were of the United States, except one German woman.

The yellow fever evidently become epidemic in Natchez about the middle of August, at which time Vidalia was healthy, though communication between the two places was frequent and uninterrupted for some length of time. On or about the 20th August, the German woman above mentioned, recently from New Orleans, was sent to Vidalia sick, from the quarantine station at Natchez, where she had been two or three days. The attending physicians pronounced her disease to be yellow fever; and in a few days she died, having black vomit, and bleeding from the nose and gums. On the 22d August, a gentleman who had left New Orleans two days previously, arrived at Vidalia, apparently well. On the third day after his arrival he was taken down with yellow fever, from which he recovered. On the 23d, a family came over from Natchez; the man sick of what proved to be yellow fever, from which he recovered, after a severe and tedious illness. Up to the 25th, there was no other case of yellow fever in Vidalia. In a very few days the yellow fever broke out in a family residing in a house not far from those in which were the sick above named. Of that family, all whites, five died. About this time the disease made its appearance in some members of a family residing half a mile below the village, on a plantation. Those first attacked had been a few days before in Natchez. From that time the disease spread in all directions; new cases occurring every day, until the whole population had undergone it.

I am unable to give the particulars of cases, or describe symptoms, further than to say, that usually the first were apparently slight, and not supposed to be serious; it was, however, rapidly developed yellow fever, and very malignant in its character; running its course in the fatal cases, in from three to five days. Some of the attacks were violent from the first symptom observed. Every death within my knowledge, except one, was preceded by black vomit; that one was of a child, who passed the black matter by purging. Generally they had bleeding from the nose and gums. I know of no case of recovery after black vomit; though several such were said to have occurred.

Some of those having the yellow fever, were known to have contracted it in New Orleans and Natchez; but I know of none from contact with goods or clothes. I cannot say positively that any took the disease by communication with or nursing the sick; but I do know that persons who contracted it elsewhere, went to places where, at the time of their arrival,

none were sick, and that in three or four days afterwards, the disease attacked the families, and spread regularly and progressively. Of this fact there is testimony enough which cannot be disputed. I know of but two whites exposed to communication and contact with the sick, who escaped the fever, except persons who had previously had it. These instances occurred in my own family. Some members of my family had been in Natchez, after the fever was prevalent there, though not supposed to be epidemic. In a few days afterwards they had the yellow fever, which attacked every other member in turn, except two children, and three adults who had previously had it. My residence is isolated from all others; a plantation intervening between it and Vidalia; the house large and well ventilated, and no marshes or ponds near it. Except those mentioned as first attacked, none of the others who were afterwards sick, had been in Vidalia or Natchez, or in any other place where the fever prevailed. There were several instances where the disease appeared on plantations having intercourse with infected places, and none, within my knowledge, on plantations not having such intercourse.

As to the social condition of the population, I have to say that generally our people are not intemperate; though some of them were so; and that abject poverty and want are not known among us. With the intemperate the disease was generally violent, and short in its course, but there were also cases of equal violence and rapidity among some known to be strictly temperate. The first case known to be of home origin—I mean among persons who had not gone to an infected place—occurred in a small house, somewhat crowded with a large family. In the course of a week after the cases brought to Vidalia, nearly all that family died.

From the first appearance of the epidemic until it finally left us, all fevers here seemed to assume the type, or as we call it, ran into the yellow fever. I know of but one fatal case without black vomit.

The development of the disease in those known to have contracted it elsewhere, was usually in from three to five days from their exposure. In those cases believed to have been contracted by communication with the sick, the time of development was uncertain and irregular; sometimes in two or three days, and sometimes much longer. In my own family there were some taken three or four days after the first known exposure, and others not for several weeks.

I do not doubt the epidemic to have been genuine yellow fever; I have seen it many times before. In Natchez, in 1839, during the epidemic of that year, when I had it myself; and in 1847, I saw unmistakable cases on steamboats from New Orleans. I know of one person who had the fever this year, after having previously had it twice; and one who, after having had it in 1837, had it this year again. In my family there were three of us; adult whites; who had the fever in Natchez, in 1839. We nursed our sick for over two months. I was myself in Natchez almost every day during the greatest virulence of the epidemic there, and much exposed, and yet none of us three were attacked this year. I know of but one white person in Vidalia who entirely escaped the fever, and that one

kept pretty much aloof from the sick. My own children, who all had the fever, were born and reared in the house where I live; and the two children who escaped it were my brother's; who, though born here, had been for several years at the North, and this was the first summer passed by them again in the South.

I do not know of any person hereabouts who had not previously had the fever; and had much communication with the sick, without taking it. I do not know of any case which I believe to have been of spontaneous origin.

TESTIMONY OF DR. W. B. WOOD, CENTREVILLE, La. ,November 14th, 1853.
E. H. BARTON, M. D., New Orleans.

Dear Sir:—Your favor of the 1st inst., accompanying the "circular of the Sanitary Commission," was duly received; a press of professional business has prevented my attending to both, at an earlier day.

At your request, I inclose to your address, a copy of the article which I published in the Planters' Banner, on the 1st of September last, on the subject of "quarantine in yellow fever," along with the "circular of the Sanitary Commission;" the interrogatories contained therein, having been answered as concisely as practicable.

It will be seen by reference to the "circular," that the first case of yellow fever that occurred in our village, appeared on the 15th of September; was well marked in all its symptoms, and terminated fatally, on the ninth day, from a relapse which occurred on the fifth day; this was a mulatto boy, aged about 25; a cooper by trade; who worked and slept in a cooper shop, situated immediately on the bank of the Bayou Têche. This boy had had no intercourse with any person having yellow fever, nor had he been out of the place to expose himself to any locality where the fever could possibly be prevailing. I regard this case, beyond a doubt, as having originated spontaneously here, without any suspicion of intercourse with other cases of the disease.

Centreville is situated on the South bank of the Bayou Têche; the Bayou at this point, running from West due East; a North wind then would pass directly from the Bayou into the village. The principal part of the dwellings are situated on a ridge of land running parallel with the Bayou, and removed from it, from three hundred to six hundred feet; this ridge is several feet above the level of the water. But between this ridge and the Bayou, and directly in front of the town, is situated, immediately on the bank of the Têche, three large coopering establishments, and a large saw mill; all of which have been in active operation for several years; and with the view of raising the low, marshy places around them, they have been in the habit, instead of burning the chips, shavings, &c., accumulating about them, of throwing them into the lowest places, and into the edge of the water in the Bayou, with the view of making a substitute for a

wharf, at which steamboats could more conveniently land in low water. This practice has filled the marshy places about each, and made it comparatively dry around them; but during wet weather the whole mass seems to be afloat, and underneath the surface, is in a very decayed condition; this, too, is all exposed to the rays of a hot sun in summer. Now so long as the wind blew from the village towards the Bayou, our town remained perfectly healthy; but, so soon as it changed from South, or Southwest to North, which occurred on the 18th of September, and continued to blow steadily from that quarter, as it did, for at least two weeks; the yellow fever appeared in the village and spread in all directions; but, particularly in the track of the wind, as it came from the bayou, passing over the largest bank of decaying chips and shavings could the disease be traced, and it did leave its plainest mark.

I believe the disease originated spontaneously here, and was not imported into Centreville from Pattersonville, or any other place; and having watched closely its rise and spread at this point, during the period embraced between the occurrence of the first case, (15th September,) and its disappearance, (about 1st November,) as an epidemic, I have been unable to discover one single fact going to prove any *contagiousness* in the disease, or to discover the slightest evidence in any case where it has been propagated from one person to another; as we can trace the spread of the measles and small pox among the nurses and attendants.

I know that *here*, as *at other places*, where the epidemic has prevailed during the past season, that persons standing off at a *safe distance;* having neither the courage nor the capacity to approach near enough to town to make a correct examination of the facts in the case, can boldly contradict the opinions and observations of those who remained on the ground and met the enemy face to face, giving what aid and succor they could to those who fell victims to the scourge, and assert most positively, (perhaps furnishing their opinions to some distant newspaper) that the yellow fever was imported into Centreville, from Pattersonville, or New Orleans, with a box of shoes, or a keg of nails; and that in *their opinion* it is as contagious as small pox or measles; and can only be *kept* out of a community as our parish authorities *kept it out* of St. Mary, by the establishment of an extensive and oppressive system of quarantine regulations.

The Police Jury of the parish of St. Mary, "with the view of preventing the introduction and spread of yellow fever" within our limits, established the strictest quarantine regulations, about the middle of August, and stationed health officers on the Atchafalaya, near the mouth of Bayou Têche, and at Berwick's Bay; rendering it impossible for steamboats or vessels from New Orleans or the coast, to get into our parish without submitting themselves and their passengers to the quarantine law, under penalty of being fired into and sunk if they attempted to pass up the Bayou Têche without submitting to the delay required!

These regulations required boats and passengers to remain nine days from the time they left any port or place where yellow fever was prevailing as an epidemic, before they could even enter the Bayou Têche and proceed on their journey to Newtown or St. Martinsville above this; and in some instances they were kept in quarantine for eighteen days; as was the case with the steamer Pitser Miller. Think of that, ye advocates of quarantine laws! The parish authorities of St. Mary detaining a steamboat, loaded with freight and passengers, in quarantine, eighteen days; which only asked the privilege of passing *directly* through the parish, on her way to St. Martin's parish! and then tell me how long the authorities of the parish of Ascension or Iberville, lying as they do, on both sides of the Mississippi river, would detain the Magnolia or the Southern Belle, or any other steamboat, loaded with freight and passengers for Concordia parish, or Bayou Sara, in quarantine, before they would allow them to proceed on their way up the Mississippi river?

And yet, with all these rigid quarantine regulations enforced in St. Mary; subjecting the whole community to great expense, and greatly endangering the lives of those subjected to quarantine; besides, being the greatest inconvenience that our traveling population could be forced into; the yellow fever made its appearance at Pattersonville, *nearest the quarantine stations*, early in September, and at Centreville on the 15th of the same month!

These two places have never before been visited by an epidemic of yellow fever, and if we were to use the same sort of reasoning on the subject that the advocates of contagion and importation do, to convince the world that the disease is of foreign origin, and consequently imported; we might, arguing with as much plausibility and truth, show to the world that the quarantine regulations, for the first time enforced in St. Mary's Parish, had been the cause of the epidemic at Pattersonville and Centreville.

Centreville is considered a healthy place, and was supposed to be free from any infection which might possibly give rise to yellow fever. But what is true of the local condition of Centreville in a sanitary point of view; if closely investigated at other points where yellow fever has prevailed epidemically the past summer and fall; would, perhaps, be found to exist at these places also.

In my opinion, it is true in reference to New Orleans, to Baton Rouge, to Bayou Sara, to Natchez, and other places, and may be true, when investigated, at all other points.

If we would arrest the spread of yellow fever in the Southwest; in my humble opinion; we must rely upon a rigid system of police, carrying out at a *proper season*, a correct and well directed plan of sanitary measures in our towns and cities, and not upon any system of quarantine regulations, which should be regarded as a relic of the barbarous ages, and as a stigma upon the enlightened and progressive age in which we live. They have signally failed in all past experiments,

and should now be regarded, in this enlightened Christian age, as a disgrace to any civilized community; calculated, when rigidly enforced; as they were in the Parish of St. Mary, to entail more misery upon a community than the plague itself.

TESTIMONY OF S. B. CROCHERON, NATCHITOCHES. LA.

To Hon. A. D. Crossman, New Orleans.

The name of the locality is the town of Natchitoches, and the lower portion of the Parish of Natchitoches. Its limits and boundaries are: Little river on the East, and pine and sandy lands on the North, with a bayou; and on the West pine hills and springs of pure water, and a lake about a mile distant; and on the South by old Red River. The surface soil is sandy and clay, and alluvial soil. Drinking water principally is cistern water; not much spring water; being very inconvenient to get. No lands cleared; ditches of the town cleaned out in August last; wells, canals, levees, improving roads, none; a great deal of paving done in July and August. Marshes, none; a pond of water, about a half-acre, in lower part of town, where the least sickness was; river not navigable. All water runs freely off in the rivers and bayous.

Meteorological observations, none. Previous to the epidemic, say a month, was very wet; during the epidemic quite dry, As the epidemic subsided, very hard rains set in. Nothing remarkable in the animal or vegetable kingdom, excepting the caterpillar or cotton worm, which was very abundant.

From yellow fever about one hundred and eighty deaths in this parish, and deduct about one hundred from the one hundred and eighty, for other fevers and diseases; leaving about eighty persons that died from what is here and elsewhere called yellow fever. Number of adults, children, male or female, white or black, foreign or native, I cannot give.

The first case was on the 10th of September; which I did not see; and died on the third day. The second case was on the 17th, and I saw that on the third day; and that case had many of the typhoid symytons, and died on the 20th, six days after the first attack, with black vomit; and no other case in town until the 23d of September, at which time it came upon us like a thunder storm in the Gulf. None of the cases had been in a yellow fever district.

From handling of goods, clothing, and or from direct intercourse with others; none. I do not believe it to be contagious.

The *two first* cases originated spontaneously; neither of them having been either directly or indirectly exposed. Those two cases were living at or near the junction of the two rivers, on the Southeast of the dwelling; and a stagnant pond on the West of the buildings.

Temperate, intemperate, isolated, or crowded houses; no difference; as it had no respect to persons; and, as to the temperate, what I saw, the attacks were equally severe, but more manageable.

First, pain in the bones; the most acute and torturing pain was in the two sacro illiæ symphyses and head; some with red, watery eyes, and some with a pearly white and dry eye, to last during the attack; after the bones paining awhile, a chill—some very hard—lasting from ten to sixty minutes; and that followed by fever; in some cases, the pulse 140, and in some not over 120; and the disease varying from three to seven days. *In all* cases that could be brought under the influence of mercury, they recovered; and some that mercurials would not touch, and pass the sixth day, recovered.

Quinine has killed more than the fever.

In what proportion of cases was the black vomit? Three-tenths.

Yellowness of skin, *all.* Hæmorrhage, none.

Did other types of fever prevail at the same time? Yes! other types prevailed; there was a large number of cases of simple remittent fever; eighteen in one family; all of which recovered; but in many cases of simple remittent fevers, the case would take on the character of the malignant form, and if not closely watched, would run into the malignant bilious fever.

Q.—Assuming the propagation of the disease from exposure, either to an infected atmosphere, to personal communication with the sick, or contact with goods or clothing, either of the sick or transmitted from a locality considered infected; what time intervened between the exposure and the appearance of premonitory symptoms, and also the development of the disease?

A.—After twenty-four miles night ride, and seventy-two hours close attention on a lady; twenty-four hours after I was taken down; three hours before I was taken to bed, had all the premonitory symptoms of malignant bilious fever; and of several others of the family of the lady, not one took the disease. This was my first summer in Louisiana.

Do you regard the epidemic as true yellow fever? I do not regard it as true yellow fever.

Have you ever seen this disease before? I have not.

I saw three cases of black vomit; also, a number of cases recovered thereafter. None recovered; although four, reported by citizens, of my cases.

Of the cases that I attended, all where the first attack: the greatest number of deaths were on the third and fourth days.

MISSISSIPPI.

TESTIMONY OF DR. J. M. W. PICTON.

Case 1.—*Bay of St. Louis, Miss.*—His first case at the Bay of St. Louis occurred on the fifteenth of July, the second on the seventeenth. The first was a resident of New Orleans, the second had just arrived from Nicaragua. Both were young men, and both were taken sick on board of the steamboat from New Orleans, on their passage across the Lake; these were the first cases occurring at the Bay of St. Louis. Previous to this time

intermittents prevailed generally. The Dr. returned to town, and cannot say if the disease spread from these cases.

Dr. Picton thinks the disease communicable from one person to another, wherever the epidemic influence prevails: thinks the disease was imported this year. The weather at the Bay of St. Louis was warm during the day and rather cool at night during the latter part of August and first of September; Westerly winds prevailed during the month of July and first of August. Noticed much formation of mould during the summer; has never seen a second case of yellow fever occurring in the same individual. Thinks the intemperate are more liable, and the attack more likely to be fatal; thinks the epidemic ceased from want of subjects; has seen two cases of recovery from black vomit; one was a young lady of fourteen; the other a negro of twelve years of age. During the height of the epidemic in the city, the Dr. experienced a giddy sensation when visiting close rooms, or rooms containing many patients; this was relieved only by breathing the open air. Always observed a peculiar odor in yellow fever patients; first noticed this in 1847.

TESTIMONY OF DR. JONES.

Ocean Springs, Miss.—The first case of yellow fever at Ocean Springs, was Mr. Waters, of the city, early in August; had been sick three or four days before visiting him; he slept in the garret with some thirty others, (unacclimated.) The next case was young Porter, who arrived a month after; he recovered; the third case Wm. Ames, a resident of Mississippi; did not at the time consider it a case of yellow fever; from after cases recognizes it as fever. The children of Dr. Austin were taken in succession soon after Mr. Porter.

TESTIMONY OF DR. DAVIS.

Ocean Springs.—His daughter remained two days in Dr. Austin's house, was taken sick, and died; it then spread through the family, and all but two, a child and a little servant girl, escaped. The interval was about one day; the first case 12th September.

TESTIMONY OF MR. PRADAS, OF BILOXI, MISS.

Biloxi, Miss.—Mr. Pradas is concerned in the Live Oak Hotel; he states that a man came to the city during the epidemic, returned to Biloxi, had the fever and died. This was not the first or only case. Has seen persons who were unacclimated frequent the room of the sick man, who did not take the fever. Knows of no instance where the disease seemed to be communicated from one person to another.

TESTIMONY OF MR. MALCOMB McRAE.

Madison County, Miss.—Mr. McRae is from Harrison county, Mississippi. Resided last summer forty miles back from Biloxi; knows of no

case which occurred there, which had not been exposed in Biloxi. A Mr. Walker made a short visit to Biloxi, returned, and died in one week; several members of his family were taken sick.

At Pascagoula, Mrs. Delmas attended relatives who came from New Orleans; was taken sick after nursing them. Col. Bliss died with yellow fever at Pascagoula; he had been in New Orleans seventeen days before. A man named Foley, a laborer, returned from Mobile, and died with fever. Miss Fitz resided two hundred yards from Mrs. Delmas; was in constant attendance upon Mrs. D., but escaped.

There was much rain early in the summer; subsequently it was dry; not more heat than usual. The Southwest winds commenced one month earlier this year than usual: there was not much moisture; mosquitoes were in greater number, and flies were seen earlier.

Mr. Ramsey's family was taken with the same disease which prevailed in the neighborhood, without having been exposed by communication with any sick person.

Mr. Dickey contracted the fever in Biloxi, returned, and none who attended him were taken.

Mr. Hatton's family, which was as numerous as Dickey's or Walker's, escaped, although exposed.

TESTIMONY OF DR. N. B. BENEDICT.

Case 1.—John Allen, No. 17, Religious street, occurred on the 1st day of June; sent the man to the Charity Hospital. The locality from which he came is very crowded; the second case was Patrick Gilligan, an Irishman, in Tchoupitoulas street. Dr. Benedict has not had the fever; has treated over 400 cases in and near New Orleans. The Dr. gave a brief account of the fever in the woods. near "Hollywood," Mobile Bay, and promised a full one in writing. [See letter to Dr. Barton, in Appendix.]

COMMUNICATION FROM JNO. V. WREN, M. D.

Port Gibson.—Is about one mile square; is bounded by ridges on a succession of hills from one to two hundred feet higher than the town, which is near the centre of this second table or lower water shed. The soil is sandy calcareous; a kind of yellow clay predominates. Cistern water is chiefly used; cisterns underground.

Disturbance of soil not more than usual in this area.

Position.—Six miles East of the Mississippi, in a bend of the Bayou Pierre, which comes in through the Southeast, passes around the North side, and departs through the hills on the West. There is a small cypress swamp North by West near the town. Water runs freely from nearly all parts of this area to the Bayou. There is very little stagnant water any where in the corporation. The maximum temperature 93 deg., in the shade, and only one afternoon; frequently 90 deg. During June, July and August, not below 75 deg. In the early part of the summer frequent

rains; atmosphere very moist, and unusually charged with electricity. During the epidemic very dry weather, and after dense and cold fogs existed. The wind generally blew from the South and adjoining points, but during the epidemic here its course was from the North, Northeast and Northwest, though that was about the change of the trade winds. Fruits were not as good as usual, insects and dark unhealthy spots appearing on peaches, quinces and nectarines. During the last five years flies, gnats and mosquitoes have been on the increase. A light blue mould was very common on the grain.

Case 1.—The first case occurred on the 11th day of August, and died on the 14th; was a German bootmaker, who had gone to New Orleans for materials, and had the symptoms when he returned. He lived in a crowded house, in a filthy part of the town, low situation, being near the Bayou, and little above high water mark.

In from eight to twelve days other cases of sickness occurred in the same locality, and some in the same house; the virulence and number of the cases increased, until a second death of black vomit occurred, September 2d. The next morning another case of black vomit, and several new cases; some of them in the higher portion of the town. Yet, perhaps, all but one had passed by the original locality, or, had been engaged in business near it. The exception was a lady of one of the best families here, who had just returned from Cooper's Wells to a well ventilated house in the highest portion of the town, and who took the fever and died with black vomit in twenty-four hours. Previous to the second death, a very severe case of sickness occurred on the ridge or upland, West of the town; and which is now pronounced yellow fever. The patient was of the nervo-sanguineous temperament; and had merely passed along on the opposite side of the street, where the fever had first appeared.

Most of those who died were persons of careless and intemperate habits, and most of them of a lymphatic temperament.

The first case was a man who had a short time before returned from New Orleans, where the fever was at its most fatal stage as an epidemic. The disease spread from square to square for some two or three weeks, until the whole village had been visited by it. All classes seemed to be equally subject to the disease. The prominent symptoms were the same as those occurring in New Orleans; firstly, chill, duration of fever thirty-six to forty-eight hours, slow convalescence; or, hæmorrhage with black vomit would succeed, with extreme yellowness of skin and death. Black vomit occurred in nearly all the cases that died. I had seven cases of true black vomit that recovered, during the month of September. I have seen this disease during every epidemic that prevailed at Natchez since 1825, and one or two epidemics in New Orleans; and must say that the disease of this year, as I saw it in New Orleans and in this place, being of the same type, is in my opinion different in some of its peculiarities from any epidemic yellow fever. I have never seen the nervous symptoms run higher; and the fever has, in many cases, assumed more of a

typhoid character; still, I deem it the true yellow fever, of a most malignant type. I have seen no case this year of alledged second attack.

From the lights before me, I am still of the opinion I have ever entertained, that yellow fever is not contagious; and have had no reason to change that opinion. Yellow fever occurred in several places in this vicinity, where no communication was held with an infected district. At Woodlawn, six miles Northwest of this place, there were, among the blacks, sixty-six cases of yellow-fever, three cases of black vomit, four of passive hæmmorrhage, and two deaths; eight cases occurred after frosts of severity sufficient to kill all vegetation. I know of but three or four persons who were employed, either as physicians or nurses, who have escaped the disease.

TESTIMONY OF MR. JOHN H. CRUMP,

Contractor R. R., on board the steamboat "Southern Belle," December 28th.

The first case of yellow fever at Port Gibson, was that of a German shoemaker, about the 6th of September, who had brought up a stock of leather, shoes, &c. from New Orleans. He landed at Grand Gulf, from the river. The fever did not occur at Grand Gulf until after it had broken out in Port Gibson. The wife of the shoemaker was the next case at Port Gibson; and, some four or five cases occurred in the same house before the fever broke out in other parts of Port Gibson. The shoemaker was sick four days, and died. His wife had it two days after he died. There were several cases fatal. In the course of three weeks from the first case it began to spread through the place, and seemed to radiate from the shoemaker's house, as a centre. This house is situated in a filthy portion of the town, low and wet. Population about 1000. During the epidemic, there were left in the town about 200 whites and 300 blacks. There were sixty-four deaths. The fever, as epidemic, ceased the 28th October, though some cases occurred thereafter. The fever spread into the country for some fifteen miles, and cases when carried from town produced many new ones. Very few cases were carried out which did not spread. I have never had the fever. I regard it decidedly infectious. Before this season I have not regarded yellow fever infectious. I think the infection can be carried by persons. Whether by good and bales, I cannot say. I have kept no memoranda in regard to the fever; what I mention are general conclusions from what I have heard and seen. Attest: W. P. R.

TESTIMONY OF MR. J. H. MOORE.

Port Gibson.—Lives in New Orleans; arrived in Port Gibson on the 8th of September; knows nothing of the first cases there, except from hearsay.

There are three elevations upon which the town of Port Gibson is situated, each higher as you go up from the river. The first case took place on the lower level; the next was a negro woman, who was brought from

New Orleans by Mr. Green; she took sick on board of the steamboat; she was carried to the highest elevation. He understood that the fever spread from these two cases; the town was healthy until the occurrence of these cases. These facts were communicated to him.

There had been no cases in the vicinity of Port Gibson up to the time of his arrival there.

The only case which came under his personal observation, was Mrs. Moore, who went to see Mr. Kelly, a decided case, but doubtful in its first stages. On the second night before his sickness he slept at Mrs. Moore's; was removed to his residence in Grand Gulf.

Mrs. Moore was taken fifteen days after; she had no communication with any infected place; the distance between Port Gibson and Grand Gulf is eight miles. Mr. Kelly was perfectly well when he arrived at Mrs. Moore's. Kelly recovered; Mrs. Moore died with black vomit; no other source of communication could have existed with Mrs. M., with the exception of Kelly and myself.

After an interval of six or eight days, others who had attended upon Mrs. Moore, were taken with the disease; his impression is that all the women who were in the house, were attacked, but some were not attacked until the disease reached the negro quarters.

Twenty-five or thirty cases occurred there, although intermittent fevers occurred at the same time and locality; other places, not distant, were exempt from fever at this time. No mould was observed, and no new upturning of the soil had been made.

The distance between Woodlawn and Claiborne is one-half mile. The only case at Claiborne was a little girl, who had communication with Woodlawn; she was taken at Claiborne on the 7th October; the physician attending, had the fever. The overseer and his child, at Woodlawn, had the disease; the first died, and the child recovered. The overseer nursed the sick assiduously; the family occupying the same house in which Mrs. Moore was taken sick; did not contract the disease; they were unacclimated. Mrs. Moore had the fever in New Orleans, in 1841.

TESTIMONY OF REV. C. K. MARSHALL, Vicksburg. March 18th, 1854.

DR. J. L. RIDDELL, M. D.:

Dear Sir:—Owing to the confusion of the two letters I sent you on the subject of the epidemic of 1853, as they were printed by the legislative committee of your State, I have felt compelled to correct them, and in doing so, have added some further particulars which I have recently learned. I have confined myself exclusively to the origin and progress of the disease.

I have lived in Vicksburg about twenty-one years. Was in the city during the summer from the middle of July till the epidemic ceased. From all I can learn, I am of opinion that the late fever which ravaged this city was brought to the place by persons and goods directly from New Orleans.

The usual population of Vicksburg is a little more than 5,000. It was reduced during the epidemic to about 2,000 whites and 1,000 blacks. About 350 or 400 blacks were taken away during the epidemic. The suburbs embrace about 2,000 persons—not more than 300 or 400, if so many, could have been removed.

There were about 2,100 cases of fever, as near as I can form an estimate from the best sources of information. We lost about 500. Some died whose names are not in the reported lists.

I believe the first cases of yellow fever in the city, in private practice, were attended by a Dr. F——, a most infamous quack, who had recently imposed himself upon a part of the community, who scorned the frank and fearless warnings of their old and tried friends, and took up with what proved the most brazen ignorance and miserable cheat that was ever allowed to test the gullibility of poor sick humanity. Fortunately, perhaps, for suffering humanity, and the cause of science, he died of the fever. But we have lost the observations of a scientific physician, who, had he seen these cases, might have thrown some light on the great questions now before the medical public.

The facts I learn, after much effort and numerous corrections, are as follows: Six pedlers came from New Orleans, in June, and took boarding at Mr. Fugates, on Grove street, near the corner of Monroe. His wife was a Mrs. Clarke, and I called her by that name in my first note. On the 12th of July, Mr. Scannell, the proprietor of the pedling caravan, went to New Orleans with one of his assistants, by the name of Clifford, and brought up a large supply of silks and satins. They returned on the 18th, and came on the Natchez, being the same boat on which they went down. The day after Scannell returned, he had a chill, followed by pains in the head, back, loins and joints, and suffered from great thirst and restlessness. Dr. F. attended him; he was salivated; was sick two weeks, and recovered. His wife was also attacked while he was sick, but recovered. Five members of Mr. Fugates family had the fever, and though often with other cases, after their recovery, till the epidemic ceased, not one of them was attacked again. The pedlers left, August 7th, as soon as Mr. Scannell could travel, and they went, as Mr. Stewart informed me, to Yazoo City, Millikin's Bend, and Memphis.

Mr. Clifford left Vicksburg on the 19th, the day after returning from New Orleans, and was sick at or near Warrenton, and was taken that day.

The next cases were at the Hospital. The following is a transcript from the register of that Institution:

"Thomas Jackson, born in Hinds county, Miss., aged 24 years; admitted July 23d—died on the 28th, of typhus icterodes, from steamer Empire State.

Wm. Quimby, born in Massachusetts; aged 22 years; admitted July 30th, died August 4th, of typhus icterodes, from steamer Frank Lyon."

At this period, the health of the city was very good—but much alarm felt from private communications and rumors from New Orleans.

Gilbert Coats, died August 1st, at the Washington Hotel. He had returned from the Yazoo Swamps about two weeks before his death; and those swamps produce a fever so fatal and peculiar as to be classed as "swamp fever."

I learned from Dr. Burchett that he had black vomit, and was esteemed a clear case of yellow fever.

Mr. C. was in town a week before he fell sick, and spent the time chiefly on the wharf-boat. He was in the constant habit of visiting steamers landing at this port. The wharf-boat moved down to the quarantine grounds on the 25th of July, and Coats went to the Washington Hotel, and was at once taken sick. This was the first case of death of yellow fever in private practice.

The next case pronounced yellow fever, by reputable physicians, was that of Mrs. Lanier, a lady living in comfortable circumstances, and in a very healthy portion of the city. She died on the 11th of August. As far as I can ascertain the history of the case, the following are the facts, obtained from the families and persons concerned more or less:

Mr. Lanier's house was near the residence of Mr. Fugates, where Mr. Scannell was sick, and his room but a little distance from Mr. Lanier's House.

One or two days before Mrs. Lanier was taken sick, one of the pedlers had taken their goods from Fugates to her house, and she examined them carefully. This was on Friday or Saturday, August 5th or 6th, and on Sunday, the 7th, she was taken violently, and died on the following Thursday; had black vomit.

Drs. Crump and Harper attended her, and never doubted the character of her disease.

The next cases in the order of occurrence took place on the 8th of August. R. D. Howe, merchant, was one of these cases. Dr. Magruder, pronounced it yellow fever. Mr. Howe, thinks that goods brought from New Orleans by his next door neighbors, which were quite offensive, together with his passing Mr. Fugates' many times a day, when the fever existed there, the cause of his sickness. He recovered.

On the same day, Miss F. Worthen was taken sick. Resided in the Little Verandah. Had been present at the opening of a lot of dry goods from New Orleans, at Mrs. Edwards'—then sat up two nights with a child, whose mother had been traveling with it on the boats but recently. The day the child died, Miss Worthen was attacked, and was taken ill with the child's corpse in the carriage; and though the fever was afterwards in her family, and she lost her father, mother and brother by it, she was not sick again.

The next cases were taken on the 9th and 10th of August. The first was Mrs. Shultz, whose husband is a merchant tailor; keeps

three doors from Woodman's drug store. I learned that this lady occasionally visited the family of Mr. Lachs, residing in the house nearly adjoining Mrs. Lanier's, and she had been there during her sickness. She was taken on the 9th of August, and recovered. Drs. Crump and Harper attended the case, and never doubted the character of the disease.

The other case, occurring on the 10th, was that of Ed. D. Bailey, a clerk in McCutchen's store. He died on the 18th. He had been much exposed to the sun in going to and returning from the quarantine ground, and in receiving goods there. I think it more than probable he caught the disease by visiting the steamboats, or from New Orleans goods.

The next case in order was Mr. Simon Lachs, who lived next door neighbor to Mr. Lanier, and spent a part of two nights at his house while his wife was sick. He was attacked the 14th; and, soon after, his wife, and then his brother. While Mrs. L. was sick, her sister, Mrs. Myers, from Jackson Road, came to nurse her, but on the second day fell sick, and returning home, the disease soon spread into every contiguous house.

The next case was a negress of Colonel Moore's; aged 17; Lived with a colored woman who took in washing, and washed for the Washington Hotel; the fever had been in the Hotel before this period. Took washing from all directions. Jane was at work for her, and was taken violently sick on the 15th of August. Dr. Balfour was called in on the 17th; she died with black vomit on the 20th. I know a case of a colored woman who washed for a sick man who died with the yellow fever, and she took it, though she never left her own lot as far as I can learn.

On the 16th of August, Miss Z. Potts, residing in the family of D. Walker, Esq., complained of illness, and on the 17th, Dr. G. P. Crump was called in; he pronounced it yellow fever. Mr. Walker lived in the Northeastern part of the city, on Farmer street. As the young lady had been to no place where any one was sick, it was a matter of surprise how she could have taken the fever at that place; and her brother, a young man of 15 years, observed that "she must have caught it when they passed the residence of Mr. Lanier." It seems that the brother and sister had crossed the city together, and his observation leads to the conclusion that they passed the infected district. They passed there two days before she complained. They are now both absent.

The next case was Ed. Scarbrough; he was taken on the 17th of August, and died on the 24th. He had been with Mr. Lachs while sick, and two days after was himself taken down, and nearly every man who nursed him took the fever.

John Rigly, Esq., went and nursed Mr. Scarbrough, and was in a few days taken sick, and with great difficulty escaped alive.

The next case occurred in the families of Messrs. Rapp. John R.

Rapp spent two nights with Ed. Scarbrough, and, two days afterwards, on the 20th, he was taken sick. His sister Margaret, who had visited Miss Worthen when sick with the fever, was taken down the day before—on the 19th; all the family had it.

About this date, James W. Bell fell sick at the Washington Hotel, and others soon after in the same house.

On the 23d, Mr. Reel was taken; he lived in a house in the rear of Finnie's carriage and repairing shop. Was the first case there. Six persons had the fever there, and three died. How or where Reel got it cannot be ascertained. It had been in his vicinity for nearly a month.

Meantime, the fever had worked its way through Mr. Fugates' family, where it commenced, and entered the family of Mr. Stewart, in the next house. It broke out among Mr. Bender's negroes, in the stable near Mr. Fugates, August 22d.

By this time it was admitted to be yellow fever by all the Medical Faculty, and cases were appearing in every direction throughout the city.

The fever was pronounced epidemic on the 7th and 8th of September, by all the physicians, as far as I could learn, and it ceased as an epidemic about the 20th of October; but cases were developed as late as the 21st of November. It prevailed nearly three months so as to suspend nearly all business.

I believe the first case of yellow fever in this city occurred July 19th, at Mr. Fugates, in the person of John Scannell. The last case was Col Levi Mitchel, on the 21st of November.

Cistern water is mostly used in town; a good deal of river water is used. Most all the cisterns are subterranean; there are none above ground in the city.

I have supposed that exposure to bad air, polluted dry goods, and to the infection of persons who had the disease, were the chief cause of the epidemic here. I have heard of several persons who said they had distinctly perceived the approach of the epidemic; in other words, they had experienced a sudden sensation previous to actual sickness, which they were sure was the first of the disease.

There is not the slightest local cause why this city should have been subject to the epidemic; no stagnant waters worth naming about; no fresh excavation of earth, near the time of the appearance of fever, except what I myself made around my residence, to the amount of two or three thousand cubic yards, perhaps one or two others had a little done.

My family have been exempt from the epidemic, except a slight fever by a servant; part of my family was absent. I have never had the fever myself. The city in the beginning of the epidemic was decidedly cleanly. A small pond near my residence has not been deemed injurious to health, and the fever was late in appearing near it. I know of very few who were subject to the disease and

were exposed here but took the fever, unless they had previously had it.

Children have been subject to the fever. During the epidemic there have been thirty-nine deaths among the negroes; thirty of them were from yellow fever. A majority of them, I believe, mulattoes. We had a quarantine which did not go into operation until after the first cases referred to had occurred in the Hospital, and some in private practice.

We moved the wharf-boat one mile below the city, and placed officers aboard to guard the city from promiscuous visitors from the South; but we could not see that it did any good; and was in some instances evaded. People could land at the quarantine, and coming round through the woods, to the East, enter the town; and as boats descending the river were not subjected to quarantine, any one coming from New Orleans could pass up, and exchange boats and land in the city coming down, without delay. I am satisfied that the only way in which we could manage a quarantine here, so as to render it in any way efficient, would be to establish it on the opposite side of the river, and doubtless the Legislature of Louisiana would give our city the right to establish one there, if no private right were injured by it.

The fever did not spread to neighboring plantations, except in three or four cases, and generally non-intercourse soon put an end to its progress. There was one quite remarkable instance of spreading the disease, which occurred directly North of the city, at a distance of two miles, in which direction the fever spread about four miles. A gentleman went from town, and was sick about one week; recovering, went to the interior; perhaps one of the watering places. About two weeks afterwards, the lady, Mrs. Sisson, at whose house he had been sick, was attacked with the fever and died; while she was sick, her neighbors came and nursed her, and soon after they were taken with the fever. The husband of the lady, Mr. Sisson, next took the fever and died; he had no black vomit. Several of his negroes also had the fever at the time. This was the only direction from Vicksburg in which the fever spread as an epidemic, any distance. In this case, as in others of which I have been informed, the origin of the fever could readily be traced to persons and goods coming from the town.

The fever also appeared in the family of Mr. George Selser, about seven miles from Vicksburg, and the same distance from Warrenton; supposed to be carried there by a visitor at first, then probably aggravated by a visit of one of his sons to Warrenton to see a sick friend. The eldest son soon died; then the mother; then several servants had it, but all recovered; then other members of the family, among them the father, Mr. Selser, who recovered; but a noble son, after three months sickness, died; who was taken about the time the mother died; all died in the same house, and no inter-

course was kept up with more than two families — those of Mr. S's daughters'—and the fever was carried to them, or taken by them while nursing.

Another instance occurred about four miles Southeast of the city. The lady, Mrs. Hildebrand, and her daughter, visited some relatives near Warrenton. Report says, a man from Warrenton, where the disease was then raging, passed the previous night at that house. The mother and daughter (a married lady,) returned home; both sickened, and both died of black vomit. Before they were taken sick, and perhaps in their absence, a son of the lady, (Mrs. Hildebrand,) determined on marrying; went to Vicksburg and obtained the things necessary to the consummation of that purpose; was married at Warrenton on the 14th of September, by J. Crawford, Esq., (whose wife died of yellow fever in the house where the ceremony took place, the same day.) Mr. Hildebrand and his wife returned immediately to the country—soon sickened, and in ten days from his marriage, died with black vomit. These facts I obtained from physicians and several members of the family. Dr. Thomas J. Harper, says that the crop at Mr. Hildebrand's being delayed in gathering, when the excitement had a little subsided, their neighbors turned out to assist in gathering it, and adds, "among others, Mr. Ferguson, worked for him about three days, and took his meals with Hildebrand's manager — at the time there was no fever on the place. In a short time, one of Mr. Ferguson's negroes was taken sick; then Ferguson himself. I saw him, and pronounced his a case of yellow fever. Previous to this time, none of his hands had been exposed, nor had he. These cases occurred in November."

The disease was developed in a few cases at the Bovina Settlement, about ten miles from this place, on the Railroad, and all the cases are easily traced to connections with Vicksburg.

I know of no person whose information and judgment would be relied on, who doubts the fact that the disease was carried from house to house by goods or persons, until the whole atmosphere became charged with the poison; when cases arose from the common pollution of the air, as a matter of course.

I visited Warrenton, and found that a pedler had come there from a point somewhere below by steamboat — fell sick — died. Some days after, another man slept in the bed where the man died — soon sickened — and the poison spread in every direction. No place in the South suffered more than that town.

I had no idea of the time and labor it demanded to obtain and arrange the matter of this letter. It may contain errors, and doubtless does — but I have spared no time, labor or cost to obtain the facts, and have them correct. I have endeavored to furnish the facts as they existed, and I can come to no other conclusion than that the late epidemic was imported. I have kept my notices

strictly confined to the origin and spread of the disease, and though I belong not to the Medical Faculty, I hope you will excuse me if I submit to you the conclusions to which I have come, after examining this subject personally, in this city, at Jackson, Brandon and Warrenton—

1. That it was an easily communicable disease, and has never spread in this region without the assistance of some agency of communication.

2. That clothing, goods, and persons, are all good agents for its transmission; and it has often been carried by persons, physicians and others, visiting the sick, or infected districts, or boats, to persons and families, while the person constituting such link of communication has wholly escaped.

3. That timid, nervous, and feeble persons, and those predisposed to any disease, are very liable to take the fever, and may do so from merely passing a house, boat, or ship, where it exists, or has recently been. Witness the cases reported in the Medical and Surgical Journal, of New Orleans, January, 1854; the case of the ship Mandarin, at Philadelphia. I think the Augusta and Camboden Castle at New Orleans, and the other ships mentioned by Dr. Fenner in his report; precisely similar cases.

4. That it requires the human system to be in a state or condition favorable to the disease to take it. This is the only reason why thousands did not die instead of hundreds; and hundreds instead of tens. It is a wonderful provision of Providence that all persons shall not, according to the laws of nature, be at all times in equal peril. The world had been a desert ages since, but for this arrangement.

5. That it is a rare occurrence for persons to have the yellow fever twice. With perhaps one or two exceptions, none of those who had the yellow fever in this city, in 1841, 1847, or 1849, had it in 1853; although constantly exposed. But I know several who never saw a case before—persons from the North and West—who were constantly with it, and never were sick an hour from the fever.

6. That the yellow fever was imported into this city, and all other places on the river, directly or indirectly, from the city of New Orleans, by persons or goods.

C. K. M.

DR. J. L. RIDDELL, M. D.:

Dear Sir:—I have just returned from Brandon; and as the yellow fever reached that place, and you expressed some anxiety to learn its origin and progress there, I obtained all the information I could, and herewith transmit it to you.

On the 23d of September, Robert Langford died. Had black vomit. This was the first case in Brandon. He was sick five days. Mr. L. was the conductor of the rail-cars between Jackson and Brandon, a distance of about fourteen miles. He was daily in Jackson

during the epidemic until taken sick. Drs. Posey and Belt attended him. Dr. P. says it was a violent case of yellow fever; if it was yellow fever that prevailed at Vicksburg and Jackson.

The second case was a colored man, Green, a barber. He had been in Jackson. While there he visited the barber Alfred, of whose death by yellow fever I informed you in my letter respecting the disease at Jackson. He helped lift Alfred, and was with him some hours. Some few days after his return to Brandon, Robert Langford (the first person who had the fever there) came to his shop and told him he was suffering from pain in the head, and had his head dressed; left the shop; went home, and in a few hours was reported through town as having yellow fever. Green was attended by Dr. J. J. Thornton, who informed me that his was a marked case; though not violent. After Green recovered, he shaved several sick and several dead persons, and was not sick again.

The third case was that of John Smith, a young man, a stage driver. He had been at Yazoo City, and more recently at Jackson, from which place he fled to Brandon. He died October 8th. Dr. J. J. Thornton attended him, and informed me that S. had black vomit, and throughout his sickness showed the clearest evidences of having the yellow fever.

The fourth case was Dr. James H. Belt, who had attended Robert Langford, and consulted with Dr. Thornton in the case of Smith; the third case. After about five days sickness he died, October 24th. He was an able physician, and universally esteemed. During his sickness he was attended and nursed by several excellent young gentlemen, nearly all of whom took the fever soon after.

The fifth case was Elisha Maxey, who died on the 30th of October. I inquired if he had visited where the fever existed, and learned from Mr. A. E. Martin that, he had been with and assisted in nursing several cases.

Case 6.—Charles H. Edwards was the next case that terminated fatally. He died on the 4th of November. This estimable young man was one of five who had nursed Dr. Belt. The other four recovered.

Case 7.—This was the case of Edmund Smith. He died on the 8th of November. I can trace no connection in his case with any other.

Case 8.—The next death was that of H. E. Grimes. He died November 11th. He had been with and nursed Edmund Smith.

Case 9.—This was the case of William H. Shelton. He had nursed a cousin, H. F. Shelton, who took sick after attending Dr. Belt. He also nursed Mr. Maxey, who died, and finally he went and took Maxey's place, and slept in the room where he died. Mr. Shelton died on the 23d of November, and was one of the most violent cases that occurred in Brandon.

Case 10.—Mr. W. H. Kirkland, who nursed Mr. Wm. H. Shelton, soon fell sick of the same fever. He recovered.

The eleventh case was that of Mrs. Eleanor Gardiner, a very aged woman, who died December 3d, after a sickness of only six hours. I could not learn of any connection with any infected place, or visit to any one sick of fever. The gentlemen of the family had probably been with cases of sickness. Dr. Posey thinks it was the epidemic fever. This was the last case in the town.

I heard of two other ladies who were attacked with the fever and recovered, but nothing of how or by what means they took it.

S. A. Adams died on the 25th of September, and at first it was reported a case of yellow fever; but I learned it was the medical opinion that it was not yellow fever; but congestion of the brain, without yellow fever symptoms. There were some doubts expressed, however, and nothing certain could be learned.

There were reports that Mr. Easterling, and Mrs. Standard, and one of her colored women, had also been attacked with yellow fever; but Dr. Posey informed me that they did not have the yellow fever.

I have obtained the above facts from Drs. H. J. Posey and J. J. Thornton, A. Harper, Esq., D. Fitzhugh, Esq., A. E. Martin, Esq., and several other citizens.

Brandon has a population of near twelve hundred, and was not diminished much by the epidemic. It is one of the healthiest places I have known in the State for many years, and will become a retreat from cities and river homes in future. C. K. M.

VICKSBURG, February 6th, 1854.

DR. J. L. RIDDELL, M. D.:

Dear Sir:—According to my promise, I have been to Jackson, were I spent nearly a week in diligent and careful inquiries on the subject of the introduction and spread of yellow fever during the last summer. As you will obtain from distinguished medical gentlemen the information you may wish, strictly relating to their profession, I shall only attempt to furnish a few facts, illustrative of the origin and progress of that terrible scourge. These facts I have obtained from reliable sources, and they are as correct as I could make them, after numerous efforts, sometimes spending a whole day, and calling on a multitude of persons scattered over the whole infected districts, to obtain a few dates, or correct one.

The first cases of yellow fever that occurred in Jackson, were carried there from Vicksburg. They were the servants of Col. L. C. Moore. One of them, a colored man, was unwell when he left Vicksburg—had just buried a fellow-servant who had died of yellow fever. Soon after his arrival in Jackson, his wife was taken sick; then a girl, perhaps 10 years old. These servants went to Jackson on the 21st of August; were nursed by a negro who once had the yellow fever in New Orleans. He did not take it. They were attended to by Dr. Langley, and the disease did not spread from

that family, though L. thinks two or three of the white family had it soon after. The place where this sickness occurred was well out of the city, in an open, salubrious portion of the suburbs. No person out of the immediate circle of Col. M.'s family had any fever, that can be traced, which might be supposed to have resulted from their sickness.

The next case was that of a German, by the name of H. T. Mosher. This man left Jackson on 21st August, and came to Vicksburg, where he remained until the 24th. While here he spent part of his time at the Verandah, by which name a group of old decayed wooden houses are known, and where the fever existed. On the day after his return to Jackson, he seemed unwell, and on Wednesday, August 31st, took his bed, complaining of pain in the head and back, and of great prostration. He was a carpenter, and worked for Allen Patrick, Esq. He died with black vomit on the 5th of September, at an ale, beer, and boarding house, near the railroad depot, kept by Mr. Iehler. All the physicians, I believe, deem this the first case of yellow fever; after the cases of Col. Moore's, at Dr. Langley's, above mentioned.

Three days after Mosher was taken sick, a woman by the name of Mrs. Cothrine, who lived in the next house—a few feet apart only—fell sick, and Dr. Farrar informs me she died of yellow fever on the 1st of September. She boarded at Mr. Webber's, whose wife took sick on the day of Mrs. C.'s death, and the fever spread throughout the family.

The next case was a Mr. Muller, who lived at the other end of the town, a little North of Spengler's saloon. He died on the 7th of September, and Drs. Langley, Cabanis, and Boyd, agree that it was a case of yellow fever. Finding the brothers of this man, I learned from them that the deceased had been with Mr. Mosher during his sickness.

On the 12th, Alfred, a colored barber, died; and no doubt was entertained of its being of yellow fever. So his physicians think. Indeed, his nurse informed me that he had black vomit in a moderate degree. The case was believed to have been produced by the condition of the atmosphere, as nothing like a cause otherwise seemed to exist. After making numerous inquiries concerning this case, I learned the following facts: When Alfred was sick, he supposed he had the yellow fever, and told his partner in business that if he had it, he "took it from the man he shaved." But either the man he shaved was unknown to his partner, or he was unwilling to say Alfred had shaved a case. I then called on Mr. Iehler, at whose house Mosher died, and learned from him that Alfred was sent for and came and shaved Mosher.

Mr. Patrick doubts not that, upon futher inquiry it seems clear, that he shaved Mosher about the time he was taken sick—or while sick.

On the same day that Alfred died, a German died at Spengler's Mill; name unknown. This man had boarded at Iehler's, and left under the apprehension that Mosher had the plague. Their rooms were opposite each other. On the 14th, Peter Gallaher died of the same fever, on Greasy-row, at Mrs. O'Connor's; he had escaped from Vicksburg a week previous to his death, to save his life. The inmates of the house fled, and the disease spread no further from that point.

The next case was that of Mr. Clancey, a saddle and harness maker; he died on the 16th, of black vomit. A panic began to develope on this announcement. It has generally been supposed that Clancey's case originated from atmospheric causes alone; for a while it was rumored and believed that he had taken the disease from a lot of leather, lately received from New Orleans; but Mr. Sizer, his employer; informed me that the leather came two days after he was taken sick. On the day C. was taken sick, viz: the 12th, he said to Mr. Sizer, "I am sick, and if Alfred Englehard died of yellow fever, I have got it." A little startled at the announcement, Mr. S. omitted to ask him if he had been with Alfred; the barber above named; nor did any one hear Clancey say any thing about it while sick; but the natural inference from the observation is, that he had been to see Alfred, whose shop was nearly opposite to C.'s lodging room.

Mentioning the circumstance to Dr. Boyd, he at once informed me that he called one evening to see Alfred, and found Clancey there. Alfred's sister and partner both informed me that several white men came to see him while sick, some of whom they did not know.

Both of the men who nursed Clancey took the fever, and one of them, Mr. Brush, died of it.

On the 13th, Mrs. Cashman, and her daughter, 8 years of age, were both taken sick, and on the 16th Dr. Boyd was called in; the mother recovered, but the child died of black vomit on the 18th. Mr. Cashman informed me that he had been to Vicksburg to purchase leather, and some other small articles; as near as he could recollect the date of the trip, it was between the 3d and 8th of September; he had also been at Alfred's when he was sick, but refused to go into the room,—sat in the next room. He lives at the northern extremity of the town from the depot; and how the disease could get there has been a matter of surprise.

On the 14th, Mr. Foster died at Mrs. McCarty's, next door to Iehler's, where Mosher died; Dr. Bailey attended him—says it was a marked case. On the 16th, Mrs. McCarty's son, aged 10 years, died; had black vomit.

On the morning of the 16th, the day of Mr. Clancey's death, Miss Amanda Lee was seized with fever, and at 12 o'clock the next Sunday, Mrs. Newton was taken down; they both lived at Mrs. Virden's millinery store. The young lady was making a shroud when taken;

she left it unfinished; and Miss. N. went to work on it and was also taken while at work. I inquired if they had seen any sick person, or been where the disease existed; Mrs. N. informed me that Miss Lee had passed the house where a man was said to have died the night previous of yellow fever; this was on the 15th, in the morning. At noon the same day, Mrs. Newton passed the same place, and both, I learn, were much alarmed; on the day following, they were both taken sick, and Miss. Lee died on the 21st September; had black vomit. Dr. Farrar attended. The house they passed was where Peter Gallaher had just died of yellow fever.

On the 21st, two men by the name of Stowe, who had boarded at Iehler's up to the death of Mosher, died of the fever; their physicians informed the citizens of yellow fever; they died at Spengler's Mill.

On the 23d, Mrs. Donnell died of fever, she had assisted in shrouding Mrs. Cothrine, the first lady that died.

On the 23d, Mr. Fox died at Mrs. McCarty's; a violent case. This is the vicinity of its origin. Dr. Baley attended. On the 24th Miss Henckle died, and soon after, her mother—then her father; related to Spengler's family, and with them while complaining and sick.

Mr. T. Horrabin died on the 25th; he was useful,—everywhere among the sick.

Mrs. McCarty lost another child on the 26th; had black vomit.

On the 29th, Mrs. Hull died at the depot residence; was the wife of the clerk.

Thus I have traced the origin and progress of this fearful pestilence for one month. Some cases of disease occurred which recovered, and I have not specially noticed them. But in every instance I believe the disease may be traced until the atmosphere becomes charged with the pestilential agent, when, like a conflagration, it breaks out in all directions. I have followed up towards the latter part of September, only the fatal cases; for before the 21st of September, a large number had been suddenly taken down. But the cases which took place early where distributed in every direction over the town; but the greatest number were confined to the region of the railroad depot, and south of it, where the disease commenced its ravages.

It did not reach the point of its greatest ravages until the 7th of October. On the 13th, I visited the place, and passed two weeks assisting and nursing the sick, and burying the dead.

The Lunatic Asylum is a distance out of the city of a mile and more perhaps, and during the epidemic was made a place of refuge for a great many who fled thither, in number about two hundred; and what is somewhat singular and remarkable, not a solitary case of yellow fever occurred among them.

The ordinary population of Jackson is about three thousand; during the epidemic it was reduced to six hundred and ninety. It is believed there were three hundred and fifty cases of sickness, of which one hundred and twelve proved fatal. Mr. A. Patrick and Mr. Dudley, under-

takers, informed me that the list of deaths published was very imperfect, both in dates and names; consequently some of my dates differ from those published in the journals of Jackson. C. K. M.

TESTIMONY OF DR. T. B. BENEDICT.

Fort Adams.—Dr. Benedict resides near Fort Adams. The first persons taken sick were in the Presler family, living one-fourth of a mile from the river, and about two miles from Fort Adams, on a high hill. This occurred about the last of October. The disease must have originated spontaneously: there is no other way of accounting for it.

Mrs. Presler was an elderly lady, of about 65 years of age; she seldom left her domicil; there was no possibility of her having contracted the disease from abroad; the whole family lived a secluded life; Mrs. Presler and son died, and also Dr. Taylor who attended them.

The wife of the overseer at "Monterico," a plantation three miles distant from Presler's, was taken sick after its appearance at the latter place. About eighty cases occurred at Monterico; most of them negroes.

Dr. Davis resided fourteen miles from Presler's, passed a night there; was taken sick a few days afterwards, and died with fever.

Dr. Benedict thinks the disease different this year, from that which he has previously seen.

Dr. Baldwin, who resides six miles from Dr. Davis, visited him during his illness; took the disease and died. From neither of these cases did the disease spread.

The brother-in-law of Presler, who lived on the opposite side of the river, died with fever, and was carried through Fort Adams to be buried. Many supposed that the fever was introduced into Fort Adams in that manner.

Dr. Benedict noticed a peculiar smell in yellow fever patients, about the third day; cannot say that the disease is contagious, except in an epidemic condition of the atmosphere.

The season was warm; not much moisture; less mould than usual. It was very hot in the sun, but cool in the shade; the nights were cool. Frost occurred much later than usual, and did not seem to check the disease. Many unacclimated persons in Fort Adams escaped the disease. Has seen the disease before in the Hospital. Noticed in the rear of Presler's, a large slide in the bank. The soil is alluvial.

Vicksburg, December 27, 1853.

William Rogan, (landlord,) Washington Hotel, Vicksburg, Miss.—I have lived in town nineteen years; the first case of yellow fever this year, was I think, Mr. Geo. Coates, who arrived here in July, I think

the 20th. He was taken sick about the 27th, and died early in August. He was a resident of this place, and had been out land surveying at the Artesian Wells, some seventy or eighty miles from here.

Dr. Burchet attended him. He had black vomit. Yet I believe some said it was only sun fever that he had. Mrs. Lanier was the next case; in regard to the circumstances, I am not fully informed. A Jew pedler, from New Orleans, lived close by her, and had lately brought a stock of goods from New Orleans.

I would, however, refer to Dr. Burchet and Mr. Fuget, the deputy marshall. Attest: W. P. R.

Rev. C. K. MARSHALL.—I have lived in Vicksburg about twenty years. According to the best of my knowledge and belief, the late epidemic was brought to this place by persons and goods from New Orleans. The first cases which occurred were in the hospital, but the disease did not spread from there. These cases were about the 1st of August. The first case in the city (pronounced as such by the physicians,) was Mrs. Lanier; she died about the 15th of August. I do not know whether Mr. Coates had the fever or not. Concerning the particulars of Mrs. Lanier's case, it was said that a Jewish pedler was at her house, and there opened and exhibited his goods, lately received from New Orleans. She was a woman in good circumstances, a very excellent lady, kept things in good order, and cleanly; I think she did not have black vomit. During this time, boats from New Orleans were constantly landing here and people arriving.

The fever became epidemic, according to physicians, near the 7th or 8th of September. The first case in Jackson, according to the marshal, (Col. Fielding Davis,) occurred at Spingler's saw-mill. The man who was taken had been absent from Jackson about a week, no one knew where or what he had been doing; when he returned he was sick. It was thought that he could have been no where except to Vicksburg; he had been out on a spree (bust.) The saw mill is one half mile to the North of Jackson; the fever raged worse in the lower portion, the upper part was also affected.

The second case was that of a man (Clancey,) connected with a carriage establishment; whether he had been to Vicksburg, no one is able to say. During the time when these cases occurred, the physicians denied there being yellow fever, and were saying that it was a great shame to set on foot reports which were tended to create alarm and panic. I was at Jackson myself, and am well acquainted there; the opinion there was that it might have been introduced by the railroad. I do not know how many cases there were, the number of deaths was about one hundred and ten. The number of inhabitants left, after the alarm had been taken and during the epidemic, was, according to a census taken at the time, not more than six hundred (600). The Lunatic Asylum which is a little distance out of the city, and during the epidemic it was made a place of refuge for a great many who fled

thither; in number about two hundred; and what is somewhat singular and remarkable, not a solitary case of yellow fever occurred among them. The population of Jackson is usually about three thousand (3,000.) I am not informed concerning the particulars of yellow fever at Brandon; the period of its occurrence there was however subsequent to its breaking out in Jackson. The fever did not occur in the interior towns. The usual population of Vicksburg, exclusive of the suburbs, is about six thousand (6,000); the population during the epidemic was reduced to twenty-three or twenty-four hundred; including the suburbs, the population must have been, during the same time, about three thousand one hundred. We suppose there were about two thousand one hundred cases of yellow fever here, and nearly five hundred of these proved fatal. The portion of our population which suffered most, were foreigners. I think the proportion of fatal cases which terminated with black vomit, was one-half; at least I consider this a safe estimate. I know of one case of recovery at Jackson, subsequently to black vomit, it was the case of a boy about sixteen years old.

The epidemic here ceased about the 20th of October; sporadic cases did however occur subsequently, even as late as the 20th of November. I think the fever was introduced here through the agency of persons and goods arrived from New Orleans. There was one case which occurred seemingly spontaneously, nineteen or twenty miles from this town, and eight miles distant from the railroad. The man's name was McGoomy; he recovered; the disease did not spread from him at all where he lived.

[The foregoing testimony, of the Rev. C. K. Marshall, was taken down in shorthand, by W. P. Riddell. The following was carefully prepared by himself, during subsequent leisure. The testimony is more full and explict.—J. L. RIDDELL.]

Rev. C. K. MARSHALL.—I have lived in Vicksburg about twenty-one years. Was in the city during the summer, from the middle of July till the epidemic ceased. From all I can learn I am of the opinion that the late fever, which ravaged this city was brought to the place by persons and goods directly from New Orleans. The first cases that appeared were two young men from New Orleans. One came on the steamer Empire, the other on the Frank Lyon. The first went to the hospital on arriving here, July 23d, and died on the 28th of black vomit. The second went to the hospital from the boat, July 30th, and died of black vomit on the 4th of August.

At this period the health of the city was very good—but much alarm felt from private communications and rumors from New Orleans.

Gilbert Coats died on the 1st of August, at the Washington Hotel. Don't think he had yellow fever, from all I can learn. He had just come out of the Yazoo swamps—and those swamps produce, at times, a fever so fatal as to have been classed "swamp fever." His physician reported his, a case of that fever.

The first case pronounced yellow fever by reputable physicians was

that of Mrs. L——, a lady living in comfortable circumstances, and in a very healthy portion of the city. She died on the 11th of August—had black vomit. Whilst she was sick, a lady on Washington street fell sick, and was pronounced yellow fever. About the same time a man died in the next house to the residence of Mrs. L——, on the North. As far as I can ascertain the history of these cases, the following are the facts, obtained from the families and persons concerned more or less.

During the month of July, five or six pedlers—a class of persons who have done this State immense damage—came from New Orleans and took boarding at Mrs. Clark's, on Grove street, near the corner of Monroe street. They brought a large quantity of the best quality of silks and satins, as I am told, and visited many parts of the city and country to sell them. The chief of the gang, a man by the name of S——, had left his wife in New Orleans, and on hearing the alarming reports of the spread of the epidemic in New Orleans, went down and brought her up. On arriving here she was taken sick; had a slight attack of fever. Soon after her husband was taken sick; was badly salivated; got well. Others in the family were taken, and before it ceased, five in that house had it.

I believe the first cases were attended by a Dr. F——, a most infamous quack, who had recently imposed himself upon a part of the community, who scorned the frank and fearless warnings of their old and tried friends, and took up with what proved the most brazen ignorance and miserable cheat that ever was allowed to test the gullibility of poor sick humanity. Fortunately he died of the fever. But we have lost the observations of a scientific physician, who, had he seen these cases, might have thrown some light on the great question now before the medical public.

The room in which this Mr. S——, was sick, and where his goods in part were, was only a few feet from the residence of Mrs. L——, above referred to. One of the pedlers took some silks, brought from New Orleans by S——, on his late return from the city, and carried round to show Mrs. L——. She desired him to call the next day again with his goods; having carefully examined them; and on calling the day following he learned that she was sick. She died of black vomit. Had the best of medical attendance. The lady on Washington street, referred to, it seems, had constantly visited a family living in the house adjoining Mrs. Clark's and near Mrs. L——, on the South. She was taken sick on the morning of the 10th of August. The work thus began to spread into every house contiguous, and the fever broke out in other places near this period; where I am credibly informed the pedlers had gone with their elegant, but poisoned goods. None of the persons who had recovered among these first cases took the fever at a later period.

I was told by the mother of the lady with whom the pedlers boarded, that they went from this city to Yazoo city and Millikin's Bend.

The usual population of Vicksburg is a little more than five thousand.

It was reduced during the epidemic to about two thousand whites, and one thousand blacks. About three hundred and fifty or four hundred blacks were taken away during the epidemic. The suburbs embrace about two thousand persons; not morethan three or four hundred, if so many, could have removed.

There were about two thousand one hundred cases of fever, as near as I can form an estimate from the best sources of information. We lost about five hundred. Some died whose names are not in the reported lists.

I know of no person, whose information and judgment would be relied on, who doubts the fact that the disease was carried from house to house by goods or persons, until the whole atmosphere became charged with the poison, when cases arose from the common pollution of the air, as a matter of course.

The fever became epidemic, according to physicians, near the 7th or 8th of September. The first case in Jackson, according to the Marshal, (Col. F. Davis,) occurred at Spingler's saw mill. The man who was taken had been absent from Jackson about a week — no one knew where he had been or what he had been doing. When he retured he was sick. It was thought he could have been no where except to Vicksburg. He had been out on a spree (bust.) The saw mill is half a mile South of Jackson. The fever raged worst in the lower portion — the upper part was also affected. The second case was that of a man (Clancy) connected with a carriage establishment — whether he had been to Vicksburg no one is able to say. During the time when these cases occurred, the physicians denied there being any yellow fever, and were saying that it was a great shame to set on foot reports which tended to create alarm or panic. I was at Jackson myself — am well acquainted there. The opinion was that it was introduced by the railroad. I do not know how many cases there were. The number of deaths was about one hundred and ten. The number of inhabitants left after the alarm had been taken and during the epidemic, was, according to a census taken at the time, not more than six hundred. The Lunatic Asylum, which is a little distance out of the city, and during the epidemic it was made a place of refuge for a great many who fled thither, in number about two hundred — and what is somewhat singular and remarkable, not a solitary case of yellow fever occurred among them. The population of Jackson is usually about three thousand. I am not informed concerning the particulars of fever at Brandon. The period of its occurrence there, however, was subsequent to its breaking out at Jackson. The fever did not occur in the interior towns. The usual population of Vicksburg, exclusive of the suburbs, is about six thousand. It was reduced during the epidemic to twenty-three or twenty-four hundred, including the suburbs. It must have been, during the same time about three thousand one hundred. We suppose there were about two thousand one hundred cases of yellow fever here, and nearly five hundred of these proved fatal. The portion of our population which suffered most were foreigners, I think. The

proportion of fatal cases, which terminated with the vomit, were one-half — I consider this a safe estimate. I knew of one case of recovery subsequent to black vomit — a youth about fourteen years old — he was sick twenty days.

The epidemic here ceased near the 20th of October, sporadic cases did, however, occur as late as the 20th of November. I think the fever was introduced here through the agency of persons and goods arrived from New Orleans.

THE SISSION FAMILY.

There was one quite remarkable instance of spreading of the disease, weich occurred directly North of the city, at a distance of two miles, in which direction the fever spread about four miles. This gentleman went from town, and was sick about one week; he then recovering, went to the interior, perhaps one of the watering places. About two weeks afterwards, the lady, Mrs. Sission, at whose house he had been sick, was attacked with the fever and died; while she was sick, her neighbors came and nursed her, and soon after they were taken with the fever. The husband of the lady, Mr. Sission, next took the fever also, and died; he had no black vomit. Several of his negroes also had the fever at this time. This was the only direction from Vicksburg which the fever spread as an epidemic, for any distance. In this case as in others of which I have been informed, the origin of the fever could not hardly be traced to persons and goods coming from the town.

The fever did not spread to the plantations. Cistern water is mostly used in town; a good deal of river water is used. Most all of the cirterns are subterranean; there are none above ground in the whole place. In regard to this subject, I am pretty well informed, having sometime since made particular inquiries, because I had a notion of building a cistern for myself above ground, not because I thought the underground ones objectionable, but because of the superior convenience of the former in distributing the water through the house by pipes, and to be used in connexion with the others. I have supposed that exposure to bad air, polluted dry goods, and to the infection of persons who had the disease, were the chief cause of the epidemic here. I have known of several persons who said they had distinctly perceived the approach of the epidemic, in other words they had experienced a sudden sensation previous to actual sickness, which they were sure, was the first of the disease.

There is not the slightest local cause why this city should have been subject to the epidemic this year; no stagnant waters worth naming about, no fresh excavations of earth, near the time of the appearance of fever, except what I myself made around in my yard, to the amount of two or three thousand cubic yards; perhaps one or two others had a little done.

My family have been exempt from the epidemic, except a slight fever by our servant; part of my family was absent. I have never had the fever myself. The city in the beginning of the epidemic, was decidedly

cleanly. A small pond near my residence has not been deemed injurious to health, and the fever was late in appearing near it. I know of very few who were subject to the disease and were exposed here, but had the fever, unless they had previously had it.

Children have been subject to the fever. During the epidemic, there have been thirty-nine deaths among the negroes; thirty of them were from yellow fever. A majority of them, I believe, mulattoes. We had a quarantine which did not go into operation until after the first cases referred to, had occurred in the Hospital.

We moved the wharf boat one mile below the city; but we could not see that it did any good, and was in some instances evaded. People could land at the quarantine, and coming aroung through the woods, to the East, enter the town. And as boats descending the river were not subjected to quarantine, any one coming from New Orleans could pass up, and exchange boats and land in the city coming down without delay. I am satisfied that the only way in which we could manage a quarantine here, so as to render it in any way efficient, would be to establish it on the opposite side of the river, and doubtless the Legislature of Louisiana would give our city the right to establish one there, if no private rights were injured by it.

VICKSBURG, January 28. 1854.

Dear Sir—I have been prevented from writing for want of some information for several days, and wish for more time, but fear I may delay you in your duties. I have re-written the first five pages, or four and a half of them, and wish the other left out. I have hit quacks designedly, and with intent, in referring to Dr. F. The chief pedlar I call S., was a fellow named Scannell, from New Orleans.

Dr. Nailor promised me a carefully prepared account of the origin and progress of the fever at Mr. Selser's, and was to send it to you. I have condensed it in the last case on the extra page (of page five). Hildebrand was the name of the lady whose home (four miles from our city) had the deaths and the wedding referred to. I have left out all the matter about Jackson, as it was disconnected and imperfect. I go out there to-morrow, and will immediately send you the items to append in due form at page eight. Yours, truly, C. K. M.

A. B. BURRELL, Esq., of Jackson, Miss., (planter and lawyer.)—I have lived in Jackson continuously for four years; previously in Vicksburg and Jackson since 1836. In Jackson, the fever appeared on the 1st of September. The first cases which I knew of, were brought from Vicksburg, in the lower part of the town. The case came on the railroad, and occurred at the Baker House.

The first citizen who was taken, was a very reputable man in a carriage shop, (Mr. Cloucy.) The second case was that of Mr. Spangler; and several cases in his family were fatal. The fever became epidemic about the 17th of September. I left the city at that time. The range of the epidemic was about one mile in length, by one-half mile in breadth. The population of Jackson is usually 3,500. During the fever, it was reduced,

I should think, to about 1,200; though it is said that an actual census was taken at the time, and found the number only 590; but on inquiry, I found that many were left out; for instance, at my house none were counted, though five persons were there all the while.

I noticed a good amount of mould during the season, especially on my return to the city of Jackson; but I do not know that the amount was greater than usual. The fever, as epidemic, ceased on or near the 26th of October. Several sporadic cases, however, occurred subsequently. I remained during the summer, two miles away from the city, (Jackson.) There were in Jackson several who were subject to the fever, but did not have it. On going away, I left at my house in the city, my gardener, with his son, who had a wife and two children, all unacclimated; being French, from the Rhine, and speaking only French; had been in this country two or three years. I, however, enjoined on them the strictest non-intercourse. I provided them with all the necessaries, and told them to see nobody, and not to go without the yard. They said that they observed my instructions, and, at all events, none of them had the fever. My house stands in the city, and has a capacious yard.

Attest: W. P. R.

Col. C. S. Tarpley, (lawyer and planter, of Jackson, Miss.)—I reside in Jackson; have lived there, I may say, always. I think the fever was imported into Jackson, and believe that if a strict system of non-intercourse had been established there, we should not have had the fever at all; the early facts connected with its introduction, seem to prove this idea. A carpenter, living at Jackson, had been to Vicksburg; on his return, he was taken with the fever, and died early in September. Spingler sat up with him and nursed him, and was very soon after taken sick himself, and died also with the fever. In this portion of town where these cases occurred, the fever raged most extensively. Thirteen of the Spingler family died. I became satisfied that the disease was contagious, and made up my mind to remove myself and family from the city. Moreover, all the nurses who attended patients during the epidemic, except a few acclimated ones, and those who came from New Orleans, had the fever. I do not know any local causes which should have induced the fever with such singular violence this season. With the exception of the yellow fever, the city had been remarkably healthy—more so than ever before. For instance, I have usually had to pay my physician $200 or $300; but this season not one cent. I know of no unusual prevalence of heat or cold, or dryness or moisture. I did not observe any unusual tendency to mould, either among my books or furniture. Families who returned to Jackson after the subsidence of the fever, and neglected to ventilate their houses and rooms. were pretty sure of having the fever; those who carefully ventilated, did not thus suffer. Cases carried out of Jackson did not spread. There were no cases in the neighboring country, except those carried there. I left the city on the 15th of September. The worst case I knew of was one who, returning to the city after the subsidence of the epidemic, neglected to ventilate her rooms. I do not think it is so much

personally contagious, as transportable in clothing, &c. We get rope and bagging from New Orleans, for plantation use, but not just previous to the advent of the epidemic. I do not know of any spontaneous cases; there were none. The Lunatic Asylum is one and a quarter miles North from the town of Jackson. Many persons went out to it, and took refuge in it during the fever, *and some of them frequently came into the town; yet none of them had it.* Many Jewish pedlers, &c., came out to Jackson from Vicksburg, and crowded into small shanties throughout the town, which I have no doubt contributed largely to the virulence of the epidemic. One locality was so much distinguished for this sort of population as to be called "Greasy Row."

Attest: W. P. R.

DR. THOMAS J. HARPER.—I have practiced medicine in Vicksburg sixteen or seventeen years. Mrs. Lanier was the first case of yellow fever which I knew. She was taken sick about the 5th of August. There might have been cases in the hospital previous to hers. I saw Mrs. Lanier two days before her death. She had not been out much previous to sickness, and had not been away from the city. She resided near the market-house. Concerning the circumstances connected with the origin of her sickness, I have heard it suggested that a Jewish pedlar, from New Orleans, visited her house with a variety of goods; some of which he sold to her. Of this I am assured by report; but know nothing about the fact myself. Mr. Lanier had been to New Orleans a short time previous to this. The fever became epidemic about the 20th of August.

The second case in the city occurred three doors from Lanier's, near Mr. Woodman's, (the druggist,) about the 9th of August, in the house of a German Jew, a merchant tailor, whose wife was the subject. I attended her, (Mrs. Schultz.) She had not exposed herself out of the house. She lived above the store. I think Mr. Schultz had not received any late goods from New Orleans. The case was a well marked case of yellow fever. Mrs. Schultz recovered.

I did not see Mr. Coates, who is said to be one of the earliest cases of yellow fever.

The fever originated here, so far as I am able to see, and was not imported. I know of no local cause why the city should have been unusually sickly this season—the weather dry and pleasant. I did not remark any unusual prevalence of mould. Do not think there was anything remarkable connected with any uncommon tendency to mould. *The heat of the sun seemed more oppressive than usual,* though the thermometer did not indicate a remarkably high range. I hardly think the disease was contagious; though there are some circumstances which have come under my observation, which seem to establish the fact that it is infectious. I have known of cases occurring in the country. None of those which I knew were spontaneous. The most remarkable case occurred in the Selser family;

but I am not acquainted with the particulars concerning them. It occurred three miles from town; and if I am rightly informed, strongly indicates infection. Hildebrandt had the fever, and his crops were delayed in gathering. His corn went to waste to some extent in consequence. When the excitement had a little subsided, his neighbors turned out to assist him. Among others, Mr. Ferguson, with his hands, worked for him about three days, and took his meals with Hildebrandt, &c. At that time there was no fever in the place. In a short time one of Mr. Ferguson's negroes was taken sick; then Ferguson himself. I saw him, and pronounced his a case of yellow fever. Previous to this time, none of his hands had been exposed; nor had he. These cases occurred in November. Some eight or ten days ago I saw a remarkable case, which, in like manner, seemed to indicate the infectious nature of the disease. It occurred at a boarding-house, on Main street, near the market-house. The whole family had had the fever during the prevalence of the epidemic. The fever had subsided with them in the latter part of October. About ten days ago a lady came to the house, and remained there about five or six days. She was taken ill, and sent for me. I saw that she was quite sick, and had no doubt but that she had yellow fever; though it was considerably modified by the lateness of the season. I believe this was the last case we have had in the city.

I have seen no case of recovery from black vomit. Such, however, have occurred. I have practiced through three epidemics at this place. This one has been considerably different from other epidemics. I believe the type has been modified. Do not think it has been so inflammatory. I have found no unusual difficulty in managing it, though the treatment had to be somewhat different. In my practice, the proportion of fatal cases which terminated with black vomit, was near fifteen per cent.; that is, I lost thirty-three cases. Of these five died with black vomit.

The different conditions of people seemed to exert an influence in regard to fatality and period of the attack. On the hill, for instance, there were several large houses, in each of which were crowded together about ninety or one hundred persons. Pretty nearly every one had the fever; and many of them died. We have here, also, places in which emigrants congregate in filthy places, and I believe that *these small woodcn houses* in which they live, have been the *cause of much of our fever.* I believe that if all the cellars and houses should be well ventilated, and all these small wooden buildings burned down, that we should have very little, if any, yellow fever in this place. I have observed black vomit to occur in other diseases than yellow fever; both here and in Virginia; and therefore do not consider black vomit as an absolute indication and proof of yellow fever.

During the epidemic, I observed very little yellowness of the skin. I did notice, during the sickness, a peculiar smell, which I could

distingush as distinctly as I can a man's (your) face. I cannot describe it; yet it differs essentially from all the other smells I know of.

Cases were carried out a mile and a half. Along the suburbs, which are not very thickly settled, but are inhabited by a number of small proprietors, the fever did not occur as an epidemic, however, among them. I know nothing about the introduction of the fever at Jackson.

The Northern winds are the winds which are prevalent when most sickness prevails. This was the fact this season, though not to an unusual extent. I have noted the *Northeast wind generally as most deleterious to health.* There are eight or ten physicians in this place. Attest: W. P. R.

Dr. F. White, *druggist.*—I have never practiced medicine in this city; have practiced in the country back. Since coming to Vicksburg I have kept a drug store. I had the fever at my honse. Dr. Harper attended my family.

I think the fever was brought to my house, and did not originate spontaneously. I myself was the first case. I am satisfied I took it at the store. Moses was the second case; then John was taken; both at the store. It was then taken at the house by others of my family.

I think the disease is communicable, and believe the Jewish pedler brought it to Vicksburg. At the place where he stopped, pretty much everybody had it, and were the earliest cases.

I did not observe a more than usual tendency to mould among the shoes, &c. Attest: W. P. R.

Dr. G. K. Burchet, *hospital physician.*—The first case of yellow fever in Vicksburg occurred in the hospital; and it could be traced to New Orleans. Mr. Coates was the first case in private practice. Previous to his sickness, only one case had occurred in the hospital. That was a man by the name of Jackson, who was a lumberman, and had come to this city from New Orleans. Coates had had no communication with him.

The second case in the city was a man who came from New Orleans on the Frank Lyon. Gilbert Coates died on the 1st of August. I saw him after he was taken. He had black vomit. He was not a citizen of Vicksburg. He had been a clerk in the hotel, and was proprietor of the Artesian Wells. Said he had not been to New Orleans previous to his being taken with the fever; but that he had been to Silver Creek. Came down the river, when he landed at Vicksburg. He was a clear case of yellow fever.

My opinion is that he contracted the disease here. I consider the epidemic as of domestic origin, and not imported. Another early case was Mr. Gamble, who had been to New York. Absent from Vicksburg about two months. There was no fever here when he returned. He was in fine health, and looked remarkably well. I advised him to leave

the town, and that immediately, to which he agreed. He did accordingly, and started for home, only stopping long enough to take a drink. He landed in the city at 10 o'clock on Friday, and left town at 12 on the same day. The very next Tuesday he was taken, at home (one mile and a half from the town) with the fever.

The second case in private practice was Mrs. Lanier. Mr. Lanier had been to New Orleans, and returned about ten days before his wife was taken. I think her fever was contracted here spontaneously. Some think it was from a dress which Mr. Lanier brought her from New Orleans. The third case was Mr. Bailey, a clerk in McCutcheon's store. I do not think he caught the disease from any person or things, but that he contracted it here (spontaneously?) He was a receiving clerk, and might have been exposed to goods from New Orleans.

The quarantine went into operation early in August. I do not think it done any good. I think the fever was domestic, and not imported.

The next cases were at Mrs. Finly's, within ten days after Mr. Bailey was sick. More than fifty cases occurred in different localities throughout the city. The fever did not seem to observe regular movements in its progress, and it did not seem to travel in a manner which could be traced from one part of the town to another, but seemed to occur indifferently in all places. I do not know of any local cause why the fever should have visited Vicksburg this season so severely. Do not know of the existence of any predisposing causes, such as stagnant water, excavations of earth or unusual filth. On the contrary, the city was cleaner than ordinary. I did not observe the unusual prevalence of mould. My experience convinces me, that the fever did become somewhat infectious. One reason is drawn from its spread in the hospital. We have room there for sixty-five or seventy patients; and, in the early part of the season, I set apart one ward for the accommodation of yellow fever cases; but in a very short time this ward was entirely full. I had many cases of chronic diseases in the ward adjoining the yellow fever ward. But in the course of ten days from the first breaking out of the epidemic, there was not a patient in the whole number free from yellow fever. I saw no recoveries subsequent to black vomit. In crowded localities the fever raged worse.

This is my first practice in epidemic fever. Intemperate persons were very obnoxious to the fever. So mania-a-potu seemed to run quickly into it. We have in the city many places crowded with emigrants and foreigners. Several large buildings near the railroad were very much crowded, in which the fever was very fatal. I have heard it said, that within a very small compass there are sixteen widows who lost their husbands near the same time. I do not know how the fever was introduced into Jackson, but think it was in the same manner as into this place—i. e., produced locally.

Clinton, which is situated on the railroad, had no fever. A great many went there from Vicksburg, yet no cases occurred there. Clinton is not situated on the river. Many persons passed through there; many stopped and remained; many received supplies from there. I did not observe any

particular smell, except at the hospital. I however use snuff, and am, consequently not very acute in perceiving odor.

Attest: W. P. K.

Dr. A. L. Magruder.—It is my opinion that fever was imported from New Orleans and introduced among us, by means of steamboats bringing persons and goods. The first case which I saw was at the hospital, and came from Orleans on board the Empire City; which, besides, had some fifteen other cases. This was previous to the establishment of our quarantine, 23d of July. When the man landed he was a little indisposed only, and had intended going further up the river; but the boat left him while he was getting some medicine. He grew rapidly worse, and went into the hospital.

By the kindness of Dr. Burchet, I was permitted to see him as often as I pleased, and I took great interest in watching the progress of the disease. I saw him every day. He did not throw up black vomit, but was a decided and well marked case of yellow fever.

We made a post mortem examination, and found his stomach full of black vomit. His liver was of straw color and almost white. I believe that no cases originated from him here.

The second case was William Quimby, who came up from New Orleans, as a hand on the Frank Lyon. He was in this city three or four days before he was taken sick. Arrived on the 30th July, and died October the 4th. There was no spreading from this case.

The third case was Mr. Coates, whose disease was said by some to be swamp fever. The fourth case was Mrs. Lanier, who died with black vomit. In regard to the origin of her case, we found out that a Jew pedler, John Scanner, had lately been to the city of New Orleans, and on returning to Vicksburg, he stopped at a house close by where Mrs. Lanier lived—on the adjoining lot. The day on which he arrived, he unpacked his goods and took them to exhibit in different parts of the city. He called at Mrs. Lanier's, and sold her a woolen dress. On the next day she was seized with the fever. Mrs. Fuget's case, near by, was next; and not a single person escaped it in her family. These cases all occurred before the breaking out of fever as an epidemic. From this vicinity, Mrs. Long's boarding-house, the fever seemed to radiate; and only ten days subsequent to Mrs. Fuget's case; broke out as an epidemic. I had cases in other portions of the town, but I have studied their origin closely, and not a case came under my notice which I could not distinctly trace back to this locality. Mrs. Fuget's house is near the centre of the town, just West of the market.

I am not aware of any local causes which should induce or favor the prevalence of yellow fever this season here. Vicksburg was never in a more beautiful and cleanly condition. Mr. Fuget lives in a very cleanly style.

All other febrile diseases seemed to vanish and run into yellow fever. I have practiced here through three epidemics. I look upon this one as of a peculiar type; we call it the typhoid yellow fever.

I did not observe any remarkable prevalence of mould, and unusual abundance of insects, musquetoes, &c. I perceived for some time during the epidemic a peculiar remarkable odor, which only disappeared at the close of the epidemic.

I do not consider the disease contagious, in the proper sense of the word; but that it was infectious, I have no doubt. Clothes and goods which can inclose air, I believe to be most efficient transmittors of the infection. I have given a good deal of attention to matters pertaining to the origin and spread of the epidemic this season, and have kept careful memoranda, which I am now collating and compiling, and intend to send Dr. Fenner, of New Orleans, and shall finish the subject in a few days. In my paper I have included all the particulars which I have mentioned, and others. Attest: W. P. R.

ALABAMA.

COMMUNICATION FROM J. C. NOTT, M. D.

Gentlemen:—I herein transmit to you such facts as I have been able to collect, bearing on the epidemic yellow fever which prevailed in and around the city of Mobile, during the summer and autumn of 1853.

The disease this season has pursued such an unusual course, as to bring under discussion again the long neglected idea of *contagion*, which I, in common with most members of the profession, had regarded as obsolete. However it may be explained, the fact is none the less certain, that the disease has extended not only to all the little settlements within five or six miles of the city, but to Citronelle, the present terminus of the Ohio Railroad, thirty-three miles from town; and to the various towns on the rivers tributary to our bay as far as steamboats have gone and no farther —to Montgomery and Demopolis, for example; to say nothing of many intermediate points.

The first cases of yellow fever which occurred in Mobile, it is conceded on all hands, were imported from New Orleans on board the barque Miltiades; and for the following facts I am indebted to Doctor Walkly, and Mr. Cox, one of our most respectable stevedores—Doctor Walkly's information was derived from the captain of the barque and the second mate of the steamer Daniel Pratt, which acted as lighter to her.

The Miltilades sailed from Portland, Maine, to New Orleans, where she lost several of her crew with yellow fever; from thence she came to Mobile Bay and anchored below Dog River Bar, some fifteen or twenty miles below town, on the 11th July; and on the 13th, Peter Johnson, one of the crew was sent to our Marine Hospital, in the back part of the city, one mile from the wharves, where he died with black vomit. Dr. Lopez, surgeon of this hospital, informs me that this man entered on the 11th instead of the 13th, in *articulo mortis*, and that he had been sick at sea five days with yellow fever.

On the 14th, three days after the arrival of the vessel, the stevedores went on board to load her with cotton for Liverpool. One of them, John Johnson, was taken down with the yellow fever on the 19th or 20th, and was brought to town on the steamer Daniel Pratt, and placed in the "Sailors' Home," where he died with black vomit on the 25th. On the 25th, four others were brought up from the vessel sick, by the same steamer. One was taken to No. 9 Government street; one to Franklin street, below Eslava, and another went to the hospital.

On the 1st of August, the second engineer of the Daniel Pratt was taken down with the same disease and recovered. Dr. Levert saw a stevedore, David Nichols, with yellow fever, from the same vessel, on the 27th July.

These, as far as I can learn, include all the cases from this vessel. There were, however, other imported cases, preceding the appearance of the disease among our citizens, as the following facts will show; and these, like the former, cannot be questioned.

On the record of our "*City* Hospital" the following entries are made of yellow fever cases: July 23d, one; 25th, two; 26th, three—all of whom were laborers that had fled from the epidemic in New Orleans, and were either sick on arrival or taken soon after. It may be worthy of remark *en passant*, that I was informed by the Sisters of Charity that the disease did not spread among the inmates of this hospital until some time after, when it had become epidemic throughout the city.

After diligent inquiry among the physicians, the first case I can trace among our citizens who had no communication with the Miltiades, was Mr. McDowell, a patient of Dr. Levert; he slept at Hollywood, a watering place on the opposite side of the bay, and came to town every day on the steamboat Junior; he sickened on the 31st of July, and recovered.

A few days after this, rumor was busily at work, and cases were talked of in different parts of the town, but having no connection with each other. On the 18th, I made a memorandum in my note-book, to the effect that up to that date, from the best information, there had been in the town about thirty cases. I inquired among the physicians as to their dates and localities, and could trace no connection among the cases; they seem to have been sown broad-cast over a mile square. I kept, as is my custom, the range of the thermometer, the winds and rain, from the 1st of May until frost, and could see nothing in the season to account for disease. May, June and July were temperate, showery, pleasant, and remarkably exempt from all febrile diseases. Nor was there anything in the type of diseases to foreshadow yellow fever. Yet, I predicted, a month before its appearance, with great confidence, that we should have a terrible epidemic in Mobile, and simply from the fact that I had never known the disease early in the season to attack Vera Cruz, West India Islands and New Orleans, without completing the circuit of the Gulf. I expected unusual virulence; because this had been its character everywhere it had gone; and I shall be greatly deceived if the same disease does not attack cities on the Atlantic next season, and particularly Philadelphia. The germ is sleeping, but not dead.

It should be remarked that our corporate authorities had shown unusual activity in cleansing our city, and long before the appearance of the disease, everything had been done which foresight and prudence could do, to ward off the scourge.

The foregoing statement includes, as far as I know, all the essential facts connected with the late epidemic in the city. I now propose to give what information I have gathered relative to its extension from this point to others around the city and along the rivers.

"Spring Hill" is a part of a sandy, pine hill region, West of Mobile; 150 feet above tide water, and six miles distant from the wharves of the city; it has been a summer retreat for many years; is watered by excellent springs; and has heretofore been considered exempt from yellow fever, or any form of malarious disease. This settlement covers about three-fourths of a mile square, with the virgin pine forest still standing, and includes about thirty families, together with St. Joseph's College, which contains about two hundred resident pupils. The epidemic commenced its ravages at Spring Hill about the 5th of September, and we shall give the history of its progress.

On the 12th of August, just about the time the yellow fever began to assume the epidemic form in Mobile, and one month after the first imported case, I was called to see a young gentleman, Mr. Alfred Murray, with a well marked attack of the disease, at a boarding house in Mobile, on St. Louis street, near St. Joseph; and on the 14th had him removed on a bed to the house of his brother-in-law, Mr. Wheeler, on Spring Hill, about the centre of the settlement. He recovered, and twenty days after he entered the house, 5th September, two of Mr. Wheeler's children were attacked with the epidemic, and about two weeks after two other children were attacked; three had black vomit, and two died.

On the 22d August. Mr. Stramler moved his family from town to Spring Hill, and occupied the house of John B. Toulmin; on the 27th, he carried out a negro woman sick with intermittent fever, who died on the 31st, under circumstances which I need not detail; but I have every reason to believe she did not have yellow fever.

Mr. Greer moved with his family to the same house on the 29th, from town, carrying a daughter convalescing from yellow fever; another daughter sickened on the 8th; three of Mrs. Flemming's children in the same house, on the 10th; and Mrs. John Greer on the next day; Mrs. Flemming on the 15th, and John H. Greer two or three days after. This house is about 300 yards Northwest of Mr. Wheeler's.

My father-in-law, Col. Deas, lives on a lot about 100 yards North of the last named house, and his household, white and black, consisted of sixty persons. On the 7th September, one of his negro women was attacked, on an adjoining lot; on the 8th, his daughter-in-law, Mrs. John Deas; and on the 9th, Mrs. Brown, his daughter; each being in a different inclosure, and one hundred yards from each other. The disease then spread rapidly through the families of the three adjoining premises, attacking whites and blacks indiscriminately. Fifty-four were attacked out of the sixty, and

in fourteen days the whole tale was told—five whites, two mulattoes and one black were dead with black vomit, and the rest were convalescent. One-half of the whites attacked died; and I had never in twenty-five years practice witnessed such a scene, among a class of people well lodged, in clean, well ventilated apartments, and surrounded by every possible comfort, and this too, on a high, barren sand hill, nearly six miles from the city.

Cases existed simultaneously at Wm. Stewart's, Mr. Wheeler's, and Mr. Purvis's and Toulmin's houses, widely separated from each other; and in the latter part of September and through October, the disease visited the houses of Capt. Stein, McMillan, Rev. Mr. Knapp, Mrs. George, Dubose's, John Battle's, and some others. The disease skipped about in an extraordinary manner; some houses escaped entirely, some had but one or two cases. I could see no connection between the houses or inmates to explain the order of attack. There was scarcly a fatal case among those attacked after the 16th September—not more than two or three.

The great majority of the subjects on Spring Hill had had no communication with the city for many weeks, and it is worthy of note that the disease had attacked most of the country between the Hill and town before it reached the Hill; though some neighborhoods, as the Nunnery, and around it as far as Hubbell's, escaped. As far as I can learn, the disease did not spread among the country population beyond Spring Hill, which is sparse.

Citronelle.—This is the name of a village which has sprung up in the last twelve months, thirty-three miles from Mobile, at the present terminus of the Mobile and Ohio Railroad. It is situated on a beautiful plateau of pine land, about 400 feet above tide water, and has been considered, like all these pine hills at the South, perfectly healthy.

The following is an extract from a letter of Dr. James S. Gaines, a most promising and estimable young gentleman, who witnessed the facts. This letter was dated 4th October, 1853, and published in the Mobile Advertiser, of the 6th:

"The local population of Citronelle is 250; adding the boarders at the hotels and different boarding houses, say 100, it will make our population about 350. This estimate of the population does not include over one hundred hands in the immediate vicinity of Citronelle. I have seen and treated, since the 16th of August, fifty-three cases of yellow fever; thirteen out of this number have died. There have been seven other deaths since this date; they were not seen by me, but from what I could learn, five out of this number were from yellow fever; making the total number of deaths since the 16th of August up to date, twenty. That will just make an average of one death to seventeen of the population. The first case that I was satisfied of its originating here, occurred on the 11th of September, since which time there have been several clear cases, and within the last ten days the number has been increasing; some of them of a very malignant type. I have no idea that the disease could have

originated here, had it not been for the frequent communication between this point and Mobile; and it is not singular that it should have done so, when we reflect that the baggage cars are almost air tight when closed, running from Mobile to this point in two hours."

The Doctor, unhappily, did not live to tell the whole tale—he himself fell a victim to the disease soon after this date. Many more of the population died, and sixteen out of eighteen of the employées on the railroad, besides many laborers. There are no data for accurate statistics, but from what I can learn, something like a fourth or fifth of the population along the road from Mobile to Citronelle died. According to Dr. Gaines' statement, there was just a month between the first case imported into Mobile and the first at Citronelle.

The Dog River Cotton Factory is situated Southwest of Mobile, about five miles, and has within its inclosure of some twenty or thirty acres, about 300 operatives, including their families. The houses are built in a hollow square, and form a complete village. Mr. Charles Wattleworth, one of the most efficient and intelligent officers of the establishment, under date of 21st November, writes the following reply to certain queries:

"*Dear Sir*:—In answer to yours of yesterday, I send you the following account of the deaths and recoveries from yellow fever in our immediate neighborhood:

"The first case we had was a man that had been to New Orleans; he was taken ill on the 18th August, (two days after his return) and died on the 22d; a man that waited on him died about the same time.

"The next cases that occurred were about the 1st September; they were about six in number, and the parties had been in the habit of going frequently to town.

"The first cases that appeared here among parties that had been in no way connected with the city, or with the sick, occurred on the 9th October; there were five cases on the evening of that day, and about the 13th there were five more. Other cases have occurred since that time, and there are three sick at present, (21st November,) one of which is not expected to live.

"The whole number that died of yellow fever up to date, is twenty-three; and forty-six have recovered.

Yours, &c., CHAS. WATTLEWORTH."

What is called St. Stephen's Road goes off from Mobile in a Northwest direction, and is so densely populated for five miles as to present much the appearance of a continuous village. My friend, Dr. E. P. Gaines, who lives about four miles from town on this road, had ample opportunities for investigating the epidemic, and to him I am indebted for the following facts.

The following cases all occurred from two to four miles from town, on the St. Stephen's Road, or in other words, between the Creek and Gen. Toulmin's residence. August 23d, two cases; 24th, one; 30th, two: September 1st, one. These were all contracted in town.

The following were the first originating in the country: September 4th, one; 7th, one; 9th, one; 11th, two; 12th, two; 16th, one—Miss. Willson, the first death with black vomit,—and from this date the disease became decidedly epidemic.

Dr. Gaines thinks the disease contagious, and narrated to me some instances which are difficult to explain on any other ground. The disease extended out in this direction some ten miles, into the neighborhood of William Cleveland.

Heretofore in Mobile the colored population, except in 1819, have escaped yellow fever; this year they have been as generally attacked as the whites, but with less fatality; there have been at least fifty deaths among them this season from yellow fever, and the mulattoes have suffered more than blacks.

Children, who heretofore have been little liable, this year have been generally and violently attacked. No acclimation short of an attack of yellow fever, has served this year as a protection; not only many who have lived here fifteen or twenty years, and passed through several epidemics untouched, but grown up natives, and even those advanced in life, have been fatally attacked. There were very few second attacks. I saw but one clear case.

It is remarkable that not only some neighborhoods around the town escaped, within three or four miles, but many houses in town. Mrs. McKnight, a milliner, lived in Claiborne street, between Dauphin and St. Francis, and she, with eleven unacclimated girls, escaped entirely. Other examples of the same kind occurred.

Elevation seemed to have no influence over it. The Battle House, a large and superb new notel, had just been completed and occupied but a few months; it was as clean as any building could be, and as well ventilated. The female Irish servants slept in the fifth story, and the males in the basement. They were nearly all attacked, and about one half died. The cleanest parts and best residences in the city suffered as much as the small buildings in filthy alleys.

On the opposite side of the bay, while many cases occurred at isolated houses, and some sixty deaths between the village and Point Clear, yet Freeman's and the Point Clear hotels, having more than one hundred regular boarders each, escaped almost entirely, though cases were brought to them from Mobile and New Orleans.

Contagion.—Under this head, according to my views, two distinct questions have been confounded, viz, *the contagiousness* and the *transportability* of a disease. A disease may not be contagious in the proper acceptation of the term, that is, communicable from one human body to another, like small pox; and still it does not follow that the germ or *materies morbi* may not be transported from one place to another in a vessel or baggage car, and there be propagated.

With regard to the *contagiousness* of yellow fever, my mind is still undecided, nor is my conviction yet complete with regard to its *transportability.* In the epidemics of yellow fever which I have witnessed

on former occasions, 1837—'9—'42—'43—'47, the evidence seemed to be decidedly against contagion; while in 1853 the facts have been so conflicting as to leave me still in doubt, though my leaning is rather in favor of the contagiousness of this epidemic.

The reader need not be told how completely we are in the dark with regard to the laws by which epidemic diseases are propagated, to say nothing of their obscure origin. It is a common opinion that the decomposition of animal or vegetable substances may and do produce certain gaseous emanations which rise into the air; are diffused through it, and thus produce yellow fever; but this theory will not bear a moment's examination. If a gas, the cause of yellow fever must obey the laws of gases, and be very soon diffused, by changing currents of wind, all over the city, from a given point. Yellow fever, on the contrary, is extremely erratic in its course. It prevailed this season in Mobile for more than two months as an epidemic, and attacking new houses every day in different parts of the city; houses on opposite sides of the street, or beside each other, were attacked at intervals of several weeks, and many houses escaped entirely, or had but one or two cases, in the very heart of the city. If the cause was in a gaseous form, how could it thus skip from house to house in town, and travel in the same erratic way for miles around the town? It is a curious fact that Montgomery, Demopolis, and Spring Hill were attacked about the same time, viz: between the 1st and 5th of September; while Selma and Dog River Factory were not attacked until about the 8th of October; Spring Hill and Dog River Factory are within five miles of Mobile, while the other points are two hundred. Intermediate points, like the houses in town beside each other, were attacked at irregular intervals.

The above facts would seem to disprove the idea that the cause of yellow fever exists as a gaseous emanation, and we must seek some more plausible hypothesis. An examination of the facts tends more to show that the cause exists in an organic form, and possesses the power of propagation and progression by organic laws. The *transportability* of yellow fever, to say the least, rests upon much more stable support than its contagiousness; for however conflicting the minor details may be; the broad fact stands out that the disease was not only a traveling disease, but traveled to those points on the Gulf of Mexico frequented by vessels and railroads, and *no farther*. When on former years yellow fever visited Vera Cruz, the West India Islands and New Orleans early in the summer, it has almost invariably extended along the coast of Mississippi, Alabama and Florida. So in 1853, after it had marched from Rio to New Orleans, I predicted with certainty that it would continue its march around the Gulf; and, although we had had a cool, showery, pleasant summer in Mobile, and extraordinary sanitary precautions had been taken, I advised my friends to fly, and was called an alarmist.

It has been, too, the invariable habit of yellow fever, when it has visited Mobile, to commence first in the city, and not to attack the sur-

rounding country for several weeks. Why, if it depends upon an atmospheric cause, should it not attack the settlements around for five miles, as soon as the town?

It is a fact worthy of note that the yellow fever this season has visited every point on the Lake where the New Orleans boats have touched; while Portersville, where they did not touch, has escaped—Biloxi, Pass Christian, Pascagoula, &c., have all been attacked. At Portersville, where several hundred people were assembled, and about one hundred and fifty in one inclosure, no cases occurred, though five imported cases were brought in, nursed by different persons, and two died with black vomit. These facts I have from Dr. J. W. Moore, a very intelligent gentleman who lives at Portersville, and saw every case of sickness that occurred there.

Other facts favor the transportability of the germ or *materies morbi*. It is admitted that a vessel may go from an infected to an uninfected port; carry the *materies morbi* with her, and that persons at the latter port may go on board the infected vessel, take the disease and die with it; hundreds of examples of this kind have occurred, and the barque Miltiades, alluded to above, is a case in point. The stevedores of Mobile, as did two men from the steamer Daniel Pratt, which lay alongside of her, took yellow fever from her. It is by no means an unreasonable idea to suppose that the *materies morbi* may have been transmitted to the Daniel Pratt, that was carrying freight to her for some days and by her brought to the city.

It is also a fact perfectly well established, that yellow fever has in many instances started in an alley or other point in a city, and gradually extended itself through the whole or part of a city; this has occurred twice, in my day, in Mobile — 1842 and 1843 — each year taking several weeks to travel half across the city, and each year prevailing in different parts of the city. In 1842 the disease commenced in the Southern part of the city, and spread over one half; and in 1843 it commenced in the extreme North and covered the part of the city untouched the previous year. This fact and others lead me strongly to believe that Philadelphia will be scourged next summer, and probably other Atlantic cities.

It is notorious that yellow fever has repeatedly spread from a point in Philadelphia and New York. So slow has been its progress that they have fenced it in, and in some days after, discovering that the disease was progressing, they have moved the fence to keep pace with it. A very reliable old gentleman, who was a member of the Board of Health in New York in 1822 or '23, when yellow fever prevailed, told me that by actual calculation it traveled forty feet a day on that occasion.

If, then, the *materies morbi* of yellow fever can be transported in the hold of a vessel from one port to another; and if it can be propagated from a single point in a city throughout that city; why may the disease not make its point of departure an infected vessel lying at a

wharf, as well as an infected alley, or other point of land? As far as reasoning goes, I confess I can see no difference, and the spread of yellow fever in 1793 from a vessel in Philadelphia, and numerous other examples since, would seem strongly to favor the idea that a city may, under certain unknown circumstances, receive and propagate the *materies morbi* of yellow fever from an infected vessel. It is true that infected vessels have often arrived in ports without communicating the disease, but the same may be said of small-pox and other strictly contagious diseases — a negative does not disprove a positive fact.

Nor can the admission of the occasional importation of yellow fever into New Orleans or Mobile conflict with the fact, that sporadic cases or epidemics may spring up from germs which have been long slumbering in these cities. The facts do not conflict.

A doubt was long ago started as to the indigenous origin of yellow fever in America. Many have contended that it is an imported African disease; and I confess that my mind is by no means free from doubt on this point. Cholera, small-pox, measles and scarlet fever are all Asiatic diseases; all imported into Europe since the Crusades and into America since the conquest. So recent is scarlet fever in this country, that Dr. Rush remarked, fifty years ago, that the disease was so rare that one physician would not be likely to see it more than once in his lifetime! It was never known as far South as the Carolinas before about 1830, and yet how common has it become. These diseases have all the habits here which they had in their original country; they lie dormant for a time and then wake up to their work of destruction; they travel from place to place in the most erratic manner, by laws impenetrable to us. Some may be transported by contagion, others not; some may be transported both by epidemic laws and by contagion. Scarlet fever, for example, may break out and prevail as an epidemic without its origin being traced, or it may be transported by contagion.

Some five years ago I published an article in the New Orleans Medical and Surgical Journal, to show that the *animalcular* hypothesis explained better the erratic habits of yellow fever than any other, and every day's experience and reflection since have strengthened those views; but I will not here repeat them. I am fully aware of the numerous and ingenious objections which have been urged, and among others those in the recent paper of Prof. Leidy, in which he pronounces the idea "absurd."

I am not disposed to open the discussion at present, but must be permitted to say, that ingenious and philosophical as are the experiments of Prof. Leidy, they are wholly inconclusive to my mind. Prof. Agassiz, whose authority will be allowed in any scientific assembly; regards all microscopic observations heretofore made in this department as so defective, that he informs me he has not assigned the infusoria a place in his classification of the animal kingdom.

Microscopic observations are yet but in their infancy, and in reaching the causes of disease it is as far behind reality as we know chemistry to be.

In reasoning from analogy, the "Insect hypothesis" of Sir Henry Holland explains best the habits of certain epidemic diseases, and it is the part of true philosophy to abandon such theories as the old malarial one, which is in accordance with no known laws, and to explore in a direction towards which rational hypothesis points. Prof. Leidy says "none of the well known animalculæ are poisonous. At various times I have purposely swallowed large draughts of water containing myriads of *Monas*, *Vibrio*, *&c.*, *&c.*, without ever having perceived any subsequent effect." He might have swallowed the poison of the viper with the same impunity. By what various means the poison of insects or animaculæ might be communicated through the air or directly to individuals, we know not. During the past summer I knew a lady of very nervous temperament to be kept for weeks in a nervous, neuseated state, from the effluvia of certain insects on trees in the yard; while no one else perceived it, or was affected by it; she did not recover until the season for the insects had passed over. Here is a perfect analogy to the *Rhus Vernix* and other vegetable substances alluded to by Prof. Leidy, as capable of poisoning the air. Similar analogies abound.

Table of Interments in the Mobile Cemeteries during the Yellow Fever Epidemic from 1*st August to* 1*st November*, 1853.

Months.	D'ths.	Months.	D'ths.	Months.	D'ths.	Months.	D'hs.	Tot.
August..... 1	6	August..... 9	3	August.....17	10	August.....25	20	
" 2	3	" 10	4	" 18	12	" 26	15	
" 3	4	" 11	4	" 19	15	" 27	26	
" 4	2	" 12	11	" 20	11	" 28	28	
" 5	5	" 13	6	" 21	8	" 29	39	
" 6	2	" 14	7	" 22	11	" 30	15	
" 7	2	" 15	9	" 23	12	" 31	25	337
" 8	2	" 16	8	" 24	12			
September..1	40	September. 9	33	September. 17	31	September.25	13	
" 2	45	" 10	28	" 18	21	" 26	18	
" 3	29	" 11	31	" 19	18	" 27	17	
" 4	31	" 12	30	" 20	21	" 28	8	
" 5	36	" 13	32	" 21	18	" 29	9	
" 6	39	" 14	26	" 22	21	" 30	12	780
" 7	30	" 15	40	" 23	14			
" 8	44	" 16	25	" 24	20			
October.....1	8	October.... 9	6	October....17	11	October ...25	5	
" 2	9	" 10	7	" 18	8	" 26	6	
" 3	6	" 11	4	" 19	9	" 27	3	
" 4	15	" 12	8	" 20	11	" 28	4	
" 5	9	" 13	6	" 21	8	" 29	5	
" 6	4	" 14	6	" 22	7	" 30	6	
" 7	9	" 15	8	" 23	6	" 31	6	214
" 8	5	" 16	5	" 24	4			
		TOTAL.....						1331

The epidemic had so exhausted itself by the 26th October, that the Medical Board announced that it was at an end, and discontinued their daily reports; scattering cases, however, continued to occur through-

out the months of November and December; and I find on examining the records of the sextons, that twenty-five deaths in November, and fifteen in December are placed to the yellow fever list. The last death was on the 16th of December; but other cases, not fatal, occurred later.

The above table includes deaths from *all causes*, and we possess no data by which we can classify with accuracy the different diseases for those months; but we can approximate the number of deaths from yellow fever alone sufficiently near for all practical purposes. The aggregate, from *all causes*, during the three months, was 1331; and those informed on the subject will allow that fifteen deaths a week, or sixty a month, would cover the mortality at this season of the year from all other causes than fever, and particularly during the prevalence of an epidemic. According to this estimate, the three epidemic months would give an aggregate of 180 deaths from causes exclusive of yellow fever. The facts may be tabulated as follows:

Deaths during August, Sept., and Oct., from all causes.....	1,331
" for same period from other causes than yellow fever.....	180
" " " " yellow fever alone.....	1,151
" during Nov. and Dec'r, from yellow fever alone.....	40
Total of yellow fever from 1st Aug. to 16th December, ...	1,191

About fifty of the deaths from yellow fever were among the colored population; and this class was almost as universally attacked as the whites; which shows a degree of malignity unknown in Mobile since 1819; when the disease attacked creoles, negroes and Indians.

The winter population of Mobile is at present about 25,000, of which at least one-third were absent during the epidemic; some of the latter remained in the vicinity, and many went to the interior or other States. It should, however, be borne in mind, that our city cemeteries are the repositories of most of the dead for several miles around the city, as well as for the steamboats; and that our bills of mortality may therefore exhibit a larger per centage on our population than truth would justify. But to mitigate the facts as we may; 1331 deaths in ninety days is a terrible mortality; and had the population remained in the city, I see no reason to doubt that the white portion would have been more than decimated. Certain it is, that in many villages along the Gulf States, where the number of inhabitants could be closely approximated, and where none were "acclimated," this fearful epidemic comitted ravages far beyond decimation.

MOBILE, December 18th, 1853.

COMMUNICATION FROM A. H. HUTCHINSON, ALABAMA.

Bladen Springs.—I include two cases which occurred at the landing, four miles from this place.

Surface soil—sandy.

No stagnant water in our vicinity ; distant four miles from the Bigbee river.

Drainage.—Water runs off freely.

All these cases had been in a locality where yellow fever was prevailing; none are believed to have risen from the handling of goods, clothing, &c.; and none to have originated spontaneously, without any suspicion of intercourse with other cases of the disease. The cases of yellow fever which occurred here were the same as those of Mobile, Alabama. All who died had black vomit.

Yellowness of skin.—None but those who died.

I do not regard the disease as true yellow fever. I have never seen the disease before. Numbers were attendant on the few that were sick here; yet no one took it.

The weather was very dry during the months of July and August; hot in the sun, and pleasant in the shade. An unusually regular and continuous sea breeze was felt during this time. Commencing on the last of August or first of September, we had frequent gusts of wind from the South, accompanied with showers of rain ; but less thunder and lightning than I have ever witnessed.

We had fewer flies than usual, but more musquetoes, which continued during the season; but little mould, and that of a very white, dry appearance.

Many visitors from the cities, who did not take the disease, were attacked, after coming here, with diarrhœa and dysentery. The derangement tending to yellow fever no doubt passed into other forms of disease, as it was not common to persons from the interior of the country.

TESTIMONY OF R. W. ADAMS.

Mr. Adams left New Orleans on the 15th of August. On his arrival at Mobile, being fatigued, and having exposed himself to the influence of the sun, he was unwell. On his arrival at Montgomery, he was attacked with fever. This was twelve days after his departure from New Orleans; thinks he had yellow fever, from the similarity of symptoms with the disease he contracted in 1841. Mr. Washburn, who accompanied him, died there ; supposed to have been laboring under delirium tremens, as he drank to excess. There were no other cases of fever in Montgomery at that time.

COMMUNICATION FROM A. G. MABRY, M. D.

The city of Selma is situated on a very high bluff on the West side of the Alabama river, in latitude about 32½ deg., and nearly two hundred miles from tide water. Owing to a bend which the river makes at this point, the city is nearly North of it; occupying

a very level plain; extending North three-quarters of a mile from the river and on its bank, East and West, two miles.

The soil is chiefly sand, resting on a bed of rotten limestone with a stratum of clay of variable thickness and of unequal distance from the surface running through its whole extent. The lime rock immediately on the bluff, is found near the surface, but soon dips and re-appears again two miles off beyond the limits of the city; thus forming a concave bed for the immense deposite of sand on which the city stands.

Almost every tenement within the corporation limits is supplied with a well, which at the depth of from eighteen to twenty-six feet affords an abundant supply of delightful stone-water, and in addition to these, we have a number of Artesian wells, the waters of which differ little from that of the common wells.

In the business part of the city, as might be expected, the houses are compactly built; but the lots of the private residences are large and the buildings far apart.

The streets are wide and running North and South and East and West, cross each other at right angles; they are uniformly dry and clean, and the whole city, wth one exception, has been kept free from all offensive accumulations of every description.

There are no canals, ditches, pools or other places that contain stagnant water within or near the limits of the city. There are two creeks near by; one half a mile, the other two miles off, and they both empty into the river; one is a very small stream, confined to narrow limits with precipitous limestone bluffs, the other is more flat, but most of the marshes on it for some years past have been reclaimed and brought into cultivation.

Most of the business is transacted on Broad street and at the foot of it, or where it terminates on the river bluff near its intersection with Water street; there has been a large gully made by the washing away of the sand by the water which passes down the two streets and collects there in quite a large volume before it enters the river. This wash encroaches upon these two important streets at their intersection with each other to such an extent as to make it an object for the last fifteen years, not only to stay its further progress, but to repair the damage already done. For these purposes immense quantities of brush, shavings, logs and every thing of the kind that could be conveniently obtained, have been, from time to time, thrown in and covered with sand. About the middle of last summer, however, a company of gentlemen having purchased the end of Broad street, including the gully, commenced their excavations for a building 120 feet by 100 feet; these excavations were continued until they reached a depth of more than 20 feet below the surface, giving room for two stories under ground, and embracing the gully. All *deposits* heretofore made had now necessarily to be *exhumed*, and much that was thus *dug up and removed was spread out on Water street*, in front and beyond the site of the building each

way, and the *balance heaped up on vacant lots near by, and all exposed to the rays of the sun.* Other excavations were made in the same streets, and the earth, as in the former case, *was deposited on Water street.* Diagonally opposite the first excavation, on the corner of the same street, a decayed old wooden building was torn down, and much *filth exposed.* The decayed lumber of this old building was purchased by a German living two squares from its former site, and piled in his yard near his house.

The weather during the summer and fall, was generally hot and dry; the spring was a wet one, until the latter part of May; the hot and dry weather continuing until the last of July.

Up to the middle of September, the year was considered unusually healthy; but at this time a change took place from summer to fall weather, and we had some cold East winds, and a very remarkable increase in the number of remitting and intermitting fevers; which, as usual at that season of the year, had been prevailing. Many cases of influenza occurred about this time. From the 1st to the 25th of October, the weather was dry and hot for the season. We had frost on the 25th.

About the 1st of September, a German, a clerk in a grocery store on the corner of Broad and Water streets, was taken sick and died, with symptoms of yellow fever.

On the 16th of September, the wife of the German who purchased the old building sickened; and died in a few days of what we are now convinced was yellow fever. This man had three children; all of whom died, successively, within two weeks of their mother; making four, out of a family of six, who died within that time.

On the 17th, a Northern man, employed in the iron foundry, was taken sick at his boarding-house, corner of Green and Water streets, and died with what was considered by the friends in attendance as yellow fever and black vomit. About the 20th, a family came up from Mobile, a number of which had yellow fever; they evaded the quarantine regulations established on the 13th; Drs. Barnum and Blevins having been appointed health officers; they had no communication with the citizens, having violated the law.

On the 6th of October, a young gentleman, clerk in a clothing store on Broad, near the corner of Water street, was taken sick, and died with symptoms showing a well marked case of yellow fever. On the 8th, Mr. Mitchell, a young lawyer, occupying rooms and sleeping in McCraw and Prestridge's buildings, immediately on the river, fronting Water street near the corner of Broad, was taken sick. On the 9th, Mr. Fourcard, a little up Broad street; same day, Col. Bun, boarder in the Dallas House, Water street; and two mulattoes attached to the same house. On the same day, Mr. Smith, a grocer in Mc Craw and Prestridge's buildings; and Mr. Blevins, one square up Broad street. On the 12th, Mr. Fourcard; on the 13th, Maj. Gee, of

the Dallas House; Drs. Barnum and Blevins, health officers; Mr. Atkinson, exchange broker in C. and P.'s buildings; Mr. White, architect, and boarder in the Dallas House; with several others. These cases all proved incontestably to be cases of yellow fever. On the 14th, Messrs. Mitchell and Blevins died. The citizens now became alarmed, and it is supposed that one thousand fled; which, with five hundred absent; reduced the population proper from three thousand, to one thousand five hundred persons. The proportion of negroes and mulattoes is about one thousand. Three cases occurred respectively on the 6th, 10th, and 13th days, after the frost on the 25th of October.

Hæmorrhage from the nose, gums, throat and bowels were of frequent occurrence, and in one or two instances there was considerable bleeding from slight abrasions of the skin. Black vomit occurred in perhaps two-thirds of the fatal cases; and in one-third that recovered.

In such cases as recovered; convalescence commenced about the begining of the fourth day; and death occurred in those that proved fatal, between the fourth and eighth day.

Judging from my own experience, I should say that one out of every five of those attacked, died. The disease seemed truly to be no respector of persons. We lost some of our best citezens; and most of them robust young men. Several mulattoes were attacked, and two or three died; but no blacks, so far as I am informed, took the disease at all. I know of but one case of relapse; and no one that I am aware of who had previously had the disease, was attacked.

That the disease originated here, is clear enough to my mind; and I cannot avoid the conviction that the causes, whatever they may be, had their origin, and were developed, by the *excavations made on* Water street, between Green and Lauderdale streets; and on the corner of Broad street; and by the manner in which the earth from the *excavations was disposed of.* If this be not the case, I am totally at a loss to account for its origin.

There was no intercourse between the first persons who were seized, and those who afterwards took the disease; and something like a dozen persons were taken on the same day, and of course could not have taken it from each other; and few or none of them had been about those who had been previously taken. The slowness with which it progressed, and the narrowness of the limits within which it was confined, forbid the idea.

It was remarkable that those who were most with and about the sick, none, with scarcely an exception, took the disease; and, with very few exceptions, all who did take the disease were in the habit of resorting to that part of Water and Broad streets so frequently referred to. There were some few, however, who neither frequented that vicinity, or were near any person sick; and if the cause originated there, it must have extended its influence.

I had seen cases before brought from Mobile, who were freely visited by our citizens, without, in a single instance, having it communicated to them.

Thirty-two deaths occurred from the disease; the last on the 13th of November.

My experience in the disease was heretofore very limited.

TESTIMONY OF HENRY S. LEVERT.

MOBILE, December 22, 1853.

Prof. E. H. BARTON, M. D., New Orleans.

My Dear Sir: — When I had the pleasure of seeing you in our city, I promised to bring to your notice some of the facts concerning yellow fever, since my residence in Mobile. That pledge I now propose to redeem.

Whether this disease is of foreign or domestic origin, is a question which cannot be satisfactorily answered at this time; nor is it to be presumed that the few facts herein contained will materially aid you in its solution. To accomplish this object successfully, a long series of carefully made observations, at different times, in various localities, and during different epidemics, will be required, before satisfactory evidence can be obtained, upon which the profession can rely.

At present great diversity of opinion exists, whether yellow fever is imported into our Southern cities, or has its origin in our midst.

From the facts which have been forced upon my notice, my mind, at least, has been led to the conclusion, that if the causes existing in our midst, do not generate the disease they favor its introduction, and contribute greatly to its extension.

One point, I think, is satisfactorily established in connection with its appearance in Mobile, upon almost every occasion, viz: That it has invariably occurred in those seasons when *large excavations have been made, or extensive surfaces of fresh earth exposed to the action of the sun and air, during the heat of summer;* while, on the contrary, our city has been almost as invariably exempt from this scourge in those seasons in which no such causes existed.

In 1825, the old Catholic grave-yard, which was situated in the middle of the city, was broken up; the bodies disintered and removed to another locality, where they were again buried, during the summer season. Yellow fever of a malignant type appeared, and proved fatal to a large number of the inhabitants.

In the winter of 1829 and '30, the authorities of the city of Mobile commenced shelling the streets, which work was continued for the six succeeding years; and until almost all, and perhaps all streets then opened were paved with shells, which from use soon formed a firm and compact road; dry and clean. About the close of the year 1836, the shells for paving purposes were abandoned by the city authorities, and after that time none were ever used. During the period between 1829 and '36, the streets were firm and dry; requir-

ing no grading, no repairing save occasionally a few shells upon broken or injured places, and little or no fresh surface was at any time exposed.

The result was we had no yellow fever between 1829 and '36. Evidence, though of a negative character, is yet not the less strong.

After the use of the shells had been abandoned, for a year or two, the streets became broken and unfit for use, and it was necessary to have them graded and leveled; the soil being very light and porous, these repairs were not durable, consequently they had to be frequently repeated, and always in warm and dry weather.

In addition to this large extent of *fresh surface thus exposed*, in 1837 several new streets were opened and graded, and large portions of *swamp land were filled up in* the Northern part of the city during the *months of July, August and September.* Yellow fever became epidemic in the month of October of this year.

In 1841, the disease appeared in the Eastern and Southern parts of the city, *just at the point where these excavations (grading)* were commenced, and it lingered in that region for several weeks before it extended to other portions of the town; it, however, finally did prevail throughout the city.

In 1843, the *same causes* existed as in 1841. The excavations (grading) were commenced, however, in a directly opposite direction, in the Northwestern part of the city, on Hamilton and St. Anthony streets. Here too the epidemic first appeared, and to this neighborhood it was confined for a long time before it extended to other localities. I may here observe that *this exposure of fresh surface* was made in *both years*, '41 and '43, during the months of *July, August and September.*

The *same causes existed in* 1839, in which year there was a severe epidemic of yellow fever.

In the spring of 1844, at the request of the Board of Health, the authorities of the city of Mobile, *prohibited any excavations or grading* of the streets after the 1st day of July; this precaution was pretty rigidly observed until 1849 or '50, and during the whole of this interval we had *no yellow fever*, save a slight and mild epidemic in 1847.

In 1851, there was also a slight epidemic; but in this year, as well as in 1850, the *same method* of grading the streets was *continued*, as prior to 1843.

In the present year, 1853, *more grading has been done*, and more *extensive excavations have been made* in the city, and consequently *much larger surfaces of fresh earth* have been exposed than in any *one year* since 1825, and the epidemic of this year has been *more general* than at any former period.

It will be observed that in 1841 and 43, the disease appeared in those localities where the *excavations were first made*, and for a long time it was confined to the immediate vicinity. In the present year, 1853, these excavations were made simultaneously in almost every

part of the city, and were continued throughout the warm weather until the disease appeared.

That this epidemic was of *local origin*, seems much more than probable, from the order and manner of the occurreuce of the first fifteen or twenty cases.

The first case that came under my own observation, occurred on the 28th of July, in Government street, near the water.

The second case, on the 30th, on St. Francis and Commerce streets, four squares removed from the first. The third case occurred on the 31st, on the corner of St. Joseph and Bloodgood streets, half a mile from the two former cases. The fourth case, on the 5th of August, on the corner of New Hampshire and Laurence streets, one mile removed from the last case. The fifth case, on the 9th of August, on Royal street, in the heart of the town. The sixth case, on the 12th of August, two miles in the country, in a Southern direction; on the same day there were several cases in the Battle House; on the 14th, a case occurred on Stone street, two miles in a Northern direction; on the same day, a case in the Lafayette House, corner of Royal and St. Michael streets; on the 15th, a case on St. Francis street, corner of Cedar; and on the 18th, there were five or six cases in one house, on the corner of Conception and Government streets; on the 20th, there was a case on Franklin, below Government.

The different points here enumerated, and taken in precise order of the occurrence of the cases, are as remote from each other as they well could be, within the limits of the city. After the 20th of the month, the cases became so frequent as to assume the character of a general epidemic, occurring in every street, and almost in every house.

Another striking example, of the influence of local causes in producing yellow fever, is furnished in the history of the disease, as it appeared on the Eastern shore of Mobile Bay. Besides the large boarding houses, Freeman's and Short's, there is a number of dwellings, inhabited by families from the city, ranged at a short distance from each other, along the Bay shore. At nearly an equal distance in the rear of these houses, runs a creek, in which are several "fish ponds." During the present summer *two of these fish ponds were cleaned out*, and one was left undisturbed. The consequences we will now proceed to show.

Freeman's is the first house you approach from the North; immediately behind Freeman's, is the first fish pond on the creek, and is the only one that was left undisturbed. In Freeman's family, though it numbered, including his company, not less than two hundred souls, not one case of yellow fever occurred during the whole season, and what renders this exemption more striking, is the fact that Dr. Northall, from New Orleans, and Richard Miles, from Mobile, sickened, after their arrival, and died of black vomit.

Next below, and adjoining Freemans', are two houses, occupied by Messrs. Moreland and Peden, these two families were also exempt from the disease.

We next come to Short's. This establishment consists of five buildings, four of which are in a line, on the Bay shore, with the houses of Freeman, Peden and Moreland. Next to Short's is the residence of Capt. Adams; and, next South, that of Dr. Minge, and still farther South, is the residence of James Campbell, as will appear more fully from the inclosed diagram.

In the rear of the last of Short's four houses, of Capt. Adams' residence, and also of Dr. Minge's, is the second fish pond on the creek, and this was cleaned out in the month of May, and the *mud and rubbish placed upon its bank, and suffered to remain* in that situation through the summer.

The third fish pond is lower down, and nearly in the rear of James Campbell's place. This was also cleaned out at the same time; but Campbell took the precaution to cover the mud and rubbish with *quick lime and guano*, as fast as it was removed from the water, for manure. The whole of Dr. Minge's family, Capt. Adams' family, and Mr. Voorhies' family, who occupied the last, or Southernmost of Short's houses, were attacked with yellow fever. No cases occurred in the three other houses of Short's, further removed from the influence of this pond. No case occurred in James Campbell's family, though it numbered thirty-six.

A case did terminate fatally in Campbell's family which was contracted in Mobile.

It should be remarked that Short's family residence is some distance in the rear, and consequently nearer the creek than the other houses, and a little North of the pond; and it is further worthy of notice, that the land breeze which blows from the East, every night, passes directly over this pond to the bay, and would, consequently, pass over these houses on its way, and this may account for the small *lateral* extent to which their injurious influence seem to reach. At all events, *the facts* are as we have stated them. Yours, &c., H. S. L.

TESTIMONY OF DR. N. B. BENEDICT.

Prof. E. H. BARTON, M. D., New Orleans.

Dear Sir:—I have the honor to submit the following account of the local origin of yellow fever in September, 1853, in the pine woods, in the vicinity of a place of summer resort named "Hollywood" and "Freeman's," situated on the Eastern shore of Mobile Bay. My notes were written upon the spot, with every precaution to insure accuracy, and I was assisted in the investigation by Capt. Geo. H. Kirk, of the steamboat "Empress," and his brother, Mr. Robert S. Kirk, of Mobile. I will add that Wm. H. Croft and Daniel G. McKenzie were, at the last account, still residing on the spot.

This shore of Mobile Bay presents a beach of clean white sand, and a bold bank, rising abruptly to a height of thirty or forty feet. The top of the bank is nearly level for a distance of six or seven hundred yards back, where a moderate depression, from North to South, re-

ceives the waters of several springs, flowing out of the base of higher ground beyond the depression, and forming a little brook of remarkably pure water, and of sufficient declivity to supply the bath houses and to keep in operation a "water-ram." This purpose is accomplished by throwing across the brooklet a dam of moderate height, which is necessarily kept in good repair; that the supply of water to the vast hotel of "Freeman" may be unfailing; and it also furnishes a little reservoir for fish. This table-land between the shore and the brooklet is the particular locality called Hollywood, and was originally clothed with holly, magnolia, beach, gum and kindred trees of largest growth; a great portion of which are yet standing, except immediately about the hotel buildings. Beyond the brooklet the surface of the country ascends with a gradual and unvarying acclivity for a distance about one mile; attaining an altitude estimated to be one hundred and fifty feet above the level of the waters of the bay. The summit forms a well defined, though greatly sloping ridge, having a direction parallel with that of the bay shore, and distant from it about one mile and a quarter. The whole of this land is covered with a dense primeval forrest of pine trees, extending for many miles along the course of the bay shore, and Southeastward forty miles, to Pensacola, Fla. The old stage-road from Hollywood to Pensacola, after passing the extreme summit of the high land, turned Northward and followed the direction of the ridge along its Eastern slope, for about a mile and a half, and then bore away to the East, and finally to the Southeast. Along the vicinity of this old road are situated some ten or twelve small houses, mostly new, of split pine logs, each surrounded with a "clearing," little more than sufficient to avoid danger from the fall of adjacent trees, and occupied by persons in very moderate circumstances; many of whom live here only during the summer, for the sake of the reputed healthfulness of pine woods. The culture of the soil, beyond raising a few vegetables, seems generally neglected; indeed few of the houses are even surrounded by an inclosure. They are all, without exception, situated upon the East side of the road, and, consequently, at a considerable lower point than the summit of the ridge, or even of the road itself. The present road to Pensacola, after crossing the high land, runs almost due Southeast; so that all public traveling passes at a distance of a mile or more to the South of the neighborhood.

One hundred and thirty yards Southeast of three houses, which are presently to be described as the scene of paramount interest; occurs a slight depression in the general surface, which receives water during a rain; but dry weather and a porous soil speedily remove the water after ordinary showers. At the time of my visit, it was full of water; forming a pond ten or twelve yards in diameter, owing to the extraordinary rains which had been falling daily for several weeks. About three-quarters of a mile East of the old road and the dwellings, occurs another brooklet, formed by the waters of a few springs, resembling in its direction, and all other respects, the one formerly described. It

nowhere forms basins or marshes, and the water, like all found in this region, is so pure as to afford no cloudiness on adding nitrate of silver. Besides the localities named, there is no other stream or body of water anywhere to be found nearer than Fish river, a small stream which is eight miles farther East. The soil is the mixture of black sand, reddish clay, and gray sand, in which the Southern long-leafed pine is found to flourish.

To recapitulate: this neighborhood is situated one mile and a quarter from the bay; distant also, from any thoroughfare, and in an elevated pine region, which is free from all accumulations of filth or stagnant water, or sources for the generation of "miasm." It is, moreover, cut off from all influences that might exist at the bay shore by the interposition of the wooded bank, by the dense pine forest which clothes the rising ground from base to summit, and by that summit forming a ridge about ten feet higher than any of the dwellings themselves. In this locality occurred seven unequivocal cases of yellow fever; and so complete was the insulation; so abundant and perfect the testimony, that I embraced the opportunity, as one of the most precious, perhaps, that had ever fallen to the lot of a physician, for discovering some means to settle the vexed question of the origin of the disease. A most careful investigation was undertaken, and continued daily from September 17th to the 27th, resulting in the utter failure to trace any connection; immediate or remote; between these cases and any others, or any dependence whatsoever upon those causes which have commonly been supposed to be essential to the origin of the disease. All the cases occurred in three of the houses which stood near each other in the relative positions of the angles of a rectangular triangle. The two houses representing the shorter side of that figure were next the road; the first being occupied by Wm. H. Croft. The second, occupied by Daniel G. McKenzie, was eighty yards due North. The third, occupied by H. M. Stevens, was one hundred yards due East from McKenzie's; consequently, a right line drawn from the first to the third (i. e., from Croft's to McKenzie's) would have a direction nearly Northeast; a length of about one hundred and twenty-seven yards, and would form the longest side, hypothenuse of the triangle. This line, continued in the same direction one hundred and twenty yards farther, would mark the exact position of a well which was made several weeks before, and which was the only new one in the neighborhood. It was in the house last described that the first three cases of yellow fever occurred, and the only cases that were fatal. The family consisted of H. M. Stevens; his mother, Mrs. Frances Stevens; his nephew, Thos. H. Stevens; a little boy named Michael Elliott, and two boarders for the summer, Edmund Howard and wife.

The first case was that of Michael Elliott, an orphan boy of six years; born in Florida; of a half-breed Indian and a white woman, and brought to this vicinity while an infant. He was a bright little fellow, with an eye and complexion resembling the Indian.

The passages following, which are marked as quotations, are the answers, verbatim, which were given to my inquiries: "He had always lived about two miles farther North, in these pine woods, till after his mother died, last January. Then he was brought to live with a family about a mile East of here. About the end of July, H. M. Stevens took him home to live with him." This was about six weeks before he was taken ill. "He never had an hour's sickness before in his life. He never saw anybody sick with any kind of fever. There had not been a case of sickness within a mile and a quarter for a year or more," and the last death that happened, was in the preceding spring, from a gunshot wound. "Michael never saw a city or town, nor was ever off this pine ridge in all the four years since he was first brought here. He was too little to go by himself, and nobody had any occasion to take him with them." He had been looking dull and sluggish for several days, and complaining of headache; but being a very resolute little fellow, he did not give up till Thursday, September 15th. I was not called to him; but being at the house on Saturday, the 17th, I observed him lying on a fragment of blanket in the doorway, with excessive heat about the head; the eyes dingy, injected and suffused, and the extremities very cold. The family had administered calomel on Friday night, and oil on Saturday morning, but with no obvious effect. I took upon myself to admonish them to attend to his case without delay, as he was evidently very ill; but they seemed incredulous, or indifferent, and I was not permitted to prescribe. On Sunday, the 18th, they requested me to examine him, and advise them what to do. I found he had bled at the nose slightly, during the night, and the bowels were moved for the first time, while I was present. About one o'clock that morning, they had put him into a warm bath, and they reported that he had sweated, while in the bath, for the first time since his illness. I found all his symptoms worse than on the previous day; the tongue slender as a finger, dry and dark, as if blood-stained; the surface about the forehead, neck and arms a little soft, but not moist; the respiration twenty-eight; the pulse feeble, and ninety-eight; his manner wilful, and impatient of constraint. Throughout the day, and following night, his waywardness increased, until he became utterly refractory and furious—screaming and struggling to defeat every attempt to do anything for him, whatever. No part of the treatment ordered had been carried out. About daybreak he threw up genuine black vomit, and passed the same in abundance, by stool, both before and after death, which happened previously to my morning visit, on Monday, September 19th. In my whole experience, I have seen no case of yellow fever, where the characteristic color, after death, was more perfect, even to the minutest details.

The next case was that of H. M. Stevens; a native of South Carolina; age 26 years; had resided constantly here for four years; never was in New Orleans; had been in Mobile for a short time, many months before the sickness there, but never since "He had been ailing or out of sorts,

and complaining of headache, for several days." He was seized at one o'clock, on the morning of Saturday, the 17th, with a slight yet distinct chill, stretching, intense headache, and pain in the loins. Had, by domestic prescription, mustard pediluvium, mustard to the the loins and feet, a large soap enema, and was thoroughly drenched with infusion of capsicum. On my arrival, after nine o'clock in the morning, he was passing great quantities of dark indurated fæces, with severe griping, which was succeeded by relief of the head, but not of the loins; perspiration profuse; complexion naturally very dark; eyes not injected or suffused; tongue broad, flat, moist, clean; respiration 19; pulse 86, feeble. The bowels moved twice in quick succession, and after an hour had elapsed the skin had become dry and cool; the pulse 80, full, soft, and equable; respiration remarkably intermittent—after three or four regular inspirations, the process would be suspended for ten or fifteen seconds, then resumed as before, to be again suspended; resulting altogether in an average of twelve respirations in a minute. On the 18th, respiration regular, and 26; pulse 73; had sweated mostly since the previous noon, but the skin was now dry and hot; eyes injected and a little suffused; tongue broad, moist, and dirty yellow; no thirst; no pain in the head or loins; no epigastric uneasiness, but slight tenderness on pressure; some three hours later, there was slight perspiration. On the 19th, the family and the neighbors (who were all near relatives of the patient) were found perfectly beside themselves with panic. The little boy, Michael Elliott, was sick in the same room, and his disease so obvious that they could not misapprehend its nature. His screams had a terrible effect on Stevens, who had seen and heard everything, and had once even fainted with terror. I found him in a condition like that of a person deaf or unconscious, or with only sufficient consciousness to resist whatever might be attempted with him. He was tossing about incessantly, and could not be kept covered for one moment; slight moisture about the forehead; the tongue could be seen only by pulling open the mouth, and was thickly coated with very dirty paste; his breath had the peculiar and offensive odor which accompanies suppression of urine; but no one was able to inform me whether he had voided urine, or received any attention for twelve hours past. On the 20th, I found him pulseless; the limbs cold to the knees and the elbows; the exposed surfaces very dark, not unlike that seen in the last stage of cholera; restlessness excessive; retching frequent, but no vomiting; incessant voiding of stools that could not be distinguished from the matter of black vomit. He died before the break of day, on the morning of the 21st, and immediately became as yellow over the whole upper surface as a ripe orange. He had never thrown up black vomit, but voided it to the last.

The third case was that of Mrs. Frances Stevens; the mother of H. M. Stevens. She was born in South Carolina, in 1791, and had resided here constantly for four years. She described herself as "A Methodist, living in slavery and sin, and working herself to death." At my first visit to her, on Sunday, the 18th, she "had been ailing for four or five days;" said she had that morning "eaten a morsel of salt mackerel, and could taste it yet."

She had taken a large dose of some nostrum called "Wright's Indian Vegetable Pills," with no obvious effect; vomiting frequently acid mucus and bile, to accomplish which she persisted in running out of the house each time; habit constipated, and bowels now torpid; tongue broad, convex, tremulous, faintly coated, moist; respiration 21, irregular; manner restless, impatient of questions or control; headache intolerable; eyes clear; skin a little inclined to moisture; extremeties cold; pulse 102. On the 19th, the condition had in nowise improved; no part of my prescription had been obeyed; and nothing remained but to reiterate former instructions. On the 20th, a slight attempt having been made to obey directions; the symptoms appeared to be somewhat improved. But she had been all the while in the same room with the little boy, Michael; her bed touched that of her son—her only one; and there was no hope, that of her being able to survive the horrible spectacle of his death. On the 21st, she seemed to have been utterly neglected; no bed-pan or other contrivance had been used; and not a soul could tell me even where the medicines left for her on the previous day, had been put, or whether she had been offered a drink of water! The mouth was open, and black as if charred; the tongue thin, pointed, and dry as a rasp; the pulse 114, and very feeble. She drank water when I offered it, as if maddened with thirst. On the 22d, the extremities were icy cold, the nails livid, and the pulse extinct. Her attendants had not discovered that she had suffered enormous uterine hæmorrhage. In utter despair of accomplishing anything with such neglect, I declined seeing her again. These were all the fatal cases.

The fourth case occurred at the house of Wm. H. Croft, in the person of his daughter, Melissa Ann, aged four years, and born here. Began to complain on Wednesday, the 14th, about sunset; had considerable fever, which was strictly remittent, and of the tertian type. The only interest of the case arose from its coincidence with the others. It was easily managed; carefully nursed; and resulted in speedy and perfect recovery.

The fifth case occurred in the second house described—that of Daniel G. McKenzie—in the person of his daughter, Araminta Alice, aged twelve years; born in Coffee county, Alabama; resident, the last four years, at this place; a remarkably fine, healthy, and interesting child. Seized furiously at sunset, on Sunday, the 18th, with all the characteristic "aches" and other phenomena of the disease. The fever was effectually interrupted on the 19th, and never permitted to return. The nursing and the final result, the same as in the fourth case.

The sixth case occurred at the house of Croft, in the person of his nephew, Thomas H. Stephens, who, until now, had resided with H. M. Stevens, in the house where all the deaths had happened. Born in Barbour county, Alabama; aged, seventeen years; resident here four years; had never been from home, except to Mobile, in March last, and occasionally to the bay shore. Was slightly constipated on the morning of the 19th, and took some "patent pills;" but felt perfectly well, until after working excessively hard at digging a grave for the little boy,

Michael, without allowing himself time to return to dinner. Seized at 4 o'clock that evening; the greatest distress being in the head. I first saw him after noon, on the 20th. Skin a little moist; head hot and aching; eye clear; tongue broad, moist, slightly pasty; respiration 28; and regular pulse very full—distinct—the stroke instantaneous—the average number about 98—but the most singularly intermittent I ever met with. The intermissions, as is common, occurred after every possible number of beats, from one to thirteen; but the time of the intermission, instead of being equal to one beat, as I have always observed, bore, in this case, no rythmical relation to it, whatsoever. The time of an interval was always less than the time of one pulsation; causing continual surprises, and great intricacy in reckoning. His case proved to be perfectly tractable, and good nursing secured rapid recovery.

The seventh and last case was that of a second daughter of Mr. McKenzie, named Frances Jane; born in Stockton, Ala.; brought here when five weeks old; present age, four and a half years; never but once at the bay shore, a year or two since, and never in any house in its vicinity. Seized on the 20th, after a hearty dinner, and dosed by the family with "whiskey and garlic," which was followed by thorough vomiting of all the food, and of acid mucus. The case yielded readily to treatment, and recovered.

As to the cause of this outbreak of yellow fever, I frankly acknowledge I came away unsatisfied. Three cases had occurred at Hollywood; the first, from New Orleans, seized August 26th, died the 29th; the second, from Mobile, seized September 4th, died on the 7th; the third, likewise from Mobile, seized 10th, died 15th; three days after my arrival there; but no intercourse existed between that place and this neighborhood. My inquiries were minute, and specially directed to this point. The people were remarkable for shyness, and lived secluded and apart from any neighboring communities, as if they had belonged to a different caste. No goods of any description were brought among them from any other place, for many months; and the importation of disease by fomites was an impossibility.

In view of all the facts detailed, only one kind of investigation remained, namely: *to ascertain in what respect the condition of these people differed this year from any former year.* In this inquiry, nothing, certainly, should be deemed trivial, provided it clearly established between this year and others a positive difference; first, in the habits of the people, whether physical, social or moral; or, second, in the influences to which they were exposed, whether terrene or meteorological. But the inquiry utterly failed to discover any change in their *habits.* No new pursuits had been adopted, or old ones laid aside. No change had in any respect been made in their habitual mode of living, as regarded redundance, deficiency, or quality of food. No missionaries of any religion, either true or false, had raised them to fanaticism, or plunged them into despair; nor had political rancor, or the demon of intemperance excited their passions, imbruted their minds, or destroyed their health. They led, in all respects,

as they had done for years, secluded, inoffensive, indolent lives, characterized by no suffering, and by no excess. The investigation was, therefore, narrowed down to the *external influences*, to those which are chiefly, if not wholly, beyond the control of man. The examination in this direction was characterized by the same care as had been observed throughout; not because it was expected to support any theory as to the origin of yellow fever, for I had no such theory; not because it was expected to lead directly to the detection of one of nature's most recondite mysteries, but simply because the meteorological and terrene conditions were truly different from those of ordinary years, and the only conditions discoverable that were so.

It has already been mentioned that the hypothenuse of the triangle formed by the three houses invaded by fever, if continued one hundred and twenty yards farther, would mark the position of a newly made well. This was the only enterprise that had been undertaken for years; and though so ordinary an event as the digging of a well would not commonly be suspected as the cause of a mortal disease; yet to have passed it without notice, would have been unpardonable; when we remember that it was an unusual occurrence, and that it was, moreover, in close proximity to the very house in which the disease first appeared, and in which alone the cases were fatal. The facts are important as mere coincidences, independently of all question as to any relation of cause and effect. The work was performed by the united industry of the nearest neighbors. It consisted of a shaft about sixty feet in depth, and about six feet square; the sides being lined and supported by wooden "curbing," as is generally practiced where neither stone or brick is procurable. The earth penetrated, was near the surface the dark or black sand and the reddish sandy clay, commonly found in pine lands; this various colored clay, more or less mixed with gravel or lighter colored sand, to a depth of fifty feet or more, where the true water-bearing stratum was reached, consisting of quicksand, white as snow, and coarse like broken crystals of salt. This was excavated to an additional depth of perhaps eight or ten feet, and kept open for the proper reservoir of water, by a contrivance called a sand-box. The quantity of earth brought out of the well was very great; exceeding two thousand cubic feet; and forming, around the top of the well, an annular embankment of forty or fifty feet in diameter.

As to the meteorological conditions which prevailed, I am able to speak not only from the concurrent testimony of others, but from my own experience. No person at Hollywood was provided with apparatus for a systematic course of observations. It was, however, the general remark of the visitors there, and of the people in the hills, that it had rained daily for about a month previous to my arrival; which was on the 12th of September. The unusual repletion of the small basin, at a short distance Southeast of "the three houses," has already been mentioned, and I may add, that so saturated was the whole earth of the high pine range, that small streams could be seen pouring into the sides of the well, at

nearly every height above its own reservoir. One person at Hollywood said: "It rained for five days and nights, from the 6th of September, to the 10th, with scarce any intermission." Another person, who has resided in a small dwelling, detached from the Hotel, for many successive summers, said: "I never saw such weather. It rained for three weeks, at least. We had always occupied the same cabin, and found it dry and comfortable. In a few hours the sun would make all dry again, after any hard rain. But this year it has never been dry. We have lost a great deal of clothing by mildew. A carpet-bag, in which we deposited soiled linen, was spoiled, with all its contents, by this cause, in two or three days. Clothes hanging in the driest room, would soon lose all their stiffness, as if they had not been starched." Another person, now in this city, referred to the injury of clothing from dampness and mildew; and said his family, during the coming summer, would exchange the "cabin," for rooms in the Hotel, expressly to avoid the dampness of their old home. He says: "The rainy weather in August continued for several weeks; in general, the quantities which fell, at any one time, were not excessive; but showers were frequent, as if the atmosphere was surcharged, and was compelled to part with the overplus." The same gentleman testifies that he had observed in New Orleans a great contrast between the temperature of sunshine and of shade, and between that of day and of night; that when the days were hottest in the city, he required covering for his bed at night; but that having occasion to compare the two places, he found the nights at Hollywood, during the rainy weather, excessively sultry. As the rains abated, the same contrast of sun and shade temperatures, so noticeable in New Orleans, became equally so at that place. Having a great deal of idle time, he and his frends were in the frequent practice of amusing themselves with cards, in the large open hall of the Hotel. "In the very hottest part of the day, they had often shifted the position of their table in consequence of the unaccountable chilliness." His friends, as well as himself, had "remarked the strangeness of the occurrence; for it happened when there was not a breath of wind perceptible. It was a very strange year. I never could understand it."

Of the temperature from September 12th to the 27th—I speak from personal knowledge—not one drop of rain fell in that vicinity during my stay. Until the 19th, the days were almost constantly cloudless, The winds were very frequent, and exceedingly light, varying to every point of the compass, but mostly Easterly or Northerly. The heat in the sunshine was insupportable—requiring the constant use of an umbrella; but the coolness of shade was invariably unpleasant. In many of the rooms, fires were lighted at night, and very few persons could dispense with a blanket to the bed. On the 19th, the North wind began, and the temperature became suddenly very cold, continuing so until my departure.

I have already said that I came away unsatisfied as to the cause of the outbreak of yellow fever in the locality under consideration. But since that time, other circumstances have occurred which have directed

my attention, in an especial manner, to a cause assigned by yourself at a meeting of the New Orleans Academy of Sciences, June 6th, 1853. For a long time I gave little attention to the matter, because I misconceived your meaning. My impression was, that you attributed the origin of yellow fever solely to extensive disturbances of the earth, and to filth. I know that such is also the general misconception. The naked proposition of the terrene origin of the disease, I daily hear denounced as yours, and as erroneous. But I cannot censure this absurd mistake of others, while I reflect that I failed to discover it myself until a few weeks since; though all the while the records of the Academy, in my possession, contained the explicit enunciation of the *two-fold* nature of that cause, in your very words. You have very aptly denominated the cause, "The Shears of Fate;" as indicating its essentially *duplex* nature; for, like a shears, it consists of two separate things, which must coincide, and it is wholly inoperative if either of the *two blades* is wanting. One of these *blades* being terrene filth, from any and every cause; the other blade being a peculiar kind of weather, which must prevail in order to render the first noxious. The proposition, thus defined, seems obvious enough; but I have yet to meet with the first objector who has taken into account the meteorological condition, while condemning a theory of which he has comprehended exactly one-half, and no more. The circumstances which have specially directed my attention to that two-fold cause are the following:

1st.—I learned from Dr. Levert, of Mobile, that every epidemic of yellow fever in the city during twenty-eight years past, has been immediately preceded by great excavations, or by extensive surface exposure of fresh earth to the action of the sun and rains during the heat of summer; insomuch that he had of late years, vainly warned the council of that city of the great hazard of yellow fever which they incurred by permitting such works as the opening and grading of streets in summer. He had even offered to go so far as to give bonds in an enormous amount, to guarantee the city against an epidemic, on the bare condition of being empowered to put a stop to such works at such seasons.

2d.—In Wilkinson county, Mississippi, I learned from the attending physician, that the first and the most virulent cases in the Western part of the county, last autumn, occurred in the house of Joshua Presler; the insulation of which (on account both of physical and social causes) is extraordinary; that long rains had occasioned a landslide, of several acres of earth, within a few yards of the house, and the weather, subsequently, was similar to that described at Hollywood.

3.—From a gentleman of intelligence,* whose own wife was the first victim of yellow fever, near Gainesville, Miss., in October last, I learned that there had been no intercourse with the village for several weeks, nor

* Mr. Lewis Folsom.

had there been a case of sickness of any kind in all the vicinity. His house is in a dense pine forest; distant more than half a mile from any other dwelling; and no cause of sickness existed, that he could suspect. Her seizure had all the marks of the disease; she had black vomit many hours before death; and the surface changed to the characteristic orange color, immediately after. In answer to my inquiries, he said: "all the fruit had been destroyed by premature decay, and many cows died suddenly, in great distress, from no cause that was apparent. The winds were remarkable only for being exceedingly light and variable; the days very hot; the nights excessively cold; and the difference of the heat in the sunshine and shade such, that he had frequently ridden under a tree to avoid the intolerable heat, and presently been compelled to quit the shade for fear of taking a chill." The extremity of a hill, at a distance of one hundred and fifty yards from his house, had been cut down to make room for the road, damaged by rains. A small ditch, one hundred yards in length, had been dug in front of the house; and at the distance of ten feet from the corner, he had cleaned out a well; the deposit in which was clear white sand, but very sticky, and intolerably offensive to the smell.

4.—Before the epidemic of last year, there were in progress in and around this city, three railroads; a vast basin, and the enlargement of the old Canal Carondelet; besides a condition of the streets, the offensiveness of which, was unprecedented. Within one month, rain fell to a depth of over eleven inches; and the peculiarity of the temperature was a subject of daily remark. One fact may suffice: while driving down Royal street, with Mr. W. W. Carré, a few minutes before noon, the full rays of a July sun being nearly perpendicular, we were compelled to lower the top of the carriage in consequence of the extraordinary coldness. The sensation was exactly similar to that of the cold stage of intermittent fever, and no wind was perceptible to account for it. Before proceeding the distance of two squares, we were obliged to raise the carriage-top again, to avoid the intolerable heat; and the discomfort caused by either condition was so great, that the whole proceeding was actually twice repeated before we reached the Pontchartrain Railroad.

In view of this most striking fact; that the insulated spontaneous cases which occurred at Hollywood, and in Wilkinson and Hancock counties, Miss., were all coincident with the two phenomena—the terrene and meteorological; that the utter impossibility of contagion from other causes, or *fomites* is abundantly proved; and that we are unable to discover or to conjecture any other cause, we are compelled to conclude that there is strong reason to suspect the agency of this two-fold condition, in the production of yellow fever. This conclusion is avowed in no spirit of a partizan; and I shall protest against being identified with any hypothesis, until careful observation of the phenomena, in all times and places, shall establish their uniform concurrence:—until actual experiment shall demonstrate that the destroying of one of the "blades," invariably averts the disease; and shall prove the theory to be true.

The mere coincidence of such facts with such a terrible visitation, ought to command the attention of all men—the merchant, the political economist, the statesman, not less than the philanthropist and physician. If the true nature of the "Shears of Fate," is discovered, its interest to us is infinite. If these conjectures are false, it will be an easy task to refute them; but whether true or false, the refusal or neglect to investigate such remarkable "coincidence," would be, not criminal only, but monstrous. Yours, &c., N. B. B.

New Orleans, July 1st, 1854.

FLORIDA.

TESTIMONY OF DR. WEDDERBURN.

Dr. W. states that his first case this year, was at the corner of Dryades street and Triton Walk, on the 5th of June. Saw four or five cases in the same house one month afterwards. The first case was an Englishman, who had been in this country one year. Four brothers, his mother and sister lived with him. Does not know if the man had any intercourse with shipping. Has no knowledge of the disease having been introduced here.

Pensacola, Florida.—In 1847, the disease was introduced into the Pensacola Navy Yard. The Dr. thinks he took the disease from a man by the name of Heath. He came from New Orleans, where the fever was raging. The man who nursed him had the fever; then the physician, who attended him; then all the members of his family were attacked, and the disease spread from house to house, in regular succession, commencing with the one occupied by Heath. In 1839, a person came from New Orleans, with fever. The disease did not spread from him. In 1841, the U. S. ship Levant came in from the West India Islands, where yellow fever prevailed. The sailors who were sick with fever were landed and placed under a shed, on shore. On their way to the hospital, they passed the marine barracks. A negro woman, who lived near the shed used by them, was first attacked by yellow fever; then the marines, who lived in the barracks; on the route of the sailors, on their way to the hospital; and then the disease spread regularly. The first time the disease was introduced into Pensacola, the marines entirely escaped; because they were not exposed, as was the case when the sick sailors were passing their quarters. Has not observed any peculiar smell in yellow fever patients.

Thinks the disease communicable, as other contagious diseases are communicable, by clothing, touch, &c., &c. The Dr. has had yellow fever three times. Thinks a certain condition of the atmosphere necessary to produce an epidemic. Never has seen the disease at sea. Doubts if a quarantine sufficiently strict to be effectual could be enforced here. Thinks yellow fever never originates here.

COMMUNICATION FROM DR. ISAAC HULSE, U. S. N., PENSACOLA, FLA.

Localities where he has become acquainted with yellow fever:

In Baltimore, in 1822, while a student.

The fever of the West coast of Africa, 1824, on board the Grampus.

In Gosport Navy Yard and Barracks, 1825.

In Pensacola, and Navy Yard, Pensacola, 1827.

In Pensacola Navy Yard and Hospital, in 1828.

In Port au Prince, (St. Domingo,) on shore, and on board the S. S. Erie, 1831.

At Naval Hospital, Pensacola, 1834.

On board the Home Squadron, at Pensacola, and in the city of Pensacola, in 1839.

At Naval Hospital, Pensacola, yellow fever of the Levant, and French frigate Gomer, 1841.

Fever of brig Dunois; crew at the Naval Hospital, 1842.

Saw the malignant intermittent, at the Naval Hospital, 1843 and '44.

Yellow fever at Naval Hospital, brought in by U. S. frigate Mississippi, and other vessels, from Vera Cruz, 1847 and '48.

At Pensacola Navy Yard, and the villages in its neighborhood, 1853.

Does not think that he has seen an instance where the disease has been propagated by contagion. Has treated, perhaps, one thousand cases.

Has recognized in the late epidemic the genuine yellow fever, with a greater degree of virulence than he has ever before witnessed.

The usual proportion of black vomit one in ten; black stools, equivalent to black vomit, were frequently seen without black vomit. Black stools occurred among children, who died of convulsions in the early part of the season. I refer to cases in the villages, in the early part of the epidemic.

TEXAS.

COMMUNICATION FROM JOHN HENRY BROWN, OF INDIANOLA, TEXAS.

Indianola fronts four miles on Matagorda Bay, and one mile deep; town proper, one and one-half by one-half miles.

Surface of soil—shell, more or less decomposed, and sand.

Water used—about half is cistern; the balance shallow well water, found at from three to five feet, in shells and sand.

Some small ponds filled up, amounting to little.

No rivers nearer than from fifteen to forty miles; small salt marshes near; nothing objectionable.

All waters flow with the tide.

The first case was landed from a New Orleans steamer, about the 20th August; the next six cases, also from August 24th to Sept. 10th.

There had been at least six or eight cases landed from New Orleans before a case originated here. There had been but two deaths in the place for nine months previously.

All these cases were from New Orleans. There is no doubt that some

cases are believed to have arisen from the handling of goods, clothing, and from direct intercourse with other cases of the disease.

Not here, but at Salina, fifteen miles below, several cases occurring, apparently of that kind; but they had been among our citizens, and fled there from the epidemic; and were twice a week within four hundred yards of the New Orleans steamers.

It is easily traced from one to another and family to family; and the first cases followed the winds, i. e., Southeast winds. At first it prevailed among the lower classes, or those exposed by intemperance or night air, but in time reached the best unacclimated persons. Old citizens, of five or six years, suffered comparatively little.

TESTIMONY OF R. H. McNAIR.

Arrived in Galveston on the 9th of July, in the steamer of that date.

The steamship Mexico arrived at Galveston on the 9th, from New Orleans, and three sick persons; steerage passengers; were taken from her and sent to the hospital. No fever was known to exist, previous to her arrival.

On the 22d of August, two weeks after, the hospital physician was taken sick. The case was pronounced yellow fever by the physicians.

On the 28th of August, a clerk on the strand was taken, and it was also pronounced yellow fever. This person had no communication with the sick, nor had he received any goods from New Orleans.

On the 3d of September, other cases occurred, three blocks distant. No intercourse took place between these parties.

The weather was similar to that of 1852, but more calm; the atmosphere was dry.

The buildings are generally clean and well ventilated.

Fevers in acclimated persons, were of the intermittent and remittent form, whilst in the unacclimated, the usual symptoms of yellow fever obtained.

Mrs. Hunt, the wife of an officer of the army, died with black vomit; she was nursed by her husband, who was unacclimated; he did not take the disease.

MEXICO.

TESTIMONY OF DR. WM. HUMBOLDT.

Dr. Wm. Humboldt, from Mexico, states that yellow fever, up to this period, has never been known to prevail in Mexico at a greater distance from cities than thirty miles, even though carried thither.

It was found this year two hundred and seventy miles from Acapulco. It was brought from Acapulco, and spread to the extent of two hundred cases Considers it endemic in Vera Cruz; originating spontaneously. Many Germans died there in January, 1853. It was carried

to Acapulco in a vessel from Guayaquil; during her voyage the fever made its appearance on board. There was no fever at Guayaquil when the vessel left there. She was ballasted with sand and mud, taken from the bank of a river. Fifty or sixty cases occurred in Acapulco, from which place it was carried to Chipazingo, Equador and Tpitslan. Never knew a case in Nuervacla, (a large river intervenes between the last named place and the former three,) although it is in the same valley, and there is constant communication across the river. In the small towns yellow fever was also found. Yellow fever is more fatal among the Indians than the whites. It also occurred on plantations. Never knew this to happen before. Has lived nine years in Mexico. Thinks the disease may spread from person to person during an epidemic condition of the atmosphere. It is not thought to be contagious in Vera Cruz. Has noticed a peculiar smell in yellow fever. Has seen but one case of recovery from black vomit, and that in the person of his own wife. Different forms of fever prevail in different years. This year it was typhoid. Ten per cent. of the Mexican soldiers died. Death generally occurs in from five to ten days. In the country the disease is considered contagious.

Extract from a Communication addressed to the Sanitary Commission.

BY W. HUMBOLDT, M. D.

[TRANSLATED.]

Last year Vera Cruz was for six months the seat of two epidemics—the cholera and the yellow fever—and they made great ravages in that city and the environs. I was at Vera Cruz, sent by the Government to observe the course of these epidemics, and to ascertain the causes of of them, and at the same time to make a comparison between the two diseases as epidemics. The Military Hospital of the city was placed at my disposition. Perhaps it may interest the members of the Sanitary Commission to see the results of my observations; and I will therefore here copy the scientific part of the report I made to the Mexican Government.

It results from the observations and examinations made by me, that the yellow fever, as an epidemic, differs from the cholera in two important circumstances.

First, because it is confined within a certain zone; and, secondly, attacks in preference those who have lately arrived in this zone, or near its limits; while the cholera extends from continent to continent, ravaging nations in all climates, without elevation, or temperature, or the keenest cold, having any effect upon it. The domain of the yellow fever is strictly limited to those parts of the equatorial and tropical regions, in which, for several weeks together, an unvarying temperature prevails, without being very high; that is to say, where the thermometer ranges at from 76° to 86° Fahrenheit, (24–30 Centregrade;) and does not vary more than from 5 to 10 degrees, between night and day. Hence, it follows, that the Antilles, certain parts of the two

Americas, the Coast of Africa, and the South of Spain, are the ordinary seats of these epidemics.

The second sign which distinguishes the cholera from the yellow fever,* is that while the cholera, without any regard for acclimation, attacks both natives and new-comers, the yellow fever generally altogether spares acclimated creoles who are born within the sphere of its action. The whole history of the yellow fever shows, that those who are the most subject to it, are those who have lately arrived within its sphere, particularly inhabitants of Northern climates, who are so much the more liable to it, the higher the degree of North lat tude from which they come, and the shorter the time of their passing from the regions of Europe, or from the elevated regions of the interior to the equinoctial regions or to the coast. As a proof of this, we have observed in Vera Cruz, that the yellow fever broke out shortly after the arrival of troops from the interior, at each place, and in all the barracks; and, for all that, individuals born on the coast and acclimated, were spared from this disease. People of color, so numerous at Vera Cruz, and in necessary communication with the troops and all strangers, were completely exempt from it. How was that so? Let the small-pox, or any other really contagious disease, be imported, and the sufferings of these individuals would perhaps exceed those of strangers. In the interior of the republic, they are as subject to typhus and dysentery as others. It is only the yellow fever that spares them; and how is that to be explained, except by the evident fact that the disease is an acclimating fever, of a malignant nature, the product of a high temperature and an insalubrious locality, and, so to say, peculiar to Europeans and inhabitants from elevated regions. In high latitudes, cold, fatigue, trouble and hunger, pushed to excess, engender fever every where; but each region, each climate, will present that class of fever which is peculiar to it. At Mexico, for example, it is typhus; to the South of Mexico, Guadalajara, Colima, Tehuantepec, &c., remittent fever; on the coast of the Gulf of Mexico, yellow fever; confined to certain conditions of locality, temperature and elevation, it is a veritable hot climate epidemic, which cannot be transferred to any other soil. It is places, not persons, which determines the rule of its existence.

While the yellow fever thus differs from the cholera, by some circumstances which have the greatest influence over the extent of its course, observers agree in recognizing that there are two conditions of striking resemblance between the two diseases. The first *has reference to the condition of the blood.* In the cholera, according to the general opinion, a peculiar poison penetrates into the blood; this vital fluid is consequently decomposed, and a fatal emission of its serous or watery particles is produced. In the yellow fever, also, it appears that the blood is poisoned and decomposed; but in this disease it is the more solid particles, and particularly the red ones, which are thrown out from the system. In the

* N. B.—I here speak of the yellow fever in its greatest intensity and seriousness.

yellow fever, the combination of the blood is as much broken up as before death; vitality is as much destroyed as they would be by the introduction of the venom of a serpent. It may with truth be said that the blood is killed by the poison; and, according to the expression of John Hunter, that the yellow fever which terminates fatally, is the death of the blood. It escapes in a torrent from the mucus surface of the stomach in the form of black vomit; it discharges by the gums, the nostrils, the eyes, by the skin itself, and everywhere in short; and after death, the blood has evidently lost every characteristic of its nature and of its composition, since it is found in vessels like the lees of port wine or coffee grounds.

The second point of resemblance is the analogous condition of the brain in most of the cases. In cholera, the clearness of the intellect, and the calmness of the mind, up to the last moment of life, present a striking contrast to the stupefaction, the dullness of the intellect, the delirium, and finally the insensibility of typhus: *the functions of the brain are generally preserved as perfect in yellow fever as in cholera.*

Another point of resemblance between the yellow fever and the cholera, is the slightness of the *apparent* cause which determines and often leads to a mortal attack. Yellow fever, like cholera, breaks out in places in which there was no ground for supposing that it is of foreign origin, in which the strictest investigation cannot succeed in tracing it to an infected source, and in which all communication with infected persons or objects is often impossible. Let us take for example one of the most recent of such cases, the breaking out of the yellow fever at Acapulco and Yguala, in the year, 1853, in the month of April, a region in which it had never appeared before; and while, if the disease is susceptible of importation as an epidemic, it may have been constantly conveyed thither by the vessels trafficing with Guayaquil. At Acapulco the yellow fever broke out on board a vessel called the San Carlos, which came from the river San Salvador, in Costa Rica, ballasted with mud, as is customary in those parts. The discharge of the ballast was commenced when it was perceived, from the offensive odour it emitted, that the mud, which probably contained much vegetable and animal substance, had entered into a state of putrefaction. On the same day, the mate, the second mate, and two sailors fell ill with the yellow fever. Before taking them to the hospital, there had already been two cases in the town, both fatal. Here all communication with the sick on board was suspended, since it was Sunday, when only the necessary guard was on board; and nevertheless the epidemic continued its ravages on shore. Three days afterwards, there were more than twenty-five cases of yellow fever in the town.

The yellow fever, like the cholera, breaks out simultaneously in different towns far distant from each other, and at different points distant from the towns, among people who have had no communication with the sick. For example, when the epidemic of the yellow fever broke out at Acapulco, there were three days afterwards cases of this epidemic at a distance in a straight line, of fifty-six leagues, (at Yguala,) without there having

been possibility of any traveler's arriving there, passing over such a distance in three days, since the bad condition of the roads prevents the communication.

In the yellow fever, as in cholera, it appears that there is a gradual and local development of the disease, and the breaking out of the disease is preceded by individual or sporadic cases, in greater or less number.

In the yellow fever, as in cholera, if the disease breaks out in the midst of a family, it attacks only two or three members; the rest escape it, even those who give constant attention to the sick; and when, as sometimes happens, many individuals of the same family are attacked, it is found on examination, either that the disease is general in the locality which the family inhabits, or that the individuals attacked had been in a locality in which the disease prevailed. The numerous examples of two or three persons or more being attacked in the same house, at the same time, and in the same hour, and that general susceptibility which pervades all ranks, make it appear, *not* that the disease has the property of spreading from one person to another, but rather that it is the product of a general cause, to the influence of which they have been simultaneously exposed.

In the yellow fever, as in cholera, the disease, instead of spreading from house to house, in the district or locality which it invests, is often confined in quite a remarkable manner, to certain houses in the same street; to certain houses on the same side of the street; and even to certain rooms of the same house. This latter assertion I saw verified at Vera Cruz, where, in the great barracks of the Southern port, the apartments, the windows of which faced the Southwest, furnished a much larger number of cases than those, the windows of which faced the sea.

One would naturally be led to believe that there, where a focus of infection existed, in a hospital containing all the sick, could not be found a place of safety; it, nevertheless, is that which, in all probability, offers more of it than is supposed. Physicians are never seen to suffer there from the disease, more than in the just proportion of their numbers; and unacclimated servants, more immediately in communication with the sick, the orderlies, and others, if the ventilation and the discipline are good, generally suffer less than the soldiers of the barracks, who never come into proximity; for while they are in service at the hospital, they are not exposed either to the heat of the sun, to night exposure, nor to drunken excesses. It is a fact which I observed in the military and civil hospital, at Vera Cruz, and it is a fact, too, that the supposed contagion never communicated itself to the patients in the surgical department, or to the convalescent; although they occupied contiguous beds in the same hospital. My uncle, the Baron de Humboldt, in his political essay on the kingdom of New Spain, vol. iv, p. 171, makes the following remarks:

"It is incontestible that the vomito is not contagious at Vera Cruz. In most countries the common people consider many diseases contagious, which do not possess this character; but public opinion in Mexico has never interdicted the unacclimated foreigner from approaching

the bed of individuals attacked with the vomito. Not a single fact can be cited which establishes the probability that immediate contact, or the breath of the dying, are dangerous for those who, not being acclimated, take care of the sick. On the continent of Equinoctial America, the yellow fever is no more contagious than the intermittent fevers of Europe."

Contagion or Non-Contagion may be resumed in the following manner: It is a terrestrial poison, engendered in new comers by a high state of atmospheric heat, and which cannot exist without this heat; but it affects nobody through vicinity to the sick, and cannot be transported in pure atmospheres.

The attacks of yellow fever, like those of cholera, take place principally during the night, as I had occasion to observe in the barracks at Vera Cruz. *Another point of resemblance* between these two diseases, and epidemic diseases *in general,* is that the epidemic poison, whatever it may be, affects the lower animals as well as man. *The yellow fever, like the cholera,* is not subject to any rule of gradual progression, or of proportional severity, but decimates certain localities, while it spares, or only slightly affects others closely adjacent. For example, in the epidemic of the yellow fever in the state of Guerrero, in Mexico, we observed that Tyxtla and Iguala it made numerous victims, while at Cuernavaca, situate between the two towns, there was not a single case.

The influence of humidity in hastening the progress of cholera is generally admitted; the proof is quite as complete as to the equally powerful effect of this influence in localizing the yellow fever; particularly of that humidity which rises from the foul sea shores. The slime and mud of rivers, canals, ponds, road-ditches, and those about garrisons; the mud and mire of unpaved streets, lanes and alleys, and yards of cities and towns; and the drainages and percolations from sewers and cesspools are frequent causes of humidity in small, low houses. But the strongest cause is undoubtedly the proximity of marshes; and as at Vera Cruz this is a cause which prevails all the year, this is why the malignant character of this disease develops itself in the manner we daily see it.

We have still to make some researches on the following question: "*Does the yellow fever differ from the marsh or remittent fever of hot countries, (endemic at Acapulco,) or is it the same fever under a more aggravated form?*

I am of the opinion that in all countries which can engender fever the yellow fever is its most concentrated form; I believe it intimately allied in its nature and in its causes to ordinary fevers, especially on the coasts of the Gulf of Mexico, whether the type of those fevers is remittent as on the shore of Yucatan, or continuous as at Vera Cruz and Acapulco.

I do not believe it more peculiar or less indigenous to the latitudes in which it commonly appears, than the common continuous fever is at Acapulco.

The form of yellow fever, or that which is accompanied by black vomit, a form taken as the only true type of the disease, acquires this preëminence over the ordinary fevers of hot countries, through the presence of unacclimated persons, who are attacked with it with a frequency so much the greater, as their sojourn there has been the shorter. In the absence of these last subjects, we might, with perfect safety, defy those who maintain that the yellow fever is a distinct disease, to produce any considerable number of cases, offering the peculiar group of symptoms, and the kind of issue, which, according to them, suffice to distinguish it from the ordinary fevers of the country, and to designate it as an essential and separate disease.

It happens at Vera Cruz, the same as in Europe, and often at the same season of the year, that unhealthy or epidemic seasons envelop the entire population, and then a special and peculiar form of the disease is shown with the greatest certainty by the new comer; but it is very certain that ordinary or healthy seasons for the natives, are the contrary for this new comer; his constitutional susceptibility appearing to compensate for the want of force in the cause, and consequently many peculiar and irregular irruptions of the disease are confined to this category of subjects.

It is natural that we are forcibly led to one or the other of these two conclusions: 1st, either that the susceptibility of the foreigner furnishes a greater activity to the causes which produce among natives a very mitigated disease; 2d, or that for some end which it is impossible for us to ascertain, he is alone chosen as a victim of a disease depending on causes which differ not only specifically from those which affect the native, but which are as variable as their migrations. Could it be possible that the black population of the coast of Vera Cruz, and even the majority of people of color, who suffer from putroadynamic fevers, and all other diseases which assail the white race, should not present, under any form, a disease indigenous to their country? To say that they have it in their youth, in a much more benignant form, is to throw one's self back on the ordinary fevers of the country, and to abandon the sole diagnostic, the black vomit, by which a line of demarcation can be drawn; it is to admit, in fact, that benignant continuous or remittent fevers are the forms under which the natives present the yellow fever.

The colored population, and acclimated Europeans, rarely present the disease in its intense form, under which it attacks the new comer; they ordinarily only suffer from remittent and intermittent fever, and are sometimes altogether exempt, while the foreigner is the solitary victim of the yellow fever;—a fact full of instruction, if the blindness of theory permitted us to make the application of it. Nothing, I am convinced, can explain this anomaly, except the greater susceptibility of the foreigner to the noxious influence of a climate to which others are assimilated; the opportune arrival of the contagion, at the period when it is known he is most subject to the mortal effects of this climate, being an idea too improbable to allow its being entertained.

We appear to have chosen in preference the disease of the foreigner,

who, however is, of all individuals, the least fit to represent the diseases of a country, as well in the character or the degree of their symptoms, as in their pathological conditions. We should not consider as at all a faithful representation of the diseases of Europe and of their fatality, the results which should follow the exposure of individuals born within the tropics, to the cold and vicissitudes of the North; why, then, should we take our distinctive mark, our point of departure in diagnosis, not from essential traits of the disease, as it presents itself among individuals born in the tropics where that disease prevails, but from a fortuitous symptom, the exudation of decomposed blood in the stomach, a symptom scarcely known under an epidemic form, except among foreigners. It must not be believed that there is one cause of disease in the foreigner, and another for the native; they suffer very intelligible modifications of the same disease.

We constantly see cases of ordinary endemic fevers, whether bilious, remittent, or continuous, prevail simultaneously with the yellow fever, in greater or less number, and present even the appearance of mortal symptoms, as passive hæmorrhages: it is always difficult, and sometimes impossible to distinguish, during half and sometimes three-fifths of their course, that is during their phase of excitation, the cases which terminate thus, from many of the cases of ordinary fevers.

There is a great analogy between the important symptoms of yellow fever and those of the malignant remittent; collectively these fevers differ by the more persistent and more intense character of the symptoms in the former; but it is principally, and sometimes only by the presence of black vomit among the last symptoms of yellow fever, that they are distinguished one from the other, a contingency, or to make use of a happier expression, "*accident d'une saison*," which, according to my view, is not at all essential or sufficient to separate these diseases as radically unlike; cerebro-gastric affection, a more or less intense yellow suffusion, irritability of the stomach, suppression of urine, hæmorrhage accompanied by dejections and vomitings of a more or less dark color, proclaim, in my opinion, that the malignant remittent fever is *very closely* allied to the yellow fever, and that it is, like it, the highest degree. This degree, for the rest, is dependent on the circumstances of locality, those of the subject, and the violence of the cause; modifications and concurrent differences being able, as in all fevers, to produce infinite alterations of form.

In prolonged cases of recognized epidemic yellow fever, marked remissions have frequently been observed. Without maintaining that the yellow fever belongs to a remittent type, it may be inferred that it often is so, and that if the remissions are not apparent, it is to the violence and to the rapidity of the course of the disease it must be attributed.

I believe that the yellow fever has no specific character or pathognomonic symptoms, which can be defined in its course, in its duration, or in its attributes; but that it is an accidental variety of a numerous and variable class of the continuous and remittent fevers of certain latitudes; fevers from which it differs, only by its violence, the rapidity of its course,

and its final phenomena. Its apparent causes, the principal and essential symptoms, and its pathological conditions, as also the periods of its inception, of its greatest development and of its decline, all proclaim, that it is like those other fevers, a variety of the same kind, that cannot, with exactitude, or with the view of reconciling the facts in contradiction in the history of the tropics, be subdivided for any essential or appreciable difference, in their multiform varieties, notwithstanding the practical utility that might be the result.

"*Does the yellow fever, like the small pox, exempt from a second attack, except in rare examples?*

I believe that an attack of yellow fever, like a certain length of residence, gives much security against a second attack *of the same form*, or of the form which terminates in black vomit, but that affords only a slight protection against those which I consider other forms of the disease, or those which attack acclimated individuals, and which I believe to arise from the same causes. The apparent exemption then from a second attack is not real; the same fever is liable to return under a different form. As I have already said, I cannot believe that there is one cause of fever for the acclimated, and another for the new comer; or that causes capable of producing the yellow fever, which is in some cases only a very moderate fever, are inactive, or foreign to the subsequent fevers inseparable from a long residence.

To close: I shall say that however positive may be the manner in which I have expressed my opinions, I have purposed to give them with the humility appropriate to the subject. I implore indulgence from criticism, and I hope that they will be received for what they may be intrinsically worth. I ask nothing more. W. De H.

TESTIMONY OF THOMAS J. DIRGAN, UNITED STATES VICE CONSUL.

MATAMORAS, April 1, 1854.

TO THE SANITARY COMMISSION OF NEW ORLEANS.

I forward a report from Dr. Antonio Lafon, of Matamoras; I refer to it for more complete statements and answers, to the within questions. I was here during the whole of the yellow fever, but of course, could have no such opportunities as that gentleman, for observing the disease on either side of the Rio Grande.

The surface soil is a calcareous, clayey soil.

The water used, is usually taken from the river Rio Grande. In some few cases well or rain water may be used, but very rarely.

Disturbance of the soil; nothing of the above description has been practiced.

The Rio Grande runs within half a mile of the town.

In the rainy seasons the water does not run off freely.

The wind from the Southeast, during the epidemic, and the temperature generally very warm and moist.

I am not aware that any of the lower animals, or vegetable kingdom were effected by the epidemic.

The number of persons, of all classes, according to the census of July, 1853, was 6,500. In making the census, no distinction was made of persons, whether adults, over or under age, &c., nor of natives, foreigners, &c.

There were 322 deaths in Matamoras from yellow fever, but no statistics were kept of the different ages or color of those who died.

No statistics were kept of the number of persons who were taken down with the yellow fever; but Dr. Lafon, whose report is herewith forwarded, states that the natives of Matamoras suffered less than persons from the interior of Mexico, and other parts.

The first case of yellow fever took place on the 22d of September, 1853.

The disease prevailed without distinction of classes, habits, age, &c,

Q.—Do you regard the epidemic as true yellow fever? *A.*—I do. *Q.*—Have you ever seen this disease before? *A.*—I have. *Q.*—If you have, state where? *A.*—In Matamoras, in 1847. T. J. D.

[Translated by Prof. Tornos, of the University of Louisiana.]

TESTIMONY OF ANTO. LAFON, D. M. P., MATAMORAS,

[THROUGH AMERICAN VICE-CONSUL, THOS. J. DIRGAN, ESQ.]

Report on the Yellow Fever in the City of Matamoras, from September, 1853, to January, 1854.

TO THE SANITARY COMMISSION OF NEW ORLEANS.

I.

Matamoras, of the department of Tamaulipas, in the Republic of Mexico, is situated on the right bank of the Rio Grande or Bravo del Norte, in lat. 25deg. 53min. North, about one thousand yards from the bank of the said river, and also at a distance (in a direct line) of eight leagues from the coast of the Gulf of Mexico. On account of the little consistency of the soil, the bed of the river is continually changing, leaving over those parts which it abandons, lakes (esteros) which if they become dry after some time, are again formed at great inundations, so that there have been periods in which the inhabitants have been surrounded on all sides by these lakes. Notwithstanding, since 1847 there are only two permanent lakes, one to the North, the other to the East, which wash the outskirts of the city.

Matamoras has, as its neighboring city on the left of the Rio Bravo, at about a mile distant, Brownsville, in the State of Texas, (U. S.)

The soil of Matamoras is of very late formation—at the surface is found a large quantity of vegetable earth, but a little dense, underneath another layer of clay, and at four or five feet commences a sand, being the deposit of the alluvial soil; at a depth of twenty to twenty-five feet you find sweet water in certain spots, and in others salt water, another where there is nothing but clay the water is of bad quality, and gives off sulphuretted hydrogen gas, and even carbonic acid gas,

which has caused the death of several laborers who have descended for the purpose of sinking wells.

The immediate deposits of water are the above named Rio Bravo, and the lakes; these waters are of ordinary quality; that of the lakes, which is stagnant water, and is changed as soon as it mixes with the river, is only fit for washing purposes and for animals. The water of the river is the only potable water generally used; it contains in solution small quantities of carbonate of lime, and those of the wells show the presence of sulphuretted hydrogen gas.

II.

Matamoras lies in a plain exposed to all winds; those most frequently prevailing are the North and South, which may be called prevalent. The North winds appear generally in October, and continue until April, and last one, two and eight days, and sometimes in the depth of winter, until fifteen days. These winds cool the atmosphere exceedingly, so that it is not seldom seen that the thermometer falls in less than one or two hours, ten to fifteen degrees, Centigrade.

The predominant wind, during the epidemic, was the Southeast. The temperature was generally warm and damp; in the night it was less warm and more damp. In the month of November, from the 18th to the 21st, there occurred three or four days of heavy rain. The epidemic was then at its greatest height, and it may be said that this rain had contributed to the increase and to the malignancy of the cases of yellow fever.

It is not possible for me to give exact particulars of the meteorological observations, as I made none; yet I will affirm, as it appears to me important, that the winter of 1850 was considerably severe, inasmuch as the lakes in that year were frozen over for three days, and the cold winds prevailed frequently; that further, in the years 1851 and 1852 the winters were so only in name; that in these two years, during the months of June, July and August, there were frequent risings in the river Bravo, caused by the rivers and streams which discharge themselves into it, at considerable distance from this city—that in those same years prevailed a torrefying aridity on the coast during the summer; and that another aridity just as great succeeded in the summer of 1853, that in the months of the rise of the river, and the consecutive months of the years 1851 and 1852 prevailed an epidemic of stubborn intermittent fever, whose virulence was greater than in anterior years; and that lastly in the corresponding months of 1853, the epidemic was not intermittent, but yellow fever, which some authors, including myself, are disposed to consider as a pernicious intermittent fever, in origin and nature, and many points analogous.

III.

Our attention was not called to any particular phenomena in the vegetable and animal kingdoms, which might not be common in other years.

IV.

The population of this city, according to statistics made up in the last July, amounted to 6,500 inhabitants. These are either descendants of the pure European race, or mixed with European and native, thereby being a less number of natives, and very few negroes, mulattoes or quadroons. In the statistics which we have referred to in the Secretary's office of the corporation of this city, no division in the number of the natives of the city has been made between that of the strangers, &c., &c., and on this account I will not enlarge more on this particular.

V.

In the course of the epidemic in this city, I had in my practice alone thirty-one cases of death by yellow fever:

Eight under 10 years of age, six males and two females;

Twenty-three above 10 years, sixteen males and seven females;

Of whom nineteen were natives of this city, or resided in it for many years, and twelve were strangers, of the interior of the Mexican Republic, whose residence in this city had been only a few days, or at most a year.

VI.

Of one hundred and eight cases of yellow fever that fell under my observation there were

Twenty-two subjects under 10 years, fifteen males, seven females;

Eighty-six do. above 10 years, fifty-five males, thirty-one females;

Of whom thirty-two, (twelve of whom died, and twenty recovered) were strangers, from the interior of Mexico, and were recently established in Matamoras; six (three of whom recovered, and three died) whose natal country is not known, nor when they arrived here; and seventy-six (fifty-seven of whom recovered, and nineteen died) natives of the city, or residents for many years.

VII.

The first case of the yellow fever which presented itself to me in the city, occurred on the 22d September, in the servant of a doctor, who had just arrived from the city of Victoria. The sickness showed itself in her with the following symptoms: shivering, headache, pain in the waist and limbs, red eyes and full of tears, face with the appearance of typhus, pain in the stomach, frequent nausea and vomitings, insatiable thirst, skin warm and dry, pulse full and quick; in the night giddiness and sleeplessness; nevertheless, these symptoms are not continual; then perspiration takes place at the end of some hours, and with this the rest of the symptoms disappear, to return again with the regularity which is observable in intermittent fevers of a similar type. But notwithstanding this similarity, I say that the case of which I am speaking was yellow fever, for the following reasons: the appearance at the beginning of the aforesaid fever was the same which this woman showed and which is common in those attacked with yellow fever; the vomitings, if even they are common at the time of the chill in the first attack, cease

generally very quickly, and are not repeated, while in this case the vomitings were continuous, even at the time of the intermissions, and afterwards, during convalescence. The jaundice, of a dark yellow color, showed itself in this case on the fourth or fifth day, and although the disease yielded in ten or twelve days, the patient was left weak, and broken down for a long time, a common occurrence after a fever such as the yellow fever, but seldom after a simple daily fever of ten or twelve days duration.

When I was attending this sick woman, a rumor spread through the city that at Brownsville, our neighboring city, several cases of yellow fever had occurred; and although I went to investigate the truth of this, in company with my friend, (the master of the sick person in question,) I could not arrive at any certainty. Still I was bound to suppose so, as two persons had died at the end of four days, of a *bilious fever*, and ten or fifteen days after the disease had become general in a manner not to be mistaken, it having entered that city fifteen or twenty days before ours.

The second case which came under my observation in Matamoras was that of a child, about six or seven years old, in which I assisted Dr. Ortega. I had been called in for consultation, twelve hours before the child died. At my first visit it had been three days ill; bloody evacuations, pulse slow and weak, cold perspiration, vomiting every now and then of viscous matter. One hour before death, these vomitings were of a black hue, characteristic; so that in this case the distinguishing symptom was not doubtful.

Seven cases occurred in my practice from the 4th October to the 24th of the same month, after which date the yellow fever began to reign as an epidemic in this city, for at the same time every one of the faculty, both in this city and in Brownsville had some case or other under treatment.

According to more authentic dates, the epidemic began to prevail in this city some ten or fifteen days after it had somewhat spread in the neighboring city; and from circumstances of which I am aware, it appears that it was brought from New Orleans to this, not by sea, but by land; then Galveston, Corpus Christi, Point Isabel, and Brownsville were successively attacked, after an interval of time much greater than that which it takes to cross the short space of the gulf which separates these cities one from the other, cities between which there are now perhaps daily communications by sea.

As regards the cause which produces the yellow fever, I think it lies in the atmosphere; the said disease spreading by infection and not by contagion; for I have seen many persons in contact direct, with some suffering under the disease, and they escaped it, *then;* whilst, afterwards, without any known cause, they were suddenly attacked and even succumbed to it.

A miasma existing in the atmosphere produces yellow fever; and that miasma, if not that which produces intermittent fever, ought to

bear much resemblance to it; for it has been observed here, that, as well in this epidemic as in the accounts of intermittent fevers, the whole Southern population, which are not in the direction of the winds passing above the lakes, have been proportionally very little visited by these terrible azotes.

VIII.

The yellow fever has no consideration for the different classes of society attacking, equally the rich and the poor, men and women, old and young. In 1841, when this fever appeared for the first time in this port, that which I have just mentioned could be better observed than in the present epidemic, for then more than half the population were attacked, a great part of whom died, as much the natives as strangers who had never lived in the focus of such a terrible azote.

In the present epidemic more mildness was observable; for many persons resident in this port for two or three years, either were not attacked, or if so, with little violence, a great many of them being saved, and the yellow fever venting its intensity on the strangers recently established, or whose residence did not exceed one year; the mortality being among those attacked, as one to three.

Although no particular class is free from the disease, one cannot deny that the sanitary precautions of the rich are much more favorable to a good result, if attacked—a greater mortality being observable among the poor, on account of the want of those precautions which means afford.

IX.

General symptoms observed in the first stage: shivering, eyes wild, fixed, full of tears, heavy and red, with great pain in the sockets, extension of the pupils, flushed cheeks, cephalalgia very intense towards the forehead, ruddy tongue at the sides and the tip, covered in the centre with a whitish or yellowish coat, skin burning and dry, seldom moist, pulse hard, less and less frequent, and generally full; pains in the lumbar region and in the limbs, with cramps often in the feet and legs, the stomach seldom painful to the touch, nausea and vomitings—first of undigested food, then of bilious matter; impatience, thirst; at times moderate, at others violent; costiveness in the greater part of the cases, reddish urine, and somewhat abundant; appearance as from typhus.

In the second stage, which begins from the third to the fourth day, jaundice and hæmorrhage appears. The face assumes a strong yellowish color, which commences to be observed in the conjunctiva. Diarrhœa then takes place; at first, viscous, afterwards bloody, or even the blood flows through various natural apertures. There exists much agitation and anxiety while this jaundice and hæmorrhage occur; then ensues a painful crisis, during which the suppression or the retention of the urine is observed; vomiting and evacuations of a black color. Sometimes in the agitation which accompanies this second stage, succeeds a general warmth, a deceiving calmness,

during which the skin becomes fresh and moist, the pulse regular, although slow, and the spirits of the patient revive with the hope of a speedy recovery. But this state lasts but a short time, for quickly return restlessness, the pains, and besides these, vomitings, and then death ensues.

In some cases there is no exterior, but interior hæmorrhage, observable by the difficulty of respiration, and drowsiness of the body.

This epidemic did not declare itself in this city suddenly, but, as I have said, gradually, several isolated cases being observed at the beginning, and very easy to be mistaken, (no epidemic raging at the time,) with certain cases of bilious or violent intermittent fever.

Notwithstanding, if at the beginning, as at the end of the epidemic, less violence was observed in its course, and always an intermission in its symptoms, which made it comparable to strong intermittent fever, this same intermission was observed, also, at the height of the epidemic, among certain individuals attacked who were natives of the port, and had not had, at other periods of the epidemic, the yellow fever, or who, without being natives of this port, lived in it for five or six years. From which it may be deduced with sufficient reason, that the yellow fever is of the same nature as the intermittent fever, from which it differs solely by its greater violence.

The duration (generally) of this disease in the more serious cases, was from three and a half to four days, these cases being among persons recently arrived, or not sufficiently acclimated. Among the natives of the port, or among the acclimated, the disease, although it might terminate in death, lasted much longer, and this in proportion to the being acclimated, which diminishes much the virulence of the disease, without exception in this respect of even the aged persons.

Of the 108 cases of yellow fever, I noticed in twenty-six there were vomitings or black evacuations; of which twenty-six, twenty-three died and three recovered; of these three, two had been attacked at the commencement of the epidemic, and were natives; and the other, recently arrived, owed his recovery, without doubt, to the good fortune of having been among the last attacked, when the epidemic had lost its virulence. This case was very curious; the subject, a child of nine years of age, of a very weak constitution, had suffered from pleurisy many times, and still has the germ of tubercle in the lungs. It was the last case observed in my practice; in fact, the last case in the whole city.

In thirty-six cases there was jaundice, of which twenty-three recovered and thirteen died; and in twenty cases hæmorrhage, thirteen dying and seven recovering.

In general, the prodroma were of short duration, being, at most, twenty-four hours. The subject is within the focus of the infection. Scarcely has the poison, or whatever cause of the disease, penetrated into his economy, but he begins to feel its presence and provokes its climination.

The epidemic which reigned in this city, was the real yellow fever, similar to that which raged in New Orleans, in Galveston, Corpus Christi and Brownsville, &c., and requires no more confirmation than the history of the epidemic itself.

I have only been practicing five years; and although I had not had the opportunity to see this disease, at least as an epidemic, still I had noticed in this port several perfectly well marked cases.

Of the 108 cases of yellow fever which I observed in the last epidemic, I have already said, in paragraph VI., how many died, and how many recovered.

This epidemic committed ravages not only in the city, but also in the little villages adjoining, and in rural habitations; and I am sure that in several of them the disease appeared before it entered the city.

The number of victims by yellow fever, according to the statistics made up in the office of the corporation of this city, was 322 in 6,500 inhabitants, which number we have said the city contained.

SOUTH AMERICA.

QUITO, ECUADOR.

TESTIMONY OF DR. WM. JAMESON.

QUITO ECUADOR, March 22, 1854.

The name of the locality is Guayaquil, situated on the Western bank of a navigable river bearing the same name, which discharges itself into the Pacific in lat. 2 deg. 15m. South. Its limits and boundaries are the Pacific on the West and South-west; towards the East the chain of the Andes, and towards the North the provinces of Manabi and Esweraldas.

The surface soil is clayey for some distance above Guayaquil, and extending to the mouth of the river.

The river supplies the water used by the inhabitants. That procured by digging wells is brackish, and therefore unfit for domestic use. Even the river water possesses this quality during the period of the dry season, and must be brought down from a situation on the river considerably above Guayaquil, where the ocean tide is not so perceptible.

Disturbance of the soil; nothing of the above description has been practiced.

Position with regard to rivers, bayous, &c.; probably at some remote period the province of Guayaquil was covered by the ocean—it presents an extensive tract of level country interspersed with a few isolated hills crowned with a luxuriant vegetation of forest trees. From the end of December to the beginning of May, it is almost under water, and becomes navigable in canoes. The inundation is caused by the rains poured down in the interior during the above mentioned period. The banks of the river, to within a short distance of Guayaquil, present a rank vegetation of lofty Mangroves, the roots of which are alternately bathed and left dry by the salt tide. The clayey soil in the vicinity of Guayaquil is impreg-

nated with salt, and produces in abundance a species of *Salicernea*, from which kelp is occasionally prepared.

I did not notice any material change in the weather as to dampness or dryness, hot or cold, or the prevalence of rains and fogs, winds, &c., during the existence of the fever.

I am not aware that any of the lower animals were effected by the epidemic—neither did its operation extend to the vegetable kingdom during the epidemic.

The population is estimated at about 15,000 inhabitants, probably one third whites. It is difficult to obtain authentic information on this head; when the Government issues an order to form a census, the people generally imagine that the ultimate object is to recruit for the army, or to exact a contribution—any inquiry is consequently evaded. The foreign population, probably altogether did not exceed fifty or sixty, comprising natives of the United States, England, France and Italy. The natives of Panama, as well as those of the Atlantic coast within the tropics, such as Carthagena, Santa Maveba, Laguayra and Puerto Cabello, invariably escaped the epidemic; also the natives of the interior, and even Europeans who had previously resided in these countries.

When the epidemic assumed an alarming character, perhaps about one-third of the inhabitants abandoned the town, consequently there remained about 10,000, of these 1,691 died within the period of six months. In the neighboring villages within the jurisdiction of Guayaquil, the population of which may, in the aggregate, be stated to amount to 18,000, including the 5,000 from Guayaquil, the mortality did not exceed 700. Population of Guayaquil with its dependant villages 28,000; number of deaths from yellow fever 2,391, or about 12 per cent. of the total population.

Among the colored it was not so generally fatal as among the whites; although many of the former were severely attacked.

My first case occurred about the 10th or 12th of Sept., 1842. (For other cases see Appendix.)*

I do not know of any case which appeared to have originated spontaneously; several individuals who took the precaution of isolating themselves by retiring to the country, at no great distance from the town, escaped the epidemic during the three years that it prevailed. Such individuals were exposed to the same endemic influences.

The vicinity of ponds, swamps, &c., and I may add a high temperature, certainly favors the development of yellow fever; but another cause will be superaded, and that I conceive to be a *specific infection*.

People recently arrived from temperate countries, as well as the natives from the elevated regions of the interior, suffered more severely than those of the coast; women less so than men; contrary to the general opinion, many individuals habitually addicted to the use of spirits, (or professed drunkards,) although severely attacked, recovered.

Occasionally commenced mildly with symptoms resembling a violent

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* The appendix, we regret to say, never came to hand.

catarrh; but generally the attack was of a more violent character, with rarely any premonitory simptom, the patient being seized with sudden and violent headache, loss of appetite, severe pains in the loins, thighs and knees; no remarkable heat of skin; weakness and oppression of the pulse; eyes injected and watery, with intolerance of light; tongue moist and covered with a whitish fur, red at the edges; costiveness; tension and pain of the abdomen, particularly in the epigastric region.

Yellowness of skin with the latter stage, appearing first about the neck and face and afterwards extending over the whole body.

Hæmorrhage was frequently observed first from the gums, which became remarkably spongy, the blood not coajulating; also hæmorrhage from the nose, the ears, the anus and the uterus, in cases terminating fatally.

Remittent fevers were equally prevalent as on former occasions, and when these assumed a malignant character, were with difficulty distinguished from true yellow fever. Their origin could be traced to the decomposition of vegetable matter, and their symptoms characterized by slight intermissions.

Q.—Assuming the propagation of the disease from exposure either to an infected atmosphere, to personal communication with the sick, or contact with goods or clothing, either of the sick or transmitted from a locality considered infected, what time intervened between said exposure and the appearance of premonitory symptoms, and also the development of the disease?

A.—Generally within a period varying from six to ten or twelve days. The Indians and other inhabitants of the interior who descended to Osabahayo for objects of traffic, frequently returned with the germ of the malady, and perished on the road. At Angas, 3,028 feet above the sea level, many died of the fever contracted on the banks of the river of Guayaquil, but in no case was it communicated to the inhabitants of Angas.

Q.—Do you regard the epidemic as true yellow fever?

A.—Yes.

Q.—Have you ever seen this disease before?

A.—No.

Q.—Please state the whole number of cases of black vomit which you have seen?

A.—I cannot at present recollect.

Q.—Also number of recoveries thereafter?

A.—Scarcely any where black vomit becomes the prominent symptom.

Q.—State the number of cases alleged to be the second or third attacks, and the evidence thereof?

A.—I know of none from personal observation, and my impression is that a person who had once experienced an attack of true yellow fever is for ever secure from a second attack; even should he have afterwards lived in a cold climate and afterwards returns to the coast where the fever was actually prevailing.

Q.—State as nearly as possible the number of persons attendant on the

sick, or otherwise exposed to its possible causes and liable thereto from never having had it, who have entirely escaped during the epidemic?

A.—I believe that none escaped who had not previously had the epidemic.

Q.—Does the yellow fever ever occur in the rural districts, or if conveyed there from a city, does it spread from such case?

A.—In 1842, 1843, and 1844 it extended to the population distributed on the alluvial country forming the province of Guayaquil.

Q.—Is it a new fever? Does it come from abroad, and if so from whence? if of domestic origin—what has produced it?

A.—See Appendix.

Q.—What probability of its having been imported from Africa. Were the newly imported Africans affected by it, and did it terminate in black vomit? Enclose a copy of your sanitary measures.

A.—No sanitary measures have been published.

PUERTO CABELLO.

UNITED STATES CONSULATE.

PUERTO CABELLO, March 15, 1854.

HON. WILLIAM L. MARCY, Secretary of State, Washington.

Sir:—I have the honor, herewith, to inclose answers to the questions of the Sanitary Commission of New Orleans.

I am indebted to Dr. Lacomb for his kind assistance. Although his remarks are lengthy, I could not well abridge them without impairing their force; therefore I have sent them entire.

Dr. Lacomb is the best educated and most skillful physician in this city; and has been, to my knowledge, very successful in his treatment of yellow fever. He has had much experience and extensive practice.

I remain, with great respect,

Your obedient servant,

[Signed] SOUTHY GRINALDS.

TESTIMONY OF DR. LACOMB.

Answers to the questions of the Sanitary Commission of New Orleans, each number corresponding to those of the questions:

1.—The name of the locality is Puerto Cabello.

2.—It is bounded on the North by the Carribean Sea, in latitude 10 degrees, 28 minutes North; extending South to the Province of Equador; and extending about forty miles East and West of Puerto Cabello.

3.—The soil is mostly sandy; part of the city formerly was surrounded by swamps; which have been filled up with all sorts of dirt, horns and bones of oxen, and continually with Indian cornstalks, and animal manure or dung from the stables of the city, and also with all the filth of the houses. The water edges of the port, with ballast of vessels from all parts; the city and port are surrounded with mangrove, (phizophora,) in a circle close

to the port; extending in an Easterly direction, from North to South, and with elevated mountains, from three-fourths to three miles from the population. Large and filthy swamps exist, also, in some parts of the city,and in a circle surrounding it. From East to West, nearly all is left to time and nature almost, for the removal of such nuisance. The water bottom of the port is partly muddy, partly carbonate of lime coral, and partly of sand and small freestones.

4.—The drinking water used, is from the small river San Ertebons, which takes its sources from the mountains, some five or six leagues off; the water is of the purest sort, very light, and soft, when filtered through a stone, as performed in the city, and when taken from the river, some distance from the city. Heavy rains alter much the quality of the water, with mud and ashes proceeding from the burning of the bushes on the mountains or elevated lands in the vicinity of the river, in the months of February, March, April and May, before the commencement of the rainy season, so as to cultivate them. Bowel complaints are the results, and prevail during these months, in consequence of the great quantities of potash carried down into the river, during these months, by the first rains

5.—No disturbance of the soil, further than for the ordinary purposes of building houses; of little consequence.

6.—[This has been answered in reply to question No. 3.]

7.—The drainage of the city, although mostly paved, is very bad; water will, in many parts, remain on the soil after rains and high tides, (in October, November and December) and stagnate. On the spots indicated in question 3d, water will stagnate for several months in the year, and create much sulphuretted hydrogen gas, perceptible on passing near or through those spots. As Health and Port Physician of this port, nine years previous to May, 1852, all my exertions to obtain from the government and local authorities some attention on the subject were of no value whatever.

8.—As regards the meteorology of the locality, as far as I can inform you, the weather is damp; extremely so from April to July; less so during the other months of the year. The rainy season is from April to July and August. The heat, from November to March, is from 72° to 80°, Fahrenheit; and from April to the end of October, from 84° to 92°; in September, till the middle of October, sometimes the thermometer rises to 96°, and even to 100°; but this will last but a few hours, now and then. Generally, the thermometer begins to go down steadily from the 20th of October. The climate is then the most pleasant; it is entirely free from fog; cool in the shade, but hot in the sun. Thunder storms and lightning are very prevalent in the rainy season indicated, and the atmosphere is then very oppressive and very hot. The wind blows generally from the East, during the day time, and from ten o'clock at night until early in the morning from the Southwest. This latter is cool and damp, and generally denominated as land breeze; in the months of October, November and December, the wind sometimes blows from the North for some hours,

and creates affections of the lungs, and rheumatism; sometimes, also, during the same months, it will blow strong from the South, raising a very strong and unpleasant dust from the plains of the country, which brings on fevers of a bad nature on the natives, seldom affecting foreigners; this wind seldom lasts more than from two to six hours at a time. Remittent and intermittent fevers are generally the prevailing diseases of the place, and yield easily under the influence of emetics, cathartics and quinine. The low classes, generally poor and of loose habits, are the subjects to their influence, and they are more fatal to them for want of proper assistance and means; as the hospital existing cannot be called such, as it is of the lowest order, and admits only twelve persons at a time, with hardly any assistance, and in the most filthy state. The physician of the establishment is an empiric, without education, (a creole) without credentials.

The prevailing period of remittent and intermittent fever, is during the rainy season, and it is a general and constant rule, that this place becomes entirely free from diseases, and the healthiest in the world, when strong heat, combined with total absence of rain and dampness prevails; the atmosphere being then dry. Another characteristic of the climate is that fevers are less frequent when the rains are very strong and great, than when small and frequent. The scarlet fever prevailed lately as epidemic in the whole population, and was fatal and dreaded; this fever had not been known here for twenty-five or thirty years; it existed amongst the creole population, and especially among children; while the yellow fever prevailed among Europeans and foreigners. During nearly two years, from 1852 to '54, the weather was materially altered from its former state; it was very hot and very damp; small rains, frequently repeated. During all this period, we had the yellow fever, the scarlet fever, colds, dysentery, intermittent and remittent fevers, and various shades of typhoid fever. Since March, of this year, disease seems to have disappeared altogether.

9.—Have not observed anything remarkable in the animal or vegetable kingdoms. Had the violent earthquake that occurred at Cumiana, any influence on the creation of diseases in this place, which we had not known here for many years past?

10.—The population of the city *alone* of Puerto Cabello, is 5,800 souls. Those of the whole district, (cantone) including the city, is 9,500 souls; occupying an immense extent of land. The population is what is called by the Spaniards an *ollapodrida*, or, in other words, a mixture of whites, Indians, mulattoes, negroes, and all the other variations of skins generally found in the population of Venezuela; and where everybody is white, (although black mostly,) it is impossible to estimate the number of real whites.

11.—The number of deaths from yellow fever were—French, about 20; Spaniards, 35, including those of the man-of-war Gen. Valdes; Creoles of the place, about 10; Creoles from the interior, 6; Americans, 11; other foreigners, 68.

12.—With the exception of four or five, all those indicated in question 11th, died of yellow fever. Except three or four German women, all were men and boys from the shipping; cannot tell the number that were taken sick.

13.—In August, 1852, a Danish brig of war came from Santa Cruz to St. Thomas, having lost many of her crew, in those islands and at sea, from there here, of yellow fever; several of the men had been thrown into deep water near the Island of Gayaguasa, three miles from this port; and several were buried in the Foreign Burial Ground of this place; at that time the city was most healthy. The commander of the said brig declared, supported by his vice-consul, that he had no yellow fever on board; but as statements to the contrary had been made to the Mayor, the latter insisted on getting the commander and consul to admit a visit from Dr. Lacomb on board of the brig, to examine the cases of sickness before taking the step of preventing any further communication with the brig and city. They resisted the order of the Mayor, and the vessel sailed for Curacao, where she lost a considerable number of her crew of yellow fever, as officially known here. About twenty days after her departure, we had the first case of yellow fever, in the foreign shipping, which gradually spread in the crews of the vessels in port, among the German emigrants, and among foreign merchants and clerks of late arrivals to this place. The disease lasted until the first day of March, of this year, and finally disappeared. The conduct of the commander of the Danish brig of war, and his vice-consul, Hide, was very little creditable to their honor, or humanity, in this case; for denying the truth, and preventing that precaution which should have been made against their communication with us, as it was not supposed that such men would be capable of deceiving the authorities of the place in such a criminal manner.

14.—The next fifteen cases took place in September, 1852, and were very mortal, as is always in similar cases.

15.—Some French vessels from Guadalupe and Martinico had men taken with the disease in this port; had suffered quarantine before admitted in it; but the disease had broken out here, before their arrival here.

16.—It is generally believed here that the disease was communicated by the Danish brig of war alluded to in answer No. 13.

17.—In 1844 the writer treated several sporadic cases of yellow fever, from a Spanish vessel with emigrants from the Canary Islands; but only few men and the captain had the disease; vomited black, and evacuated; but none died, and the disease did not spread in the shipping, which was very numerous in port at the time; and no precautions were taken to prevent its spreading. The small pox existed then as epidemic, in the whole portion of the district, creole and foreign.

18.—Relative to the spread of the early cases of the disease: to answer this question, it would be necessary to write a book; however, "yes" can be answered, and "no," also.

19.—Social condition: the first part of this question has been answered in No. 8. The houses are not generally crowded, and occupy a large ex-

tent of land compared to the population; which is, in part, given up to loose life and liquor. The yellow fever did not spread amongst the creole population, with few exceptions, as stated already above. When the endemic fevers exist, the mortality is mostly confined to the lowest classes.

20.—Retired from practice since May, 1852. I had comparatively less practice to attend to than the other physicians of the city. I only attend in some instances, to please friends, who insisted I should do so. Respecting the symptoms, to avoid writing too much, I should state that they were absolutely those indicated in the "Dictionnaire de Medicine and Chirurgie Pratique, Paris, 1830." The autopsic examination of several dead bodies an hour or two after death also presented the same organic lesions or alterations described in said book. In one case, a German of light complexion, where no black vomit nor evacuation had taken place, the stomach and intestines I found full of the stuff constituting the black vomit; the gall bladder full of a perfect black fluid, which stained my hands for two days; the liver very much enlarged and pliable; having the exact color of gum gamboge; the lungs gorged with carbonized blood, &c. The autopsy I practised an hour after death. I never found that the brain had been the immediate cause of death—judging by its state. The termination by death was, in all the cases, between the period of three to eight days from the calculated period of incubation.

21.—The proportion of cases in which black vomit appeared was about two-thirds.

22.—Yellowness of skin, with exceptions, took place in almost every case; and in the cases where it presented itself before the seventh day, death always resulted.

23.—Epistaxis and hæmorrhage of the gums, and oozings from the mucus membranes, in a great many of the cases; but mostly after the fifth day.

24.—Did other types of fever prevail, &c.? This question has already been answered in question 8th. In its latter part, the disease assumed always the typhoid type.

25.—All the questions put to the attacked with yellow fever, result, that some felt, previous to the pains of the loins, head and limbs, a loss of appetite, a great heat, with chills sometimes; the saliva thick and unpleasant, or sour taste in the mouth, from the moment a patient attacked; pains bitter of the loins and limbs, depression of spirits, facial congestion, &c. I calculated twenty-four hours since the complete invasion, and always found the calculation to answer the terms of duration, whether fatal or not. It is impossible to answer in a different manner this question, as the incubation of the disease is more or less active, according to constitution, predisposition, &c.

26.—The yellow fever we had, I consider genuine.

27.—I have seen the yellow fever in Guadalupe, of which Island I am a native; I have seen it also in St. Thomas and Carracas, in the years 1838, '39, '40, where I first treated diseases; although in quite a different manner, I did here.

28.—[Answered by the prior question.]

29.—I have seen the hospitals full of sailors and soldiers, vomiting and evacuating *black* in all directions. I have seen the yellow fever in patients of a higher order or class, in private houses in Guadalupe and St. Thomas, previous to the year 1829, when I left the islands for Europe. I have treated black vomit in Carracas in 1838, '39, and '40, as stated above; and everybody there knows that my practice was very extensive. Latterly, however, I have treated the disease here; seen most of the cases, although they were not under my care, from being retired from the practice.

30.—The recoveries in the islands at the time mentioned, and previous to it, to my knowledge, could not be above forty per cent.; the recoveries in Carracas, at the period mentioned, were seventy-five per cent. in the beginning, and at the end they were from ninety to ninety-five; they were here lately from fifty to fifty-five per cent. The greatest mortality was among those bled from the arm. I have attended from 1852 till lately about sixty-two cases which presented in all their violence the ordinary symptoms of yellow fever, and lost but two men from the German brig George; and one out of twenty-four confided to my care of the officers and crew of the Spanish Brig of war General Valdes, who had fifty-two men attacked by the disease; eighteen of the other twenty-eight I did not practice for died. I believe Consul Grinalds can testify more or less to the veracity of my assertions; and the Spanish Consul, also, in case of need.

31.—Did not observe the number of alleged second and third attacks here; but know of one Spanish sailor, of the General Valdes, which was reported as having had the yellow fever in Havana, and died of a second attack of it here.

32.—It is difficult to ascertain, positively, the number of persons attendant on the sick, and otherwise exposed—not having previously had it—who have entirely escaped the epidemic; but I know of Europeans, lately arrived, who exposed themselves, attending the sick, and did not get the disease.

33.—Deaths usually occurred, as I have already said above, from the third to the eighth day of the calculated invasion; some the third, some the fifth, mostly all entering the eighth day, a few hours after having concluded the seventh.

34.—We have instances of black vomit occurring constantly in different parts of the interior of this country; lately at Nutrias, nearly sixty per cent. of the population died of it. Also at the Aragua Valley, in Valencia, the capital of the province, situated nine leagues from this place, many cases occurred among the creole population, especially young people in Carracas, five leagues from Laguayra; many cases existed last year, and were fatal in the native population.

35.—I leave the question of its origin and cause to the most learned to answer. All we could write on it, I believe, would prove nothing more than what is already known on the subject. I think it would be best to find out the best treatment for it, and view the disease in a different way,

as I did of late; but to explain my views, it requires to write a volume; I intend to do so as soon as possible.

36.—We have no communication with Africa in this place.

37.—The sanitary measures of this place consist in leaving the streets and sea-boards constantly dirty; to throw all kinds of filth in the streets; to board vessels coming from infected places, hailing them from a little distance of a few yards, taking the bill of health, read it (or not, as often as there are port physicians that neither understand French, Latin, English, or German); and if they make out the bill is "not clean," they put the vessel in quarantine for a certain number of days, without guards, so that often the crews come on shore at night, and return before daylight on board. The number of days assigned for quarantine terminated, if nobody is sick on board, the vessel enters the port, the Board of Health meet, talk a great deal on things they don't understand, and all is over.

BRAZIL.

RIO DE JANEIRO.

CONSULATE OF THE UNITED STATES, Rio De Janeiro, March 29, 1854.

Sir :—Your communication of the 23d November last, was received by the steamer "North America." on the 26th of December, and had my immediate attention.

I prepared a circular, and transmitted it on the 28th day of December, to three of the most eminent medical men of this city, covering the inquiries propounded by the Sanitary Commission of New Orleans, "in relation to a wide spread epidemic," which has visited and devastated a large portion of the United States in the past summer and autumn.

From two of these gentlemen replies have been received. The first came from Dr. Pennell, and reached me on the 2d of January last. The second was prepared and sent me by Dr. Lallemant, and was received on the 19th ultimo. The other gentleman has yet sent me no reply, although from him (Dr. Paula Candido) I have the assurance of an answer, which is being prepared by him, and which he desires to make as full and as satisfactory as possible.

Apprehending that you, and the Sanitary Commission at New Orleans, may, however, expect some prompt answer, I now transmit you herewith the two copies to which I have alluded. I forward, also, four printed copies of a report of Dr. Croker Pennell, upon yellow fever as it appeared in Brazil, during the summer of 1849 and 1850; and also, four copies of a pamphlet from the pen of Dr. Paula Candido, "concerning the propagation of yellow fever, and of its treatment aboard of ships." The authors of these works are esteemed two of the most scientific gentlemen here.

The season is now so far advanced, that I may be excused and justified in saying that, as the city has been, from October last up to this day, very

healthy, and for the three last months free from the yellow fever, it may be confidently expected there will be shortly no re-appearance of that disease. I take occasion further to add, that from the bills of mortality daily published, the accuracy of which stand vouched for by gentlemen of irreproachable character, united to my own personal observation, there is probably no city any where whose population has been freer from disease, for many months, than that of Rio de Janeiro.

I am, with high and sincere respect,

Your obedient servant,

ROBERT G. SCOTT.

To Hon. WILLIAM L. MARCY, Secretary of State, of the United States.

TESTIMONY OF DR. C. PENNELL.

Subject 1.—There has not been much clearing of land in the immediate vicinity, nor great disturbance of the soil; except in the streets of the city, which for some years past have been more frequently lying turned up than paved; constantly disturbed by some work that has been going on. When in this (lately their usual) state, they are most offensive, being a receptacle for all kinds of filth, and are left in the most abandoned state of neglect. In the day, the city smells badly enough, but at night it is almost intolerable. The drainage is all by open gutters, having a very small declivity; consequently, after two or three weeks dry weather, many of the streets are full of black offensively smelling mud, principally derived from emptying slops, &c. To improve matters, the junta hygienica (President, Dr. Paula Candido) have directed that the mud should be daily removed. In order to do so, that which is collected in the middle of the streets, (and might lie there comparatively innocently) is first spread over the whole surface of the street, to dry in the scorching rays of the sun, that it may exhale all its pestiferous influences, to the discomfort of the inhabitants; and is then (when dry) carted away. The accumulations of water are not much about Rio; principally in Rio.

Subject 2.—The usual range on the centigrade hygrometer is from 15° to 24°R. Ordinary summer range of heat in shade from 78° to 86°, Fahrenheit; winter from 57° to 76°. Since (and some time before) the outbreak of yellow fever, there has been less thunder storms than usual—remarkably less. During the first epidemic of yellow fever, there was an unusual prevalence of winds from Northeast.

Yellow fever was said to be unknown in Rio before the epidemic of 1849—'50. For some two or three years previous to this, it was generally observed that fevers presented a different type to what they had hitherto done; and occasionally a case was seen attended by all the pathognomonic symptoms of yellow fever; and was declared by the physicians in attendance to be such. These cases created no attention, until the disease appeared in an epidemic form; but were considered as aggravated forms of the fever of the country, and pronounced yellow fever.

Bahia suffered from yellow fever in November, 1849; consequently, medical men were on the watch for it in Rio. The first cases excited con-

siderable attention. They were both discovered in lodging houses in the same neighborhood, on December 28th, 1849, and taken to the hospital.

They both died in the hospital within seventy-two hours; one dying thirty hours before the other; and therefore it may presumed was in a more advanced stage of the disease when discovered, on December 28th. The first who died was a Danish sailor, arrived fourteen days previously from Finland, direct; the second was a German, (both sailors) who had left Bahia on November 25th, and arrived in Rio on December 2d; none of the crew having been ill at Bahia, nor on the passage. The contagionists trace the disease from Bahia through this man; but do not deny that the Danish sailor must have been attacked at least as early, and that he could have been submitted to no source of infection except through the second.

The next ten or fifteen cases, for about as many days, were confined to this neighborhood; which is the locality where exist the filthy, low lodging houses, ill-ventilated, and very much crowded.

1*st.*—*Many patients* with yellow fever, have been conveyed to the country about Rio, and died with black vomit and suppression of urine; but have never communicated the disease to others in those localities.

2*d.*—Said to be new in Rio. Contagionists trace it to Rio from Bahia, and to Bahia from Havana. Non-contagionists find enough to account for its origin in the natural changes of the country—changes in the atmosphere, attested by a remarkable absence of the usual thunder storms, and prevalence of winds; besides other unknown but presumed changes; from the fact that the common non-infectious fevers of the country had been for some four years previously, clearly changing their character, and were occasionally intermixed with an unmistakable case of yellow fever—that there were abundant sources of the disease in the low flat grounds about Rio, and the filthy undrained streets, in conjunction with the atmospheric changes—and that the evidence of imputed infection was most inconclusive.

3*d.*—Not supposed to be imported from Africa. The newly imported blacks did not appear to suffer more than the acclimated, and presented a low rate of mortality. C. Pennell, M. B., London.

Rio de Janeiro, December 30th, 1853.

A SHORT REPORT UPON YELLOW FEVER, as it appeared in Brazil during the Summer of 1849—50: *By CROKER PENNELL, M. B. LONDON, M. R. C. S. E., and formerly Lecturer on Anatomy and Physiology at the Westminster Hospital School of Medicine, London.*

The following short report was written (without any intention of printing it) at the request of James Hudson, Esq., H. B. M. Envoy Extraordinary and Minister Plenipotentiary at this Court. At the instigation of several friends, who were desirous of sending home a correct statement of the progress made by the yellow fever in Rio de Janeiro, I have been induced to publish it.

Unbiased by any preconceived opinion, I have recorded every fact that has come to my knowledge, which seemed to throw light upon the nature of the disease. It is only from a large number of facts, duly observed, that a correct conclusion can be arrived at upon any subject. I simply record the facts, and *my own impressions.* Let each individual form for himself whatever opinion he may think the circumstances related will justify

C. P.

Rio de Janeiro, July 1, 1850.

A Short Report upon Yellow Fever, as it Appeared in Brazil during the Summer of 1849—50.

Yellow fever, hitherto unknown to physicians practicing in Brazil, made its appearance at Bahia in the month of October, 1849. At least two-thirds of the population were attacked by the disease, but in a very mild form; for, probably, not more than two per cent. of the affected died.

Of the English residents, 124 in number, 116 were attacked, and of these but three died, viz: a female domestic servant three to four months arrived from England, a child who accompanied her, but who had been in Brazil before, and a gentleman who had left England eighteen months before, and had since resided either in Rio de Janeiro or Bahia.

Far different was the aspect the disease wore on board of the foreign ships in port, the seamen belonging to which were, of course, all new comers. Of those attacked amongst the English seamen, more than thirty per cent. died, and I believe that during the height of the epidemic more than two thirds of the whole were affected.

The disease presented the worst features exhibited by the yellow fever as it prevails at the West Indies, Sierra Leone and New Orleans; a bright or muddy-yellow color of the skin and conjunctiva, suppression of urine, hæmorrhages from all parts of the body, black vomit, a putrid odor of the breath, and proceeding from the body generally, convulsive movements of the muscles and tetanic spasms, together with delirium, both violent and low, were common symptoms of the complaint.

It was supposed by some that the disease was imported from New Orleans, and by others from the coast of Africa, in a slaver; but as far as I can learn, without any precise or direct evidence, to support such a position. Thus, Senor Jobim, doctor of medicine, and member of the Chamber of Deputies, in addressing the house, could adduce nothing more positive than the following: "If" he said "we attend particularly to the circumstance of this vessel having arrived in the month of September, and that she must have left the city of New Orleans in July, and that at this epoch, every year, and in a constant manner, there reigns yellow fever, with its inseparable companion black vomit, we ought to conclude that, in effect, the disease was brought to us from there."

On the 2nd of December, 1849, arrived in Rio de Janeiro, from Bahia, the American bark Navarre, in ballast, with a healthy crew, which were paid off and dispersed. Some of them went into other vessels and were

no more heard of; others came on shore and took up their abode in the rua de Miseracordia.

The first known case of yellow fever which existed in Rio de Janeiro occurred in the instance of a seaman belonging to this vessel, who was attacked and taken to the public hospital on December the 28th. The next case was that of a Danish sailor who was lodging within forty or fifty yards of the house where the first patient was taken from, and with whom he is stated to have had frequent intercourse. The following five or six cases all occurred in houses in the same neighborhood, while as yet there was no yellow fever in other parts of Rio de Janeiro.

For from ten days to a fortnight the disease was confined to the rua de Misericordia and its purlieus, but eventually becoming general, both on shore and on the water, its spread was but in few instances traceable to infection, (see note at the end.)

The locality which next became infected was the Saude, at exactly the opposite end of the city, about a mile and a half from the rua de Misericordia. The Saude, for the most part, is only a little higher than the level of high water mark, and is but partially paved. The soil is clayey and intersected with open gutters. The surface being low, flat, and very uneven, affords a ready lodgment to small pools of water, which stagnate; and as they contain a certain amount of black masses of decaying animal and vegetable matter, they at all times emit a most offensive odor. It is bounded on more than two sides by water, which daily, at low tide, leaves exposed an immense surface of a dark mud that produces a most loathsome smell.

The yellow fever was unusually severe in this locality; the acclimated foreigners suffering almost as much as those newly arrived, living in more healthy parts of the city. About the middle of February, the fever began to rage epidemically on board of the foreign ships in port.

In many instances, the newly affected had either been on shore, or were known to have had intercourse with the sick, but in others, and not a few, no communication, direct or indirect, was known to have occurred, nor, indeed, from circumstances of time and place, (as will be more particularly mentioned hereafter,) could have taken place. It should, however, be mentioned that the ships were anchored in groups, and that for the most part, forty or fifty yards was the distance which intervened between each ship.

Several masters of vessels, without being questioned, declared that they entered the harbor with fever on board; although coming direct from Europe; that as soon as they approached the coast, and came within the influence of the breezes from shore, their men fell sick with fever. Most of the cases were slight, but some were attended by black vomit, and proved fatal after their arrival in port.

The population of Rio consists of probably more than 100,000 whites and of 200,000 blacks and mulattoes. The two latter classes were, perhaps, not so generally attacked as the first, and escaped with very few deaths. I attended in private practice upwards of one hundred blacks, without

losing one. In the first class the mortality was considerable. The Brazilian Government published a statistical account, brought down to April 30th in which the deaths from yellow fever were stated to be 3,522; but this was known to be short of the reality, which was estimated at 13,000 by the most moderate. Certain it is that upwards of 1,000 *Portuguese* died in the *hospitals alone*, as shown by their own statistics.

The number of deaths given by the government includes all nations. Probably three or four per cent. would be too high an estimate of the deaths to the attacked among the Brazilians, more particularly, if we exclude natives of other and elevated parts of Brazil who had recently arrived in Rio. Of upwards of sixty, attended by me, not one died. Foreigners who were long acclimated suffered comparatively little, perhaps, not much more than natives. Amongst new comers the mortality was high. Of the seamen whom I attended, about 29 per cent. died; but as this calculation includes many cases first seen on the fourth, fifth or sixth day of disease, and in a hopeless condition, it does not give a fair idea of the mortality. Excluding these cases, I lost 22 per cent.

The mortality was certainly not less among new comers on shore. The disease generally proved fatal on the fourth, fifth or sixth day, though some patients died within twenty-four hours of the attack, having been comatose nearly the whole of that time.

The history of the epidemic seems to point out infection as the mode by which it was brought into this city; and though the disease be of endemic origin, it by no means follows that it may not under certain circumstances become infectious. There are the strongest reasons, contracted on the believing that H. B. M. ships Eden, Eclair, and others spread by infection, coast of Africa an endemic disease which afterwards proved fatal to crews of healthy localities not only among the crew, but also among the inhabitants of towns that a disease not infectious where they touched. It is perfectly well known that under certain circumstances become so. Nay more, tious in its nature may under certain circumstances, infectious diseases may arise among that under favorable circumstances, if a number of persons be crowded in a confined space, with bad ventilation and unwholesome food, a fever will appear people previously healthy. If a new infection in healthy regions.

which is capable of spreading. Moore's followers, who escaped at Corunna, The remnant of Sir John of the small vessels in port. They had then rushed in crowds on board of every vessel in no disease of an infectious nature; they could hardly have carried any seeds of contagion with them, as they had been running for some days, continually wet by heavy falls of rain, and with hardly any clothes on their backs, typhus fever appeared on board of every vessel in which they embarked, and was communicated to their nurses and attendants in England, if it be possible for infection to be generated *de novo* in individuals previously healthy, how much more likely is it to arise in persons similarly situated, but with the addition of a severe disease, particularly disposed to vitiate the secretions, and to produce fœtid exhalations from the lungs and body generally. We have thus another source of disease

superadded to the original, aggravating it, and perhaps converting a simple bilious remittent into the genuine yellow fever.

It has certainly appeared to me that yellow fever is infectious; and though believing it to be nothing more than a bad remittent, with infection superadded, I am unable to prove it, further than will appear in the sequel. It is strictly in accordance with what is known of some other diseases, to suppose that a severe bilious remittent, of endemic origin, may so far vitiate the secretions and the blood, as to generate a source of infection which would propagate the disease; and probably under the form of yellow fever.

Beyond the history which I have related of the commencement of yellow fever in Rio de Janeiro, my own experience adds but little in favor of infection, as the sole means by which it is propagated. It is, however, no easy matter to determine whether an epidemic, which is almost universal, spread by infection or otherwise; in as much as every one is more or less exposed to both sources of the disease, if they really exist.

The evidence that tends to prove that it is capable of arising without infection, is of a more positive kind.

Numberless cases occurred where no source of infection whatever could be traced.

The British schooner Zone, entered the Bay towards the end of February. She never came higher up the harbor than within a mile and a half of Villegagnon Fort, and no other vessel was anchored near her. The first case of fever which appeared on board, was in a man who had never left her, and who died with suppression of the urine and black vomit, &c., &c.

The British barque Juliet Erskine, arrived direct from Cork on December 25th, 1849. The crew left her but once to go to an island in the Bay, (Ilha das Cobras,) where no case of fever had yet occurred; nor did occur for many weeks afterwards. Five weeks after the only time he left the ship he was attacked by the fever, and died with black vomit, &c.

The British brig Runnymede arrived from St. Johns. Nfld. on January 22d, 1850, with a cargo of codfish, from St. Johns. She touched at Pernambuco, for about a day; the captain went on shore, transacted some business, and then sailed for Rio. He went a shore in his boat, along the coast, and during the passage fever appeared on board. She came down first affecting those who never quitted the vessel. The fever raged among the crew, positive assurance of the captain, who is an uninterested party, I have this upon the some cases ill at the time of her arrival here. I myself state that they were slight, none having proved fatal; and necessary to exactly the mild cases on shore.

Several masters of vessels declared to me that, though coming from Europe, fever made its appearance on board of their ships as soon as they approached the coast of Brazil, and came within the influence of the breezes from the land. From the accounts which they give of it, it

appeared to be of the same kind as that which was prevailing at Rio, but slighter.

It was by no means uncommon to see vessels arrive direct from Europe, with mild cases of fever on board.

The town of Petropolis is situated at a height of nearly three thousand feet above the level of the sea. It is about thirty miles distant from the upper margin of the Bay, where yellow fever committed great ravages. In the month of February the thermometer ranges, from the hottest hour in the day to the coldest night, from about 68° F. to 80°. In the month of March, its range is from about 62° to 75°; in April, 56° to 72°. In the coldest night in the depth of winter (July) the thermometer has occasionally been seen as low as 36° F.

In order to escape the prevailing epidemic, many of the residents of Rio fled to Petropolis; several, however, were attacked after their arrival there, and, I believe, in every instance within three or four days from the time of their departure from Rio. Of the number attacked, eleven died. Some of these deaths occurred in the months of February and March.

The disease thus existed at Petropolis with sufficient violence to destroy a large proportional number of lives; for it is believed that the eleven deaths formed a high rate of mortality compared with the number attacked. It is probable that at least seven persons held communication with each individual who died, either as attendants, nurses, or in washing and burying him; so that we are thus presented with an instance of from seventy to eighty persons exposed to a virulent infection, if such it be, and singular to relate not one contracted the disease. Not a single resident of Petropolis caught the fever.

The number, eighty, who communicated with the sick is evidently too small, in as much as there were many more ill who escaped, and who also had attendants, &c. If the disease only spread by its infectious properties, it is unaccountable why almost every one exposed to this infection in Rio should catch it, and not one out of eighty or more, at Petropolis. It cannot be explained by the difference of temperature, for the atmosphere of Petropolis was then higher, both by night and day, than it is now in Rio de Janeiro, and still we have many cases of the worst forms of yellow fever.

In passing an opinion upon the nature of yellow fever, it should be observed that, when I commenced my observations upon the disease, I had an inclination towards the opposite side of the question from that which I now entertain. It would therefore be unjust to declare that an original bias has governed my inquiries, and led me to the conclusion I have formed. The opinion, true or false, which I shall express, is that which appears to me inevitably to flow from the facts which I observed; and if I have renounced my first impressions, it is only because experience has forced them from me.

Never having seen yellow fever, till the begining of the present year; guided only by authority, and placing most reliance upon the statements, arguments, and writings of Copland, Pym, &c. &c., I was inclined to

espouse their view of the question. As a proof of this, I may state that in the beginning of the epidemic, I actually sent in a report to the British Consul at this city, stating my belief that there was then existing in Rio de Janerio, two different forms of fever; one the genuine yellow fever; the other the ordinary bilious remittent. Not indeed that I, nor any one else, could distinguish between them at their commencement; but, guided by the above named authorities, the severe cases were associated with yellow fever, which they undoubtedly were; while the milder ones were placed under the category of bilious remittent. Experience however, soon taught me that the distinction could never be maintained in practice, however beautiful it might be in theory. At their beginning no person could distinguish between the two forms of disease. The mild cases soon got well; whereas the severe, in their progress, presented *all* the well marked features of yellow fever, and *therefore* were so called; but had these same cases progressed favorably, and existed in any other year, no practitioner in Rio would have given them any other name than the common remittent of the country.

The epidemic which raged in this city, had all the characters and pathognomonic symptoms of yellow fever, as described by Pym and Copland, and was beyond all doubt the same disease. Its history does not bear out their assertions. They declare that the same individual can take it but once. I have attended the same persons during two attacks, though a month or six weeks of excellent health intervened between them. I have also treated patients who were pronounced by practitioners in the West Indies, and on the coast of Africa, to have suffered from yellow fever in these localities; though I have likewise known others who attributed the immunity they enjoyed, to a previous attack in one of the above named places.

They state that acclimation makes no difference in the severity of the complaint.* This was remarkably contradicted by the history of the prevailing epidemic. Brazilians, and *acclimated* foreigners, who were nearly on a par with them, suffered but little; whilst in new comers, it proved fatal to about thirty per cent. of the attacked.

Thirdly, they state that blacks, though little liable to contract the disease, if attacked, suffer as much as whites. Nearly all the blacks in Rio de Janeiro had the disease; and I believe that if we were to estimate the deaths (including old and new comers,) at two per cent., it would be higher than the reality.

In the bilious remittent of Rio, the mode of attack, the position of the pains, and the state of the *pulse* and *tongue*, are *highly characteristic.* The prevailing epidemic preserved these features in a most singular manner, and with but little variation.

I believe the diseases are essentially the same; they begin in the same manner, they have the same diagnostic symptoms, and no one can

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*Pym differs upon this point, from Copland and the writers who otherwise hold similar views upon the nature of yellow fever.

distinguish between them, except by their severity; a difference which may arise from a more intense form of the disease, or from a superadded poison, as already mentioned. With the exception of black vomit, I have not, in the prevailing epidemic, seen a single symptom which I have not also frequently witnessed in the common remittent of the country.

In no other way, than by supposing the disease to be of endemic origin, can it be explained how natives, and the acclimated, suffered so little. Yellow fever was never known in Brazil before; and was therefore equally new to them and to those recently arrived. The former have evidently all their lives, or during the period of acclimation, been breathing a marshy, or any other endemic poison you please, in a diluted state, and consequently suffered less from a more intense dose. The poison had for years been incorporated with their system. In no other way, than by supposing it to be of endemic origin, can it be explained how ships came into port, direct from Europe, with this identical fever on board.

The spread of the fever, except in the first instance, could not be traced to infection.* Many people carried it with them to Petropolis, and eleven died there, but it did not communicate to a single resident. Many individuals took it with them to Tijuca, (about forty miles from Rio, at an elevation of eight hundred feet above the level of the sea,) and other elevated spots, but in no instance communicated it to the residents at these places. Many persons in the country around Rio caught the fever, though they had no communication, direct nor indirect, with the sick. Several of the cases presented well marked and regular remissions, while others left behind them a remittent form of disease, generally curable by quinine; and all which were of long continuance, produced the same effects upon the body, and the health generally, as the ordinary remittent of the country.

Finally, it prevails especially in those localities, and only there, where bilious remittent is common.

In conclusion I may repeat my belief, that the disease is very capable of spreading by infection, or of being carried by this means from one place to another, (see note at the end,) but perhaps only under favorable circumstances.

It is a curious circumstance, and may perhaps tend to elucidate the origin of yellow fever in Brazil, without having resource to a specific source of infection, that for the last few years the fevers of the country, evidently not infectious, but of high temperature or marsh origin, have clearly been changing their characters. The genuine remittent has been but little seen for the last three years. In 1847, '48 and '49 it was replaced by a fever of its own class; popularly known by the name of Polka; but in reality are mittent, and during the present year it has been replaced by the yellow fever, a disease also with similar features.

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*Even in the first instance it may reasonably be doubted whether the disease was propagated by infection or not. Certainly the proofs are by no means conclusive.

Coincident with these and other changes in the diseases of Brazil, the climate in its broad features has altered strangely.

Thunder storms, formerly of daily occurrence at a certain hour during the summer, are now but seldom heard; and old residents declare that the seasons are no longer such as they remember them to have been. The less tangible changes have not been noted nor observed.

In 1689 a very fatal epidemic raged at Pernambuco. Medical men of the present day believe that it was yellow fever; but the only imperfect accounts of it which I have seen did not produce upon me that impression.

It appears that an epidemic, said to have been yellow fever, prevailed on the coast of Brazil from 1744 to 1748. There is no record of its ever having returned in a subsequent year.

Yellow fever no longer exists, I believe, on shore in Rio de Janeiro, but it still hovers about the ships in harbor. Within the last week at least fifteen seamen have died of the disease.

It is difficult to say what will be the future course of the malady with respect to Brazil. There is no reason to suppose that it will behave differently from what it has done in other intertropical countries where it has been once introduced, viz: that for many years it will annually occur, sporadically at least, principally affecting new comers; and in occasional years that it will prevail in an epidemic form.

Note.—The word infection has so many different significations attached to it, that it is necessary to explain the sense in which it has been used in the foregoing observations.

Infection is a generic term, and simply implies a morbific cause capable of tainting or infecting the body, although it has frequently been erroneously used to imply the *mode* of infection.

Infection represents a genus, and contagion, contamination, morbid impression are species arranged under it, or modes by which the body becomes infected.

The word infection has thus been used in the most extended sense of the term; but when it is stated that the spread of the disease either could, or could not be traced to infection, it is of course understood from one individual to another, but without implying the mode. Indeed, I have refrained entirely from discussing the question of the mode of infection, from not being furnished with data that would warrant any positive conclusion upon the subject.

If asked my opinion as to the manner in which infection may be supposed to have caused the disease to spread: I can only answer that, no facts have fallen under my own observation that prove contact with the sick to be necessary, or that the disease is strictly contagious. It appears to act in this manner; a healthy individual enters the apartment of a man laboring under yellow fever, he breathes an atmosphere impregnated with the expired air and the exhalations of the sick, and shortly suffers from a similar disease.

From this naturally arises another question, viz: is that sick apartment under all circumstances capable of propagating the disease? The instances cited of Tijuca and Petropolis certainly prove that it is not, even under the favoring circumstance of a high temperature. Coupling this, therefore, with the fact that, at the best, infection is only capable of propagating the disease in a climate and atmosphere kindred to those in which it originated, it may reasonably be doubted whether in truth the disease is not a product of the locality itself.

Notwithstanding that the disease seemed to originate in an infected individual (from Bahia) communicating it to another, and so on, it did not appear chiefly, if at all, to spread by that means.

The man on board the Zone, for example, contracted the disease without ever having been near an infected individual. It is easy, however, to understand that, seeing so many thousands were suffering from yellow fever, the whole atmosphere of the bay may have been so tainted by the exhalations from the sick as to be capable, by virtue of this cause alone, of propagating the disease; and this would be as truly an instance of infection, as if the sick and the healthy had mingled more closely.

Finally, from the known history of yellow fever and from the facts recorded in the foregoing pages, the following propositions seem highly probable.

That bilious remittent and yellow fever exist only under similar conditions of locality and climate.

That they are essentially the same disease.

That yellow fever is the most intense form of bilious remittent. That this intensity arises by virtue of a series of causes, which at the same time, impart to it the property of communicating itself, under favorable circumstances, from the sick to the healthy.

That these causes are, a more than usually unhealthy season producing severe cases of bilious remittent, that these cases, either from a vitiated atmosphere, bad ventilation, or crowding of the sick, assume an adynamic type (which all diseases under similar circumstances are prone to assume, and though not infectious they then usually become so), and upon this change of type they acquire the property of infection.

That yellow fever may therefore arise, without any specific source of infection, in countries where bilious remittent is common; but that this event seldom occurs except in the most unhealthy localities, as New Orleans, the Coast of Africa, &c., &c., from causes not being sufficiently intense to produce the necessary *change of type.*

That infection once produced can propagate the disease in climates similar, though less unhealthy than those producing it.

That the causes which convert bilious remittent into yellow fever do not exist in sufficient intensity in Brazil to produce the change of type, and that, therefore, for the production of yellow fever in Rio the importation of an infected individual is necessary. (This proposition admits of great doubt.)

That although the climate, &c., of Rio is hardly capable of producing yellow fever, it is highly favorable to the spread of imported infection.

That the history of the disease in Rio affords no proof that contact with the sick or their bedding, &c., is necessary for the propagation of the disease, but that if infection was at all instrumental in causing the disease to spread, it acted by tainting the atmosphere breathed by the healthy.

That an infected ship or infected bedding cannot convey the disease from one locality to another, and that for this purpose there must be imported an individual laboring under the disease at the time of importation.

TESTIMONY OF DR. R. LALLEMANT.

RIO DE JANEIRO, February 19, 1854.

Rio de Janeiro is situated in a flat plain, with some rocky hills; surrounded by mountains of 1,500 to 2,000 feet in height. The surface soil is sandy and muddy. Drinking water in general is of the best quality, coming from granite mountains.

There has been no particular disturbance of the soil. The paving of streets always is more or less in disorder; but it is better now than before, (where yellow fever never was prevailing in Rio de Janeiro.) With regard to rivers, bayous, swamps, marshes, stagnant lakes or pools of water, &c , the question is investigated in the German pamphlet.

As to drainage, accumulation, &c , see my German pamphlet.

I have not observed any remarkable change in the weather during the existence of the fever; nor was there any marked change in the animal or vegetable kingdoms prior to or during the epidemic; such as the blighting of fruit, the inordinate prevalence of flies, musquetoes, &c., the death of animals; no unusual occurrence of mould.

The population of Rio de Janeiro is 277,000. The first case of yellow fever was on the 28th of December, 1849. For the succeeding cases, see both German and Portuguese pamphlets. The first case was imported here from Bahia. I believe the fever to have made its progress from direct intercourse. Do not know of any case which appeared to have originated spontaneously before the arrival of the "Navarre." Afterwards there were several. Relative to the spread of the disease, cause, &c., see my German and Portuguese pamphlets.

The new comers, between the ages of fifteen and thirty years, of intemperate life, exposing themselves to sunshine, rain, evening air, &c., have suffered most from this disease, both with regard to attacks and mortality. For acclimated people it was rather different, if they lived in crowded lodgings or not. For the prominent symptoms, progress, duration and termination of the cases occurring under my observation, see the exact exposition in my Portuguese pamphlet.

Q.—Did other types of fever prevail at the same time, &c.

A.—Every fever had the beginning of yellow fever, or could assume it immediately. (See the "causes of yellow fever" in my pamphlets.)

The propagation of the disease from exposure, either to an infected atmosphere, to personal communication with the sick, or contact with goods or clothing, either of the sick, or transmitted from a locality considered infected; what time intervenes between said exposure and the appearance of premonitory symptoms, and also the development of the disease, is uncertain. I believe from one day to forty days. The "Navarre" sailed from Bahia to Rio de Janeiro the 20th of November, and the first sailor with yellow fever was observed in my ward of the Misericordia Hospital the 28th of December.

Q.—Do I regard the epidemic as true yellow fever?

A.—O, yes; exactly.

Q—Have I ever seen this disease before?

A.—Never.

I have seen some hundred cases and more of black vomit. I have also seen a number of recoveries thereafter—exceptional cases. Of real yellow fever, I have seen but very few cases of second or third attacks.

In general, death occurs on the seventh or ninth day; but death comes on at every day.

The disease sometimes exists in the rural districts; but in general it is conveyed there from the city. The mountains were entirely exempt of yellow fever.

The form of this fever was so particular, that I recognized it immediately as a new form, in the first two cases at the Misericordia Hospital, on the 20th of December, 1849.

The newly imported Africans never showed yellow fever before the general epidemic; but when the fever spread, it fell upon the unacclimated people in the town. In this case they had the same symptoms of fever as others—general symptoms, gastritis, black vomiting, yellow color, hæmorrhage, suppression of urine, &c.

BEGINNING OF THE EPIDEMIC IN RIO DE JANEIRO.

Translated from Observaçòes ácercada Epidemia de Febre Amarella do anno de 1850 *no Rio de Janeiro, colhidas nos hospitæ se na policlinica, pelo* Dr. Roberto Lallemant, *Rio de Janeiro,* 1851.

[TRANSMITTED TO THE SANITARY COMMISSION BY THE AUTHOR.]

The commencement of the second half of the present century, is impressed in very mournful characters in the pages of Brazilian history. A fatal epidemic afflicted nearly the whole coast of this vast continent, thus spreading woe and mourning among all classes of society, not only that of Brazil, but also the remote shores of Europe and North America.

In order to explain the origin of this epidemic, as it was observed

in Rio Janerio, it is necessary to mention that on the 13th of December, 1849, the war-steamer Affonso arrived from Bahia de San Salvador, bringing intelligence that the second city of the Empire was suffering severely from an epidemic, by which from thirty to forty persons a day were being attacked. That the disease only slightly affected natives and acclimated foreigners, but was very fatal among those who had recently arrived in the country.

On the following day, the Portuguese corvette D. Joäo I, arrived from the same port, bringing two hundred and nine soldiers, besides her regular crew. Five of those who left in her had been attacked on the voyage, of whom two had died. The corvette was put under quarantine.

On the 24th of December, the English packet Petrel, entered from England, via Pernambuco and Bahia, and brought some sick on board, of whom two died while she was in port.

But neither these ships, nor these sick people, at least apparently, had any influence on the state of health in the city of Rio Janeiro. The danger came from another quarter. The infection was already lurking among us before we received the first notice of the epidemic at Bahia.

The American bark Navarre, Capt. Littley, with a crew of nine men, had left Bahia in the latter part of November, and arrived at Rio Janeiro on the third of January, after a voyage of twelve days. As up to that time, there had been no appearence of the epidemic at Bahia, the vessel was admitted to free pratique; the captain sold the vessel, and the crew dispersed. Some of these sailors went to the boarding-house of an American named Franck, in Misericordia street.

When on the 28th of December, I paid a visit in the infirmary for foreigners, in the Misericordia Hospital, my attention was especially directed to two fresh sick patients whose disease appeared to me to be of a peculiar character. In the series of pathological symptoms, the most prominent were the yellow color of the conjunctiva and skin, strong vomitings of dark colored liquid, hiccoughs, suppression of urine; and hæmorrhage from the mouth and anus, delirium, &c. These two sick persons were:

1st.—Euquist, a youth from Finland, who had arrived directly thence at this port, some fourteen days previously, in the Russian brig Wolga.

2d.—Anderson, a native of Sweden, but sent to the hospital with a certificate from the American Consul, and previously staying at Franck's tavern.

The first of these died during the following night; the other forty hours afterwards. And on the 30th of December, I declared that both these cases were to be considered very suspicious, representing them as yellow fever.

My diagnosis appeared inconsistent to some; imprudent to others. And as on the following days, no similar case occurred, I myself had nearly forgotten these two particular cases.

But on the 4th of January, another patient appeared.

3d.—Alexander Wilson, with some suspicious symptoms. Having asked him most particularly whence he came, he informed me that he was a sailor from the American bark Hercules, which had come direct from Philadelphia to Rio de Janeiro, and he had been staying at Franck's house. On the 9th of January, Wilson had recovered and left the hospital.

4th.—Josiah Baker, an American sailor, came on the 5th of January to the hospital, with nearly the same symptoms as patients Nos. 1 and 2. Great was my astonishment when this patient asked how was Anderson, who had died six days previously. Baker told me that they were both from the same ship—the American bark Navarre—and that both had been stopping at Franck's place. But the state of his illness was such as prevented him from giving me fuller explanations. Baker died forty hours after his admission, with the same symptoms as his unfortunate companion, No. 2.

I then proceeded to the American Consulate, to see if I could collect any information about these Americans; and Mr. Raynsford, Secretary of the said consulate, informed me that the Navarre arrived at Bahia on the 3d of December. The other bark, the Hercules, had landed some sailors, who had been guilty of mutiny so far as to wound the captain with a knife; three of these put up at Franck's.

Proceeding, immediately to Franck's tavern, I found, however, no other patient there.

But on the 7th of January there came to the hospital:

5th.—Matthew Donelson, an American, a seaman from the Hercules, and who, like the patient No. 3, had been stopping at Franck's. Even at some distance off, the particular character of his illness was plain. Matthew Donelson died forty-four hours after entering the hospital.

Making then a fresh search at Franck's tavern, on the 7th of January, I discovered two more sick:

6th.—Thomas Lemerton, an American, with the disease completely developed, and a very much enlarged spleen, which was the consequence of previous fevers on the coast of Africa.

7th.—H. Marshall, an American, just beginning to be affected by the disease.

I sent both to the hospital on the instant. Patient No. 6 died in forty-eight hours; Marshall left, cured, after twelve days treatment.

On the 8th of January, I met in my infirmary:

8th.—William Hamilin, an American sailor, staying at Franck's house, with the fever commencing on him. He left on the 12th of January, but returned eight days afterwards with very copious black vomit on him, and died twenty-four hours afterwards.

9th.—Meogy, an American, a sailor from the bark Hercules, like patients Nos. 3 and 5, staying at Franck's house, was attacked at the tavern on the 8th of January, but as he did not wish to go to the hos-

pital, I attended him at Franck's. Meogy recovered in five days.

Opposite Franck's place, and in the immediate neighborhood, there were two other sailors' 'boarding-houses;' one kept by an Englishman named Wood, the other by a Frenchman, named Auguste Hourdé. In both some sailors were stopping. All these sailors went from one tavern to the other. And on the same 8th of January, there came to the hospital,

10th.—Thomas Fox, an English seaman, staying at Wood's, with the same symptoms of fever; but he left my infirmary on the 12th, cured.

11th.—Robert Luff, an Englishman, who had resided many years in Brazil, a vagrant, and habitual drunkard, stopping at Wood's; he was attacked on the 8th of January, entered the hospital on the 10th, with the fever fully developed on him, and died in forty-eight hours.

These two cases induced me to go to Wood's place also, and there I found,

12th.—Wood himself.

13th.—Wood's wife, and

14th.—Lerschan, their clerk, a German, who had had the fever in a very light form.

The last, as he himself informed me, still continued low and weak, but convalescent.

15th.—Auguste Hourdé, the keeper of the third sailors' tavern, entered my infirmary on the 3d of January, with very slight fever; on the 5th, feeling himself better, he asked permission to leave; on the 14th, he returned with a strong fever and died on the 20th.

16th.—The wife of Hourdé was attacked lightly with the fever on the 17th of January, and was cured by the 21st of the same month.

17th.—A French sailor, whose name I do not remember, was attacked also in Hourdé's house, and at the same time; after a few days he also recovered.

18th.—Washington Sands, a man of color, an American seaman, staying at Wood's, was attacked on the 10th of January; entered the hospital on the 12th, with a violent fever; got better, and left on the 18th, with eyes very yellow.

19th.—Lawrence Latrow, an American sailor, stopping at Franck's house. I found this patient on the 13th of January, at 9 o'clock at night, nearly moribund, at the said tavern, having already been sick some three days; I sent him immediately to the hospital; some hours afterwards he died.

20th.—Joseph Patrick Rogers, an American sailor, stopping at Franck's house; attacked with the fever; came to my infirmary on the 17th of January, and died on the 20th of the same month.

Before continuing this enumeration, I will now make some observations on patient No. 1; Euquist; whose case appears to be isolated in our series of patients.

Euquist arrived direct from Finland at Rio de Janeiro; stopped on Castello Hill, just in the rear of Franck's house, at a height of about twenty or thirty feet; coming down from his house to go to the store of Santa Luzia, he had to pass by Franck's house. There was always there some Swede or another, as, for example, patient No. 2, Anderson, with whom Euquist himself came to the Misericordia Hospital; there the Finlander could hear his native tongue spoken; and that was, besides, the only tavern in the city, in which Swedish was spoken. Nobody doubted that Euquist had communication with Franck's house.

In the last days of his life, Euquist had frequently been on board the Russo-Finnish ships, anchored in the port; until he himself had been attacked in one of them, being carried home sick. And eight days after his death, the yellow fever suddenly broke out with violence on board two of these Finnish ships, the Norna and the Niord; there died about this time, a captain, a pilot, and a sailor; and, by the 10th of January, some sick sailors in these ships, and a Swede, from the Swedish bark Scandia, were taken to my infirmary at the Misericordia Hospital.

And yet further; in Misericordia street, between the taverns of Hourdé and Wood, and exactly opposite that of Franck, was the house of a German merchant, whose daughter, married to a fellow countryman, had returned some weeks previously from Hamburg, in the ship Marie Christine, of Altona. There came in company with this lady, a German girl named Amalia Elizabeth Peersmann; the family stopped at Pharoux Hotel, but it was their custom to dine in Misericordia street. The servant fell sick on the 8th of January, and died in Misericordia street, on the 13th, with the strongest symptoms of yellow fever.

From the beginning of January, the sailors of the ship Marie Christine, daily visited the house in Misericordia street, opposite Franck's tavern, and several of the sailors of this same ship fell sick.

From on board of this ship, as on board the Russian ones, and the Swedish one above mentioned, among whose crews the germs of the disease were already sown, some of the sailors went every day to buy fresh meat at the house of Mr. Christian Hess, on the beach of D. Manoel, and suddenly the German clerk of this house, named Christian, from Petropolis, and who sold the meat to the sailors, was attacked with the fever in its most violent form; but on the 14th of January, six days after the disease assailed him, he was out of danger, and by the end of three weeks had recovered.

Finding myself thus, on the 8th of January, surrounded by a number of patients who nearly all exhibited to me, more or less, the most certain indications of yellow fever, I judged it my sacred duty to make a communication to the competent authorities, declaring that there was the greatest certainty of the existence of yellow fever at Rio de Janeiro.

The government ordered the Imperial Academy of Medicine to be convened, in order to examine into the facts. My diagnosis met an

almost general opposition, because the cases reported had occurred almost exclusively in my practice; rather reluctantly Dr. Feital related the case of a patient from the steamer D. Pedro, which had arrived from Bahia, who died on the 29th of December, in the Marine Hospital.

The Academy nominated a committee, who presented a report upon the cases. This committee expressed itself with much greater caution upon the assumption that my observations were adapted to my ideas.

But if the cases which had occurred up to that time had still not convinced the physicians and the Imperial Academy of Medicine of the existence of yellow fever in the capital of the Empire, the cases of the following days could not be denied.

On the 17th of January, there entered my infirmary, three patients from the Russian schooner Norna; four from the Swedish brig Alfhild; three from the Danish galley Marie Christine; one from the Russian schooner Niord; all laboring under the same symptoms. In Misericordia street, and in the lanes of the vicinity, many cases had also occurred; and at the next meeting of the Academy, a member commenced his speech with the following words:

"Mr. President:—I believe there is no physician in the Academy who is not convinced that yellow fever exists in Rio de Janeiro."

Thus originated the yellow fever in Rio de Janeiro in the year 1850.

If we desire to pay any respect to passionate contagionists, we must confess that the yellow fever came from Bahia, in the American bark Navarre. The sailors of that vessel were attacked in Misericordia street, in Franck's house; nearly all the other inmates of the house were attacked; those staying at Wood's and Hourdé's, who had communication with Franck's house, were attacked; some of the visitors at Franck's house and Misericordia street carried the fever to the port, and the disease spread by sea and by land.

It may here be said, that when the Navarre left Bahia, there was as yet no yellow fever in that city. The first news of the existence of an epidemic at that port, came by the war steamer Affonso, on the 13th of December; and the steamer had made the voyage in a few days. The Navarre had entered the port on the 3d of December, having left Bahia on the 24th of November; that is, at least fifteen days before the war steamer, and she brought no intelligence of the existence of such an epidemic.

I have the deepest conviction that the fever had already existed for some weeks at Bahia when the steamer brought us the news about it. It appears to me very suspicious that this bark should have a crew of nine men, and that she should be so quickly, and, as it were, so mysteriously sold. If the epidemic at Bahia took the same course as it did at Rio de Janeiro, (and it appears that they were both entirely similar,) it is certain that when the steamer D. Affonso left Bahia, the epidemic had already existed at least five or six weeks previously. It

would only appear that the physicians of Bahia did not observe the first commencement of it with sufficient attention; or that they did not attach sufficient importance to the first cases, especially those that resulted in death. And it very much surprised me that even in the official report of the President of Bahia, of the 1st of January, no certain information, or scientific expression, about the epidemic, was to be read; while in Rio de Janeiro, a few cases sufficed to diagnosticate to us with certainty the yellow fever, in the very first days of its appearance.

On the other hand, I confess that it is much easier to discover the first appearance of an epidemic in a city, when it is already known that a great proportion of sickness exists in another; the attention of the faculty being thus awakened and prepared to make observations, even before there is, as yet, any subject for observation. And further; I was exceedingly fortunate in happening to meet with the first cases, whose origin and connection were so free from all doubt; as first cases are observed in very few epidemics. I have, therefore, enumerated them with some particularity.

Aspect of the City and of the Port at the time of the Epidemic.

By the middle of January, it became impossible to register the cases of the epidemic. The disease was already let loose, and had already commenced its terrible expedition through the streets.

At first it proceeded very slowly; but it went with firm step, as it were, from one house to another, from one lane to another; and in the houses and the lanes attacking one person after another; and while the whole quarter about Misericordia street and the beach of D. Manoel was suffering a general havoc, S. José street scarcely suffered as far as Quitanda street. It extended itself very slowly through the beaches. The Prainha, the Sande beach, the Gamboa beach, the Sacco do Alferes, furnished their proportion of victims; as far as the seacoast, cleaner than the city, the Flamengo beach, the Cattete beach, and Botafogo, also furnished some cases. Thus the disease formed a narrow cordon round the city, through the tortuous beaches. Suddenly its march became very rapid. From Direita street, as far as the Acclamacao field, the yellow fever swept the long streets of the capital; and *æquo pede pulsat pauperum tabernas ditiumque turres.* It attacked all without ceremony, prostrated all on beds of suffering; there were houses in which not an individual escaped the attack; no age, no station, no sex, was privileged or exempted. But, strange to say, if the epidemic in this respect made no distinctions, if it thus observed the most genuine socialism, true communism, its formidable companion, death, was much more eclectic, much more capricious.

Death despised the colored slaves; it scarcely took a victim from the mixed race; but it delighted in satiating itself with Brazilians of purely European origin. And the mortality increased according to these conditions. By as much less as the individual was acclimated;

by as much the farther North as he had come from; by as much the more full of health, youth, strength and color, he appeared, by so much the more easily he sickened, and sickening, died.

Very well written was an address, in the Diario de Rio, made to the inhabitants, by the Committee of Health, nominated by the Government, and composed of physicians whose names, without the least doubt, are those of the highest reputation among us. They very well explained that Brazilians had very little to fear, although they might be attacked in large numbers, and though foreigners were dying. The committee were entirely right; every thing they said was correct, only it was a little too patriotic: they said, "You, foreigners, have to die!"

And die they did!

It is difficult, and almost impossible, to say which of the foreign nations suffered most; as it also is difficult to say how many individuals, belonging to each one of them, there is in Rio de Janeiro.

A considerable number of French and Italians died. Certain classes of those nations were chiefly attacked. There was some time, during which, not a single vender of plaster statuary was seen, no vender of pans and kettles, no rainy-weather-hat peddlers. The Italian Opera was closed; and some members of the company will never be heard again. A company of posturers and equestrians was cruelly ravaged, so that the horses were almost the only creatures that escaped death. It appears to me that artists and priests of the temple of the muses were the very worst sufferers without doubt, in consequence of the misery that accompanies artistic and poetic life in Rio de Janeiro.

And how many laboring Portuguese colonists succumbed? There were houses in which entire families disappeared; and as men generally sickened and died more easily than woman and children, many women were unhappily left widows and many children orphans.

Commerce also contributed her quota of patients and deaths. There were commercial houses which for a longer or shorter period were entirely closed. "I am the only one in the house at this moment not sick." Thus wrote, one day, a bookkeeper of a German house to Europe, and in a short time afterwards he himself died.

It appeared as if the Germans and English had some stronger vital power of resistance than other nations, as also that in general those from the sea coasts and low places were not so likely to succumb as those from the interior of continents and from the higher mountains.

The death of three youths attached to foreign diplomatic corps, formed a sad catastrophe in the career of the epidemic. Mr. Morgan, Secretary to the American Legation, was married and a very amiable man. His friend, Sr. Serra, Secretary to the French Legation, did not abandon him on his death bed;—he sickened and died himself a short time afterwards. The third, Sr. Stramazzi, had arrived at Rio de Janeiro about a year previous, in company with Sr. Bedini.

And did Brazilian statesmen at the same time suffer less than others? The history of Brazil has yet for a long time to look back with grief upon the months of March, April and May. Death entered the chamber of deputies; introduced itself into the venerable ranks of the senate, and boldly took a seat in the midst of the council of his Imperial Majesty.

The months of March, April and May, were the most terrible in the mournful course of the epidemic; the funeral knell no longer tolled the burial of the christian; even the bell which accompanied the most holy host through the streets to call the attention and respect of the people was mute! In fine, the rites of worship in the churches were suspended; everything was suspended; to death alone there was no suspension!!!

The corpses could no longer be contained in the churches; and I shall never forget the sad impression I felt when I sometimes encountered a perfect line of funeral cortèges proceeding along the road to Catumby; when I saw carriages returning in shameless disorder and in a great hurry in order to go and seek more customers; for in those days even with death a true speculation was made, and undertakers profited by the general calamity.

Thus was human nature prostrated to the dust; thus did the hand of God press upon us; thus, however great and elevated he was, or however poor and humble, all said: "we are dust; we are a shadow."

What, without the least doubt, created great terror, was the absolute prohibition of the daily publication of the number of deaths. In a time of general calamity all men are pessimists; everything is exaggerated by the imagination. So also was the mortality at Rio de Janeiro. The public was suffering; that everybody knew; but the right of knowing how much it was suffering, was denied to the public; this was unjust, and not very philosopical.

The daily number of deaths was exceedingly exaggerated, by the imagination; the greater part of the inhabitants of Rio de Janeiro estimated the daily mortality at three or four times above what it really was. When five or six persons died on the Island of Bour-Jesus, it was said in the city that it was thirty or forty.

This mysterious silence made every thing a cause for fear. On each side of every door a dead body was seen; when the sun fell upon a house, and the windows were shut, it was concluded that there was a corpse in the room; when a man was seen running through the streets, it was inferred that he was hastening for a physician, or a priest for some dying victim. If the number of deaths had been published every day, I am convinced that all would have said; "still it might be much worse;" and, as I saw the cholera rage in two European cities, I, myself, say, "the mortaliy might, indeed, be much worse."

It was not only the city that presented a sad aspect of this character; the picture offered by the port was also black and terrible.

The epidemic followed the same course in spreading through the

port, as it did on shore. It reached one ship after another, in such a manner that, sometimes passing along the port, I could tell from its propinquity to an infected ship, which would be the next to send me patients.

In the short space of two months, the following vessels sent sick to my infirmary, on the Island of Bour-Jesus:

Norna, under the Russian flag; Niord, ditto; Scandia, Swedish; Marie Christine, Danish; Alfhild, Swedish; Elizabeth, Danish; Maria, Russian; Helsingfors, ditto, Louisa, ditto; Vestalniden, Swedish; Panama, English; Adami, Russian; Hans, Russian; Brave, Swedish; Frode, Danish; Niord,* ditto; Leäo, Portuguese; Tentadora, ditto; St. Marie, American; Emma et Mathilde, French; Crown, English; Tarujo 1st, Portuguese; Hebe, Swedish; Indus, American; Ocean, Swedish; Otto, Danish; Itham, English; Mathilde et Louise, Dutch; Louisiana, American; Industrioso, Sardinian; Precursore, ditto; Levaillant, French; National, Belgium; Marie Phœbe, American; Kesistencia, Sardinian; Industrial, Belgiam; Alexandre, French; Martha, American; Swea, Swedish; Bassermann, Bremen; Magnus, Swedish; Van Dyck, Belgian; Adelaide. Swedish; Superior, ditto; Staaderath Forraeus, ditto; Esperanza, Honoverian; Sanspareil, English; Leonide, Swedish; Jone, American; Daphne, Swedish; Darien, English; Elizabeth, American; Carlisle, Hamburg; Seagull, Swedish or Norwegian; Corinthianer, Danish; Uncas, American; Volatrice, Sardinian; Zelia, ditto; Francisco Catharina, ditto; Roscia, ditto; Valentino, ditto; Haparanda, Swedish; Othello, ditto; Magnus,† ditto; Sidon, ditto; General Rowarino, Sardinian; Firmeza, Portuguese; Columbo, Sardinian; Olga, Russian; Resoluto, Sardinian: Thomas Clarke, American; Odin, Danish; Jenny, Swedish; a steamer, American; Preciosa, Russian; Tuydo, ditto; Soumalane, ditto; Carolina, Portugues; José, Austrian; Triton, Swedish; Phebo, Sardinian; Port-a-Port, Swedish; Alcyon, ditto; Alco, Russian; Esperanza, Tuscan; Argo, English; New York, Hamburg; Lydia Ann. American; Czaar Peter, Russian; Crest, Swedish; Experiment, ditto; Joanna, ditto; Minette, ditto; Carl Martin, ditto; Betty, ditto.—Total, ninety-five vessels.

In the following months, from the end of March to the 1st of September, when I treated the same class of people, the list was still further considerably increased; it was the saddest congress of nations that could be seen; a conflict of nearly all the languages of Europe.

And one-half of the patients that I treated up to the 24th of March, on the Island of Bour-Jesus, died. It was a sad and terrible mortality, which made me forget the proportion of cholera cases. And was this my fault? Could I save the dying, when some of the foreign captains, or of my colleagues had already treated them on board their

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* Not the same as the Russian vessel.

† A second ship of the same name, and under the same flag.

vessels, and who often sent them to me after the agonies of dissolution had already commenced? There were some cases in which the sick died in the boat which was carrying them from the port to the Island of Bour-Jesus. Thus, one day, I saw one already dead, one dying, and one dangerously sick from the same ship, and in the same boat. And with how many was I unable to speak after the first visit, because they could never hear me again!

Some Russian ships appeared particularly unfortunate. The Russian schooner Norna lost her whole crew, with the exception of two men. One day, passing along the port, I was called on board the Danish schooner Elizabeth, Capt. Von Ehren. The captain and his wife, both very young, and married only a few months, were sick, as also were so many of the sailors that it was impossible to send a boat ashore to obtain remedies. It was necessary to hail the captain of the nearest vessel to send some men. Three days afterwards, the captain died; his wife was carried ashore in a dying state by friends of her dead husband; a few hours afterwards, being at the time in the third month of pregnancy, she also died; and they were buried both together, beneath the same tomb, in the Gamboa Cemetery.

It appears that one English ship had three captains, in consequence of two having died. Many vesels could not pursue their voyages, because it was impossible to collect sailors enough. And if, after many efforts to obtain men, the captains did weigh anchor, sickness again broke out with the labor. The Danish sloop Marie Christine lost four sailors here, and left for Hamburg. Eight days afterwards, she returned; she had six more men sick, among whom were both the pilots; and except the captain, already old, nobody would, nobody could, take charge of the vessel. The Swedish bark Hebe, and the Swedish schooner Brave scarcely got as far as the fortress of Santa Cruz, before various persons took sick, and the vessels returned to their anchorage. The Russian brig Olga, sailed hence in the beginning of February; some days aftewards, she was seen by the ship Lembranca, abandoned to the mercy of the waves; the captain and the pilot had died, and nobody knew how to navigate the ship; a steamer was sent to tow her into port, and the Olga returned.

This caprice of the epidemic was sometimes almost ridiculous. Thus, on the Swedish brig Betty, Capt. Schmidt, eight out of eleven of the crew took sick; the other three did not suffer anything. Eight weeks afterwards, during which nothing further occurred on board the vessel, the Captain ordered her to be painted, and on the same day, the other three sailors were attacked.

Sometimes vessels remained in port three months without suffering from the epidemic, while the sailors were exposed to all the liabilities of contracting it; others were scarcely in port a few days before they had sickness on board;—thus the Hamburg bark Carlisle had scarcely entered and anchored at the Customhouse quay, when all on board of her sickened on the same day, and could not continue discharging—

the Captain sent twelve men to the Hospital. About the same time there was a French ship, which anchored at the Customhouse quay; after a few moments work the sailors took sick, her discharging was interrupted, and there were some merchants who fled from the Customhouse quay, as if they had seen a spectre in the place.

The disease sometimes attacked people so suddenly, that it might be said they were laughing and lamenting almost at the same instant. One day I saw a boat with four sailors, who brought a fifth as a patient to the island of Bour-Jesus. On the way the four rowers were very much diverted; when, suddenly one of them let go one of the oars and cried out, "I have the fever!" He shivered with cold, and in place of returning with his companions, he too, remained as a patient at the island of Bour-Jesus, and died a few days afterwards."

All, or nearly all, the vessels of war anchored in the port were attacked by the epidemic.

But enough of such facts as these, which might be indefinitely increased.

Thus, the disease scourged mankind by sea and by land, although they implored divine clemency, as well in private houses, as in the churches, and even in the streets, which they more than once filled with religious processions by night, of a most mournful impressiveness.

It appears that the men suffered more than the women; at least at the beginning of the epidemic, that it was almost men alone who were attacked; but that is only in appearance, seeing that among the foreign residents the number of men greatly exceeds that of women. But there was also a time in which women found themselves most exposed to the fever, and afterwards even the servants.

Condition of life had little influence. The age of vigor, from 16 to 40 years, suffered most.

Occupation had a much greater influence. The more any one was exposed to the pathogenetic causes, of which we will speak a little further on, the more readily he sickened.

The very distinguished Dr. Valladàs Pimentel, having informed me that he was making a minute statistical statement, in order to give an exact idea as to the proportion of cases to the mortality among the population of Rio de Janeiro, I confine myself to a very few lines, in which I wish to give only a general view of the city during the time of the epidemic, without minutely enumerating the cases of death and of sickness.

I am so much the better able to limit myself to these notes, as the number of those attacked, and of those who died is generally uncertain. There were some persons who estimated the dead at fifteen thousand, which is, without the slightest doubt, erroneous. Some others pretend that only some one thousand died of yellow fever; but this appears to me too low an estimate.

An approximative calculation indicates that there were perhaps ten thousand deaths, and at least one hundred thousand sick.

The following communication, respecting the yellow fever was published by Dr. Chernoviz, in the *Jornal do Commercio*, in the beginning of the month of September.

"From the invasion of the epidemic, that is, from the 1st of January, 1850, till the 31st of August, there died in Rio de Janeiro, of yellow fever, three thousand eight hundred and twenty-seven individuals; of other diseases, four thousand nine hundred and ninety-three; in all, eight thousand eight hundred and twenty free persons and slaves.

"The mortality of these eight months of the year, 1850, compared with that of the previous year, gives the following result:

"In the whole of the year, 1849, in which there was no epidemic in Rio de Janeiro, there died, in all, seven thousand nine hundred and five persons, which gives, for the eight months, five thousand two hundred and seventy deaths, a few more or less.

"It results from this comparison, that in the first eight months of the year, 1850, there died three thousand five hundred and fifty persons more than in the first eight months of the year 1849, in which the mortality was normal.

"The number of deaths in the year 1849, gives for each month an average of six hundred and fifty-nine. The mortality of the month of August, of the year 1850, was only twenty-seven persons of yellow fever, and five hundred and ninety-three of other diseases; in all six hundred and twenty. Which proves that the mortality of the last month was less than that of the same month in 1849."

From the end of May, the disease had become reduced to a limited number of cases; but it still continued to terrify the inhabitants. But now, in the beginning of the month of September, it appears to have come to a termination.

The epidemic of Bahia, and of Rio de Janeiro, reached every port on the Brazilian coast; it followed ships into European waters; and there were cases in which sailors died of the yellow fever, very near the shores of Europe.

Nothing could be further from my intention, than to collect in this place all the notes which we possess on these cases. In a complete and extensive treatise on the yellow fever, they should not be omitted; but they would encumber a memoir, the simple object of which is to offer some considerations on the disease.

Scarcely had the yellow fever appeared in my hospital report, before many of my colleagues opposed me: "This is not yellow fever; that disease does not arrive yet at Rio de Janeiro." But when the existence of it in the city could no longer be denied, every one said: "How is it possible that this disease could penetrate yet into our capital?"

I, on the contrary, many years since, inquired of myself: "How is it possible that the yellow fever should never be engendered in Rio de Janeiro?"

There is no knowledge in the world which can tell us what are the true causes that produce yellow fever. The fact is, that as generally the margins of the Nile are the cradle of the Eastern plague, so the yellow fever generally is generated and remains endemic on the borders of that transatlantic Western Mediterranean, called the Gulf of Mexico and the Caribean Sea.

We see in this Gulf, a sea strewn with islands and rocks little affected by high tides; shores to a great extent so doubtful that, in some places, it cannot be said where the solid land begins; we see these vast swamp-plains covered with a labyrinth of avicennias, paulinas, and rhizophorus, beneath the mysterious shadows of which millions of crustacea, annelids, and infusoria are generated, die, and putrify. Various large rivers, and numberless smaller ones discharge their waters into this vast bay, making on its borders that mixture of fresh and salt water, the exhalations of which through the whole world are to be feared, and are fearfully prolific of the seeds of noxious fevers of various species, according to the other pathogenetic causes existing in the particular locality.

In this Central American Gulf, which receives and deposits the refuse and impurities of the greater part of the Atlantic ocean; and which, also, by the formation of its shores, compels this sea to take a direction contrary to the retro-rotative motion of the general ocean; on this gulf, we say, the burning tropical sun almost constantly pours his vertical rays; there are few places in the world where there are so many elements of putrefaction combined. Perhaps only the delta of the Ganges and that of the Nile in its periodical overflows, can rival that of the Gulf of Mexico in general, and that of the Lower Mississippi in particular! And thus we have conjoined the great triumvirate of insalubrious river courses—that of the Nile, that country of the plague; the Ganges, beneath the jungles of which festers the cholera morbus; and that of the Mississippi, which has already generated so many epidemics of yellow fever.

Who can deny that in the bay of Rio de Janeiro, we have a sort of microscopic daguerreotype of the Gulf of Mexico?

We see there, also, a little intertropical Mediterranean, with tides rising but very little, and scarcely causing on its border a current of any consideration; we see islands and rocks in the interior of this bay; we see extensive swampy shores, with the very identical vegetation above indicated, the same procreation and putrefaction of inferior animals; we see also, there, rivers with low banks, mixing fresh water with salt; lastly, we see in the bay of Rio de Janeiro, all that concatenation of morbific circumstances, which on the Eastern shores of America beget the yellow fever.

I do not say that Rio de Janeiro has the position of New Orleans, but that of Havana or Port-au-Prince.

Finding from this state of things, a predisposition for yellow fever at Rio de Janeiro, I wondered that this disease was not endemic there. It appears to me that these great morbific causes were still, in the current year, not sufficiently strong to create an epidemic upon an extensive scale.

Certainly, some other extraordinary and important ones were necessary to complete this fermentation on the shores, and to generate the epidemic of the year 1850.

Without expressing ourselves poetically, we may say, the region of Rio de Janeiro always contained, (and always must contain,) within its fecund lap the germ of the epidemic in a state of latent life. Meteorological conditions, bringing with them the final procreating causes, called this germ into active life; thus was produced the epidemic demon of the yellow fever, beneath whose unchecked sway we have suffered so much.

No inhabitant of Rio de Janeiro can forget the regularity with which, until four or five years ago, thunder storms occurred almost daily during the hot weather.

When in the month of November, the sun returned from hyperborean latitudes to pass over our heads, and to culminate over the shores of the province of Rio de Janeiro, there were various agents to mitigate the burning heat!

One of the most powerful agents of this nature was, without doubt, the thunder storms. When in the hot months, the morning hours had exhausted the physical forces in general, and especially those of laboring men, by two or three o'clock in the afternoon, the tops of the mountains had become hidden within the the thick thunder clouds. At a distance, the bright glare of the lightning broke through the celestial mantle, and very far off was heard the rolling of the thunder. At five o'clock, the storm, in general, very rapidly left the mountains; to a strong wind succeeded a fierce combat among the elements. The air trembled with continuous claps of thunder; a very copious rain ended the strife, frequently leaving the long streets of the city impassable for more than an hour. Thus the air underwent a most violent agitation; thus, afterwards, everything that was suspended with it was precipitated by the rain; thus, whatever had passed into a state of putrefaction was swept away by the very copious torrents; thus was the heat checked; thus was all nature reorganized.

It is four or five years since this change, so peculiar to these useful elements, for the diminishing of the geographical predisposition to diseases, became sensibly lessened. Rarer and rarer became the thunder storms; and in the hot season of the year 1849–'50, they had nearly altogether disappeared. It is true that the mountain tops were frequently hidden by thunder clouds; it is true that lightning flashes sometimes reached as far as us, and that we heard the very distant rollings of thunder; but an impenetrable barrier seemed to have been raised on the plains on the other side of the bay; and, however heavy thunder there was on the mountain tops; however many whole weeks of copious rain there were up there, the city and the vicinity were in the greatest apparent tranquillity of nature; the apparent tranquillity of a cemetery. No wind preceding an electric discharge; no bursting out of a thunder storm; no copious rain; no interruption of the intertropical heat; even the South-Southeast breeze, formerly so regular and so strong, was, in this year, rarer and slighter. Under Phæton's car, the proximity of which once

more burned the world, *domibus negata*, and under the above mentioned conditions, the vital forces of the universe were exhausted; it was impossible that humanity either could longer resist that general fermentation; the human race sickened on a grand scale; and where the organism was not accustomed to resist these influences, when it was not acclimated, it followed the immutable laws of nature; the organism was dissolved into inorganic matter.

If, indeed, we find an indubitable predisposition to the yellow fever in the geographical conditions of the bay of Rio de Janeiro, these were completed by the want of electric action, by the want of thunder and rain, and by the heat necessarily increased by these indicated deficiencies.

Far from me be the pretension that the process of human life does not depend on any thing more than the contact of electro-motive elements in the body. But, on the other hand, we cannot deny the greatest analogy, or at least, a most indubitable relation between electro-galvanic or magnetic action and the process of human life; the first being diminished, the second necessarily becomes deteriorated; and when the reaction from a part of the earth's surface against its atmosphere becomes latent, the process of zotic life also ceases, and the matter enters into other chemical combinations.

The epidemic being considered under this point of view, it would not be very reasonable, or at least it would be only a very circumscribed idea, if we should still persist in the opinion that the yellow fever was imported, and was propogated by means of contagion. There is certainly no physician in Rio de Janeiro who could have such strong reasons as I have to swear against the contagiousness of the disease. But, from the first moment up to this time, I have protested against this contagiousness. The coast of Brazil, the bay of Rio de Janeiro, with its shores, were diseased, and our epidemic was only a symptom of this morbidity of the earth. In those places in which the conditions of this terrestrial disease were not found, so likewise the yellow fever did not exist, or when it was carried thither, it did not propogate itself it was not contagious.

We have a striking proof of this non-contagiousness of the yellow fever in the colony of Petropolis.

This colony is, as is generally known, situated in the midst of the Estrella mountains, at a height of a little more or less than 2,000 feet. The locality had none of the elements above indicated as necessary to procreate or foster the yellow fever. But the people of Petropolis, all natives of the interior of Germany, blondes, of sanguinoe-lymphatic temperaments, belonged to the class of persons which in all parts of the world, if exposed to yellow fever, almost infallibly catch it, and die in great numbers.

This is no sophistical theory; it is a truth unhappily proved by a considerable number of examples in the time of the epidemic. There are in Rio de Janeiro, people from Petropolis, who, for the purpose of gaining a subsistance, had descended from the mountains to the capital, before the prevalence of the epidemic; some even came during that time.

Well! I found them sick and dying, as well in different parts of the city, in my private practice, as in the yellow fever; and the subject of even one of the first cases of the whole epidemic, the clerk Johann, in the house of Mr. Hess, on the beach of D. Manoel, was from the colony of Petropolis. I do not recollect to have found a slight case amongst them, but some fatal ones, I do.

I cannot affirm it, but I heard that a superior order, after this dangerous susceptibility of the Petropolitans had been observed, prohibited the German inhabitants of the colony from coming to Rio de Janeiro. On the other hand, there was no prohibition from going from the capital to the colony. When the yellow fever was at its greatest height, many inhabitants of Rio de Janeiro, and especially many persons recently arrived from Europe, fled thither; some of them afterwards took sick, and nearly all who did so died; it appears that there were ten, or as others pretend thirty-one, for the most part guests of the hotels of the colony, which were full and overrun with people. Some Petropolitans who had taken sick in Rio de Janeiro, were carried by their relatives to the mountains, when they were scarcely convalescent, but were even still in a febrile condition.

And what happened?

The yellow fever was several times introduced into the colony of Petropolis by fugitives from the city; these fugitives stayed and died in the midst of hotels full of people who all had the greatest proclivity for the yellow fever; but there was not a case of transference of the fever to these hotels. And the convalescent colonists who had arrived from the city, even both with their apparel brought thence, and with the fever still in their systems, living in the midst of houses all the inhabitants of which had the greatest inclination with the fever,—all these colonists exercised an influence absolutely amounting to nothing upon the colony. No Petropolitan who had not been to the city at all was attacked; the fever, considered in Rio de Janeiro so contagious, was not contagious in the midst of a thousand men who were all in the highest degree predisposed to contagion.

Similar circumstances, similar non-contagiousness, was observed in Nova Friburgo, Constancia, Paquequer, and even in Tijuca.

And here in Rio de Janeiro! If the disease was contagious, it must have followed that those brought most into contact with the sick, must have been the most easily attacked.

Who are they that were most exposed to the epidemic,—this most contagious epidemic? Ask Dr. José Mariano da Silva, who lived two months in the convent on the island of Bour-Jesus, if he was attacked! Ask Dr. A. J. Peixotto, who lived so long in the midst of so many patients in the Gamboa Hospital! Do you know why they were not attacked? Because the disease was not contagious, and those gentlemen were not afraid! And a great portion of the gentlemen boarders, devoted with so much courage to their duty, perhaps they were attacked.

It may be that some will tell me that these gentlemen by their physi-

cal constitutions, belonged to the class of persons the least susceptible of the disease. Well, then, let me be permitted to say a few words of myself!

Who had more apparent physical predispositions for the fever than I? I am a son of the far North, a man from the shores of the Baltic, blonde; of sanguineo-lymphatic temperament; and with disposition, which is the true pabulum of the yellow fever, I exposed myself in an almost reckless manner to the fever. From the commencement of the epidemic, (on the 28th of December,) until the 1st of September, I worked in the hospitals without the slightest interruption. In the morning, at 7 o'clock, I embarked for the island of Bour-Jesus; I paid the visit, returned beneath the powerful sun of the hot season, went to visit the Misericordia Hospital, attended to my extensive practice about the city, and about the vicinity as far as the Vermeilha beach and even as far as Tijuca; I visited some ships in the port; at 7 or 8 o'clock at night, I embarked again for the island of Bour-Jesus, paid a long visit to the infirmary, and returned at 11, midnight, to the city. Sometimes, chiefly when the elements were against me, I arrived at 2 o'clock in the morning, after a voyage of two or three hours; and these hours, on the hard seats of the open boat, were frequently the only ones in which I could sleep undisturbed; seeing that, on getting home, I found various other calls; and sometimes in the morning, I scarcely had time to change my clothes. There was more than one day that I did not dine, and more than one night that I did not sleep. My whole life was irregular and anomalous; I am much accustomed to fatigues and privations; but on some occasions, I could not but wonder at my being able to undergo such labors, which almost exceeded human powers. And in this existence, so exposed to contagion from the fever, I was not attacked,—without doubt because during a residence of thirteen years in Brazil, I have always exposed myself to every inclemency of sun, rain, &c. I am acclimated, and perhaps, I may say, "I have no fear!"

So we have also observed that in the epidemic of Rio de Janeiro, that a certain height and a certain temperature, in which the fever can by no means develop itself and spread. The height to which the fever cannot reach may be perhaps from 800 to 1,000 feet, a little more or less, the temperature from ten to twelve degrees of Reäumur, although one or more cold days might not be capable of completely banishing the whole of the sickness.

On the other hand, we can observe that the lower and hotter a place was, the more easily it produced the yellow fever. It appears that the febrile atmosphere is heavy. Thus the fever appeared early in the commencement of its complete development, in all the beaches of the city, which are generally horribly foul and filthy.

I consider that even low vessels, such as schooners, sloops and small brigs, were more readily attacked, and with the greatest violence, than large vessels, and loaded ones than those that had no cargo on board. This circumstance also appears to speak in favor of the idea that the febrile air is heavy. But we ought here to remark that small vessels are

generally worse aired in the sailors' quarters, and that in the act of discharging larger ones, the sailors were very much exposed to the sun and the heat.

In the greatest intensity of the epidemic, small eminences did not afford any advantage over low streets. A few weeks after the appearance of the fever in Misericordia street, the affliction scourged the inhabitants in the best aired height of the rock of Castello; and whilst the first vessels attacked in the port were schooners, the Portuguese ship Vasco de Gama, the crew of which was foreign, suffered much by the epidemic.

If we ask why unacclimated strangers suffered so much, the question would not be so easy to answer. Mere heat alone is not the cause. There are weeks in Stockholm and at St. Petersburg, in which the sun beats down with as much power as in Rio de Janeiro, and there are many places in which the maximum of heat is greater than on our beaches. The cause of this phenomenon—why unacclimated foreigners suffer so much—is certainly to be found in the circumstance of the atmospheric intoxication being in them so rapid and powerful. We who have lived some years or some tens of years beneath the Brazilian sun, are completely acclimated—that is, our conditions of life have accommodated themselves to the endemic, peculiar, and characteristic atmospheric condition of the country. If any particular character of this endemic atmospheric constitution becomes more developed, all those who have already accommodated their vital conditions to its ancient character, supported this change with greater facility than others not yet so accustomed; these must rapidly succumb, in a manner similar to that in which those who have for some time been accustomed to take small doses, can without danger take larger doses, and scarcely feel any effects from them, while others less accustomed would succumb under the same dose.

We even see this in daily occurrences. What a strife tobacco provokes in the system at first! How it shows its poisonous effects on boys who begin to smoke! And how indifferent the same leaf is to the professed smoker! Alcohol, wine, offer the same phenomenon. Custom fashions everything in man. In Rio de Janeiro it enables acclimated persons to bear the augmentation of the noxious conditions of the atmosphere; but it killed those who had not been accustomed to them.

And nevertheless, there are people who believe the fever to be contagious and imported!

Having come to the conclusion that the yellow fever is not the product of importation, either in American ships or in slave ships, and that it is not contagious, but that it is the procreation of an epidemic atmosphere, of an epidemic genius, it must follow, and be granted that every living thing was saturated by this epidemic agent.

This is my pathogenetic paradox. All men who lived at the time of the epidemic were subject to this epidemic procreative; were frustrated by the epidemic atmosphere in the time of the epidemic,

We are very poorly supplied with delicate means of ascertaining the state of our vital forces in different moments and on different occasions.

But when there are a series of plain and common symptoms—such as pains, foul tongue, quick pulse, we can combine these to realize an idea of the disease; we know so many fevers, so many *ites*, *ies*, and *isms;* and we even know on these occasions how to make a tolerable prognosis; but what do we know of the state of the vital forces, of the dynamics, of this ancient zotic breath of man, when man complains of nothing?

There is no doubt that great terror can kill a man; in an instant he falls to the earth, and returns no more to life; another falls prostrated by the same terror, but in a moment, a second afterwards he rises, has scarcely a few more violent pulsations of the heart, scarcely feels his respiration a little more accelerated, and at the end of a quarter of an hour, all has passed. And who can deny, that while in the first the vital and dynamic forces were totally annihilated, in the second they were reduced to a minimum? The individual was in that moment as near death, as was perhaps the man attacked by black vomit.

Unfortunately we possess no scale, or instrument, or metre, to measure the vital forces of man at different moments, in which we cannot diagnosticate some disease. The hygrometer shows us perfectly the state of humidity of the air; with the electrometer, we possess the power of observing the electric condition of the atmosphere; the reaction of the atmosphere upon the earth may be observed with much exactness, by means of the barometric column; with an admirable minuteness, the vibrations of the pendulum shows us the attractive force of our earth near the poles and at the equator; and it further even shows us what must be the density of the crust of the earth, where we allow the pendulum to vibrate. And the magnetic needle? An extremely small needle gives us the greatest revelations in the state of the interior of the earth. While in formidable earthquakes the needle remains entirely undisturbed,—these being very superficial,—the observer in Göttingen or in Lapland is surprised by an immense magnetic discharge in the interior of the globe, although no shock, no terrestrial movement is observed at that moment; but the magnetic needle suddenly changes its laws of declination and variation, and vibrates in an irregular and unsteady manner; suddenly the shock passes, the magnetic steadiness is restored, and some months afterwards the observer is informed that at the same instant of time, the same shock in the interior of the earth was heard, was perceived on the coasts of China or in Port Adelaide.

That magnetic needle, that *biometer*, which we may apply to our body to observe the most delicate perturbations, the internal disturbances of our vital forces, imperceptible to our gross senses, is still, however, wanting to us. And while the astronomer makes the almost divine discovery of a new planet, not yet visible, by calculating the perturbations in the revolution of another about the sun, the physician, even yet, although he has the stethoscope to aid his hearing, and the microscope his sight, is condemned to examine the vomitings, the urine, and the dejections of indi-

viduals, in order to form some approximative judgment, and which is in innumerable cases utterly erroneous, with respect to the state of the vital forces of a man. Physiology, as well as pathology, when inquiries are directed to them as to the essentiality of the vital and pathological processes, remain abashed, and exculpate themselves by giving new very minute facts, instead of explanations of facts already known.

There being thus a predisposition and a preparation, I would almost say a certain *necessity*, in all, to fall sick, some cause that generally can, at some time, and in some country, generate some disease, created the yellow fever in Rio de Janerio.

From among a thousand, I will enumerate only a few. Without the least doubt, the sun and its immediate heat, (if the sun has heat,) have a very strong influence in making this precursory poison appear as an open and manifest fever. He who for many years, and in the most unlimited manner, has been accustomed to expose himself to a Brazilian sun, can do it also in the time of an epidemic. But he who has practiced it for several years, may reckon almost with certainty upon a visit from the fever after having exposed himself, either on foot or on horseback, to the strong sun. How many sailors have not been sick from this cause, or because they had worked hard, or because in the middle of the day they had thrown themselves into the sea with their heads uncovered; while in those ships in which negroes were hired to discharge and load, much fewer of the sailors were attacked.

Excesses in eating and drinking avenged themselves much more easily than previously, by an access of the epidemic; constipations, &c., produced the yellow fever.

One of the most powerful causes of attack was, without doubt, the disposition of the mind.

Whoever had any fear, almost infallibly fell sick. And men, who with judgment and unyielding courage, sported at the disease, who followed it by sea and land, frequently enjoyed the brilliant privilege of not contracting it.

Any other passion of the mind, whether depressing or exciting, produced nearly the same effect. It attracted the fever.

Finally, whatever cause excited the circulation, was capable of producing the fever. Even a very active circulation itself, especially of the peripheric capillaries, such as we find in men recently arrived from the North, was also a cause of fever. The more disengaged the hematosis was, the more strongly the fever appeared. Thus, women a few months pregnant, especially foreigners, were in a critical condition; they easily got sick, miscarried, and were in danger of death.

In a similar position were women soon after delivery. A slight febrile disturbance, which is otherwise so frequent and innocent after delivery, in these circumstances was *anguis latens in herbâ*.

Even wounds of any consequence, which were followed by a trau-

matic fever, would by means of this fever, become a cause of yellow fever. We even saw one case in which a youth, having undergone a pretty strong attack of yellow fever, had a severe fall, and the general disturbance caused him a true relapse of the same yellow fever.

If, in this manner, anything that in general was the cause of some peculiar sickness, in the time of the epidemic could become the cause of yellow fever; if thus the yellow fever could ingraft itself on any acute disease, chronic ailments were, in a corresponding degree, the cause of yellow fever.

When in the drama comprised in a chronic disease, there was a somewhat acute scene, the yellow fever was soon associated with it. How many consumptive people, who might still cough through many acts of their tragical existence, were not attacked in a more feverish moment by the yellow fever, and carried off?

There are always in our practice, among the foreigners in the Misericordia Hospital, some foreign individuals, who, in the sad traffic, went to procure on the coast of Africa, not money, but splenic affections with almost regular relapses. Some of these splenetic men, who had already been treated by me two and four times in the Misericordia Hospital, returned on this occasion to the hospital for the last time; on the febrile access of the splenitis, the yellow fever ingrafted itself, and the patient died.

There were also cases in which persons who had legs swollen by sweating erysipelas, felt as they had many times before, a burning and redness of the skin; a slight acceleration of pulse manifesting itself on this occasion, the yellow fever supervened with all the terrible train of symptoms.

Finally, to conclude a chapter which might be extended to infinity, the chapter on the causes of the yellow fever, I make the following résumé:

Whatever was a cause of febrile disturbance, was also a cause of yellow fever, and whatever was the febrile disturbance, it with great facility took the character of yellow fever. This peculiarity of diseases to take a character so special, this necessity of their getting a form so widely extended, and oftentimes so pernicious, was the consequence of the state of the atmosphere, of the epidemic genius, whose latent existence is always found in the telluric conditions of our shores, but whose complete incubation was provoked by the anomalous atmospheric causes above indicated. It is for this reason that other diseases under the unlimited domination of the epidemic, appeared not to exist.

But if any one prefers to command the yellow fever to come in a slave ship from the coast of Africa, if he prefers the American flag to allow the pest of the Mississippi, of the island of Cuba, to approximate even to Rio de Janeiro, I do not wish to disarrange this his good pleasure for him. My idea, my most intimate conviction, is that above indicated; and that which always has directed, and always will direct my proceedings in all that has respect to the yellow fever.

And if contagionist physicians, who cannot deny me great courage, find my proceedings groundless, and capable of being the cause of great and repeated evils and public calamities, let them demonstrate to me the contagiousness of the yellow fever! As yet I know of no epidemic of yellow fever, in the beginning of which the cases were shown so coherent as in ours; I myself saw them, I followed them, I collected them; and I myself completely cleared myself of the idea that this disease is contagious. The cases of Misericordia street admit another simple and natural explanation. All those sick persons were recently arrived foreigners; in Bahia the epidemic element of yellow fever was already more freely spread than that in Rio de Janeiro; for that reason, a man coming from Bahia was more deeply penetrated by the pathogenetic causes, and would be more depressed by the disease than any one who had never gone out of Rio de Janeiro. Those which followed, dwelt in a place in which of necessity, and even without the presence of the first coming from Bahia, the fever had developed itself. And in truth the sickness of those in Franck's house was so isochronous, or so nearly consentaneous, that the consecutive infection would be difficult to prove.

If on the contrary we adopt non-contagiousness; and if starting from this point of view we look upon the first cases, it must be declared that they were attacked because they were all unacclimated foreigners.

In a dirty tavern of foreign sailors, in a filthy ship overburdened with dirty people, the yellow fever will always find its hotbed, and the first cases will be coherent, like those in the houses of Franck, Wood, Hourdé, &c., &c.

TESTIMONY OF DR. PAULA CANDIDO.

Transmitted to the Sanitary Commission by the Author.

[TRANSLATED.]

Extract from the Report made by DR. CANDIDO, *on the Yellow Fever at Rio de Janeiro, Brazil.*

The object of this work is to explain succinctly the causes which produced the yellow fever at Rio de Janeiro; to explain how to prevent epidemics, and to establish a general mode of treatment for this terrible disease.

Etiology.

1st. The atmosphere of this city is always loaded with gases and miasmatic exhalations; on all sides organic substances are seen in a state of putrefaction. These gases and these exhalations had, in the first instance saturated all bodies, adding these to the human organisms which have respired them, when the yellow fever commenced to appear. These foreign bodies in the human organism may be considered as abnormal *exciters* of physiological functions, and must naturally produce a morbid reaction; after having been absorbed by the cutaneous surface and the mucous covering of the lungs, the morbific causes may be considered *external causes* of the disease.

2d. The primary matter on which these external causes exert their influence is undoubtedly the mucous coat of the lungs, where the miasms which produce the yellow fever are condensed by the act of inspiration, are absorbed, and produce functional disturbances, principally marked by changes in the excretive functions; these are the *internal or organic causes.*

On the causes of the Yellow Fever in Rio de Janeiro.

It is a century since the yellow fever so severely ravaged either the Brazilian Empire or its capital. In the books of the Charity Hospital of this capital I have found some interesting notes on some cases of yellow fever introduced by infected vessels which had entered the port, from the United States, from the coast of Africa, from Havana, &c.; and through which, nevertheless, the yellow fever never developed itself in the city, although there were foci of infection in the port. That is to say, showing that contagion alone could not be the cause of the development of this disease in the years 1849 and 1850, and that it is necessary to search further for its origin.

The progress of the sciences in general, and the researches lately made in all civilized countries on the origin of epidemics, have demonstrated to us that we seek for their causes in other external, meteorological, miasmatic and corresponding circumstances, capable of deranging the physiological functions, and which, after having exerted their influence on the organism, create internal, immediate causes, productive of the yellow fever.

External Causes.

We have no meteorological observations anterior to the year 1850; but all inhabitants of Rio de Janeiro have observed that the regular winds of that bay, the night dew, the clearness of the atmosphere, &c., have been considerably modified for some years past. I, myself, have observed (and it has always made a strong impression on me) that the sun, in rising above the horizon, and in setting, during the latter months of 1849 and the beginning of 1850, was surrounded by a circle of a blood red color, which had the effect of enabling one to look directly at it without inconvenience. The hot winds of the North prevailed almost exclusively during the whole year. Meteorological observations, made during two consecutive years after the epidemic, have demonstrated that the force of the epidemic was greatest in those months in which humidity, and consequently, the quantity of miasms and atmospheric exhalations were most prevalent and marked.

In view of these phenomena, we must come to the conclusion that large masses of vapors of miasmatic exhalations &c., were suspended over the city before and during the epidemic. All porous bodies naturally absorbed these vapors, these miasmatic carbonic exhalations The lungs of the inhabitants, also, continually absorbed these exhalations &c., and a strong reaction could not but follow. These exhalations, with which all inanimate porous bodies were saturated, were naturally transformed by time and putrefaction into putrid and pestilential emanations. No

one can doubt that the atmosphere, dwellings, and all organisms were saturated with these gaseous or miasmatic exhalations, at the period of the epidemic of the year 1850 breaking out. When the epidemic had reached its climax (in the month of March) very abundant, copious and heavy rains fell. Many practitioners believed that the epidemic would consequently experience a considerable diminution, as the air had been purified; but, on the contrary, the epidemic increased with each rain. I came to the conclusion that it was the humidity that augmented its force.

With this humidity, besides its action, there was an equivalent for the miasms, in places where they did not exist; it was the diminution of cutaneous perspiration and of pulmonary exhalation, occasioned by the humidity itself. Collard and Martigny have demonstrated by analysis that expired air contains three parts in a thousand of organic matter in a state of putrefaction, and Smith has shown that this matter was albuminoid; many other analogous observations have proved that the disturbance of these two functions infect the economy precisely as would a miasmatic atmosphere. The quantity of these matters contained in the organism may be judged of from the cessation of perspiration, reflecting that a man in ordinary circumstances exhales eighteen ounces of watery vapors, surcharged with these albuminoid principles. Well, the organism will be infected by these matters in the same manner as if he had directly respired miasms.

With these facts before us, it will be understood, that these miasmatic or organic matters, retained in the circulation produce in man a zymotic condition—a fever. This is the reason why individuals who left the city for more healthy places, fell there also victims of the fever, although in these places the health was in a satisfactory condition; a fact observed and perfectly proved in the year 1850.

In damp houses, on ground floors, in sailors' boarding-houses in the vicinity of the sea; in all places in which miasms were fostered by an abundance of porous objects, the epidemic ravaged with the greatest fury.

Vessels, the cargoes of which consisted of provisions, were more severely attacked by the disease than those loaded with dry goods. Old ships, and those whose cargoes consisted of organic or porous substances were more deeply infected; these facts prove that the yellow fever is produced by miasms.

It is quite extraordinary that vessels loaded with coal were frightfully stricken by the yellow fever; an observation corroborated by that of Dr. Schuyler, the doctor of the steamship Orinoco; this gentleman observed that whenever coal was being taken on board in any quantity the crew presented many cases of pernicious fever. These effects are doubtless produced by the porosity of the coal, in which consequently is absorbed a great quantity of organic exhalations, in a state of putrefaction.

Vessels moored near the mouths of the city sewers were more severely attacked than those anchored in the middle of the bay.

From all these observations we may conclude: 1st that old miasms, or miasms contained in porous bodies, or organic matters in a state of putrefaction, augment the deleterious effects of an epidemic of yellow fever: 2nd, that these miasms in certain quantities, almost always produce epidemics.

We have now to resolve the following question:—"Do the causes of yellow fever consist solely of miasms?" I am inclined to think it is so, on considering the direct proportion of the intensity of the yellow fever to the miasms produced in places in which there exists a large quantity of matters which produce miasmatic exhalations. But to this it may be said; "these producing causes of yellow fever always exist, since the locality of the city is always the same, and nevertheless the yellow fever has committed its ravages only from time to time and at periods very distant from each other; so that we must suppose that only miasms produced in certain atmospheric and meteorological circumstances cause this malady in the form of an epidemic." This opinion agrees with the observations of some eminent chemists, that organic decompositions differ in chemical products according to the state of the temperature and the influence of moisture.

This question appears to me to be very easily solved in the following manner:

Miasms without doubt produce the yellow fever; but in order to produce it there must be a combination of meteorological and atmospheric influences, capable of producing in human bodies a re-action which manifests itself in the symptoms of yellow fever. The same miasms in different circumstances produce typhoid fevers, scarlatina, measles, whooping cough, &c. If these conditions are wanting, it is impossible for yellow fever to develop itself, and this is why although an infected ship may be in a port, the disease cannot re-produce itself in the city without the addition of circumstances which favor its development. These are meteorological conditions which give the character to the disease produced by the miasms, and an excessively humid and hot condition of the atmosphere; which causes such a condition of the miasms that they develop the symptoms of yellow fever.

In the year 1850, these conditions combined at Rio de Janeiro, and hence, the yellow fever developed itself in that city; that is to say; the epidemic of 1850 was *the result of accumulated circumstances*, all productive of yellow fever.

Resumé: The exterior causes of yellow fever exist in certain meteorological circumstances, joined to miasms of organic substances, modified in such a manner by the influence of heat and humidity that instead of producing some other disease they produce the yellow fever.

Interior Causes of the Organism.

Whoever has studied the causes of epidemics, of miasms, formed spontaneously, or in presence of an exciting cause, equivalent to miasm, such as bad food or water, fatigue, &c. &c., must have observed every moment that

there exists a certain condition, *a certain matter*, which renders the organism susceptible of suffering the epidemic action, or of not being able to resist this same action, and this matter it is that I call the *interior cause.* This opinion agrees with that of the great English physiologist, Dr. Carpenter. I will give his own expressions: "We must believe that the predisposing causes of epidemics produce in the blood an excess of decomposed principles, which circulate with the blood in small proportions which are formed, are deposited, circulate, to escape in the form of secretions. The circumstances which produce or augment the excess of these decomposed material principles are, first, the food and drink; second, the air respired; third, its production in disproportion to the eliminations by the respective secretory organs; fourth, the checking of the secretions. To call these matters, pre-existing in the organism, occasional causes is a logical absurdity, since they are so essential that without the addition of them there could never be any epidemics. In order that there may be epidemic there must exist a predisposition for it." The causes which render individuals susceptible to any epidemic (cholera, yellow fever, plague &c.) are the same in all epidemics, so that on the invasion of an epidemic it may in general be said: "*There must be a certain general condition of the body*, and a specific poison."

We have now to point out what is this general condition of the body, or this matter, on which we now see the specific external exciting cause act, how it is formed and accumulates in the organism:

1st. *Excessive indulgence in food*, especially in animal food, forms, in many persons, a fatal cause of yellow fever. It appears that the excess of chyle passed into the circulation, and submitted by means of respiration to the exciting action of the infected atmosphere, affords a material for the yellow fever.

2d. *Too fatiguing exercise, insulation*, and whatever influence can urge the circulation or can produce a febrile movement, gives an opportunity for the invasion of yellow fever.

3d. *Organic diseases* of the principal organs, as, for instance, of the uterus, the stomach, the liver. I have observed that lying-in women are much more affected by this epidemic than others.

4th. *The peculiar constitution* of persons born in the North or in cold countries. Foreigners living in the city, and foreign ships were more severely affected by the yellow fever than the ships belonging to the Empire, or from the adjacent coasts.

In the epidemic of the year 1850, I made a peculiar observation, and it is the following:

The odor of the perspiration, even of persons not attacked by the disease, or of persons who had already suffered from it, is characteristic of the yellow fever; this perspiration emitted the same odor as persons sick with yellow fever. That proves to me that there exists a real absorption and excretion of miasms productive of this disease, alike in all individuals; but in order for disease to break out there must be that peculiar predisposition, which I have called the internal cause.

Reviewing all these considerations, we can conclude:

1st. That in order that the yellow fever may exist, there must necessarily be present miasms, or their equivalents, which serve as exciting causes.

2d. That there must also, indispensably, be present in the economy, physiological products on which the miasms can act; that is to say, there must be a predisposition.

Transmitted to the Sanitary Commission by the Author.

[TRANSLATED.]

ADVICE: 1*st—Against the propagation of yellow fever:* 2*d—For its treatment on board ships.*

The epidemic which ravaged Rio de Janeiro, and other parts of the Brazilian coast in 1850, was certainly the yellow fever; fullness of the face; redness and sparkling of the eyes; red suffusion of the skin, disappearing for the moment under pressure; weight and pain in the frontal region; pain in the back, loins, thighs and legs; all diminishing, and even ceasing, from the second to the third day; nausea, vomitings, and pains in the stomach; and lastly the yellow color, commencing in the conjunctiva; delirium, often at the last moment; scanty urine, red, blackish, or sanguineous; hæmorrhage; depression; restlessness; black vomit, and the peculiar odor exhaling from it, leave no doubt as to the nature of this epidemic.

From February, 1850, to the end of May, its epidemic character cannot be contested, seeing that persons who did not see any of those sick with it, and who were in the best hygenic condition, were affected by it; and we may say, without exaggeration, that at this epoch two-thirds of the population were attacked. At half a league from the shore, or at the height of three hundred feet, the epidemic stopped short, and that at the very moment when it was raging with the intensity in town, especially among Europeans.

From last year, as at present, the disease no longer presents the same epidemic character; that is to say, it no longer attacks all indiscriminately. The only, or almost the only victims, are found among those who inhabit certain infected houses, or those who expose themselves to the broiling sun, to fatigue, to table, or sexual excesses, and who generally frequent infected places

An eye witness of its ravages for three years, constantly observing it, I have come to the conviction that the miasms diffused in this capital, (meaning those with which the houses were impregnated, and the accumulation of which formerly gave intermittent fever, diarrhœa, erysipelas—under certain meteorological conditions,) underwent a change under the influence of the miasms which the numerous vessels arriving from Bahia brought hither, and thus transformed into miasms producing yellow fever; and that this same transformation continues under the action of the leaven or exciting agent, once it is received in the unventilated foci which sailors generally frequent, such as

ships, and many other localities without sufficient air, and which are not kept clean.

Preservative Measures.

This admitted, it must be necessary, 1st—to exterminate all foci of ordinary miasms; and, 2d—to destroy the yellow fever miasms already formed, and which may extend their transformatory action, and carry the yellow fever wherever they may find other (ordinary) miasms, susceptible of being transformed into misams productive of yellow fever, in circumstances favorable to its transformation.

I advise, then, in order to get rid of these two sorts of miasms on board of vessels, first—to clear them of all bilge, and other dirty water, that may have accumulated in them; secondly—to lime-wash their whole interior; thirdly—to wash all the linen of the crews with chlorides; fourthly—to place on the keel, (under the lower deck,) from one hundred to one hundred and fifty pounds of disinfecting powder; fifthly—to fumigate all the several compartments of the ships with sulphur, with the hatches, doors, and all other openings closed. (I begin by laying a thick bed of gravel or sand in each compartment; I then place sixteen or thirty-two pounds of sulphur on this bed, according to the capacity of the compartment; I set fire to it and shut the hatches, only opening them occasionally to watch the combustion of the sulphur, and to give sufficient air to keep it up. The hatches ought not to be permanently opened till three or four days afterwards.) Sixthly—to spread, during the work of loading and unloading, some disinfecting powder on the goods; seventhly—never to allow dirty linen, which may have been used by the sailors or by passengers, to be kept, (were it only for a single day,) whatever pieces it may consist of, without having remained at least twenty-four hours in salt water, in chloridated water, or in lime water, and having been completely dried; eighthly—to wash, or, at all events, to whiten with lime the timbers, and every uncovered wooden surface, every fifteen days during the voyage; ninthly—to maintain, besides, the greatest cleanliness everywhere.

Experience has taught us that it is at the time of discharging ships that there is danger, especially when wet and cold weather supervenes; (I understand the lowering of temperature, within certain limits, above 20 deg. Reäumur, nearly.) The reason of this is that the surrounding air becoming heavier than the hot air at the bottom of the hold, mounts with its miasms, to be replaced with the heavier and moister, a condition which is favorable to the evolution of miasms, and thus affects the crews. Our cool nights in the tropics, following hot days, produce an analogous effect, although a less intense one. It is then that the greater part of mariners are effected, especially those who sleep near the hatchway.

In very grave cases, and in those in which there are well-founded suspicions, in addition to the process of disinfection which has just been mentioned, I advise the introduction into the interior of the vessel, with

closed hatches, (after having cleared the hold of bilge water,) by means of a conducting tube, of a jet of steam for several hours, or even for a whole day, until the temperature shall have been raised throughout the vessel; after which the combustion of sulphur and disinfecting powder, &c., should be employed, as we have just said.

It would be desirable that every vessel intended for commerce in ports infected with pestilential diseases, should be furnished with a system of tubes, each of which should reach from the bottom of each compartment of the ship, and should meet in a common tube, which should afford a constant issue for the gases contained in the several compartments, aiding the elevation of the temperature by the kitchen fire; in which, or near which, the common tube should pass; those miasms only which have been retained or kept pent up for a long time, being dangerous.

There is danger of the transmissibility of yellow fever, only under three conditions: First, from miasms (which I call ordinary miasms) in the port; especially those with which dwellings are impregnated. Second, from a temperature below 20 deg. Reäumur, especially in damp weather. Third, from yellow fever miasms to modify the ordinary miasms.

Consequently, to prevent the transmission of the disease in seaports, it is necessary,—1st, to maintain the greatest cleanliness, public and private in dwellings, and to destroy the miasms which may be found on board vessels coming from suspected places.

For this purpose, it is proper:

First—To discharge the vessel beyond the reach of the population. During this operation, which ought to be effected in the open air, the chloride of lime or disinfecting powder should be employed, and the merchandise ought to be exposed to the air as soon as possible. Merchandise not being in general the agent by which yellow fever miasms are transported, but rather the water at the bottom of the hold and the timbers of the vessel, the action of the air and fumigations of the more suspected articles will suffice; a particular care ought, on the other hand, to be bestowed on the ship.

Such are the means of neutralizing, and such are the causes which have induced the re-appearance and the continuance of epidemics on board of vessels, even after they have been subjected to the most thorough washings, the most careful fumigations, &c.; the miasms were, as it were, in reserve in their strongholds, the pores of the ship.

The precautions above enumerated, destroy the two sorts of miasms which may be developed or introduced into the interior of vessels. Chlorine cannot be trusted to. The yellow fever miasms easily transform themselves into carbonic acid under the influence of the air or of oxygen; they resist chlorine, as experience has shown me. The preference which I give to sulphurous acid is explained: First, by the elevation of the temperature of the wood of the vessels, from which ensues the disengagement of the miasms absorbed by wood and other porous bodies. Second, by the action of the sulphurous gas, combining with the oxygen and hydrogen of the miasms forming water and sulphuric acid. Third, lastly,

and most certainly, according to the demonstrations of experience, animal food, fish, meat—especially salt—cheese, milk, &c., appear injurious, their ready decomposition into yellow fever miasms, under the influence of vitiated respiration being probably the cause; fruits and everything that disturbs digestion, come next. Abstinence is the best guarantee for those who live in a miasmatic atmosphere; it destroys, or causes to be *burnt* by respiration, the chief ingredient of miasms or infection.

Cooling one-self so as to suppress perspiration, and with it the disengagement of miasms formed or received in the blood, ought to be carefully avoided. We every day see the first menaces of the disease disappear before the application of woollen to the skin, as also before sudorifics employed at the commencement of the sufferings, (which, moreover, are by no means correspondent to the intensity of the disease which they announce,) and before a very strict diet. This is a point in the history of yellow fever, to which sufficient attention is not paid, but which is nevertheless of the highest importance, considered as a preventive.

TESTIMONY OF CORRESPONDENT G.

THE YELLOW FEVER AT RIO DE JANEIRO.

"Frequent reference to the yellow fever of Rio de Janeiro having, of late, been in the New Orleans prints and letters, to the effect that the fever now prevailing there was imported from Rio, giving the name of the vessel, and that it might have been prevented by quarantine regulations; also, that "the fever, which was more malignant than ever known, was of a similar character as the Rio fever, being something like the plague, the corpses after death having black spots on them," thus leaving the inference that the Rio fever was the worst kind for virulence and extent, giving most erroneous opinions of the health of Rio, and creating a most unnecessary alarm. The undersigned being a resident of Rio, feels called upon to state a few facts in the case, that the public may be correctly informed, and judge of the propriety of renewing the antiquated notion of quarantine to prevent contagion, or feeling uncalled for anxiety for friends who may be visiting Rio while the fever is prevailing.

Prior to 1850, Rio was considered the most healthy tropical city in the world, no fatal epidemic having ever visited it; yellow fever and cholera were unknown. Early in February, 1850, some cases of fever occurred on board a vessel from Philadelphia, which terminated fatally, with all the signs of yellow fever. Others were soon reported on board ship and on shore. It spread rapidly, so in April, when it was at its height, the total number of deaths were from one hundred and sixty to one hundred and eighty per day. From 1st May it decreased, and in June it had nearly disappeared. The average of deaths while it prevailed was fifty per day for four months; two-thirds being by the fever. The disease was not so virulent and rapid as it usually is in Havana, and with immediate and proper treatment a large proportion recovered. The population of Rio Ja-

neiro is about two hundred and fifty thousand, and the number of vessels in port was very large, many bound to California with passengers. Exposure and imprudence always increase the number of victims, and all know that none are more exposed than seamen, or more careless.

The same fever pervaded the whole Brazilian coast in 1850. At Bahia it was traced to a vessel from New Orleans, and believed by many to have been imported in her. With equal propriety, it might have been said to have been imported into Rio from Philadelphia. Both would be absurdities, as the vessels left the United States in the winter season, and never had any sickness on board till after their arrival.

The epidemic was no doubt an atmospheric one, somewhat like the cholera. A malaria pervaded the whole coast; this was proved by several cases of fever appearing on board vessels from Europe prior to arrival. It was probably a visitation in lieu of the cholera, which has visited every part of the world except Brazil.

The fever was confined exclusively to the city and suburbs. It did not spread into the interior, so that there was a safe and speedy retreat to a place of safety for all those who could leave the city.

In 1851, there were a few sporadic cases, but it never could be called epidemic on shore. The cases on shipboard were more numerous, but, with proper care, they were not very fatal. The same remarks apply to 1852.

The fever this year has been worse than in 1851 or '52—having begun earlier than usual; but not nearly so bad as would be supposed by the reports published in the public prints. It is true that there have been some severe cases, but they were isolated ones, and exceptions.

The true test are the bills of mortality, which are daily published, in the most particular manner, officially. Their correctness has never been doubted by those who know the city and the facts. I have carefully examined them, and collected the following results, which may be relied on as correct.

Average daily deaths at Rio, from official reports, blacks and slaves included:

Jan.....5	Yellow Fever.	7	Consumption.	Total, all diseases,	28
Feb.....7	"	6	"	" " "	27
March ..5	"	6	"	" " "	26
April ...5	"	5	"	" " "	24
May....4	"	5	"	" " "	20

Average of five months—
5 1-5 6

About five-eighths of the deaths by fever were in the hospitals, which are well arranged and managed. At the hospital appropriated to seamen, at Jurujuba Bay, by the published weekly reports, in May the deaths were only 17 per cent. of the number entering, at that time about fifty per week. This was after a steamer was provided by the Board of Health to receive patients and take them to the hospital. The steamer was provided with

beds, physician and medicines, so that no time was lost in treating the disease. Previous to this, many were in the last stages before they were taken to the hospital, consequently, many more deaths.

By the bills of mortality examined, it appeared that the number of deaths of persons from seventy years and upwards, (averaging 80 1-3 years) were 3¼ per cent. of the whole number, when, daily, the average was twenty-five. The daily average at other seasons is under twenty. Three were 111, 115 and 118 years. Few if any cities can show a similar result.

The number of deaths by consumption has increased very much of late years. This is frequently ascribed by the Brazilians to vaccination, as previous to its introduction consumptive cases were very rare.

The name of the vessel stated in the New Orleans print as having introduced the fever there from Rio, was the Adelaide. No vessel of this name can be found as having loaded at Rio for New Orleans, or to have arrived there." G.

DEPARTMENT OF STATE, *Washington, June* 12th, 1854.

HON. A. D. CROSSMAN, MAYOR OF NEW ORLEANS:

Sir:—I inclose, herewith, a communication from Joseph Graham, Esq., U. S. Consul at Buenos Ayres, addressed to you, and also, the original of a dispatch to this Department, from William Lilley, Esq., U. S. Consul at Pernambuco, in reply to the Circular of the New Orleans Sanitary Commission, sent through this Department.

I am, Sir, very respectfully, your obedient servant,

W. L. MARCY.

TESTIMONY OF MR. WM. LILLEY.

UNITED STATES CONSULATE,
Pernambuco, April 24, 1854.

TO THE HONORABLE SECRETARY OF STATE, WASHINGTON:

Sir:—In reply to the circular, sent by the Sanitary Commission of New Orleans, and forwarded by the State Department at Washington, I have the honor to submit the following report. In collecting such information as is called for by these questions, you, of course, have to wait the convenience of scientific men, as no one can be presumed to be in possession of all the facts who is not a practicing physician; hence it is that this matter has been delayed much longer than I at first intended. Even now, it is by no means full. To such questions as the estimate of the population of the town, males or females, under or over such an age, to what country they belong, whether foreigners or natives, it is entirely impossible to give any answer that could be relied upon, for the reason that there is not one iota of statistics to be found in this place upon these subjects. Such answers, however, as I have been able to obtain, I forward, and in doing so, I cannot acknowledge my indebtedness in too strong a manner,

to Dr. Arbuckle, a very intelligent physician, long a resident of this place, for his kindness in aiding me to give the answers I send; which are as follows:

The name of the locality is Pernambuco; for its limits and boundaries, see inclosed map. The surface of the soil is sandy. Water for drinking is brought in iron tubes from a spring about six miles distant from Pernambuco. There has been no clearing of lands or disturbing of the soil that could possibly account for the development of yellow fever, and its annual return at the same season at which it first made its appearance.

Situated on the edge of the sea, Pernambuco is twice intersected by the tortuous winding of the river Capeberibe, at the mouth of which it is placed. For many miles around the town the soil is sandy, a little above the sea, from which it has evidently been reclaimed. In the wet season it is mostly marshy, especially towards the North, where, near to Olinda, there is constantly a large lake of stagnant water.

My informant says that the first case of yellow fever that he saw died on the seventeenth of August, 1849, after suffering sixty hours from the ordinary symptoms of the disease, with a cerebral tendency. From Sept. 1849 until the end of the year, sudden and unexpected deaths occurred in the practice of several medical men here, but as none of them had ever previously seen a case of yellow fever, and all were of the firm belief that such a disease was not to be met with in Brazil, such cases were set down as anomalous. None of these cases had been in a locality where yellow fever was prevailing, unless the epidemics of 1846 and '47, and 1848 and '49, which prevailed in almost all the maritime towns of Brazil, are to be considered as modifications of yellow fever. In symptoms, character and spread, they certainly resemble it quite as much as the "dengue" does the yellow fever of New Orleans.

There is, I think, no more satisfactory evidence as regards the propagation of the disease by the handling of goods, and direct intercourse with others, than for the annual return of the disease at the same season at which it first made its appearance.

As to cases which appeared to have originated spontaneously, the first epidemic of yellow fever in Pernambuco began in January, 1850. In less than three months almost the entire population felt its influence. It invaded the town by districts, beginning in that most distant from the shipping, and ending in that nearest to it. Its spread did not appear to depend so much upon personal intercourse as upon some cause generally diffused throughout the atmosphere of the section in which it prevailed. As an instance of the rapidity of its spread may be mentioned that of a family of fifteen persons, fourteen of them suffered from it at one time; and in many small families, all of them were attacked at the same time. The place remained dangerous to strangers, whether from Europe or the interior, long after the epidemic had seemingly subsided. Many cases have been seen whose origin could not possibly be traced to contagion.

As regards the population, their personal and social habits, &c., strangers of all kinds, even those from the interior of the country, residing at

such a small distance from town that there could be little or no difference of temperature of climate, suffered most severely. As regards habits, the intemperate suffered severely; also, all persons suffering from chronic diseases, especially of the liver or kidneys. I am inclined to the opinion that the circumstance of living on a ground floor was disadvantageous to many.

As to the prominent symptoms, progress &c., of the disease, the symptoms, progress, duration and termination of the cases of yellow fever that occurred here exactly correspond with those laid down by practical authors on this subject. The proportion of cases in which black vomit made its appearance amongst those recently arrived from Europe would amount to fully one-fourth, whilst among the acclimated, it was under one per cent. A large proportion with yellowness of skin. Amongst new comers, and consequently, bad cases, hæmorrhage, especially epistaxis, was of very frequent occurrence, but in what proportion it is impossible to say, as medical attention during the first epidemic was much more directed to the immediate wants of the people than to the advancement of science. As a proof of a disorganized state of the blood, I may also state that females uniformly suffered from a return of their periodical discharges; no matter how soon the attack came on after the monthly periods; and that in several bad cases where leeches had been applied the bleeding from their bites could not be stopped.

During the prevalence of the epidemic of this place, in 1850, with the exception of a case of small-pox, and another of epilepsy, Dr. A. does not recollect of having seen any disease except the then prevailing epidemic.

The English brig Glaucus anchored in the outer roads of this port on Sunday, January 22, 1852, after a passage of thirty-three days from St. Johns, New Brunswick. The day following she came into the inner harbor, and on Tuesday, the 24th instant, sent a seaman to the yellow fever hospital, suffering very slightly from the ordinary symptoms of an attack of the prevailing epidemic, though he had neither been previously on shore, or near any one ill of the disease. The attack, being a very mild one, yielded to the ordinary treatment, and he returned to his vessel on Friday, the 27th. On Sunday, the 29th, he became intoxicated on shore, and on the following day returned to the hospital, where he died on Wednesday, February 1st, with black vomit and other marked symptoms of yellow fever.

I do, most undoubtedly, regard the epidemic as yellow fever.

As to the number of deaths by black vomit it is impossible to give an answer.

Dr. Arbuckle says he has seen ten persons recover after having the decided black vomit.

Many cases of second, and some of third attack have come under Dr. Arbuckle's observation, and he also says he was once called to a lady who died of what she called the fourth attack.

The disease has occurred in some of the rural districts, but I am not aware of its having been spread by contagion.

Dr. Arbuckle states that it has been asserted by most respectable authority (vide London Medical Gazette), No. 12, 17, that yellow fever was imported into Bahia, September 30, 1849, by the American brig Brazil, from New Orleans, via Havana, but the evidence, he says, is not satisfactory and weakened, he thinks, by the fact of a person having died in Pernambuco of black vomit on the 17th of August, 1849, and the circumstance that when the fever returns in any of the maratime towns of Brazil, it almost uniformly does so at the season it first made its appearance in that town, and also by its having been preceded by two epidemics of an eruptive arthritic or rheumatic fever, which broke out at the same season and spread in the same manner as yellow fever did.

Its origin is not any more obscure than that of the influenza, which occasionally visits Europe and North America.

It is quite impossible that it could have been imported into Pernambuco from Africa directly. Besides, that part of the town nearest the shipping, instead of being the first, was the very last to feel the influence of the epidemic.

The colored population of the town suffered least of any from the epidemic, but all those recently from the interior of the country did not escape so easily.

W. L.

TESTIMONY OF MR. JOSEPH GRAHAM,

CONSULATE OF THE UNITED STATES, *Buenos Ayres, March*, 9th, 1854.

TO THE SANITARY COMMISSION, OF NEW ORLEANS:

Gents:—I received your circular, propounding various queries, relative to this locality, on the 15th ult. I have sought such information as I judge may be of service in promoting the object you have in view, it is not so complete as I would wish, yet may not be without interest.

I beg leave to reply, in same order, as the questions are placed.

The locality is Buenos Ayres, a city situated on the right bank of the La Plata, which at this place, is about thirty miles wide. Latitude 34° 35m. South, longitude 58° 31m. West, about two hundred miles from the sea. Its limits are two miles from North to South, and one and a half miles from East to West. Bounded on the East by the river La Plata, North and West by extensive plains destitute of trees, and South by a creek and low marshy lands; in the immediate neighborhood there are shade and fruit trees.

The surface of the soil is a black earth, mixed with sand.

The water used for drinking, is that of the river, and cistern water.

There has been no clearing of lands, or disturbance of soil.

Standing pools of water are quite common in the neighborhood, and even in the streets of the city.

From the nature of the country, there is no drainage.

The accompanying meteorological statement, is all I have to offer.

Within the last thirty years, there have been several general epidemics among cattle, occasioned by droughts; the health of the inhabitants does not appear to be affected by them.

This place has never been visited by any epidemic, save small pox and scarlet fever. Yellow fever has never made its appearance here.

The population is about one hundred and twenty-five thousand souls, at the highest calculation, of whom about half are natives, the remainder Italians, French, Basques, English, Germans, and a few from other countries. The most remarkable feature in this locality, is this:—about one mile South, is a creek, upon which is situated, the establishments for killing cattle, mares, horses, &c., for their flesh, grease and hides. The air is constantly laden with putrid effluvia, which is blown over the city by a Southerly wind. All the refuse is carried into the creek, and thence to the river. So bad is the water of the creek, that when the fish are forced in, by the high tides, they all die, and are seen floating upon the surface. The population on this creek, say six or eight thousand, suffer, as little, probably less, from disease, than that of the city; they generally have a healthier appearance. The mass of them are foreigners, Irish, Italians, Basques, and a few of other nations.

There are no regularly established sanitary regulations; no account kept of the mortality.

I inclose, herewith, a letter from Dr. H. W. Kennedy, formerly of Philadelphia, and now a practicioner of great eminence, in this city, to whom I handed your circular. You will perceive he resided a number of years in Parana, and has given what, I presume, will be useful information, in regard to that place, and I am also indebted to him for most of the facts herein contained.

Hoping that your investigations may result advantagously to the health of your renowned and important city.

1853.	Extreme Cold.	Extreme. Heat.	Number of Rainy days.	Quantity of Rain.	Lowest range of Barometer.	Highest range of Barometer.
				Inches.	Milmetres.	Milmetres.
September,	25	85	5	1 $\frac{58}{100}$	743	755
October,	58	88	9	2 $\frac{20}{100}$	746	758
November,	62	90	10	4 $\frac{93}{100}$	741	753
December,	70	92	8	2 $\frac{09}{100}$	742	754
January,	70	89	7	3 $\frac{36}{100}$	741	754
February,	74	90	6	2 $\frac{95}{100}$	741	752

As a general rule, the climate may be considered damp in winter, dry in summer. *At all times* mould will form, green base, white surface.

J. G.

TESTIMONY OF HENRY W. KENNEDY, M. D.

BUENOS AYRES, *February* 21, 1854.

COL. JOS. GRAHAM, U. S. CONSUL, BUENOS AYRES.

My Dear Sir—In compliance with a promise made you a short time since, I herewith transmit a statement of the "local" general health and prevailing diseases of the city of Parana, where, as you are aware, I resided a number of years.

The Parana at present is the capital of the thirteen provinces of the Argentine Confederation and of Entre Rios, one of the provinces; it is situated on the left bank of the river Parana, about 500 miles from the sea, in lat. 31 deg. 45 min. 15 sec. S.; long. 60 deg. 47 min. 38 sec. W. of Greenwich. The port is formed by a bend of the river, and like all other parts (of the river), is subject to the changes of a sandy bottom and a strong current always setting down, as well as to the rise and fall which attends rivers receiving large tributaries and running through a great extent of territory. About 1200 or 1300 feet above low water mark the land rises abruptly about 100 feet; on reaching the level of the elevation, some houses and huts are met, irregularly situated, and at about 2000 yards the city commences, and the principal square is about 600 yards further, situated about 125 feet above the level of the river. The town runs in a NW. and SE. direction, straggling over about two miles, and in width, NE. and SW. about a mile; it contains about 6000 or 7000 souls, including the neighboring country. The principal houses are one story—say 15 to 18 feet high—with flat roofs, and built around a hollow square; the rest of the habitations are built of brick or mud, and thatched with straw. The food is beef and bread; vegetables are not abundant and but little variety. During the summer, fruit is abundant, melons, figs, grapes, peaches, &c. The soil is black earth mixed with sand, the sub-soil, clay mixed with particles of lime-stone; beneath this is a strata of lime-stone of variable quality. The water drank is cistern and river water, the latter containing lime and iron in minute quantities. There has been no clearing of lands nor any disturbance of soil for any purpose whatever. There is no other river in the neighborhood than the one mentioned, which is very broad and rapid. No swamps nor stagnant lakes or pools of water. The water readily runs off into the river, and the surface does not remain long wet (even after heavy rains) after the weather clears up. At foot you will find a table of the meteorology of the place, so far as I can give it you. The climate is mild and dry, with the exception of two or three months of winter, when we have generally damp, cold days. The people of all classes live in the open air, and only care for shelter during rain or the time passed in sleep. From the mildness of the climate and simple food, one would suppose that the inhabitants would enjoy generally good health, but this is not the case; the custom of smoking tobacco and sipping at all hours the infusion of a plant called "yuba mate," (Ilex Paraguaniensis) is so universal among all classes and both sexes, combined with the inac-

tive life led by the mass of females, that chronic diseases of the alimentary canal, particularly of the upper part of it are quite common. Acute and chronic diseases of the uterus are common. Acute diseases of the chest, frequent; of the head, rare; pulmonary consumption, very rare. Intermittent, typhus and typhoid fevers, unknown. I do not think that in the nine years I practiced there that I ever saw one undoubted case of idiopathic fever. The only epidemic, apart from the measles and whooping cough, was small-pox, although scarlet fever had prevailed some years previous to my residence there. Bronchocele is quite common, as it is in almost all the towns on the same river. Yellow fever is totally unknown, and so far as I can learn, has never made its appearance on this river or its tributaries. There is one thing remarkable here, that is, with a temperature averaging more than 80 deg. in the shade for three months in the year; there is no malaria on the edges of the river, for the people who reside there enjoy, if there is any difference, better health than those who live on the high land. H. W. K.

Statement of temperature, number of rainy days, and quantity of rain which fell, in the Parana, during the years 1848–1849.

	Temperature.	Days of Rain.	Quantity.—in. $\frac{1}{100}$.
1848.—March	72°	8	5 92
April	71	2	0 50
May	65	4	0 83
June	61	8	4 25
July	54	1	0 42
August	61	1	2 50
September	68	2	0 46
October	74	4	5 66
November	70	5	4 29
December	80	5	1 00
1849.—January	84	5	7 39
February	80	5	5 00
	—	—	
1849.—March	77°	3	1 38
April	71	5	3 83
May	63	no rain.	
June	63	no rain.	
July	58	4	2 85
August	56	3	0 17
September	62	6	5 54
October	65	4	2 02
November	77	3	3 00
December	80	6	3 27
1850.—January	83	1	1 00
February	83	4	3 21

Average temperature, 70°. Number of rainy days, 50. Quantity of rain fell, 38 in. 92-100.

Quantity of rain fell, 26 in. 27-100. Number of rainy days, 39. Average temperature, 69 10-12°.

WEST INDIES.

BARBADOES.

TESTIMONY OF NOBLE TOWNER, ESQ., UNITED STATES CONSUL.

HON. A. D. CROSSMAN, OF NEW ORLEANS.

I inclose answers to the various questions of the Sanitary Committee, of New Orleans, as requested by the Hon. Wm. L. Marcy, Secretary of State, so far as they could be obtained, and have to acknowledge my thanks for the same to James W. Sinckler, M. D., of this Island; to which I will add a few remarks of my own, having had considerable experience during the epidemic of 1852, in my family; which consisted at that time of myself, wife, wife's mother, son (aged 19½ years) and two daughters, (one of 13 and the other 6 years.) At the time the fever broke out I had resided on the Island most of the time for five years, my son two years, and the rest of my family six months. My son was taken on the first day of October, and died on the 5th; he was taken at three o'clock in the morning with chills, headache, and violent pains in the back. The doctor did not bleed him the first day but did so on the second; black vomit took place on the third day, and death on the fourth. The location where I was living, was called healthy; fairly exposed to the wind, with no stagnant water in the neighborhood. By the advice of our physician, we removed from the house the same day and took lodgings in the centre of the town. The following day my wife's mother, and my two daughters were taken; all were treated Homœopathically and recovered, after having our house thoroughly cleaned and fumigated, we returned to it; about three weeks after leaving. In about a week after, I was taken with a violent fever about 11 o'clock at night, but with different symptoms from those of my son, and the rest of my family; having had but little headache, no chills nor any pain in the back. The remedies used happily worked well, and the fever began to subside in the course of eight hours. Both my son and myself were treated upon the Allopathic system; I however was not bled. which had been the universal case in former fevers with the physician that attended us. I will add that when the fever first commenced, he bled every patient and all died; this led him to adopt the opposite course, and at first with not much better success. He remarked to me one day that it was a different fever from what he had known during his practice of over fifty years. If he bled, the patient died, and if he did not bleed, the result was the same; all our physicians were of opinion that the disease was different from anything they had ever before experienced; in some cases after the patients had lost all symptoms of the yellow fever and were appearantly recovering, they were taken with low sinking typhus, which resulted in death in sixteen days in one case, and seventeen in another; no sanitary measures were used. It raged as much, or more, in the rural districts as in the city, which I am told was never the case before, it having been heretofore confined to the city and garrison. Another peculiar feature in this disease, was that black vomit were attached, which was previously a thing almost unknown.

Your obedient servant, NOBLE TOWNER.

CONSULATE OF THE UNITED STATES.

BARBADOES, April 10, 1854.

Sir:—I inclose answers to the inquiries of the Sanitary Commission of New Orleans, as requested by you some time since:

I am, very respectfully, your ob't servant,

NOBLE TOWNER, U. S. Consul.

HON. WM. L. MARCY, Secretary of State, Washington.

TESTIMONY OF DR. J. W. SINCKLER.

Barbadoes is a British West India island, twenty-one miles long, and four wide, bounded by the Atlantic ocean.

The surface soil is principally limestone and clay. The drinking water is chiefly from wells; some rain water is caught in tanks.

There has been no extensive clearing of lands in the vicinity, or disturbance of soil by digging wells or canals, making roads, draining, &c.

There are no rivers; there are three or four swamps, but not stagnant.

The drainage is very bad—principally surface, with but little tunnelling.

During the fever the heat was intense, with rather a small quantity of electric fluid displaced: the winds Northerly. Several years past all the cocoanut trees were destroyed by blight.

I am not prepared with a census; but the entire population is about one hundred and fifty thousand, the females preponderating. There is no registry of births and deaths kept here as in large cities of Europe and of America. The large majority of the inhabitants are natives of the place; but few of the United States; but few of foreign countries, viz: French, Spanish and Portuguese; twenty-five thousand colored.

There are no statistics to furnish such information; but the entire number of deaths was said to be about twelve hundred, the majority of whom were natives of the place; two of the United States; the majority being colored.

As regards ages, I cannot furnish the particulars, for want of statistics.

The first case of disease occurred on the 19th of July, 1852. He was a native, a fisherman by trade, living at the market gate, with a stagnant pool of water at his door, and pigs in his yard. When first seen by me he was dying with black vomit. The disease after fifteen days broke out near a crowded churchyard, in a low situation, and four persons in one house died. It then seemed for a time to confine itself to that locality, but finally spread all over the Island, no situation being exempt. None of these cases had been in a locality where yellow fever was prevailing.

I do not believe any cases to have arisen from the handling of goods, clothing, &c., nor from direct intercourse with other cases. The first case decidedly appeared to have originated spontaneously, without even the suspicion of intercourse with other cases.

The disease skipped about in all directions, taking no traceable course, but being more violent when the wind was Southerly, and abating when Northerly.

Our population is not an intemperate one, but from its number and pov-

erty is much crowded; still, I cannot say that affected the character of the disease much, for death was equally rife in the healthiest locality.

The prominent symptoms were shivering, headache, fever, quick pulse and general pains. From the third to the fifth day the disease either ameliorated or black vomit set in. A few cases commenced with vomiting, and black vomit has supervened in thirty hours after the attack. Black vomit occurred in about one case in five. Yellowness of skin followed all the cases. In some few cases, there was fearful hæmorrhage.

No other types of fever prevailed at the same time. I believe myself that an atmosphere, which had been infected by decomposed animal matter from a slaughter-house, produced the first case, and the Southerly winds kept it up. I am a non-contagionist.

I regard the epidemic as most decidedly true yellow fever. I have seen the disease before, in Barbadoes, in 1836 and 1848. I saw twenty-three cases of black vomit in my own practice, in 1852, of whom fourteen recovered. I have never seen a case of second or third attack.

I cannot give the number of persons attendant on the sick, and otherwise liable to the disease, who escaped during the epidemic. The deaths usually occurred from the fifth to the seventh days; one occurred on the seventeenth day.

I think it but fair to state that my patients were treated homœopathically; also, Dr. ——'s cases, and there is no doubt that a larger share of success attended that treatment than any other. Not a case of black vomit that had lost blood lived. The healthiest situations in the Island were not exempt. Prostration seemed the chief character of the disease.

J. W. Sinckler, M. D.,
College Physicians and Surgeons, University, State of New York, 1834.

ST. THOMAS.

COMMUNICATION FROM CHARLES J. HELM, COMMERCIAL AGENT, ST. THOMAS.

St. Thomas, December 8, 1854.

TO THE SANITARY COMMISSION OF NEW ORLEANS.

The soil in some parts of the Island is sandy, other parts are clayey.

Cistern water is the only kind of water used on the Island.

There has not been any removal of the soil for many years.

The Island of St. Thomas is mountainous—there are no rivers, creeks, springs. swamps or pools of water on the Island.

The water either runs off, or is absorbed by the sand, almost instantly upon falling,

The population of St. Thomas is not known, the census not having been taken for many years. It is supposed there are about thirteen thousand souls, in all, white and black.

The number of deaths of white persons over ten years of age, in 1852 and 1853, were four hundred and twenty-eight. Under ten years of age, two. Of whom two are natives of this place; thirty-

six of the United States, and three hundred and nine-two of foreign countries.

Thre were no colored persons died of the epidemic in 1852 and 1853.

I cannot ascertain the number of cases—and for answers to the questions which follow this, the Sanitary Commission is referred to the memorandum furnished by Dr. Daniel Pretto, an old and distinguished physician of this Island—hereto attached:

DR. PRETTO'S STATEMENT.

In the month of August, 1852, there were fifteen or sixteen cases on board of a French vessel, which arrived here from Guadaloupe, where the yellow fever then existed.

The majority of cases were from on board French vessels; but afterwards it became epidemic, and strangers of all denominations were attacked.

Not entertaining the principle of contagion, I cannot otherwise than look upon all as epidemic.

As already stated above, the origin of the disease was traced to vessels arriving here, from place or places, in which the fever was raging, and causing dreadful havoc.

Very few cases were found amongst the inhabitants of the Island, those which died were isolated.

An attack of yellow fever, of our last epidemic, in a well pronounced case, was manifested with the following symptoms: alternaten flushings, and rigors resolving within a few hours, into a perfect hot stage; a sensation of heat, chiefly over the head and chest; *supra-orbital* headache; suffusion of face and part of lucid cornea; preternatural redness of the mucus membrane, of nose, lips, and tip and edges of tongue; recti muscles of the abdomen tense, and well marked, without tympanitic distension; thirst; nausea proceeding on to retching and vomiting of ingesta, and of scanty yellow bilious fluid; also evacuations dark, apparently long retained, bilious, and often fœtid; tenderness of epigastrium evinced on careful pressure, in some cases entirely wanting. These symptoms continued steady during two or three days; the bilious ejections becoming greenish. The fever then subsides; the skin becomes cool and pleasant; the tongue shows a disposition to clean, and there is less feverishness of tip and edge; thirst abates, and there is some appetite for food. The patients anxiety and morbid fear of death subside, and he is satisfied of his convalescence; by-and-by the eye, which has lost its glistening appearance, assumes, a condition of chronic vascularity, of a dull orange red. The flushed countenance gives way to a sottish appearance and greasy dirty complexion; a yellowish suffusion is perceived in the sclerotica; the forehead has a dusky appearance, which extends also to the angles of the mouth, and over the neck and chest; the stomach again becomes irritable, and clear mucus fluid is thrown off in considerable quantities; specks may be noticed in the fluid, as if a pinch of snuff had been mixed in it, or a tenacious dark deposit

is found in the basin. The gastric irritation may again subside, and the tongue will be clean, the fiery edge and tip disappear, the yellow or purple suffusion of surface is now more marked; local uneasiness referred to the fauces, or to the œsophagus, or ensiform cartilage; after a time a loss of vital power shows itself by epistaxis or ecchymosis, and being uneasy, the patient turns himself in bed, and an involuntary gush of black vomit is spurted over the bed and furniture —blood oozing from the mouth, ears or nose; the scrotum excoriated; the blistered surfaces became raw and claret-colored; the skin was cold and clammy, the fingers shrivelled, and an unpleasant odor emanated from the breath and body; black vomit continued to be ejected; the pulse lost its strength, till at last it ceased to be felt at the wrist, and the patient died with intelligence unclouded and his muscular strength little impaired.

The symptoms above described existed in cases which run their regular course; others had no time to complain, dying within twenty-four hours; others again, proving fatal in two or three days, without any black vomit, and accompanied with convulsions; others again, with hæmorrhage; others again took a typhoid nature, in fact the greater part of the cases which proved fatal, were complicated with typhoid symptoms.

There was no other fever to my knowledge.

I regard the epidemic as yellow fever.

I have seen the disease before.

I have seen it on this Island during twenty-three years practice.

Cannot state the number of cases, having kept no account of them.

Death generally occurred in five or seven days.

MARTINIQUE.

[TRANSLATED.]

TESTIMONY OF DR. AMIC.

REPLY TO THE QUESTIONS PROPOSED BY THE SANITARY COMMISSION OF NEW ORLEANS.

The Island of Martinique, like all other of the West Indies, is composed of one of those volcanic masses which mark the continuation of the submarine chain of the Andes. This volcanic base, on the middle of which are found rocks of the first formation, is covered almost everywhere by alluvial or vegetable earth, formed by the decomposition of the gigantic vegetable matter of its impenetrable forests.

Of an extent of about fifty-eight square leagues, the Island is studded with hills and mountains, the most elevated of which, rise to a height of upwards of five thousand feet above the level of the sea. These mountains are covered with thick forests, and separated by deep and winding valleys, watered by streams, which, in their course to the sea, carry with them a large quantity of decayed vegetable matter. The water obtained

from these streams, together with rain water, supplies all domestic wants; but for this purpose it is generally filtered.

Since some years, the works executed for the construction of roads have occasioned considerable disturbance of earth, principally in the middle of vegetable land, and have given place to a greater emission of effluvia, produced by the decomposition of vegetable matter. If there can be attached to this cause, the appearance of a greater number of intermitting fevers, it is also necessary to acknowledge that it has had no influence on the developement of the yellow fever.

With regard to marshes, stagnant waters, and so forth, it is necessary to make two distinct categories of the Island; one of which, Fort de France, forms an example, being situated low, easily inundated, and in the neighborhood of pretty extensive marshes. The other of which, the town of St. Pierre, may be taken as a sample; it is placed on hill sides, more or less steep; swept by currents of the prevailing winds, and surrounded by streams, and small rapid currents. The two geographic conditions which engender two endemic distinct intermitting fevers, in the one case, and dysentery in the other, appears to have no influence on the yellow fever, the developement of which, demands a high degree of heat, and the neighborhood of the sea.

The temperature varies, also, with the degree of elevation above the level of the sea. Three distinct zones of heat can be established: a warm region, which extends from the sea shore to one thousand three hundred feet above its level, in which region the heat diminishes frequently to 20°. The same progression continues up to two thousand six hundred feet, where the thermometer marks only 15°.—It is the temperate zone. Then from two thousand six hundred feet, to the highest points of elevation, where the strongest heat raises the thermometer to only 10° or 12°, is to be found the cold region of the West Indies.

Besides the changes that the elevation and situation of the land may have upon the temperature, the heat follows the course of the sun. With the month of July, commences the rainy season, marked by excessive heat, and an abundance of rain. To this season succeeds, towards the middle of October, the dry season. December, January, and February forming the cool season of the year.

In order to appreciate the degree of humidity, it suffices to mention that at Paris the average fall of rain is ten inches; whilst at Martinique, in the lower parts, next to the sea shore, it is eighty-six inches; and this figure is increased to a much larger figure in the mountainous parts.

The prevailing winds are those from East and Northeast, during a greater part of the year. During the rainy season they are often from the South, in passing by the West.

The year which preceded the invasion of the yellow fever, was marked by excessive heat, and frequent South winds.

In that which concerns the meteorological condition of the Island; here is a resumé of observations, taken for each month, during a period of ten years:

	THERMOMETER.	BAROMETER.	
		Maximum.	Minimum.
January,	26.5	766	762
February,	25.3	766	762
March,	26.–	764	762
April,	27.5	766	762
May,	29.–	766	761
June,	28.5	766	760
July,	29.–	767	760
August,,	30.–	767	760
September,	29.–	767	760
October,	28.75	765	762
November,	26.7	765	760
December	27.75	765	760

NOTE.—The Barometer is in French milimetres. The Thermometer is in French centigrades.

If it is not possible to reply in figures to the different questions which concern the mortality, caused by the yellow fever, on the different classes of the population, one is able to establish, at least in a general manner, that the Europeans newly arrived are, in the time of the epidemic, inevitably, and the most frequently, victims to it. The chances of escaping go on augmenting with the length of residence in the colony, so that the creoles are almost never attacked, unless they may have quitted the country for a certain time. The negroes are never attacked. With regard to the sexes and ages, women and children appear to enjoy the greatest immunity; however, in the last epidemic, numerous exceptions were noted to this rule.

The invasion of the yellow fever of 1851,–'52. was preceded by an epidemic of measles and inflammatory fever, taking very often the form of typhus. The yellow fever commenced at Fort de France, in the month of September, 1851; and the first well marked case, followed by death, struck a Mr. Sentelz, captain of artillery, newly arrived in the colony, and of a constitution remarkably strong and plethoric. The malady afterwards, by little and little, extended to the soldiers of the garrison, and the marines and sailors on board the vessels of war. It was only in the month of July, 1852, that it appeared in St. Pierre; although many months before that, it had attained its greatest intensity at Fort de France, and, during all the time it raged there, the frequent communications existing between the two towns never ceased. Its march in these two places, as well as in all those where it has been, has always presented a period of invasion, a period of intensity, and a period of decline.

Its symptoms are those of all the miasmatic infections, and can be divided into three pretty distinct phases: a first period of incubation, which often passes unperceived, or is marked only by an uneasiness without character. A second period, signaled by the action of the miasma carried into the nervous system, and the principal organs, by the circulation; general febrile excitement, cephalalgia, lumbar pains, &c. In short, a third period of wrestle, or of crisis; during which, the

organism has a tendency to re-act against the poison, and free the system from it, (vomitings, icterus, petechial spots, boil, stools, urine, &c.) From this moment, the malady pronounces itself in one sense or another; the symptoms increase, and death follows rapidly; or they diminish, and then commences a painful convalescence, the length of which indicates the profound disorders that the system has undergone; and the energetic intensity of the cause which has produced them in so little time.

The black vomit, bleeding, and icterus occur constantly in grave cases; and announce, almost to a certainty, a fatal termination. The cases of cure after these symptoms are of very rare occurrence. Death happens generally, from the third to the fifth day.

As to its transmission, no fact has appeared to show the contagious character of the yellow fever; and never has it been remarked that the persons called to attend to patients, have contracted the malady by contact. If they have been oftener attacked than the others, it is because they remain oftener, and for a longer time, in the centre of infection. Nothing proves that the malady might have been imported with goods, clothes, or other objects. It has always declared itself in a manner spontaneous, and without that, its apparition may have been able to have been foreseen.

It has its birth, according to all appearance, in the influence of particular atmospheric conditions, yet ill defined; but once developed, it is able to form centres of infection beyond the places where these conditions exist. The circumstances necessary for its developement, appear to be heat and the neighborhood of the sea. In effect the yellow fever diminishes as you ascend; and it has never been known at two thousand three hundred feet above the level of the sea.

Signed: AMIC.

The First Doctor in chief of Martinique.

Fort de France, 4th April, 1854.

TESTIMONY OF DR. J. CHAPUIS.

[TRANSLATED AND TRANSMITTED TO THE SANITARY COMMISSION BY THE AUTHOR.]

A few words on the Epidemic Yellow Fever, which prevailed at ST. PIERRE, *in* MARTINIQUE, *in* 1852.

Every physician whose sad privilege it has been to assist in those cruel epidemics, which leave the most skillful practitioners unarmed, because all the efforts of art are powerless, must have felt the necessity of having recourse to the lessons which have been left for him by his predecessors when placed in the same circumstances, must have experienced the necessity for seeking in their writings, the resources which ordinary works cannot indicate to him, because these resources are exceptional, like the circumstances by which they are evolved. And further, the means of comfort, the consolations alone which he derives from reading them, quickly give him to understand

that it is also his duty to tell, in his turn, what he has seen, and to leave those who ought to succeed him, if not a complete treatment, at least an indication, a new course to follow, or even only the germ of ideas, of conceptions, which others after him more fortunate than he, will mature. It is the feeling of these impressions, it is the consciousness of having a duty to perform, which decide me to speak concerning the epidemic yellow fever which prevailed at St. Pierre and all Martinique, even although we may not be able to draw from it any other lesson than that of the vanity of human knowledge, before the scourges that heavenly wrath begets.

As I do not intend to publish any detailed observations, but merely to make known the general observations I have been able to make during the epidemic, I believe I ought first to state upon what documents I rely, aud from what sources I have drawn.

Charged with the surgical service of the hospital, prisons and seminary; I had some thirty cases to treat in my rooms; I saw nearly fifty in the town, either alone or with my brethren, Doctors Martineau, Rufz, Luppé, Artiere, and latterly, during the sickness of the chief physician, I was on several occasions charged with the medical attendance on the hospital; my observations then, have extended through all the categories of individuals; prisoners and wounded persons of all classes, at my rooms; seamen and soldiers of all arms, in the medical wards; Creoles and Europeans of all stations, in my private practice.

The yellow fever, which already prevailed for some time at Fort deFrance, commenced to show itself at St. Pierre, in the first days of July, 1852.

Under the influence of what causes did this terrible disease devolope itself?

Before this first question, as before so many others, we remain silent; public opinion regarded as a cause of the development of yellow fever at Fort de France, the cleaning of the canal which surrounds the city; the medical commission, appointed to inquire into the causes, attributed it to the Southern winds; the months which preceded that of its first appearance, had been marked by extreme heat and drought.

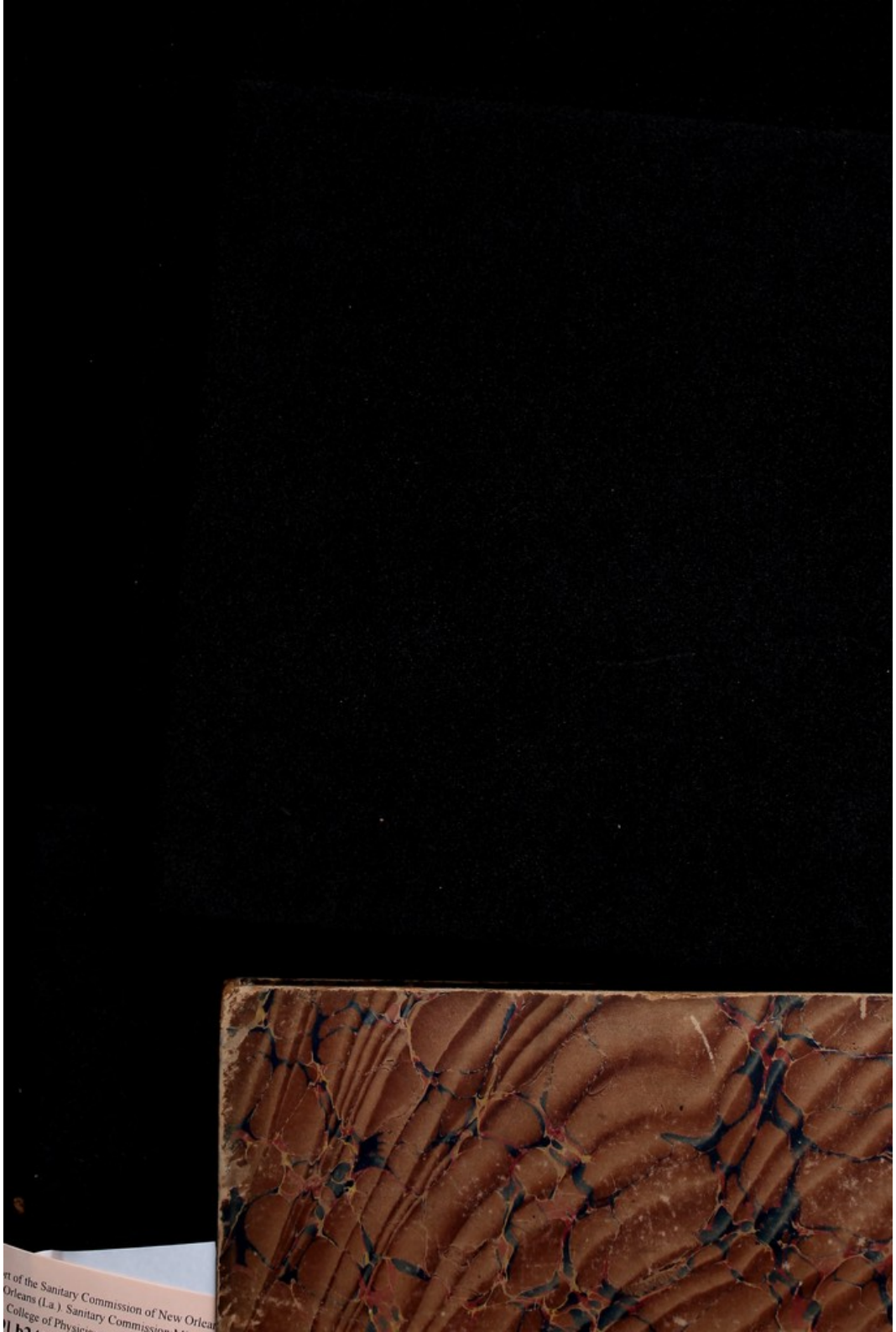
Can the whole of these opinions, either singly or conjointly, reply in a satisfactory manner? Could the formation of a local focus under the influence of certain meteorological conditions, produce a malady which ravaged, not only Martinique, but also the neighboring islands? It is to time, to observation, to the repetition of the same phenomena under the same circumstances, that it belongs to decide this.

I say nothing further in reference to the frequent communications between Fort de France and St. Pierre, as a means of introducing the disease into the latter city; the question of non-contagion seems to me to be quite settled. I shall here make only one remark, it is, that the epidemic which commenced at Fort de France in 1839, to

continue until 1841, appeared to originate in a particular focus at the Artillery Barracks, situated near the canal, and in which were quartered the military and prisoners; in consequence of the earthquake of the 11th of January, 1839. It would appear, then, that a particular focus is necessary, with the aid of certain atmospheric conditions, for the development of the yellow fever, which, from this point of departure afterwards propagates and extends itself to a greater or less distance; but what appears certain is, that the epidemic once broken out, partial foci of infection may be formed in certain given circumstances; it is thus that merchant vessels, which had none sick in our roadstead, found the yellow fever break out on board, several days after their departure, and that the hospital-frigate Armida, charged with the conveyance of the convalescents back to France, had its crew decimated during the passage, after having remained only a very short time in the Antilles.

It was on board the vessels anchored in the roadstead of St. Pierre, and at first almost exclusively among the crews of those vessels, that the yellow fever commenced to show itself in 1852; the inhabitants of the city and the military of the garrison, were then perfectly free from it. I ought here at once to turn to the question of acclimatization, for the military had nearly all been five years in the colony, while the sailors had only recently arrived in the country; but we shall see further on how much of the epidemic deprived this privilege of acclimatization of its importance, so that it became no longer a certain preservative, but only a chance of diminishing the gravity of the disease. At the same time I always reckon recent arrival in the country among the predisposing causes of yellow fever; and I have to bring to notice the fact, that in this epidemic, contrary to what has happened in all those of which have been recorded, the disease was observed to attack and often carry off, not only Europeans who had already sojourned for longer or shorter periods in the country, but Creoles, colored people, and even women and children, who had hitherto appeared to enjoy a sort of immunity from it. It may even be said that the latter paid proportionally a larger tribute to it than men.

The determining causes appeared to me to be the same as those which have for a long time been pointed out: exposure to the sun, excesses of all kinds, strong moral emotions, fear, &c. &c.



REPORT

UPON THE

SANITARY CONDITION

OF

NEW ORLEANS,

BY

EDWARD H. BARTON, A. M., M. D.

SECTION I.

SYNOPSIS OF ITS CONTENTS.

Preliminary remarks—General programme of grounds assumed and positions to be proved:—The Science of Hygiene—Ignorance of the Truth and assumptions of Facts, leading sources of error, as to our past and existing condition—Filth and Disease—Their relations to one another—The effects of imputed perennial insalubrity upon the thrift and growth of a city—What the healthy and natural standard of mortality of the Rural Districts of a country is—What the like standard in the Urban Districts. Sites of cities never selected wholly on account of salubrity—Sanitary measures and their results in this country and elsewhere—The sine qua non of their efficacy everywhere, must be skill in devising them—seasonableness in applying them, and promptitude and perseverance in enforcing them, &c. &c.

The Sanitary Commission at an early day after its organization, deemed it advisable to assign to each of the members, severally, one of the prominent topics, into which the subject (with which it was charged specially by the city authorities) naturally and conveniently divided itself. To my share was

Division of duties.

allotted the special and arduous duty, of making "A THOROUGH EXAMINATION INTO THE SANITARY CONDITION OF NEW ORLEANS, AND OF ALL AGENTS AND CAUSES INFLUENCING IT DURING THE PRESENT AND PREVIOUS YEARS, AND TO SUGGEST WHATEVER IN OUR WISDOM WILL TEND TO IMPROVE AND PRESERVE THE HEALTH OF THIS METROPOLIS." This opens a vast field of research, with corresponding responsibility, and on a theatre where the making and preservation of records are the last things to be thought of; however, those archives, the fruit of the garnering and toils of years here, will now show their value, as well as foresight, in collecting them, and it only remains to set forth for public consideration and judgment—the facts—reasonings and conclusions, which have resulted from our investigations; and which I proceed now to do.

REPORT.

Importance of the subject.

That this particular and voluminous branch of the subject, as well as those branches of it, devolving upon my learned associates, is full of importance to our immediate constituency, and eventually may become so to the age we live in, we confidingly believe, because we are fully hopeful of the results which must follow the adoption of the preventives and remedials we have suggested, at the close of our labors. But, will the city authorities, adopt and carry out, such as we have suggested and advised? That is more than we can say: But, this we *know:* That if the causes we have assigned for the late devastating pestilence, as well as those which have preceded it in past years, be clearly and inevitably deducible from the facts we have presented, and are truly assigned;—then must it follow as does night the day, that the preventives and remedials we have recommended, if seasonably applied and rigidly enforced,—will not only forestall and *prevent yellow fever* from *originating* here, but from *propagating* here, should it be brought from abroad.

Causes of fever assignable

Let me be understood. I do not pretend to say that *all* the causes, to which we assign the production of yellow fever, can be forestalled in their coming, or expelled when they do come, by any human agency, whatever; for, the meteorological condi-

tions of elevated temperature, excessive saturation, great solar radiation, large precepitation and prevalence of particular winds, or the absence of all winds, may not be entirely preventable or remediable, by the art or the power of man. But, (as will be seen, throughout the report,) great as is the influence we attribute to the presence of these most deleterious and alarming agencies, we have no where attributed, nor wish to attribute, to these agencies *alone*, a capacity for originating or propagating that disease. It is only when they are in *combination* with those morbific influences, which we have denominated *terrene*, (which embrace every species of noxious affluvia, which filth of every description, and disturbances of the original soil, generates and transmits,) that the etiological conditions exist, for the production and spread of the pestilence. Moreover, it is a doctrine of the Report, as it is a corollary from the premises—that the terrene condition *alone*, is without the power to originate the disease, in the absence of the meteorological conditions referred to:—otherwise our goodly city would be apt to furnish the *pabulum* for the disease, not only for the summer and fall months, but expose us to the pestilence throughout the year!

Not atmospheric alone.

Not filth alone

Now, it is a further doctrine of the Report, that these *terrene* causes or conditions, are entirely, and always, within the reach and control of man, and remediable and removable, therefore, at mans' option and pleasure. The *terrene* causes then of great filth, &c., being removed and extinct, the meteorological would be powerless to *originate* the disease here, and if imported here, it would be quite as powerless for propagation, be the meteorological conditions even as ominous and menacing as they were during the late epidemic, and whatever might be their injurious influences upon diseases not needing, for their existence or duration, the presence or potency of the *terrene* conditions; although, most assuredly, we think, that the meteorological conditions never have reached, and never can reach, any thing like the insalubrious and blighting excesses of the past year, in *the absence of the terrene conditions*, whatever

These controlable.

Neither alone sufficient

may be the affiliation or sources of causation and dependance between them.

These remarks are most fully borne out by a brief reference (in advance of what will be more particularly detailed hereafter,) to circumstances attendant upon the largest mortality, the subsidence and cessation of the late epidemic. The subsidence was gradual, it was true. It always is so. But it was marked, and full of significance. Solar radiation reached its loftiest elevation on the 19th of August; the epidemic reached its culminating point on the 22d; down, but gradually, subsided the combination of high temperature and great humidity, and although the latter, was occasionally very high afterwards, the *combination* of high temperature was wanting to give it virulence; the epidemic, also, gradually declined, pari passee, with these important changes in the atmospheric element, which hung over our doomed city like a funeral pall, and as they gradually passed away, the refreshing blasts returned, until the health point (the equilibrium) was reached, and the epidemic had ceased, weeks before the great queller, (as is thought,) *frost*, made its appearance, and fully one month earlier than all prior epidemics. The chart B, and tables D, and E, accompanying this Report, are absolutely conclusive of all this.

The remarkable culminating points of each.

Proof.

Well, in all this time, and up to the final cessation and disappearance of the epidemic, what became of the *terrene* condition. *They remained wholly and absolutely unchanged!* Indeed, all knew (or *seemed* to know) that it would have been madness to have *disturbed* them, while the fever lasted, and of course, they were let alone, or not materially altered, (except the cleaning of the streets, which is a very small part of the cleaning of a city—probably not constituting a *twentieth* portion.) What better proof could one have than this of the total seperability of the two conditions? And what better proof could there be that as the separation progresses, the disease subsides, and that when the seperation was complete the disease was extinct! And what can follow—BUT THAT IF

Combination only, fatal.

THE COMBINATION HAD BEEN PREVENTED, SO WOULD HAVE BEEN THE DISEASE!

To sum up—the leading and controling principle that has guided us in all our sanitary conclusions is that the following *postulata* have reached the importance of demonstrated truths, through the facts and reasonings set forth in the Report, viz:

1st. That a close junction and combination of the meteorological and terrene conditions (referred to) is absolutely indispensable to the origination, transmission and duration of yellow fever every where.

2d. That all the terrene conditions referred to, are controlable and removable by human agency; and consequently, are seperable from the meteorological conditions, at man's option, and at man's pleasure. Postulata.

3d. That the atmospherical element can be much modified and ameliorated by man's influence.

4th. That the irresistible corollary from the *probata* are, that yellow fever is an evil, remediable and extinguishable by human agency. Corollary.

The great practical principle of the Report, therefore is, that the yellow fever, although among the greatest of physical evils, is demonstrably, a remediable evil, and it will be the function of a future section to set forth, in detail, the remediable appliances, which reasonably employed and scrupulously enforced, will, I feel confident, extirpate that disease in any locality. Yellow fever preventable.

All this we maintain confidently and boldly, for our conclusions have been neither overstrained nor far-fetched, but are the legitimate progeny from the relations subsisting between cause and effect. If others may disallow or distrust them, most assuredly the Commission could not. How could we, when we know, that in the fullness and accuracy of the facts we have gathered, no toils have been spared; that in collating them one with another and assigning the appropriate weight to each, every care has been taken, with searching and impartial scrutinies for our guidance, to commit no mistake, and as to the facts and analogies we have brought from afar, we have presented the most Duty, responsibility, and toil of the commission.

eminent and reliable medical authorities of the living and the dead, as our vouchers for the facts they have recorded and the deductions they warrant, when applied either to them or to our own special testimonies. It is these deductions which constitute and authorize the results we have proclaimed; and these results constitute the bases of the principles we have promulged and maintain in relation to the origin and causes of and the preventives and remedies for the extirpation and extinction of yellow fever.

Looking then, to the momentous interest we represent in this first great sanitary movement in the South—inviting the utmost scrutiny into our facts, principles, authorities, and the corollaries we have deduced—we only expect that confidence to which, we humbly deem, all are fairly entitled. If, upon such investigation, the recommendations are found reasonable; if they are in accordance with the science and the well attested experience of the present enlightened age; then we hope there will be no hesitation in putting them upon immediate trial. The "let-alone system" has been tried long enough; it has filled and darkened with a deeper gloom the domicils of the dead—cast adrift members of our cherished population—restrained and still restrains large and valuable accessions, and has checked and impaired our advancement and thrift in every branch of industry. The trial has been full and *unsatisfactory*. ALL unite in saying there must be *sanitary reform*; it is written in indelible characters on the age.

Fair examination and immediate trial.

Health is the greatest of earthly blessings; the rules applicable to it are reduced to a science; it is denominated *Hygiene*; it is governed by principles and regulated by laws, almost as precise and exact as those attached to any other department of science. It is the true science of life; it teaches men how to live, and how to prolong life, and when properly applied, it has increased its average duration for terms averaging from ten to twenty years, and surely, this is worth striving for. It is now fully understood, and the most enlightened communities and nations are adopting its principles, and applying them to prac-

Laws of health established a mark of civilization

tice. In our country it has diffused its blessings in proportion to the extent of its application. The adoption of its principles, as well general as personal, is a mark of civilization, and characteristic of refinement. Indeed, sanitary reform is the talismanic *indicium* and distinguishing amelioration of modern reformation.

No ills without a remedy.

From the afflictive dispensation with which it has pleased an all-wise Providence to visit our city during the last summer and autumn, it becomes us to draw lessons as well of wariness as of humility. There are no physical ills inflicted upon man without their uses and their recompense. If the mortuary calamities of the year will drive our people (so long deluded on the subject of their sanitary condition) to open their eyes to the actual truth; if it can be demonstrated, to their satisfaction, that we have labored and suffered under *remediable ills;* that there is yet hope for us, then the fearful lesson we have been taught will not have been in vain, and we shall be able to date from 1853 a new era of prosperity and progress, in all that may be compassed through numbers and commerce—health and thrift.

Value of the lesson.

New Orleans requires sanitary reform, more than any other city.

In no part of the world is a thorough sanitary reform so much needed as in New Orleans. In no country on earth has a place been so much injured through a want of insight into her sanitary condition by her municipal officials. In none have more pains been taken to keep from the people a knowledge of it; the very attempt to enlighten the public in relation to this important interest has been steadily repulsed with denial, if not with incredulity, and the authors have been pointed to as inimical to the city! The obvious effect of all this has been the almost entire neglect of sanitary measures. There is another party who ascribe all the ills said to affect us to a *foreign* source; and again, there is another who despair of the power of man to alter our condition. This fixed incredulity as to the existence of facts on the one hand, and of the exotic sources of importation of the malady on the other, with an utter inadequacy of means of preventing its introduction, or expelling it when it came, is plainly

Risk in speaking the truth.

Causes of our neglect and apathy.

the cause of our apathy at the results, and restraint upon all trials at amelioration. Either opinion is adverse to a change, and from the statu quo in which the city has been kept for so many years, it might be supposed these were the prevalent opinions. They may be all resolvable into an ignorance of our actual condition—of what has produced it, and of those vast influences that have effected the wonderful changes in the sanitary condition of cities all over the globe. A belief in them has heretofore been a barrier to all improvement, has palsied the hand of enterprise, and has driven from our city valuable citizens, and prevented the immigration of labor, of wealth, and of intellect. That these views are sincere there is no doubt; that they are erroneous I trust to *demonstrate* in the course of this investigation; that they are entirely un-American, so entirely opposed as they are to the progressive advancement of the age we live in—so outrageously at variance with what has been clearly demonstrated as the result of the application of sanitary laws and usages elsewhere, I think there is no doubt. I trust to show that they will not bear the touchstone of examination, and that it is the highest aim of patriotism to make an attempt to alter them.

Ignorance of our condition.

Highest proof of patriotism.

New Orleans is one of the dirtiest, and with other conjoint causes, is consequently the sickliest city in the Union, and scarcely anything has been done to remedy it. That the one results from the other, is in exact accordance with the *common sense*, the *common experience* and *common feelings of mankind*, and yet, to use the language of a distinguished investigator, "the city lies quiet, with an open keg of powder with a lighted torch only a foot above it." Like causes produce like effects, under the same circumstances, forever. If then, the city is to be restored to salubrity, there must be a *radical change.* It is the duty of medical men, who, from their studies and province, ought to know the value of sanitary measures, to urge upon the community their great importance, to show the critical condition on which rests the foundation of public prosperity; and if any change is to be wrought, "it is best to be done quickly."

Filth and disease, cause and effect.

No city can bear many inflictions of such a calamity as that of last year without serious deterioration. Concealment and boasting will not help us much. Public confidence is plainly on the wane; the disparaging truth that almost every official as well as unofficial means have been used to conceal, deny, explain away, has been resorted to, and now it stands forth in all its unabashed effrontery, in the very face of well attested and repeated proofs afforded by our Board of Health and our Medical Faculty, that the evil exists, and is remediable.

When, a couple of years ago, an enterprising fellow-citizen (James Robb, Esq.) informed the public that "he would sink or swim with New Orleans," in a great railroad scheme, that was deemed essential to our prosperity, little did he—little did the general public think that anything else was wanting to insure that prosperity but *railroads!* so successful had been the assertion that "New Orleans was one of the healthiest cities in America," in spite of the most unequivocal proofs before the public to the contrary, evincing a self-love, that a public, gullible always, upon that point, is so prone to swallow.

Proof of our gullibility.

It required a great calamity, like that of 1853, to open our eyes to the actual truth. A conviction of an error must precede its correction. A knowledge of causation must precede the application of the means of prevention. On the important subject influencing the health of the community, "ignorance is not bliss." The cost to our city, to reach this conviction is to be estimated by millions, and to her commercial prosperity—to the value of her real estate—to the reputation for perennial insalubrity—figures cannot calculate it. But how shall we estimate it in the orphanage—the widowhood—the loss in valuable citizens—in the products of labor! Shall we say then, that all this *could have been prevented?* Have any preventive means been tried? Have there been any organized sanitary measures? Is not all the world benefited by them? Does not the common sense and common experience of mankind here coincide? Are we to take advantage of what this teaches us, or are we to be an exception to the balance of the world? Does here flourish

Value of knowing the truth.

Cost of ignorance.

No attempt to alter it.

The real mortality for half a century.

perennial health, and have we found out the perpetual elixir? The record in chart A contains what has been the memoria, the terrible memoria of the past, and it belongs to the present people to say what that record shall exhibit in future. I invite attention to this chart now merely to show what has been the mortality of the city for half a century, (I shall direct attention to it hereafter for other purposes.) There may be errors in it, but where records of the past are so difficult to be obtained as they are here, it was impossible to do better.

Average mortality for half a century.

This record then exhibits an annual average mortality during that long period, including the disastrous year 1853, 59.63 per 1,000 of the population—*more than double* what it would doubtless have been, had proper sanitary measures been adopted and efficiently enforced at an early period. To what this large mortality is to be properly ascribed, will be pointed out in its proper place, and we shall then see if our situation will admit of corrective measures or not.

The true wealth of a city.

The wealth of a city depends mainly upon the number of its inhabitants—labor is wealth—population and labor are its most productive elements;—a system of measures that is irrespective of the *poor*,—of the immigrant,—of that class that has raised this city from the *swamp and made it what it is:*—that has cleared the land and drained it,—made the streets—constructed the dwellings, and done so much to develop its destiny, is void of justice to the laborers who are worthy of their hire, and is a reflection upon the proprietors who profit by it. The value of real estate rises with competition where there is no overplus in market—the quantity of merchandise sold, depends upon the number of consumers and purchasers. If there is increased risk and jeopardy of life, an enhanced price is put upon every article sold. High food, (when we ought to have the cheapest market in America)—clothing—merchandise of every description,—high rents,—low real estate,—high wages for mechanical labor of all kinds—high price for professional talent;—these are the real reasons, as I am informed by intelligent merchants at *home and abroad*, why we have the dearest market

The real cause of the high price of everything.

in the United States; for comparatively few will risk their lives or trust their capital, *without additional compensation*, for the additional risk run! Hence the inevitable result, a retardation, if not a blasting check upon commercial prosperity and advancement, and finally, a recklessness of life, and corruption of public and private morals. Disease and crime have a similar paternity. They are twin sisters; as exists the one so flourishes the other, and there is not a doubt in my mind, that the most *effective means of advancing the cause of morals and religion among us, would be the establishment of sanitary measures!* "Cleanliness is next to godliness."

Insalubrity and immorality have a similar paternity.

It is assumed by statisticians after a very thorough examination into the subject, that a mortality of two per cent. or one in fifty, may be fixed upon as a healthy and natural standard of mortality. Attached to the late census returns for 1850, the average mortality for the Eastern District of Louisiana was 20.68 in a 1,000, and in the Western District 21.25 to 1,000, and the average of the entire State 20.92. This was a large average for Louisiana, admitting the correctness of the returns —for 25 per cent. of the mortality of that year was ascribed to an exotic to our climate (Asiatic Cholera.) The whole of England averages 21.80, one of the healthiest countries in the world. Throughout the United States the average is 22.47. The average age of death in England is 29 years, while in America it is but 20. The annual average mortality of the six or eight principal American cities, is a little upwards of $2\frac{1}{2}$ per cent. In the three principal cities of England, it is something more. Is it possible then that $5\ \frac{96}{100}$ per cent., and for the last six years in this city *preceding* '53, it has averaged $6\frac{3}{4}$ per cent.! and this from official *published* sources, is the natural mortality? Is it possible, I say, that this is a *necessary and inevitable* state of mortality? Will the worst enemy of New Orleans allege for a moment that this cannot be remedied? Is our local position—climate—are the pursuits, character and habits of our people so utterly irreconcilable, or unamenable to all sanitary influences, that this enormous mor-

Average mortality of the State.

Of England.

Of the United States.

Stigma of insalubrity.

tality is to continue, and that we are to bear the stigma of being not only the sickliest city in the United States, but in America,—nay, even in the civilized world? It is not only a stain upon the climate and position—but upon the character of the population, and the generally admitted influence of intelligence every where. Did I think so—I should not pen theselines.

Sites of cities not selected on account of their salubrity.

The primary object in the location of sites for cities, has never been, as it should be,—for the enjoyment of health,—the leading idea has always been,—its convenience for commerce,—business, or political purposes. The consequence has almost always been a great penalty in the sacrifice of life, to subserve these subsidiary purposes; and the most expensive means have been resorted to, to correct it, and usually with success. These remarks apply in a remarkable manner to our city—robbed from the swamps—with large bodies of water all around us—a hot climate—a rich earth teeming with organic remains, we have aggregated together *precisely the materials* with only the addition of a large and crowded population, for boundless insalubrity, although second to no city in the world for commercial purposes, that this result should ensue is not only not astonishing—but it would be the operation of a constant miracle were it otherwise, we have synthetically the very materials for its theoretical existence. Under such circumstances, what does common sense dictate? The answer at once will be—correct it—do, as all other cities have done and not lie idle and indolent, resting satisfied in boasting that it was one of the "healthiest places" in *former times* (when there was *no city* at all!)—but put your shoulders to the wheel, rectify the disadvantages of your position in this respect, and take courage in viewing the stupendous works that have been made to improve the sanitary condition of ancient cities—that yet in their mighty relics, are still standing monuments of the great value those people placed on health, and their confidence in sanitary measures to preserve it. It has been said on high authority,* that the climate of Petersburg, in Virginia, during

Bad locality of New Orleans, if not improved.

* Dr. Jackson.

our revolutionary war, was so fatal that no native of the place survived his 20th year. It is now a healthy locality. It has been more recently known that at Bristol in Penn., so great has been the mortality from the influence of neighboring swamps, that from its first settlement, not above two or three children, born there, have arrived at maturity—and this continued until the swamps were drained. Wilmington, Norfolk, Savannah and Louisville, were annual sufferers under the most disastrous fevers, an investigation into and a removal of the causes have restored them to salubrity. The same remark applies to all the northern cities—Philadelphia particularly, (as will be shown by-and-bye) has suffered as much by yellow fever as New Orleans—nay it has been more fatal there, than here, (*even including our last sad year.*) Now she suffers only an occasional out-break, when her sanitary measures have been neglected. The recent occurrence will be found hereafter only a confirmation of this remark. The same remarks are applicable to Baltimore, New York and Boston; they each of them for the time being have had their filthy or infected localities, when their sanitary measures were not properly enforced; but all intelligent practical men among them admit, that the great improvement in their public health, and particularly their freedom from yellow fever, is owing mainly to the strictness of their police regulations. What insurmountable obstacle exists in the position of New Orleans, that prevents her being benefited by the same means?

Petersburg once very fatal; extent; and do. of Bristol; but corrected.

And do. of others.

On what depends the improved health of the Northern cities.

Much light can be thrown on this subject, by reference to the history of other nations (of the old world) as to what has been effected by sanitary measures. In their true interpretation they are but the application of the arts, purposes, comforts and science of civilization to the promotion of health. That this has been extended in proportion to the attention paid to them and that when this has been withdrawn and a relapse into comparative barbarism has resulted, the mortality has increased. It should be gratifying to the pride as it is flattering to the industry and intellect of man, that through their constant efforts only, the salubrity of any spot (not salubrious from position) is main-

Experience abroad.

Man's situation dependent on his industry and intelligence.

tained; when these are relaxed, or when prosperity and civilization decline, the seed of disease, are, as it were, immediately deposited in the earth. There is scarcely a civilized nation of any note mentioned in history, whose progress and decline are not illustrative of this truth. In the flourishing condition of empires, disease has been kept at bay—industry and cultivation has kept pace with population, the arts and sciences have flourished, and man has fulfilled the great end of his being. With the decay of the arts and enervation of a people, cultivation has been abandoned—negligence has supplied the place of industry, and the mouldering columns and dilapidated palaces are the sure forerunners of the pestilence that sweeps its desolating besom over the land, and finishes that which man has commenced. The sombre aspect of the Ottoman Empire, and the flourishing condition of Great Britain, furnish impressive pictures of the truth of these remarks—the former being in the most neglected and sickly state—the latter the best cultivated and healthiest country in Europe. It is thus that fate, foredoomed by negligence and ignorance of invariable physical and moral laws, advances to destroy the cherished pride of many ages. Rome once the queen of cities, is following the fate of Babylon, and from the same cause, is daily diminishing in population. Pestilence advances from street to street, and has already become the sole tenant of some of its finest palaces, temples and churches. Rome, indeed, might be singled out, as affording in itself and as a warning to us, a history of most that is interesting in the police of health. When still the capital of the world, in spite of her liabilities, she overflowed with population, and the disadvantages of her position were counteracted by the activity and moral excitement of her inhabitants, the drainage of marshes, the width and durability of her paved streets and the abundant supply of pure water, from her numerous acqueducts for baths and other domestic purposes.* England, in the 17th century, was desolated by a constant

As shown in England and Turkey, contrasted, and with other countries.

* From an Introductory Lecture, by the author, to his class in the Medical College of Louisiana, December, 1835.

repetition of plagues, they have disappeared under the ameliorating influence of sanitary measures. Such too has been the case in the greater part of Europe ravaged by repeated plagues of leprosy. In several portions of it, the average duration of life, up to the present period, has nearly doubled from the same cause. But a stronger case is presented in Egypt, a country in so many respects similar to our own;—in latitude, climate, and liability to inundation from the great rivers. The plague, (which is in that country what the yellow fever is in this) exists in a sporadic form, every year, and the epidemic form about every two years and where during a recent outbreak (1835) it was fatal to upwards of 38 per cent. of its *inhabitants!*—nay, I may say *natives*, consisting of Negroes, Malays and Arabs, a description of the filthy, crowded, unaired, holes (hardly houses) they live in—the stagnant water and garbage around and a deprivation of every comfort, will readily account for this enormous mortality. An accurate examination into the condition of the classes and circumstances of the various races upon which this carnage fell demonstrated, most clearly, that it existed in exact proportion to the neglect of sanitary measures. It was least among those Europeans, who lived in airy well ventilated houses and severest on those who dwelt in the most crowded and filthy manner. A reference to the history of the same unfortunate country, a successive prey to almost every invader for centuries, will exhibit infliction or suspension of the plague just as proper measures have been adopted or neglected to preserve the health of the people; health, like liberty, requiring eternal vigilance. "During the reign of the last of the Pharaohs, during the 194 years of the occupation of Egypt by the Persians—the 301 during the dominion of Alexander—the dynasty of the Ptolemies and a great portion of that of Rome, EGYPT WAS FREE FROM PLAGUE!* The absence of any epidemic, for this long space of time, was entirely owing to a good administration of government and sanitary police, conquering the *producing causes*

Condition of Egypt.

Mortality with the natives.

Salutary effect of sanitary measures.

* Report of the general Board of Health, of England.

Consequence of their neglect.

of this most formidable malady, in a climate very similar to our own.* The fatalism of Turkish administration, opposes a barrier to all improvement and one of the finest climates in the world, is left a prey to controlable calamities. The sanitary history of Rome affords us a hardly less valuable lesson. The position is a sickly one—and the average mortality even among her highest class was at one period as high as 5 per cent. To correct this she has left some of the noblest monuments which the hand of time could not entirely destroy—in her vast underground drainage and sewerage, with her neighboring marshes dried, and other sanitary measures. With a neglect of these in her successive revolutions of government—disease again became ascendant, and one of the oldest and most lovely countries in Europe, at certain seasons, is scarcely habitable. The examples might be greatly extended, to show, that by the effect of sanitary measures and extending the comforts of life throughout all classes, and these are but sanitary measures, the average duration of life has been in many instances doubled, and in all, greatly extended.

Awakening of the public mind to the value and importance of sanitary reform.

One word more, preliminary to proceeding in *medias res:* The appointment of the Sanitary Commission has resulted from a conviction on the part of the public that the sanitary condition of the city demanded the most serious investigation; that there had evidently been vast errors in the public mind in relation to it; and, apart from all that *might have been* the condition *of New Orleans at an antecedent period,* and which can be readily credited from what we know of the rural districts now, still common sense required us to look it full in the face at *what it is at this time.* The subject itself is not a difficult one. The difficulty alone subsists in reconciling conflicting opinions. It exists in dispelling the cloud of errors that conceal the truth. It exists in getting men to belive what is against their (apparent) interest, rather than

Where lies the difficulty.

* Among these was specially noted was the neglect in *draining the marshes* after the *inundation*—leaving so many stagnant pools to exhale their poisons to the atmosphere. This was rigidly enforced during the Pharaonic and Ptolemaic times. GLIDDON

anything intrinsic in itself; here it is all clear enough, it only requires the plainest reasoning from effects to causes, and *vice versa*, it only has to show what has been done a thousand times before, with *but one uniform result!* It is not the object or intention of the Commission to flatter themselves, the people or the place; our object is to deal with *facts*, not to form hypotheses; to show, if we can, if our situation is a remediable one; if from the apposition of the facts, theoretical views shall be entertained or result, we plead beforehand, avoidance of speculative intentions, and trust that the facts themselves will be estimated at their sole value, no more. We earnestly entreat a patient and unprejudiced hearing.

Not in the subject, but in prejudices and ignorance of it.

SECTION II.

Medical Constitution—what of each month—influence of meteorological conditions upon mortality—Prediction of the epidemic in May—its commencement—interpretation of physical phenomena—peculiar climatic conditions—when they ceased, and the epidemic—the cholera epidemic of November and December, parallel between cholera and yellow fever weather and liabilities, and differences—climatic peculiarities of the year—peculiarities of the epidemic influence on man.

MEDICAL CONSTITUTION.

The Medical Constitution is derived from such a combination of climatic and terrestrial conditions as influence the constitution of man. What that constitution has consisted in (in the present case)—we shall show in another section,—constituting the most remarkable year, known in our annals. We propose now to consider, briefly, what has been the meteorological condition and its special influence on the salubrity of the city (of course in connexion with the other condition) in a succinct summary for each month.

Medical constitution.

What.

During the month of January 1853—the maximum temperature was 71—the minimum 33½—the average 47 and the

Do. of January.

range 37½—the average dew point was 44.93—barometric average 30.113—average humidity .882. The highest solar radiation 47° (a most remarkable difference between the sun and shade for the month of January.) Amount of rain 3.190 inches; winds mostly from the North, and weather pleasant.

The mortality amounted to 679. The largest number being from consumption and amounting to 92, and a very uncommon feature was the occurrence of two cases of yellow fever. The whole zymotic class amounted to 133.

Do. of February. During *February* the maximum of the thermometer was 77—minimum 36½, average 56 and range 40.50—the average dew point 50.48—average of the barometor 30.238—average humidity .845—average amount of vapor to each cubic foot 4.579—the highest solar radiation 37—winds very variable—and more from the South and Southeast, with increase of force—amount of rain 4.600 inches. The amount of the mortality was 441; of consumption 83, of the zymotic class 65—another case of yellow fever being returned.

Of March. During *March*, maximum of the thermometer was 78, minimum 43, average 62.63, and range 35—the average dew point 56.17—average of the barometer 30.262—average humidity .832—average amount of vapor in each cubic foot 5.381, the highest solar radiation 40— winds mostly North, and amount of rain 6.870 inches. The amount of mortality was 463; of consumption 90, of the zymotic class 54—of pernicious fever 2—of scarlet fever 14.

Of April. During *April*, maximum of the thermometer was 85—the minimum 50, the average 70.37 and range 35—the average dew point 66.60—average of the barometer 30.260—average humidity .833—average amount of vapor in each cubic foot 6.804—the highest solar radiation 29—winds mostly from the South, and amount of rain 1.848 inches. The mortality was 532; consumption still being the largest and amounting to 80—the zymotic class being 89—scarlet fever 19—measles 20—pernicious fever 5—and diseases of the nervous system 75—a very large increase over any preceding month, more than double

that of March, and first showing the impress of what was to come.

During *May*, the maximum of the thermometer was 88—the minimum 60—the average 73.82, range 28—the average dew point 67.11—average of the barometer 30.237—average humidity .842—average amount of moisture in a cubic foot 7.601—the highest solar radiation 39—winds Southerly and Easterly, amount of rain 3.840—a largely increased combination of injurious influences. The moisture had greatly increased with the high range of temperature, although the precipitation had been small, below the average of the month—as the preceding had been, eminently showing how erroneous it is to calculate the amount of moisture from the quantity of rain that falls, and the cause of the mistake that some of the communicants to the Commission have fallen into in describing the condition precedent and accompanying the existence of the epidemic, while on the same page, a few lines off, the evidences and effects of *this moisture* are pointed out—in the extensive prevalence of mould; and a vegetable life that alone predominates in very humid weather, and the existence of a stagnant atmosphere, or such winds as are known to be solvent of a large amount of moisture.

Of May.

Moisture mistaken for dryness.

The high combination then of heat and moisture, with so small a precipitation, together with a most remarkable elevation of solar radiation, greater than I had ever seen it, so early even as January, (see chart,) assured me that the climatic influences were very remarkable, and when I saw the filthy condition in which the city was—the great extent of exposure of the original soil of the city—for gas, water, and other purposes, the digging of the Carondelet Basin, the cleaning out of canals, and the embankments and excavations for railroad purposes, and the reflection on the fatal consequences that these had heretofore always brought on our city, with the chart A before me; this early connection of the atmospheric element with the physical showed, in the combination, a foreshadow of what was to come, and enabled me to give

Grounds for the prediction of the epidemic in May.

a warning as early as the middle of May, in the Academy of Sciences, in this city, of the disastrous consequences that were to follow, and to some scientific correspondents. How that prediction was verified I now proceed to point out.

Early cases.

The mortality now reached 671, of which the zymotic ascended to 143, consumption now declined, diseases of the nervous system reached 145. There were only two cases of yellow fever formally reported on the *mortuary record*, though the investigations of the Sanitary Commission have discovered several others, and there were several recoveries during the month from the disease, occurring in different parts of the city, without any intercommunication in private practice, in the upper part of the city.

In June.

During June the maximum temperature was 91° on three several days, the minimum 73, the average outside as before) 80.73, and inside 81.46, and the range 21. The average dew point had now reached 73.20, its maximum having been upwards of 80, and its minimum 66.3. The average humidity was .815; the average amount of moisture in a cubic foot had reached the large amount of 9.136 grs., nearly three times the amount in January. The maximum solar radiation was 35. It now became greatest at our nine o'clock observation,

Tropical character of the season.

which, with the almost daily showers, showed the tropical character of the climate we were now experiencing. The rains in May were about weekly; on the 9th of June the rains set in, and fell almost daily the rest of the month. The barometer continued unusually high, as it had done, and which continued during the existence of the epidemic, not finally falling until December, coinciding with an observation of Mr.

High barometer.

Prout, preceding and accompanying the outbreak of the first great epidemic of cholera in London, this rise being cotemporaneous with the occurrence of Easterly winds; accordingly the NE., E., and SE. winds now predominated greatly, with that influence on the system they are always known to produce, the first, especially, during our epidemics. The rise was ascribed to the diffusion of some gaseous body through

the air of the city considerably heavier than the air it displaced. —The mortality had now reached, during the month, six hundred and fifty-six; consumption, which had formed a prominent feature in the weekly mortality, was now greatly reduced, near to its normal standard; and scarlatina, which seems to be a prodrome of the epidemic yellow fever here, as it is in various other countries, was now reduced to half its mortality during the preceding month, and thence gave way to the epidemic, and scarcely made its appearance again, until December. Precisely opposite was the influence of the season on the class of *nervous affections*; almost keeping pace with the epidemic, it reached its acme at the same time and then declined. The class was unusually large throughout the year.

Antecedence of scarlatina.

Predominance of nervous affections.

The zymotic class began now rapidly to augment. Bilious remittent, pernicious, typhoid, and malignant fevers greatly increased, and more than twenty deaths by yellow fever were reported.

We are now approaching the limits of that great epidemic influence, which so severely afflicted our city, and extended its ravages in an unprecedented degree, nearly throughout the Southwestern states; in many instances even desolating portions of the rural districts, for the first time. The period of its commencement may be fairly dated from the second week in July. By that time physical agents had sufficiently matured their power to show their influence on man. Let us not exclaim, at this late day, as of old, "*vis est notissima, causa latet.* It is the duty of the profession, standing as sentinels upon the great watch-tower of public safety, (as to health,) to find out the causes of effects so disastrous. Providence permits no evils, without there being corresponding remedies; and these remedies can only be properly understood or applied, but from a previous knowledge of their causes.

In July.

Duty of physicians.

No evil without a remedy.

To the meteorologist, to the observer of causes and effects, and the influence of physical agents, the phenomena precur-

sory to, and during the existence of an epidemic, are not at all obscure. The alarm, the agitation of mind, the anxiety for the sick, which usually exist at this period, is not very favorable to exact observation. The difficulty then exists to curtail the exuberance of the imagination, and record the nakedness of truth. A distinguished French traveler, (Chateauvieux,) in describing an epidemic, says: "No visible signs mark the existence or approach of this pestiferous air. The sky is as pure, the verdure as fresh, the air as tranquil, as in the most healthy region. The aspect of the elements is such as should inspire the most perfect confidence; and it is impossible to express the horror which one experiences, on discovering that all this is deception; that he is in the midst of dangers, of which no indication exists, and that, with the soft air he is breathing, he may be inhaling a poison which is destructive to life." Now this vivid description, although generally credited, is mostly a fancy sketch; and the philosophic observer should interpret the facts as they really exist; the "pure sky" is evidence of excess of radiation, and the "tranquil air" is but stagnant, suffocating saturation, or the wind blowing from unusual quarters, laden with moisture, or deprived of it, (as the simoon,) is destructive to the vital principle. The filth and the stinks around him, warn the observer that the elements are at war with his being; that his constant skill must be exercised in the application of corrective measures, and that the equilibrium of his constitution must be constantly maintained. Elemental disturbances did exist, both precedent to, and during the epidemic; and a long experience, of near thirty years, has shown me that they have *always existed;* if they have not been always properly interpreted, it was because the precision of science was not so rigidly applied to the laws of causation, nor were her votaries then required to explain everything, as now.

Interpretation of physical phenomena.

A disruption of the ordinary catenation of seasons was early apparent. The winter was unusually mild; great and unusual

Prodrome of the epidemic.

radiation evinced an elemental derangement. Spring came "before its time;" summer leaped into her lap; and this brought, before the system was prepared for it, blighting autumn with its associate diseases—the full force of radiant power, great heat and intense saturation. Here was one branch of the "shears" prepared for its influence; the other was supplied in a most unusual disturbance of the earth, and the presence of excessive filth.

No precursory influence on man.

On man this great epidemic was not heralded (as is often experienced) by the severity of its *avant couriers*; no precursory violence announced the approach of the disease; it was mainly in the atmosphere that that portion could be predicated from (radiation); on earth all was quiet and calm, but, as it often happens with cholera, it was the "torrent's stillness ere it dash below," with a few cases of yellow fever as early as May, as a kind of warning to the authorities, which increased to twenty in June, still unheeded; during July it rapidly, but regularly augmented, at a geometrical ratio, each successive week, and when it reached upwards of one hundred victims a day, our drowsy Councils established a Board of Health!

Great moisture.

During July the maximum temperature was 89°, minimum 71, average outside 79.88 and inside 81.68, (our table in the appendix is limited to outside temperature); the outside had been lowered by frequent rains, as is usual in tropical countries; range 18. The average dew point 72.13, the highest being 80.9, and lowest 66.5, (the day after!) The average daily humidity .825, the *average at sunrise* being .930. The average amount of moisture in a cubic foot being 8.798 grs., the *average at sunrise* being 9.600! The maximum solar radiation was 32°. The rains were now truly tropical, not only in number but amount, having rained on eighteen days and four nights during the month. The thermometer continued very high, and averaged 30.265, its maximum this (as during last month) being 30.37. The predominant winds were now mostly from our rainy quarters, SW. and W., blowing over

an extensive region of swamps, and the bed and banks of the river for upwards of eighty miles. But what most distinguishes the month in this respect was the unusual number of calms noted in my register, amounting to twenty-six during the month, showing, nearly one-fourth of the month, the atmosphere to be in a stagnant condition, hot, saturated, filthy. The gutters were, twelve hours after a rain, reeking and bubbling up with gaseous products, all highly inimical to animal life. (I am indebted to my friend, Dr. Benedict, for keeping my meteorological journal this month.) The consequence of all which was a total mortality of 2,216, and the epidemic being fully established, those from yellow fever amounted to 1,524, and the whole zymotic class 1,734.

Great stagnation of air.

Filthy gutters.

In August.

During August all the meteorological and mortuary conditions reached their culminating point, *and about the same period*, as will be seen by reference to the chart B, and the tables C, D, E, in all which this is shown in great detail; the influence and the inference are both clear and indisputable. The maximum thermometer was 91°, minimum 72°, average 81.25, the maximum dew point 79.4, minimum 66.2, and average 78; average temperature of evaporation 76.13, average barometer 30.194, average humidity .873, average at sunrise .950, only requiring one-twentieth more for complete saturation *every* morning! this being actually noted at fourteen observations, the number of grs. per cubic foot, on an average for the month. being 9.737 grs., and at 9 P. M., being 10.045. more than three times the amount in January, and at the highest temperature, the highest solar radiation having attained the almost unprecedented height of 61°! although there was but one day during the month that was marked *entirely clear* the whole day, (the 30th,) raining nearly every other day, some days two or three times in succession, and the amount during the month reaching 7.016 inches. The winds were mostly E. and NE., and the number of "*calm*" days, without a parallel here, amounted to seventeen! or, at *sixty-eight observations*, evidence of a close, suffocating, inelastic atmosphere, which, with the antecedents and

High temperature, and almost average saturation.

High radiation.

Unprecedented saturation.

Unparalleled stagnation of air.

terrene accompaniments, most satisfactorily accounts for the unprecedented mortality. This amounted to 6,201, and the mortality by yellow fever to 5,269, the whole zymotic class, dependent upon the same general conditions, being 5.338, besides the "unknown," and diseases of the nervous system 209. Mortality.

The month of September has been usually the most fatal month, on an average of more than half a century here. This year, however, it was something less than one-fourth that of August. The meteorological condition had materially changed, the maximum temperature being 86°, minimum 60, average 76.23. The maximum dew point 78°, the minimum 50.3, and average 70.93, average temperature of evaporation 72.44, average barometer 30.191, average humidity .857, the highest solar radiation (in the early part of the month, the 4th,) being 45°, winds mostly N., E., and NE.. The rains continued until the 13th, amounting during the month to 5.045 inches, a large precipitation for September. After this there were but two light showers, and the disease rapidly declined with the change in the meteorological condition, which was considerable in every particular. This is a uniform fact, and especially in reference to the hygrometic, as shown by reference to my records of former epidemics. In Septemb'r. Great climatic change.

The whole zymotic mortality was 1121. The yellow fever being 1066, and the epidemic, with the climatic change in the second week, evidently declining—the whole mortality for the month amounting to 1627. Attention is invited to tables C, D, E, which contain the daily meteorological and mortuary condition in great detail during the three epidemic months, and I would gladly add the whole year of both, could the latter be obtained, for the gratification of scientific men, to show how much climatic conditions influence our health, and especially during this remarkable year. Epidemic retiring.

In interpreting the connexion of meteorology with *mortality*, two circumstances are to be taken into consideration: First, the amount of vital resistance to be overcome previous to the attack (for it is never at once.) Second, the period to elapse before resulting in death. These, as yet, are undeter- The mode of interpreting the influence of meteorology on mortality.

mined and irregular, dependant upon individual susceptibility and constitutional power. The second is easier estimated than the first—for the *average* duration of the *disease* is known to be from three to five days. The *period of incubation* is less known. We sometimes find, in the advanced period of the season, that a sudden great fall in temperature produces a frightful mortality; cutting off at once all who are very sick, unless carefully protected; and here a little foresight of a coming change can often be put to most valuable use. In this case it is almost equally apt to prevent the farther continuance of the disease, *provided the change is a permanent one.*

In October. During *October* the maximum temperature was 81°; minimum 48°, and the average 66, 81; the maximum dew point 74° 5; minimum 31° 9; average 59° 31. The average temperature of evaporation 62.30; average barometer 30 231; average humidity .804; maximum solar radiation 41°.

Climatic change continued. Winds mostly from East and North but two days, on which it rained until the latter part of the month, one night preceding the frost of the 25th, and having rains two days after, amounting in the whole to 5.175 inches, which exceeds the amount of precipitation for any October during the last ten years, excepting that of 1849. Range of

Epidemic, as such, ceased. "*drying power*" during the month, 30. Here is a great reduction in the destructive elements in every particular, and the mortality greatly declined. Indeed, this has continued pretty regularly ever since the 10th or 13th of September, about which period the climatic changes occurred. These are often more obvious to one's feelings than by our instruments, and the time is not distant when these can be stated more precisely. The mortality from yellow fever during the month was 147; of the whole zymotic class 243, showing that the epidemic feature had almost entirely departed. The entire mortality was 674.

In November. During *November* the maximum *temperature* was 75°; minimum 45°; and average 66.92. The maximum *dew*

point 69.5; minimum 36.1; average 59,46; average *temperature* of *evaporation* 61°.85; maximum solar radiation 46°. Winds mostly East and Northeast. This direction of the winds has been very remarkable and particularly from the East for the last four months, exceeding the average of the last five years at least 200 per cent. The maximum barometer occurred on the 18th, and was 30.46—a very unusual heighth here—soon after which the cholera broke out. The average for the month was 30.329; average humidity .846. There were but three days of rain until the 26th, '7th '8th, '9th, when they were heavy, and the amount, of precipitation for the month reached 7.032 inches; range of "drying power" 20.

Unusual East winds.

The average for the month was 30.329; average humidity .846. There were but three days of rain until the 26th, 27th 28th and 29th, when they were heavy; and the precipitation for the month reached 7.032 inches. Range of "drying power 20.

The mortality for cholera was 177. The yellow fever mortality was but 28; and the whole mortality 987; and the zymotic class 318.

The condition precedent to and accommpanying a disruption of the cholera here, is irregularity of *climatic movements*—a high and low barometer, and mostly the latter—and a high and low drying power, mostly the former.

During *December*, the maximum temperature was 68 on the 8th, and the minimum 34 on the 20th—the maximum dew point 65, minimum 24.2 on the 31st—average temperature of evaporation 50.67, maximum solar radiation 25°, winds continued from East, North, Northeast, the maximum barometer 30.48 on the 2d, when the cholera was at its height, and declined to its minimum 29.57 on the 30th, much the lowest point it had reached during the year. Average humidity .823, and the average number of grains of moisture in the atmosphere was 4.167 to each cubic foot, less than there had been since January. There was but one slight shower of rain to the 13th, and this occurred on the 7th; the amount was only 200th of an inch—the total for the month

In December.

Great barometric variations.

Air comparatively dry.

was 4.560, and under the average for *any December*. The cholera ceased soon after the middle of the month. New Orleans was in no condition to *localise it, as at this period there had been some attempt, during our long scourge of yellow fever, to cleanse* the city! This epidemic, so different from its predecessor and incompatible with it, is doubtless influenced by meteorological conditions that differ also. They have never existed here as *epidemics* together, they consequently depend upon somewhat different elements for their existence, as such. The latter requires exalted temperature and high saturation, and is essentially a disease of the hot season—the former exists in a lower temperature, with much less and very *variable humidity* and *great variation of the drying power*, often very exalted, (such at least, has been the case in this climate,) irritating, by rapid evaporation, the mucous surfaces, producing in them an erethism, always a prodrome of the disease—such is just the condition attendant on epidemic influenza—the almost universal precursor of cholera. The dew point is also essentially different in cholera from* what it is in yellow fever. While in the former it varies from 48º to 70°, in the latter it rarely descends below 60° and ascends to 80°—these are very remarkable differences. I speak of that state of the atmosphere sufficiently aggravated to produce an *epidemic* of these diseases respectively. I do not here allude to incidental, sporadic or endemic cases; *they* may occur under circumstances somewhat different from these, and are dependant upon local circumstances that have not been subject to analysis. And be it remembered that I speak of the climate of New Orleans, with the records before me. The predominant winds are also different—while in cholera they are the East and Southeast, in yellow fever they are the East and Northeast.† The individual liabilities are also different; while

Parallel of cholera and yellow fever.

Climatically and physiologically.

Their dew-points.

Do. of winds.

* Or lower.

† How deeply it is to be regretted that there is no meteorological record of that remarkable occurrence of cholera here in the fall (Oct.,) of 1832, when the yellow fever existed to a great extent in this city. A *few days* after its outbreak, the yellow fever entirely disappeared, and was thoroughly supplanted by the worst cholera epidemic ever witnessed in this city. Being on a visit to the cholera districts in the North, I did not reach here until it subsided, which was as rapid as its advent, from a sudden fall of temperature with North winds. In the epidemic cholera of the

with the former, a full habit—sanguineous temperament and high living, predispose to the disease, it is a protection to the latter. The one attacks the cerebral and sanguiferous system and mucous surfaces—with the local developments dependant much on the habits and condition of the individual, the other attacks the great system of organic life, giving increased activity to one secretion, whilst paralysing all others, leaving cerebral life, with all its integrity, to the last moments of existence. The one occurs with a high atmospheric pressure, the other under a low one, or this predominates. Both belong to the zymotic class, they are invited and localised by filth—want of ventilation, &c. The difference in the climatic elements may greatly aid in explaining their different effects on the system. Such certainly is the result of our experience here in the several epidemics of cholera which have occurred in this city during the last twenty years, and the very fact that they never prevail together, but successively here, is a proof of the correctness of the remark that it arises from the difference in the meteorological elements, that constitutes the sole or principal dissimilarity in the remote causes, and that, still, if the localising condition, (filth, the hot bed of corruption and vitiation) be not present, immunity is enjoyed.

Pathological differences.

The mortality from cholera, during the month was 332—of yellow fever but 4—of the whole zymotic class 429, and the total mortality for the month 844. The table F, prepared by Dr. Macgibbon, for the Sanitary Commission, embraces the detailed mortality for the whole year, classified, with the months, ages, nativities, colors, sexes, &c., and made as correct as it was possible, under the difficulties of procuring the materials.

Mortality of the month.

After this detailed application of the meteorological condition and its special consequences, in this most remarkable year, it

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succeeding year, I find no record of the dew point in my meteorological journal, (hygrometric observations were only commenced by me in 1834, and have been kept up ever since.) But I find in my journal of the period of the epidemic "a great fall in the thermometer on the 8th June, (and of course the hygrometry) a heavy fall of rain on the 9th, over five inches, and severe thunder and lightning; a change of wind from the Southeast which had predominated, to the Western quarters, and the disease gradually declined, it *reached its acme on the eighth!*" and terminated about the 25th.

will be instructive to review the two conditions productive, in combination, of such disastrous results, and see how they differ from those of other years. If in the appreciation of those at the command of science—the causes pointed out do not seem commensurate with the results, it is to be recollected, that it is but "yesterday" (as it were) these definitive causes have been developed by scientific investigations and applied to human maladies, that in the great store house of nature, the mightiest results have been caused by apparently the most insignificant means, and that in *no human infirmity* can we yet measure the *precise amount of causation.*

Great results often proceed from apparently insignificant causes.

The annual *average temperature* in 1853 has been less by about two degrees, and this has occured during the rains, it has been accounted for by Prof. Blodget by the tropical character of the season, the daily curve of temperature being much less sharp during the rainy season, hence the daily mean of temperature is less than usual, this has been specially verified here. *More rain* has fallen than any year during the last thirty excepting a fraction more in 1839.* The *barometer* has been much higher than any year I have ever noted it, and continued so until some time after the occurrence of the cholera in December. The *winds* have been nearly one-third more Easterly than during the last five years, and especially during the epidemic; more Northerly—not half the usual Southerly winds, about one-third more of Westerly winds—in this respect, what has eminently distinguished the season has been the unusual occurrence of *calms*, or stagnant state of the atmosphere, for the whole year; it has been about four times as many as usual, and for August more than eight times as many calms as the average of the last five years. The "*drying power*" has been greater for the whole year than usual and especially for December. The *radiation* was materially different, as is usual, in yellow fever years, the highest amount existed during the yellow fever, (and this is commonly in September,)—this year the largest mortality oc-

Climatic peculiarities of the year.

* I was not here in 1847, being absent in Vera Cruz—more rain is alleged to have fallen then.

curred during August, accordingly the highest radiation occurred then. In a series of non-yellow fever years, the culminating point existed in May—vegetation probably then requires it most. High radiation and sickness concomitant.

So great is this "drying power" in a climate where moisture is deemed the "*only sinner*," that at times it becomes very embarrassing in the treatment of disease, and it is of great importance to remdy it. It occurs not only in cholera, but in cramp, in rheumatism, in pneumonia, in scarlatina, and sometimes even in yellow fever; it makes the meteorology of the sick room a part of the proper armory of the profession. Covering the body with blankets and bed clothes does not prevent the rapid evaporation that ensues, in a dry period, not only from the surface of the body, but from the lungs. In the more elevated sierras of Mexico, where the perspiration passes off with such celerity, from diminished atmospheric pressure, that sensible perspiration (or sweat) is not often or long seen, there is worn a kind of close woven (or Canton flannel) under garment, that resists this rapid desiccation, and is very comfortable. I am in the habit, at times here, of changing the hygrometry of the sick room by having water poured on a heated iron. Too much dryness, then, may be a cause of disease as well as too much moisture. Effect of great "drying power."

England, enveloped in her fogs a large part of the year, is, with her *low temperature*, one of the healthiest countries in the world; while New Orleans, with her great moisture and *high temperature*, complicated as it is, with other powerful agencies, is one of the sickliest. The exact amount required for health is a subject for future investigation. The Sanitary Commission has tried, in vain, to procure such an array of facts during our last memorable year, as to justify some generalization on the subject. It is not abandoned; it is too valuable, if such a record *can be* procured of the exact *period of occurrence* of the principal classes of disease of a year so distinguished, as well for its meteorological as mortuary condition, it should be done. The meteorology of it Difference between moisture and high and low temperature.

we have. But three professional gentlemen, Drs. Benedict Kovaleski and Copes, answered our circular, furnishing *dates of the occurrence of cases of disease during the whole year*—too few for important deductions.* It does not require that statement to show whether meteorology has any influence on man, there is not a day or month of this, or any other year, in which this is not shown to the satisfaction of every mind capable of observing, and not closed against conviction. The contrary supposition embraces the belief, neither more nor less, that man is independent of climate—nay, of external agents—is so absurd that I dismiss it with no further notice than this bare reference to the hypothesis that has nothing reasonable to support it.

In closing this imperfect analysis of the "epidemic constitution," it is proper to refer to those specialities for which this epidemic is entitled to the paternity. Hereafter it will be shown that the fever of this year has been the same in all its essential features with those of preceding years, with the usual variation for season, and that all the stories of its African, Rio Janeiro or West India nativity, are as equally groundless as the importation of the epidemic itself. It is doubtless true that its malignity was hardly ever equalled with us and that there were sections of the city where many cases terminated within twenty-four hours from the commencement. It was remarked that an unusual number of children were attacked, even those born here, *unless both parents were themselves creoles*—a much larger proportion of the colored population than common; the remarkable number of forty-four are reported (although *much less* than in the country)—females also suffered more, and especially those pregnant, than in any year since 1835—a fine miliary eruption was usually seen on the skin within twenty-four hours from the attack—it was the harbinger of safety as long as it kept out—

Peculiarities of the season.

Creoles exempt.

Influence of color and sex.

* Since the above was written I have obtained, with the assistance of the Sanitary Commission, near 10,000 cases of certain classes of disease, supposed to be most under the influence of meteorological conditions, at the dates of their occurrence, during this interesting year (1853), which I intend digesting with their corresponding meteorology at as early a period as practicable.

its repulsion the signal of great danger if not of fatality; this was followed during convalesence, with troublesome furunculi, throughout the body, it even occurred in many who had not the fever; this same eruption characterised the great epidemic yellow fever of Philadelphia, of '93, many were affected with carbuncles, and in several instances buboes during the fever. The perspiration was offensive even with those who were careful enough to bathe twice a day, the same was noticed of the above Philadelphia epidemic. The appetite for strong food and drink was materially lessened with those who had extensive and exhausting professional labor to perform, and its indulgence increased the exhalation from the body above spoken of. These, however, I have repeatedly observed in former epidemics, a large proportion of the telegraph operatives fell victims to the fever.

Eruption, carbuncles, and buboes.

The stimulus of the generative power, which the distinguished historian of the great Philadelphia epidemic of '93, Dr. Rush, mentions, and the facility of and liability to conception, even with those who for ten or twenty years had ceased bearing, also existed; (noticed here by me, and published in my account of the yellow fever of 1833;) it seemed a kind of law of compensation like that which attaches to the poor in sickly countries; of multiplying their births in proportion to the mortality. The rise and decline of the mortality in the zymotic class (or preventible mortality) has been traced in its successive monthly stages, its culminating point this year being August instead of September as heretofore, uniformly, unless when epidemic cholera shall have been the principal disease; this being essentially a winter disease with us, or at least, occurring at any other season than the summer, it makes the angle in that part of the chart A designating the *monthly liabilities*, much less sharp for September than it otherwise would be.

Law of compensation.

Class III, of monoxysmal or *contagious maladies*, had its greatest prevalence in May, and was at its minimum in September.

In May most contagious malady.

The class of "nervous diseases" had also its culminating point with the highest temperature in August. That of pulmo-

Nervous diseases in August.

Reverses of the pulmonary.

Intemperance most injurious in summer.

Thunder storms and lightning during epidemic.

Unless a hurricane.

Gas in the gutters soon after a rain.

nary affections again reverses the figure. Intemperance reaches its highest amount as the fears of the fever increase, and doubtless added an immense amount to the whole zymotic class. This table shows here, as every such table shows, that the "unpreventible diseases" are a constant quantity, and that our enlightened efforts are mostly to be directed to the variable classes (mainly the "zymotic") which man has (most fortunately), so much power to control. There exists a popular error of the "purifying" influence of storms accompanied with thunder and lightning; it is something similar to that denominating a heavy atmosphere (high barometer) "light"—because with a low temperature it is bracing, and a light atmosphere (low barometer) "heavy." Storms of thunder and lightning, I have noticed for thirty years in this country, to exist during epidemics, and instead of "purifying the atmosphere," to injure the sick; they existed throughout the epidemic here and elsewhere last year, They have been noticed during the epidemics at Rio and Demarara and other places. It is the opinion of many physicians in tropical climates, (Belot at Havana, and others at Rio, &c.,) that this development of electricity increases the cases of yellow fever; that in proportion to the violence of the storms the disease augments in violence and that it aggravates existing cases, (and so in cholera,) unless a hurricane occurs, when (so great is the change) there at once occurs a great temporary abatement of the disease. The frequency of the rains are shown and their amounts during the epidemic months, exhibited in the meteorological tables for those months, in detail. It was remarked also as frequent as the gutters were thus cleansed when stagnant water still remained, that discolored slimy pellicles covered its surface, bubbles would issue, within twelve hours after these ablutions; I called the attention of my chemical friends to it and advised its annalization. It is to be greatly regretted that the arduous nature of our professional duties during a severe and exhausting epidemic curtails greatly our ability to make that extended sphere of experiments which science and humanity both demand, for these are twin sisters,

TABLE G.

Monthly Returns from each of the Cemeteries.

1853.	Jan.	Feb.	Mar	A'ril	May	Ju'e	July	A'g.	Sep.	Oct.	o v	Dec	Total.
Cypress Grove No. 1.....	24	28	23	36	31	34	43	151	53	25	18	14	480
No. 2, or Pottersfield.....	61	56	53	55	73	56	139	1424	361	127	150	135	2690
Odd Fellows' Rest.....	2	4	5	7	..	11	13	52	14	7	4	2	121
St. Patrick's.....	5	57	68	63	95	123	486	1038	262	86	127	102	2558
Charity Hospital.....	89	67	85	69	72	94	604	917	227	184	122	108	2638
Lafayette, or 4th District...	92	69	84	82	121	137	469	1177	207	74	110	124	*2696
St. Vincent de Paul.....	89	86	79	82	146	104	224	1040	302	93	82	119	*2446
Hebrew, on the Ridge.....	2	..	3	4	..	1	...	7	2	2	1	...	22
Hebrew, Lafayette.....	....		....	....	1	2	25	71	12	2	4	7	*124
Protestant.....	30	29	31	29	38	22	60	218	68	29	33	47	*633
St. Louis No. 1.....	17	23	18	27	18	14	20	67	39	33	22	35	*334
St. Louis No. 2.....	61	68	59	56	79	70	49	136	74	38	74	66	*830
Totals.....	518	487	508	510	676	668	2132	6298	1621	700	747	759	15572

* Those thus marked (*) are within the city limits, and amount to 7063.

EXPLANATION.

There are some discrepancies in the report in relation to the monthly mortalities—the monthly returns by the cemeteries—the aggregate mortality for the entire year, and number in the tabular return of yellow fever cases, with those from which I have made my calculations, which require notice.

For the first three, one explanation will suffice, for about *one-third* of the year was there an *authorized board* to record the number, and the cause of death—for the balance of the year it has been difficult to get the cemetery returns and they do not correspond.

In relation to the number of deaths by yellow fever, many were stated as "unknown" "unspecified"—whose deaths were probably caused by yellow fever;—anxious to arrive as near the truth as possible, the Sanitary Commission has authorized me, during the epidemic, to add a large portion of these to the yellow fever mortality, which I have done in the daily returns in the tables C, D, E.

and the measure of the utility of the one depends upon the extent it can advance the other. This is our apology for not accomplishing more in the most memorable year for both that our country has yet known, and we feel humbled at the small offerings we have been able to make at the altar.

It is as well to mention, without knowing that there exists any connexion between them, that there was a slight shock of earthquake at Biloxi about the period of the occurrence of the fever there; that simultaneous with the outbreak of the fever here in May, there were earthquakes in Georgia, and that at the precise period when it was most fatal viz: the 20th and 21st of August; there were earthquakes in Ohio and Thebes, all of these were attended with thunder and lightning.*

Earthquakes during the summer.

SECTION III.

Estimate of the life cost of acclimation in New Orleans from nativity—to the natives of Louisiana—to those of the Southern and Western States—to the Northern States—to the North-Western States—to the British population—to those from the West Indies, South America and Mexico—to those of Great Britain and Ireland—the North of Europe—of Middle Europe—of Western Europe—of the mountainous parts of Europe, and the South of Europe, together with the probable causes of the remarkable differences.

The classes of our population, with regard to their social position on whom this epidemic has borne most heavily, connot be shown by any recorded proofs; and must be left to be inferred from the exhibits from the several cemeteries, in which they were interred, and they are to be seen in Table H. The poor are the greatest sufferers always, and especially in insalubrious places, and during epidemics; they live in more crowded, filthy, and uncomfortable dwellings. They are ignorant mostly of sanitary laws, are unable, or find it inconvenient to apply them, and hence, require the strict surveillance and kindest concern of a paternal government. The most of those

Social position as represented by the cemeteries.

*Meriam.

who constitute this class, are the *hands*, the *machinery*, that make the wealth of a community, and give it its power; and hence, are the rightful claimants of its fostering care.

Cost of acclimation.

Table H, has been constructed from the materials of which our mortuary table of GENERAL MORTALITY has been formed, to show the liabilities of our heterogeneous population to the epidemic yellow fever from NATIVITY. For this Mr. De Bow (our fellow townsman) has kindly responded to my request, and fur-

TABLE H.

COST OF ACCLIMATION,

SHOWING THE LIFE COST OF ACCLIMATION; OR LIABILITIES TO YELLOW FEVER FROM NATIVITY, AS EXHIBITED BY THE EPIDEMIC OF 1853, IN NEW ORLEANS.

	NATIVITIES—STATE AND COUNTRY.		Population in 1850. United States.	Estimated population in 1853.	Estimated mortality from Yellow Fever	Ratio per 1000 of the Population.
1		New Orleans,	38,337	46,004	140	3.58
2		State of Louisiana,*			25	
3	Southern States.	Arkansas, Mississippi, Alabama, Georgia, South Carolina,	2,655	3,176	42	13.22
4	Northern Slave States	North Carolina, Virginia, Maryland, Tennessee, Kentucky,	4,160	4,984	153	30.69
5	Northern States.	New York, Vermont, Massachusetts, Maine, Rhode Island, Connecticut, New Jersey, Pennsylvania, Delaware,	8,898	10,751	353	32.83
6	N. Western States.	Ohio, Indiana, Illinois, Missouri,	1,693	2,030	92	44.23
7		British America,	318	381	20	50.24
				66,945	.825	12.32
8		West Indies, South America, Mexico,	1,693	1,790	11	6.14
9		Great Britain,	3,832	4,598	240	52.19
10		Ireland,	22,093	26,611	3,569	204.97
11	Northern Europe.	Denmark, Sweden, Russia,	491	588	96	163.26
12	Middle Europe.	Prussia, Germany,	14,765	17,718	2,339	132.01
13	L'w Western Europe.	Holland, Belgium,	127	152	50	328.94
14	Mountan'ous Europe.	Austria, Switzerland,	663	797	176	220.08
15		France,	8,306	9,967	480	48.13
16	Southern Europe	Spain, Italy	1,848	2,217	61	22.06
			109,679	62,648	7,011	111.91

* These were not all the States represented by population in New Orleans; but they are all that were debited by deaths from yellow fever, and all that could be estimated from; although there were 26,590 that were necessarily unrepresented in these calculations, most of whom, were colored, however.

nished me, from the U. S. Census Bureau, of which he is the honored and intelligent head, the aggregate and nativities of the population of the city for 1850. That furnishes the first column; upon that I have calculated the population for 1853 for each country respectively, by adding a fractional increase per cent. over that from 1847 to 1850, (the most recent fixed periods;) that supplies the second column. The third is derived from the Cemetery Reports *during the prevalence of the epidemic*, but as there was a large number that was classed as "unknown," it was deemed the nearest approximation to the truth, as in all our records it is little better than *approximations*, to add a large per cent. of these, for such is the negligence herein relation to such records, where there is neither law, responsibility or appreciation, that the statist can only be expected to *approach* the truth, however desirous he may be to be *exact*. These, then, I have divided among the known in the proportion they bore to them respectively. Accordingly, this column was thus constructed, and it is believed not to vary greatly from the truth. It carries, at least, strong probability in its favor. The fourth column results from this, and furnishes the ratio of mortality per thousand of the population. Upon this foundation we arrive at the following remarkable results, which, if correct, furnishes the *cost of acclimation* to every description of our population.

Mode of constructing the table.

The estimate for New Orleans is very imperfect. In the census with which I have been kindly furnished, the nativities of the *city* have not been seperated from those of the *State*, and hence are aggregated together. The mortalities of the natives of New Orleans from yellow fever have almost entirely been confined to those under ten, with very few exceptions, and still only amount to 3.58 in a 1000.

Cast in New Orleans.

While the proportion is shown to be pretty much the same in the range of States along the Gulf and South Atlantic (none being recorded for Texas and Florida,) the *average* shows but 13.22 in a 1000, or about $1\frac{1}{3}$ per cent., which is small for the population, and is very small even for bilious fever, and will

Do. in the extreme Southern States.

fully sustain some views in relation to the *identity of the origin and nature of these fevers*, in a future part of this Report.

Do. from the Northern slave States.

The next range of States farther North, being the Northern slave States, or middle States of the Union, are subjected to a cost of acclimation which is more than double that of the more Southern States; it amounts to 30.63 in a 1000, or a fraction over 3 per cent. This was to be expected; the winter climates are as different in their temperatures, as the summers in their hygrometric properties.

Do. from the Northern States.

The next group embraces the *Northern States*, which still farther increases this difference, being 32.83 in a 1000, or nearly $3\frac{1}{3}$ per cent. It is probable that the habits of life between these two sections are more influential in the production of this difference than the climates.

Do. from the North western States.

But what shall we say of the Northwestern States, having an increase over the Northern States of *more than one-third*, or more than three times larger than the Gulf States, being 44.23 in a 1000, or nearly $4\frac{1}{2}$ per cent. This is a large increase, and is not accidental; it is regular. The States of Tennessee and Kentucky, which form the Western part of the group of our Northern slave States, is considerably larger than the Eastern.

Probable causes of this difference.

The great difference in the life-cost of acclimation between the Northeastern and Northwestern States, and those from their brethren farther South, probably, in great part, arises from their habitual indulgence in animal food and general gross living at every meal, more than in any part of our country, or probably the civilized world. This habit is not readily dropped; when they immigrate South the process of animalization is accompanied with the evolvement of great heat or combustion, and is incitive to, and apt to produce fever. This calorific process is but slowly adapted to the requirements of the climate, and the habit and its consequences are productive mainly, in our opinion, of the foregoing results. It is at least suggestive of valuable hints, and should not be lost sight of. Man can adapt himself to any climate, but it is mainly through his living. This is proved

by the valuable and interesting experience of Northern voyageurs, who find their crews resist the rigors of a Northern winter in proportion as they adopt the mode of living of the natives. It is perfectly reasonable. Where man resists it, and carries the habits of one climate into another, he pays for it by abbreviation of life.

British America still rises in the scale, and illustrates its value and correctness. It amounts to 50.24. Do. from British America.

It is equally proved by looking at the small influence from change of climate on those from Mexico, South America and the West Indies, where the great contrast is shown by the exhibit of only 6.14 in a thousand, and doubtless, these derived their liability from coming from districts where the yellow fever is unknown, for the opinion is entertained, by the reporter, that the acclimation to the disease in one climate affords immunity throughout the zone. Do. from S'th America, Mexico, and West Indies.

So much for the NATIVES of this continent, showing an *average* influence of this change of climate on them of about 12.32 per 1000 in order to acquire perfect acclimation here. Of the *colored population* there are no records but that of death, and the remarkable number of forty-three is given in our mortuary table for last year, a number utterly unprecedented in our annals, although it has been much greater in the country. The *nativity* of the slave population is not given. I do not remember ever to have met with a case of death in the black population during the prevalence of this disease in the West Indies, except during the recent outbreak. Total, 12 1-3 per cent. for all America. Mortality of the colored.

The table exhibits, as we proceed down the columns, a still more serious result from change of climate, while the mortality of the natives of France, with their temperate living and habit of adaptation, have now reached 48.13 per 1000; those from England, generally a rather choice population, with fine constitutions, but with national obstinacy in relation to diet, have ascended to 52.19, probably from a much fuller habit of living, not readily adapting itself to the requirements of a warm climate, and at least this difference, if not more, exists wherever these two Do. from France. England

nations are exposed to similar influences in a hot climate, and most probably from the cause stated.

Do. from Ireland. Those from Ireland reach the enormous amount of 204.97 in 1,000, showing the consequences of an entire revolution in everything, climate, diet, drink, social habits, all that elevates man to the dignity of his being, from moral, political and physical degradation and subserviency, with propensities and dispositions the most reckless.

Cause.

From North of Europe. Those from the North of Europe are also very large, 163.26. The difference of climate is very great, and men will not, until after much suffering, adapt their habits to altered condition.

From Middle Europe. Those from Middle Europe, it will be seen, are much less, 132.01 in 1000, although still very large, and the same remarks apply here as in those of Ireland, although the social change is not so great, and there exists among them greater constitutional prudence. With these, and indeed, all European immigrants, and particularly, among the Irish, a propensity to crowd their families into a small space, with the inevitable result of accumulation of filth, and deficient ventilation, is eminently conducive to a greatly enhanced mortality.

But still, the largest mortality in our table is found to exist among the immigrants from the *low regions* of Western Europe, reaching the highest elevation of 328.94 in 1000. Holland and Belgium are low, flat countries, with much moisture, which, at a low temperature—with proper comforts of life, is not incompatible with great salubrity, but when these are exchanged for a climate of *high* temperature and great saturation—and these will be shown hereafter to be a material part of the conditions most inimical to health—together with a total disruption of his social habits, the influence on the constitution is most deeply felt, as recorded.

From Holland and Belgium.

Probable cause.

But the climatic change from the high, mountainous regions of Europe, (Switzerland and Austria,) with their low temperature, dry, elastic air, and plain food, to the heat, moisture and different social condition which they soon reach here, is productive of consequences, although great, scarcely sufficient to ac-

From Switzerland and Austria.

count for the large mortality of 220.08 in 1,000. Elevation then, in a temperate climate, in its proclivity to develop the sanguine or blood-making and heat-producing system or temperament, so different from that of warm climates, where the bilious temperament predominates, and which is so much better adapted to it, must aid in accounting for this large mortality. This is eminently illustrated in seeing how small is the mortality in the natives of Spain and Italy, about one-tenth of those just mentioned, or 22.06 in 1,000, and who are almost uniformly of the bilious temperament, living on a milder vegetable regimen and great temperance, which this temperament instinctively calls for.

Accounted for.

From Spain and Italy.

Probable reason.

SECTION IV.

Total population of the city during the year; estimate of the unacclimated; number of cases of yellow fever in public and private practice; ratios of mortality in each; comparative mortality in other countries; mortality in our rural districts, &c., &c.

The total population of the city of New Orleans, by the United States census, in 1850, was.....129,747.

By adding the ratio of increase from 1850, and carefully and laboriously calculating, from the varied and imperfect returns of the city census of 1851,–'52, for each ward and class of the population, so far as it was possible to procure them, I have arrived at the conclusion that the augmentation, in our aggregate permanent population in 1853, amounted to.....154,132.

Total population in 1853.

It is well know the increase has been much greater, especially of the floating population.

The difference between the population during the last preceding epidemic, in 1847, and that of 1853, is 45,433; to which add 5000, a very small estimate of the floating population, and of that large class of denizens, who have their actual homes here, but are a

Difference of population in 1847 and 1853.

large part of their time absent, and which are embraced in the enumeration of the population of other large commercial cities (more particular in this respect) all of whom are unknown to our census returns, and who generally form the *first victims* of an epidemic; and we have an unacclimated population of 50,433. But as no epidemic so thoroughly influences the whole population, as to leave none still susceptible to attack, and we well know even the last did not, and that was the most thorough and wide pervading we ever had: whole families escaping, and of course, the disease did not stop for the want of subjects. In fact no epidemic so thoroughly influences the entire unacclimated population, in any city, so that none escape; may be from some transient or accidental cause, although they may be subject to it afterwards, as we now well know. During the existence of the plague in Marseilles, in 1720, when *near half the population* fell victims to it, amounting to 40,000—thousands did not suffer at all, out of a total population of 90,000. It is probable that more than double the number was left untouched in 1847 than were taken sick; it is deemed fair to estimate the total *susceptible* population, in 1853, at..... 60,000.
And the entire city population, at.....158,699.

Total unacclimated population.

This will be considered moderate, when I add that our foreign immigrant population, arriving in the city, to the month of June, '53, reached near 24,000, many of whom doubtless remained.

On this as a basis, I have supposed there left the city, before or through the epidemic, and thus reducing our population to that extent,..... 36,283: being something less than one-fourth. I have come to this conclusion, after a very minute examination into all the records and sources through which this extensive emigration could take place, viz: by the river, and through the lake; by public and private records;

Number supposed to have left the city.

and deducting the ingress from the egress. To be more sure, I have consulted the judgments of those who have been here, like myself, during the epidemics of the last twenty or thirty years, and there is a pretty general concurrence in the belief that the population, *during* the *summer*, amounted to at least.....125,000. Number in the city during the epidemic.

The total mortality, from *yellow fever*, during the year, not only those certified to be such, but a large proportion of the "unknown," *supposed* to be such, from a want of proper records; it is estimated, upon all grounds of probability, to be..... 8,101. Mortality by yellow fever.

The ratio of *mortality* from *yellow fever*, to the entire *permanent city population*, being the calculated natural increase over the census returns, is 1 in 19.02, or [per cent.] 5-25. Ratios to the different populations.

The ratio of *mortality*, to the population supposed remaining in the city, or *exposed*, is 1 in 15.43, or..... 6-48.

The ratio of *mortality* to the population estimated *susceptible, or unacclimated*, (60,000,) is 1 in 7.40, or.. 13.49.

And the total mortality of the year, to the total known permanent population, after deducting all other causes of mortality than *disease*,* was 1 in 10.19, or.. 9-80.

And including all causes of mortality, 1 in 9.76, or 10.23.

To arrive at the number of *cases* of yellow fever which occurred during the year, the details are more precise than have ever been attained here before, but still far from perfect, owing to the backwardness in the faculty reporting their cases.

The reliable returns are derived from the following sources, viz:

	[Cases.]	[Deaths.]	[per cent.]
There occurred at the *Charity Hospital*,.....	3312, of which,	1890,	being 58-84,
The *Howard Association* had, *besides* 429 in the Touro Infirmary, and about half of those in the four Board of Health Infirmaries.....	9353, "	2252, "	24-09.

* Deduct from the aggregate, Table F, the following causes of deaths, *not from disease*, viz: "non viable," 13; "still born," 346; casualties, 61; drowned, 105; burns and scalds, 18; hydrophobia, 6; poisoned, 4; wounds, 47; suicide, 14; old age, 5; treatment, 3; (to which ought rightly to be added, intemperance, 123; although I refrain,) amounting to 670, or about 4¼ per cent. of the whole mortality, and reduces this to 15,117; and the ratio of mortality will be as above.

I have not made this correction in Chart A, for previous years, because I had not the materials. The deduction would have, doubtless, been much larger.

		[Cases.]		[Deaths.]	[per cent.
Cases, mortality, and ratios in various public institutions.	The *Touro Infirmary*, of Howard 429; others, 94,..	523,	of which	213, being	40-72.
	The *Maison de Santé*,.....	338	"	97, "	28-69.
	The *Luzenburg Hospital*,.....	150	"	79, "	52-66.
	The *Board of Health* and *Howard Infirmary*, No. 1,	343	"	155, "	45-18.
	" " " " " No. 2,....	338	"	170, "	51-18.
	" " " " " No. 3,....1500		"	500, "	33-33.
	" " " " " No. 4,....	432	"	207, "	47-91.
	The *City Workhouse*, 1st District,.....	89	"	14, "	15-73.
	The *City Prison*, 2d District,.....	30	"	5, "	16-16.
	The *Lunatic Asylum*.....	9	"	0, "	00-00.
	The *Boys' Orphan Asylum*, 4th District,.....	60	"	2, "	3-33.
	The *Boys' House of Refuge*,.....	21	"	6, "	28-57.
	The *Girls' House of Refuge*,.....	21	"	1, "	4-76.
	The *Catholic Female Orphan Asylum*, Camp st...	81	"	4, "	4-93.
	The *Poydras Female Orphan Asylum*,.....	50	"	9, "	16-20.
	The *Circus Street Infirmary*, no returns, but estimated about.....300		"	100, "	33-33.
	To which add, of cases reported to me, and called "outside cases," by members of the Howard Association, and other philanthropic individuals, and supposed same rate of mortality as the Howard's *public practice*,*.....	2929	"	705, "	22-02.
Ratios.	Making the total of *elemosynary cases*, or at..... per cent. or 1 in 3.03.	19479	"	6409	equal to 32.90
Number of cases in private practice.	From various members of the faculty, in the city, whose names are mentioned hereafter, I have had reported to me, localised,.....	7624.			
	From the best estimates the Sanitary Commission is able to form of the location, practice, and number of those who have not reported, it believes they do not exceed.....	1917.			
Total ratios.	The total, then, in *private* practice, to which must be debited the balance of the mortality from yellow fever, amounts to..... per cent., or 1 in 5.89.	9541	"	1691	17-72
	Making the total number of *cases* in the city, during 1853,..... per cent., or 1 in 3.58,	29,020	"	8101	27-91

This is the largest number of cases, and the greatest mortality from yellow fever that ever afflicted our city. But it is the least mortality to the number of cases that has ever occurred in a great and malignant epidemic yellow fever,

* These were all attended by physicians of this city, almost entirely without remuneration, and it is but bare justice to them to say, that they were ever, at the call of duty and humanity, making every sacrifice at the noble shrine; and that, when the epidemic slackened in its virulence here, they generously voluntered to pursue the scattering pestilence into the interior, in aid of their less experienced brethren and suffering fellow citizens. It is with pride we record that no one proved recreant and deserted his post, and that many (fourteen) fell victims to their high professional honor and devotion. Nor was the other branch of the profession less distinguished in the call of duty, and suffered still more in obeying it; more than thirty apothecaries having sunk under it.

such as this was, and it is but fair to claim for our faculty and philanthropic associations, unequalled skill and kindness, in the treatment of the greatest scourge of our country, as I shall presently show. It is but a faint tribute of praise, due to the warm hearts and open purses of our countrymen, in other sections of our happy union, to acknowledge that much of this proceeded from their kind aid, in the deepest hours of our travail we saw that our calamity was felt with electric speed every where, and that relief, accompanied with warm sympathy, came, even beyond our wants; which was then as liberally distributed to our suffering fellow-citizens elsewhere.

Tribute to the faculty; our associations and friends abroad.

Now, thoroughly to understand our relative *status* to other places, and it can only be done by comparison, let us *en passant*, cast a glance at the sufferings from this disease in other cities and countries, not that it makes our misfortunes any the less, but it is consolatory to know, that other cities have suffered as much or *more* than we have, and are *now enjoying* the blessings of health. It will be made probable that we might, by similar means, do so also, *and it is for that purpose, mainly*, that *I make this comparison.*

Why compare with other cities.

Mortality of epidemic; Yellow fever in Philadelp'a in '93-'97-'98.

In PHILADELPHIA,	in 1793, the ratio of mortality to those exposed or remained, was	1 in 10	
	and the ratio to the entire population	1 in 13	
do.	do. in 1797, the ratio of mortality to those that remained,	1 in 16.6	
	and to the entire population	1 in 50	
do.	do, in 1798, the mortality to the entire population was	1 in 15.50	
	and to the number exposed	1 in 6	
The three epidemics of the same city, for 1793, 1797 and 1798, gave an average mortality of the entire population of		1 in 14.24	
	and of those that remained in the city, of	1 in 10.13	
And the mortality to the cases attacked in the epidemic years, from 1793 downwards varied from 1 in 1.2, in 1819 to 1 in 3.86 in 1805, giving an average for all these epidemics of		1 in 2.12	

Average hospital mortality.

The loss at the Hospital alone during the epidemics of 1793, 1797, 1798, 1799, and 1802–'3, the only years in which the admissions were recorded, varied from 1 in 1.68 (1799) to 1 in 2 (1803,) with an average for the six seasons of 1 in 1.867.

In these several attacks of epidemic yellow fever in Phila-

Where most fatal.

delphia, it was remarked, that it was much more fatal in the low filthy malignant atmosphere of some districts, than in those where they were more elevated and airy—in those in wooden houses than in those of brick. This is found to be the case every where.

In New York, Baltimore and Charleston.

The general mortality to cases in NEW YORK, was about 1 in 2; in BALTIMORE, 1 in 2.87; in CHARLESTON, about 1 in 4 of the cases fatal, on an average of the several authorities. In Savannah the number of persons dying of autumnal diseases to the whole white population was in 1817, 1 in 9⅗, and in 1820 1 in 5.1–10. In Natchez, on an average of a number of years, the mortality to cases was 1 in 2.13 and 1 in 16 of the population. In Mobile, 1839, and 1847 the average mortality to cases, was estimated at 1 in 7. The mortality to the cases in the epidemic here of 1820, was 1 in 6 in adult whites, in various description of persons; as women, children, blacks, 1 in 10. The average in New Orleans in a series of years to 1849, the mortality was 1 in 4, this, however is taken mostly from the Hospitals, in private practice about 1 in 8 or 9, and the proportion to general population as 1 in 55. From an estimate I made some years ago, from the results in private practice, there is some difference from those above, which are obtained with the preceding interesting historical statement, from the reliable authority of Dr. R. La Roche, in Philadelphia, mine made the mortality in private practice to vary from 1 in 10 to 1 in 20, while those in Hospital did not vary greatly from those in our public institutions last year, with the exception of being from about 10 to 15 per cent. less. During the late epidemic, the statements, as usual, were conflicting and imperfect—no estimate that is entirely reliable can be formed of it, in private practice; I have averaged it at 1 in 5.89, it is impossible from obvious circumstances, to arrive at the exact truth, it no doubt varied from 4 to 50 per cent.

Mortality in New Orleans.

During 1804, not less than twenty-five cities and towns were visited by the fever, in *Spain*; the population amounted to four

hundred and twenty-seven thousand two hundred and twenty-eight, of which fifty-two thousand five hundred and fifty-nine, or 1 in 8.12, perished. In fourteen of these places, at different periods, the mortality, in proportion to the population, was 1 in 6.42; the extreme being 1 in 2.25, and 1 in 13.3. In seven places, the proportion of persons affected, amounted to 1 in 278 of the population; the extreme being 1 in 1.18, and 1 in 5. In twenty-one, the average proportion of deaths, to the number affected, was 1 in 3.087; the extreme being 1 in 1.3, and 1 in 6.42. While two hospitals gave a mortality of 1 in 2.15 of the number admitted, with extremes of 1 in 11, and 1 in 282.* In Spain.

In the *West Indies* it is often difficult, as it is here, to obtain exact records; the public and private practice being so different. In the government military hospitals, in Cuba, the mortality from yellow fever is very small, not exceeding often, (if the statistics, as published, can be relied on,) two to five per cent.; while in the hospital for the reception of the poor, it is very large, as large as any where. In the West Indies.

In *Vera Cruz*, the mortality in private practice is very small; the treatment being very mild and simple. While in the military hospitals, with the Mexican soldiers coming from the *tierras templados i frias*, (upper country,) it is frightful; sometimes nearly the whole dying, and the whole per centage is that of escape, which is very small! The filth of the hospital, and intemperance of the men, being very great. The details will be given hereafter, when we come to show the influence of sanitary measures upon it, and the comparison of other Southern cities with New Orleans. At Vera Cruz

In Rio Janiero, from the highly valuable information the Sanitary Commission has received direct through the United States Consul, Robert G. Scott, Esq., (who has sent many valuable documents; see proceedings,) exhibiting a remarkable proof of the protection, and assimilative influence of climates, on these diversities, all exposed for the first time to this (then) new malady—affecting them respectively as follows: Ratio of mortality of different classes at Rio.

* Dr. La Roche.

per cent.

On native Brazilians, about..... 2

On negroes of recent and former importation, from.....1½ to 2

On acclimated, (to that country,) Europeans,.....5 to 6

On the unacclimated and sailors, a mortality of about.....30

Mortality in the interior.

In the interior towns of this and the adjoining states, the mortality to the cases, as also to the population, was, last season, much larger than in this city, many villages being more than decimated of their population; of the mortality to cases, probably nearly half dying, in many places. This can only be accounted for by a want of familiarity with the disease, and not having proper nurses. In this city, where these exist, it is probably as successful, in the *same description of subjects*, as it is any where. In Havana and Vera Cruz, with a Spanish and Mexican population, and from the South of Europe generally, whose inhabitants are not given to intemperance, the mortality is very small. Indeed, with them, it is not considered the most dangerous form of fever, nor can it hardly be deemed so here, in good subjects, with proper care and attention.

Great mortality from yellow fever abroad.

Professor Dickson, says; "Yellow fever must be viewed as one of the most destructive forms of pestilence, exceding even the plague perhaps, in proportion to mortality. In 1804, in Gibraltar, out of a population of nine thousand civilians, but twenty-eight persons escaped an attack, and the deaths amounted to more than one in three. Musgrave gives a scarcely less terrible account of it in Antigua, in 1806. In Jamaica, under the care of Dr. Hume, three out of four died of it. In the city of Philadelphia, in 1820, there died eighty-three out of one hundred and twenty five, about two out of three." During the late outbreak of the yellow fever, in Philadelphia, there occurred one hundred and twenty-eight deaths, out of one hundred and seventy cases, in public and private practice, making a mortality of 1 in every 1.48, or seventy-five per cent.

It will be apparent from these statements, that yellow fever is a much more fatal disease in Northern than in Southern

climates. The subjects differ as much as the treatment and the climates.

SECTION V.

Epidemic Constitution—Its Constituents—Proof—Influence on Vegetable and Animal Life—Meteorological Elements—Terrene do.—Difference of an epidemic from an Endemic—An Epidemic cannot be Imported—Epidemic requires localising causes for its development.

Having thus shown the special medical constitution and of its disastrous influence on man—and contrasted its effects here with what it has displayed, not only in various parts of our own country, but throughout the yellow fever zone; we now proceed to approach it a little nearer and ascend to its *causes.* Let us scrutinize these, as well general as local, that we may thoroughly understand our *status*—the *principle upon which it depends for existence*, and by a practical application draw useful lessons from it,

Division of the subject.

I proceed then to exhibit the evidence, which proves, first, that a great epidemic constitution, or what has been denominated "epidemic meteoration," existed; and secondly, what, were the probable causes or CONSTITUENTS of it.

Epidemics formed of certain constituents.

We have evidence of the existence of a great epidemic yellow fever in 1853, not only over the city of New Orleans, but over a large portion of the Southwestern part of the United States; from its effects on nearly all the forms of life, animal, as well as vegetable; that there were some vast influences let loose or developed, or some apparent irregularity in the ordinary elements of existence, that was at war with its being, that is essential to be understood, in order to derive the necessary aid to counteract or control them. It is of vast practical value then to know the CONSTITUENTS which composed it, if they be susceptible of analysis, for it may be considered a settled opinion with all intelligent men, that *epidemics derive their power and spread themselves* from certain *unusual circumstances*

and conditions, that these are required to give them activity, and the important fact is clearly inferable that being the *sine qua non*, THEY FORM THEM. This, in the nature of things, from its wide pervading, direct and almost immediate influence over an extensively spread population, must be atmospherical, and we state them, en passant now, to be more specially mentioned hereafter, that the admission of this principle—the admission of a wide-spread *atmospherical element as a necessary constituent, draws after it an important, if not inevitable inference, in its being a conclusive answer to all averments of its contagious qualities!*—not that a contagious disease cannot become epidemic (although it is very rare), but the difference is, that a contagious disease *never looses that quality, and epidemic disease does, directly it is removed out of the sphere of the epidemic atmosphere*, which always has bounds and limits, however extensive it may be, and beyond the influence of the localising conditions which will be pointed out hereafter. The testimony in support of this, which the Sanitary Commission has obtained, has been most ample and conclusive. We make it as our offering to the vast proofs with which medical record abound on this important subject.

If epidemic, not contagious.

Proof of an epidemic atmosphere.

An epidemic disease is known to prevail when a large number of cases of disease, of the same type and character, break out, either simultaneously, or within a brief period, over a considerable extent of a city or country, *wearing one general livery, and evincing and maintaining a sway over all prevailing diseases.* The statement of this proposition, is to carry conviction of its truth to all those who witnessed the characteristics of the disease last summer, when forms of morbid action, that were not suspected to be yellow fever, from wanting its prominent symptoms, were suddenly terminated by black vomit. Indeed, so fatal was its influence in many cases, that nearly, and in some cases all its stages, were merged in the last and unequivocal one—the fatal black vomit, as a child in the nurses arms, in others, in a vain attempt at vital re-action, the system sinking in the effort within twelve hours;

so virulent the poison, so futile the recuperative principle. The general uniformity of its type, its speedy prevalence over the entire city, breaking out in distant and disconnected parts at the same time, and by-and-bye, extending over its entire area, and thence, as we shall see, to different parts of the country, not immediately, even in those having hourly communication with the city, but many weeks afterwards, as the combined principle (meteorological and terrene) became matured and extended, with a greater or less prevalence and intensity of the *localising* causes, to be mentioned hereafter. Farther proof.

It is farther proved from its reaching insulated places, as jails, penitentiaries and lock-ups, heretofore exempt. Even insulation on a plantation did not always exempt the inmates; in the tardiness and great length of convalescence (taking about double the usual period,) the great liability to relapse, from the deficiency of re-action in those that continued in the epidemic atmosphere, and the rapidity of restoration on a removal from it. Do.

Hence then the atmosphere constituted wings for the propagation of the general epidemic and localising conditions gave it a habitation in various places.

What is meant by an epidemic atmosphere then, is the presence of certain elementary constituents or their combination different from the habitual or normal condition. We shall essay hereafter to state, in what these consist. We have no proof of anything *specific*, beyond this combination, and this is *two-fold*, the meteorological part probably forming the predisponent, is innocuous without the other, it is but one blade of the "shears," the second is the local circumstances and influence — the true localising or fixing power. It is what has been denominated by high authority, *"the test and touchstone of poison"—that produces its development whether acting on individuals or communities, filth in every kind, degree and sense, represents our meaning. For an atmosphere to prove epidemic pre-supposes the pre- Epidemic atmosphere. What.

*Mr. Limon.

sence of both. If there is only one of them present, (and either one of them is the same) the effects do not take place. If a case is carried from an infected locality to one that is pure, it does not spread; but if conveyed to a place where there exists an impure, kindred or infected atmosphere, the disease is propagated, and it seems, to the surperficial observer, "contagious," and hence arises the establishment of one of the great "false facts" in physic, and the foundation for endless, but ridiculous controversies to the disgrace of science and the injury of humanity. Instances corroborative of each of these conditions, are furnished in another page. The special characteristic attribute of contagion is that it is irrespective of external conditions; it pays no respect to climates, zones or seasons; it requires no special atmosphere—it yields to none; it is self-propagative and progressive, and dependant upon its own creative and self-sustaining powers. To *none of these has yellow fever any similitude.*

Its great value.

Contagion independent of external circumstances.

Certain atmospheric appearances have been often observed here, during the cholera epidemics of 1832 and 1833. The dark murky "cholera cloud," as it was then denominated, hung over our devoted city, like a funeral pall, as long as the epidemic continued, and struck every heart with dismay. The experiment with meat, has been often tried during a cholera epidemic, and it usually became putrid, if somewhat elevated in the atmosphere, and filled with animalcules. This, however, is believed not to be remarkable, as it would take place at any season. It was observed here last year that butcher's meat became earlier tainted in the stall than usual. Birds and beasts have been driven from their usual haunts, into the deepest recesses of the forest, showing by their instincts that they were sensible of some malign properties existing in the bosom of that atmosphere whence they derive their main vital influence. At Lake Providence Judge Selby noticed that the feathered tribe almost entirely disappeared during the prevalence of the epidemic. In a former outbreak of cholera, on the "coast," it was observed

On vegetable and animal life, formerly.

Soon tainted butcher's meat.

Birds driven away, and killed.

that the carrion crows ceased to make their appearance, although there were plenty of dead cattle exposed in the fields. An unusual influence on animal life has been often remarked during the existence of cholera here. In Spain, so malign has the air been sometimes found during the existence of yellow fever, that birds confined in their cages have died. The older records in our profession, of periods when epidemics raged with one hundred-fold more violence than they have done in later times, almost every species of animal life suffered—nor do I know of any reason for the comparatively lesser influence of epidemics of latest, over ancient times, than the extension of the comforts of life, and the refinements which civilization has wrought, which, really, are nothing else but sanitary measures.

Its influence on animal and vegetable life in the neighborhood

Nor are we without evidences of the extension of such influence to the vegetable creation. During the late visitation, Mr. Lawrence, who is engaged largely in horticulture, in the lower part of the city, informs me that his garden seed would often fail to germinate, but still more often, when they would sprout up a few inches from the soil, a sudden blight would seize them, and in a few days they would wilt and die. This was eminently the case with the cauliflower, the celery, the cabbage, raddish and other vegetables. To keep up his stock, he, in vain, applied to his neighbors, to those on the opposite side of the river, and down the coast. The same influence had been extended to them. Many of his fowls died, old and young, without previously appearing sick. These effects only continued during the epidemic. In other parts of the country similar effects were produced in the destruction of the various kinds of poultry, in the tainting and destruction of orchard fruit, and a blighting influence of various forms of vegetable life; and on the coast of Texas the fish were found dead in immense quantities, as reported to the Sanitary Commission, viz:

Epidemic influence on fish on the coast of Texas.

At Biloxi, the peaches rotted on the trees; great mortality existed among the fowls; flies and musquitoes remarkably nu-

Biloxi.

merous; mould on the trees; heat unusually great; thermometer 94°; two earthquakes during the season; many cases of yellow fever, without personal intercourse, with any sick of the disease.*

Bay of St. Louis. *At Bay St. Louis*, there was an epidemic among fowls.

Bayou Sara *At Bayou Sara*, the China trees had a sickly appearance and their leaves covered with a crustaceous larvæ.†

Centreville. *At Centreville*, musquetoes and flies more numerous than ever observed before; and mould of a drab color, and very abundant; season unusually wet, and heat of sun *very* great.‡

Clinton. *At Clinton*, musquetoes uncommonly numerous night and day.

Baton Rouge. *At Baton Rouge*, "fruit of the peach full of worms, and potatoes rotted in the ground."

Lake Providence. *At Lake Providence*, "fowls very sickly and many of them died; animals and plants sickly—many had bumps upon them; musquetoes tenfold more numerous than ever known before; never saw one-twentieth part of the mould; toadstools vastly more plentiful than heretofore; a peculiar smell pervaded the atmosphere of the place." §

Port Gibson. *At Port Gibson*, dark and unhealthy spots on the peaches; bright and bluish mould very common on the grain. Dr. McAlister writes that during eighteen years of close observation, he had never seen such repeated floods, attended with such an excess of thunder and lightning, succeeded by such hot sultry days, during the latter part of the summer. The city occupies a level locality on a rich alluvial soil, and presented during this time, the appearance of a marsh.

Natchez. *At Natchez*, epidemic among poultry (fowls); musquetoes very numerous, and the epidemic particularly severe with pregnant women.‖

At Washington. *At Washington, Miss.*, epidemic among poultry (turkeys) taking off entire stocks, without apparent cause; their livers found greatly enlarged and diseased.¶

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* Drs Byrenheidt & Cochrane † Brown. ‡ Dr. Wood.
§ Judge Selby. ‖ Dr Davis. ¶ Prof Wailes.

At Gainesville, fruit rotting prematurely and extensively; native cows dying in great numbers, without obvious cause. At Gainsville.

But fortunately for the interest of truth, the recent progress of science has not even left this hitherto dark corner, without other rays of light, with which to illuminate it. The Smithsonian Institution, in the noble language of its founder, established "to extend knowledge among men," is spreading the enlightening rays of science over every region of our country. I am indebted to the kindness of Professor Blodget of that valuable institution, who has most obligingly answered the queries I have addressed him upon the subject, for the subjoined information, containing direct and conclusive proof of an *epidemic atmosphere,* showing, most satisfactorily, that wherever the epidemic influence was felt by man, *there* was *exhibited proofs through meteorology,* of the existence of that atmosphere, that this prevailed to a most remarkable extent, that, notwithstanding the advanced period of the season and the presence of a remarkable elevation of temperature—*that* is proved not to have been a sufficient meteorological ingredient to constitute the epidemic constitution, and that the disease did not become developed until there was superadded to this, *high saturation,* affording demonstrations upon the subject, it is believed, never exhibited before.

LETTER FROM PROFESSOR BLODGET.

"*The Temperature Comparisons.*

"The comparison of mean temperature, at various stations embraced in the district over which the yellow fever extended at sometime during the summer, with the mean for a series of years, or for 1852, shows, on the whole, a greater number of negative than positive differences. Yet the inferences, supported by the first view, of a colder or less tropical summer temperature, are the reverse of truth, as may readily be shown. The daily curve of the temperature is much less sharp in the rainy summer of the tropics, than in the latitude of New Orleans, in usual seasons. When, therefore, a temporary institution of this rainy and humid tropical summer occurs in these latitudes, the mean temperature deduced from the usual observations is too

Information of epidemic influence from Smithsonian Institution.

Rainy season depresses the midday temperature, and elevates the morning and evening.

low, and the true mean, also, lower than usual. Thus, in the rainy season of Central America, the mean for July descends to 77°, deduced from the usual hours; while in Texas, it rises to 85°. At Fort Brown, on the Rio Grande, July, of the present year, was dry and healthy. In August the tropical rains set in, and, with the same morning and evening temperature, the midday mean fell from 92° to 88.7°. The same result occurred at New Orleans, in the contrast of June and July, in a still more decided manner, the morning mean rising, in July, 2.5° above that for the same hour in June, and the midday mean falling 2.5° below that of June. The daily curve, from minimum to maximum, was thus diminished during the rainy month of July 5°, and was actually but 4.4°, an unprecedented low, and peculiarly tropical curve.

Tropical weather in New Orleans, in 1853.

"Comparison of all the stations here given, in this manner, would prove the apparent low temperatures they exhibit, to have been *the institution of conditions approaching the tropical climate more nearly than in any year of which we have precise record.*

And extended throughout the stations.

"In further proof of this position, the great and general heats of the summer on this continent may be cited. A change of ten degrees of latitude, Southward, would give about the precise measures of temperature and humidity actually experienced on the continent With this general accession of temperature, the humidity, and sanitary consequences, follow inevitably.

Equal to a removal 10 deg. farther South.

Rains as shown by the Table.

"The amount of rain, as a rude measure of humidity, is given at several stations, in comparison, also, with the means of a series of years.

Frequency of rains, next to amount, evince tropical conditions.

"Frequency of rains is next to amount; and in the present case is particularly important. The stations are thus distinguished in connection with the tables of amount.

"To group the results: South Florida only was profusely rainy in June, except for the last half of the month, when New Orleans became remarkable for frequency of rains. In July Texas was very dry; New Orleans the reverse, with tro

pical frequency of rains. In Northern Florida and South Carolina the rains were heavy, though not unusually frequent. In August the tropical rains of New Orleans continued, and began at the close of the month in lower Texas. In September they spread over the Gulf coast East and West of New Orleans, and diminished at that point. In October they were continued on the Rio Grande, and at Bermuda, and other islands, and over most of the Gulf coast also.

Rains and fevers cotemporaneous.

"The yellow fever began on the Rio Grande with these rains in August, and continued till they ceased in October! It began in other parts of Texas with the same conditions, and so at Mobile, continuing with their unusual continuance.

In Texas and Mobile, fever and rains simultaneous.

Humidity.

"The mean humidity or per centage of saturation, is given for the observed hours, and for the mean of the whole month at several stations in the South and West. June is seen to have a low fraction of saturation in all parts of the United States, *except at New Orleans,* where, with a temperature 3° above the mean, the saturation was unusually high. In July the fraction of saturation at New Orleans largely exceeded that at any other locality observed, Savannah, Ga., approaching it most nearly. In August it was largely increased at all stations; in Texas and at Savannah becoming nearly as great as at New Orleans in June. In September it was slightly less at New Orleans, and greater in Texas, and Eastward from New Orleans, at Mobile, &c. October had mainly a high temperature and high fraction of saturation."

Simultaneous occurrence of the fever with high saturation and elevation of temperature.

For proof and illustration of these positions, reference is made to the tables J, K, L, and M, subjoined, containing records of temperature, rain and humidity, throughout and beyond the epidemic region of last year, and the averages of other years, with which to compare it. The whole is most conclusive.

TEMPERATURE, RAIN, AND HUMIDITY, OF SAVANNAH, PENSACOLA, AND JACKSONVILLE, 1852—53.

		Jan.	Feb.	Mar.	April	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
MEAN TEMPERATURE.													
Savannah,...	1852....	.....	.....	.....	.....	73 04	75 44	79.98	77 84	74 47	....	....	....
" "	1853....	47.88	54.40	59.50	68.11	74.00	79.00	81.50	79.33	75.83	64 50	60.40	48.40
Jacksonville,	1853....	.....	.....	.....	71.86	77.29	78.89	81.74	82.56	77.55	68.92	64.28	53.45
Pensacola,...	1852....	.....	.....	....	.....	75.67	78 00	.....	81.00	78 00	.....	.....	.....
" "	1853....	51.33	57 04	63 58	69 67	74.25	80 22	82 08	82.38	78.42	69.56	65.67	54 94
AMOUNT OF RAIN.													
Savannah....	1852. ..	.....	.....	.....	...	8.721	9 310	5 324	5 040	4 673	....	.....	.....
" "	1853....	1.147	1.142	2.479	0.444	3.959	0 787	6.464	8.168	9.427	2 888	3.096	6 882
Jacksonville,	1853....	.....	.....	.....	0.465	1.530	3.240	7.400	2.700	9.675	9.350	2.275	3.618
Pensacola,...	1852....	.....	.....	.....	.....	4 862	0 833	.....	14.000	0 500	.....	.....	.....
" "	1853....	3 250	4 062	2 562	0 500	0.200	0 937	2.531	1 562	14.781	5 500	1.000	1.969
MEAN PER CENTAGE OF HUMIDITY.													
Savannah,...	1852....	....	.....	....	....	.740	.752	.787	.800	.8'8	.....	....	.....
" "	1853....	.658	.677	.690	.617	.690	.707	.773	.7	.793	.737	770	.710
Jacksonville,	1853...	....	.. ..	....	.....	.....	.826	.864	.840	.871	.....	....	.....

TABLE J.—*Mean Temperatures for* 1853 *in Districts in which Yellow Fever at same time prevailed—And a Comparison with a mean of years, or with the year* 1852.

		JUNE.	JULY.	AUG.	SEPT.	OCT.
Charleston,—Ft. Moultrie.....		78.48	82.85	80.08	76.83	65.69
.....		-|-0.1	-|-1.5	—0.2	-|-0.7	—1.5
Savannah,.....		79.00	81.50	79.33	75.83	64.50
.....		—0.4	-|-0.2	—1.0	—1.1	—2.7
Whitemarsh Is'd,.....		77.40	80.92	78.65	74.85	63.74
.....		-|-1.1	-|-1.8	—0.4	-|-1.0	—2.2
Jacksonville,.....		78.89	81.74	82.56	77.55	68.92
.....	1852	80.00	82.92	82.37	76.47	71.59
Key West,.....		80.50	83.42	83.97	—	80.27
.....		—1.4	—0.2	—0.6	—	-|-2.0
Ft. Brooke, Fla,.....		78.56	82.15	82.23	80.20	75.00
.....		—0.8	—1.7	-|-2.0	-|-2.7	—0.9
Ft. Meade, Fla,.....		75.53	79.00	78.20	79.93	73.01
.....		—3.7	—0.8	—2.6	-|-2.0	-|-0.0
Cedar Keys,.....		80.11	83.18	81.98	79.37	71.94
.....		-|-1.5	-|-2.7	-|-1.3	-|-0.6	—1.2
Pensacola,.....		80.22	82.08	82.38	78.42	69.56
.....		—0.4	—2.8	—1.1	—0.5	—1.5
New Orleans,.....		80.38	80.24	79.60	75.89	—
.....		-|-2.2	—0.1	-|-0.0	—1.2	—
Austin,.....		80.81	82.00	81.01	76.77	66.65
.....	1852	79.37	—	83.83	75.71	69.43
New Wied,.....		80.80	82.00	81.00	76.80	
.....	1852	79.25	82.75	83.75	75.75	68.75
Fort Brown,.....		82.08	84.18	82.88	78.41	71.88
.....		-|-0.4	-|-0.8	—1.8	—2.0	—2.1

TABLE K.

Weather at various Stations during the Yellow Fever months of 1853.

	JUNE.	JULY.	AUGUST.	SEPTEMBER.	OCTOBER.
Charleston, Fort Moultrie,	Dry	Last half, showery	Very showery.	He'vy sho'ers.	Usual
Savannah,	Very dry	Showery	Very wet	1st half very wet	
Jacksonville,	Dry	Very showery.	Usual	Very wet	
Bermuda,					
Key West,	Very wet	Showery	Showery		Dry
Fort Meade,	Showery	Very showery.	Showery.	Showery	Frequnt. showers.
Fort Brooke,	Wet	Very showery.	Showery	First half. showery	Few showers.
Cedar Keys,	Dry	Very showery.	Showery.	1st half very wet	
Pensacola,	Dry	Usual or dry.	Usual or dry.	1st half very wet	
New Orleans,	Last half. showry	Very wet	Very showery.	1st half very wet.	
Austin,	Usual	Dry ex. last five days.	Humid, few showers.	1st half wet, 2d do humid	
San Antonio,	Usual	Dry	Usual	Usual	
Fort Graham,					
Fort Brown,	Dry	Very dry	1st half dry, 2d " wet	Constantly showery	Constantly showry

TABLE L.—*Amount of Rain at Stations at which Yellow Fever prevailed, for the Summer months of* 1853, *and in comparison with a mean of several years.*

	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Charleston, Ft. Moultrie--	1.550	10.880	2.200	8.100	4.050		
	—2.8	-|-4.4	—5.0	-|-2.5	-|-1.5		
Savannah	0.787	6.464	8.168	9.427	2.888		
	—7.2	—3.2	—1.2	-|-4.9	—0.3		
Whitemarsh Island, Ga...	1.280	5.280	5.580	13.200	3.240		
	—3.0	-|-1.2	—0.2	-|-10.4	-|-2.1		
Cedar Keys	3.262	11.437	3.625	15.437	4.600		
	—1.9	-|-2.0	—4.0	-|-9.1	-|-1.2		
Key West	18.110	2.330	5.020		1.690		
	-|-14.6	-|-0.0	-|-1.7		—1.5		
Ft. Brooke, Fla	9.090	4.120	4.670	4.360	1.700		
	-|-2.4	—7.0	—5.8	—3.9	—0.8		
Bermuda.....1853			3.510		6.690	11.630	11.340
1852			7.000		4.260	2.400	2.980
Ft. Meade, Fla	3.540	4.520	3.390	2.120	0.310		
Pensacola	0.937	2.531	1.562	14.781	5.500		
		—6.1	—7.1	-|-12.1	-|-2.0		
New Orleans	1.712	11.508	6.280	4.948			
	—3.7	-|-5.0	-|-0.8	-|-1.0			
Ft. Brown, Matomoras...	1.700	0.000	3.100	8.000	7.750		
	—1.0	—1.8	-|-1.2	-|-3.3	-|-2.8		

TABLE M.

Humidity, or Fraction of Saturation at the Hours of Observation, and the Monthly Mean at Various Stations for the Summer of 1853.

	June.				July.				August.				September.				October.			
	7	2	9	Mean	7	2	9	Mean	7	2	9	Mean	7	2	9	Mean	7	2	9	Mean
Richmond, Va.,	...	...	...	.597	...	...	...	.722	...	...	...	(R.) .700	...	...	...	.750	...	...	...	...
1852,	6 .741	2 .429	10 .743	.637	6 .851	2 .540	0 .823	.738	6 .935	2 .654	10 .931	.840	6 .948	2 .547	10 .875	.790	...	...	...	...
Savannah, Ga.,	.770	.550	800	.707	.860	.630	.830	.773	900	.690	860	.817	.890	.640	850	.793	.830	.580	800	.737
1852,	6 .857	2 .584	10 .806	.752	6 .902	2 .615	10 .847	.787	6 .883	2 .603	10 .833	.800	6 .907	2 .673	10 .868	.818	6 .879	2 .541	10 .829	.750
Culloden, Ga.,	.710	.423	.561	.565	.863	.501	.762	.736	.830	.622	.784	.745	.815	...	.802	.763	.817	.587	.731	.712
Eutaw, Ala.,	.695	.456	.716	.623	.815	.626	.885	.775	.871	.688	.950	.838	...	.664	...	...	...	...	...	...
New Orleans,	.907	.650	.876	.811	.895	.707	.918	.840	.944	.805	.907	.885	.930	.671	.910	.852	...	...	...	...
1852,	S. R. 3 .938	.639	...	.789	.951	.728	...	.840	S. R. 3 .910	.677	...	.809	S. R. 3 .954	.676	...	.815	...	...	...	...
Austin, Texas,	.723	.446	.849	.673	.782	.550	.798	.710	.814	.501	.890	.735	.840	.525	.868	.744	...	...	...	...
1852,	S. R. 3 .899	.493	...	.696	S. R. .854	3 .448	...	.651	S. R. 3 .832	.380	...	.656	S. R. .892	3 .547	...	.720	...	...	...	...
Lebanon, Tenn.,	.632	.373	.622	.543	.699	.455	.741	.632	...	...	...	...	...	...	...	...	...	...	...	...
1852,	6 .806	2 .438	10 .740	.662	6 .835	2 .419	10 .692	.648	6 .862	2 .556	10 .774	.719	6 .858	2 .527	10 .775	.719	...	...	...	...
Glenwood, Tenn.,	.833	.485	.735	.684	.857	.566	.786	.703	.910	.651	.831	.797	.922	.664	.843	.810	...	...	...	...
Knoxville, Tenn.,	.805	.471	.767	.681	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1852,	6 .915	2 .545	10 .866	.782	6 .915	2 .563	10 .847	.774	6 .927	2 .575	10 .886	.799	6 .913	2 .432	10 .873	.806	...	...	...	...
Germantown, Ohio,	.760	.410	.780	.650	.790	.480	.770	.680	.898	.566	.888	.784	.940	.640	.890	.820	.923	.562	.841	.776
1852,	6 .907	1 .583	11 .867	.786	6 .893	2 .496	10 .832	.740	6 .910	2 .530	10 .830	.757	6 .940	2 .604	10 .905	.816	...	...	...	...
New Harmony, Ia.,	.669	.490	.750	.633	...	...	...	...	.850	.590	.780	.740	.880	.630	.860	.787	...	...	...	...
1852,	S. R. 3 .890	3 .570	...	.730	S. R. .890	3 .580	...	.735	S. R. 3 .900	3 .630	...	.765	S. R. 3 .900	3 .644	...	.772	...	...	...	...
Dubuque, Iowa,	.721	.496	.745	.654	.750	.501	.780	.680	.780	.520	.800	.700	.790	.600	.800	.730	...	...	...	...
1852,	6 .770	2 .450	10 .760	.660	6 .820	2 .494	10 .810	.707	6 .824	2 .433	10 .779	.679	6 .820	2 .500	10 .780	.700	...	...	...	...

In comparison with 1852, and with previons years generally, the difference of hours must be taken into account. Sunrise and 6 A. M. always give a higher fraction of saturation than 7 A. M.; and the mean deducted from 6, 2, 10; and from sunrise and 3 P. M. it is always greater than that from 7, 2, 9. The precise measure of this correction has not been determined.

June, of 1853, was everywhere less humid than 1852, except at New Orleans; there its fraction of saturation was greater in 1853, distinguishing this point as reversing the condition common to most other parts of the country for that month.

July, of 1853, has a higher saturation at Austin, New Orleans, and Savannah; elsewhere less than in 1852.

In August, 1853, is everywhere of higher saturation than in previous years; and the difference is greatest at New Orleans.

September, 1853, presents the same conditions prevailing in August.

October is not sufficiently observed.

Such then, are some of the *direct* proofs furnished by meteorology, of the limits and extension of the great epidemic. It is only to be regretted that every village and hamlet in the country does not supply data of a similar character, to make the application still more precise. On a critical analysis of these highly valuable observations, it will be seen with what exact accordance they correspond with the variable outbreak of the epidemic in every part of this extended region. *In every instance where the facts are known great heat and high saturation* were the predominant conditions for the prevalence of the disease, and it was often remarked that "the *return of these conditions re-produced the fever two or three times.*" Can proof be made stronger? It will be thus seen how truthfully and philosophically this explanation comes in to substitute itself for that most unsatisfactory and barbarous one of contagion, sundering, so far as it extends its creed, every tie that binds man to man, as we have unfortunately found to be the *case* in many instances during the last season in the interior, not in this city, where the doctrine is entirely new. The inhumanity of that attribution is only equaled by its folly. If yellow fever is contagious, *it is a law of the disease*, this it must carry into all places, and under all circumstances (like small pox.) A "*contingent contagion*" is a medical misnomer, is void of a precedent, and has no parallel in the annals of the science. Every device has been resorted to in the way of experiment to show the contagious quality of yellow fever, if any existed, but have all signally failed. That it may be *infectious* under certain circumstances, is admitting nothing more than that it is caused by *impure air*, and that this air can be carried in the hold of a vessel, or any similar mode, by which the air of one place is conveyed to another, or even through clothing, (in some special cases and to a very limited extent,) is not denied. Where the above conditions are present in a sickly season or district, it sometimes requires but a slight addition for the development of the disease, and this is apparently furnished occasionally, by the arrival of cases, or vessels, or goods,

Great heat and high saturation always present

Why impossible to be contagious.

To what extent infectious

with the poisonous or infectious air; but it is not a result of *secretory* action, as all the contagions unquestionably are. This susceptibility of conveyance or transportability, exists, to a very limited extent, and only when the causes giving origin to the disease are more than usually malignant, and are *only propagated in a kindred or congenial atmosphere.* These views have thousands of times been proved by our constant experience here for more than half a century, and such, I deem it, is the general result of the experience of the profession South, during that long period, with a very few exceptions, and those mostly of the last year.

Infection not personal.

Infection is not a personal quality—it applies to vitiated air from whatever cause proceeding. It is the product, not the producer. It is the *rem.* How is it when we approach so near as to causation—to the thing—the principle—in any of the generally acknowledged contagious diseases? In small pox the smallest appreciable amount of *secreted matter* inserted into the body, at *once* and *always* produces the disease, and all these contagions have a *peculiar secretion* as a *product of the disease*, which by its specific action on the system, re-produces itself and thus propagates the malady. Is that the case in yellow fever? *All the secretions and products of the disease* have been over and over again inoculated into susceptible bodies. Even black vomit itself has been tried in every way, and all with impunity. They have been slept with, clothes used, all with the same result, and this would ever be the case, unless there should happen to be *present an epidemic, or foul, or kindred atmosphere!* Without then, this *localising condition*, the congenial materials, the disease does not spread. If it is not contagious, and it has never been found *apparently* so in this country before, then there are existing independent circumstances that account even for the *seemingly* contagious quality, and this proves the existence of the epidemic atmosphere or epidemic meteoration, and the extensive prevalence of yellow fever out of its usual bounds *is proof positive of the existence of that epidemic atmosphere*, and its prevalence and limits are bounded by it.

What is contagion.

Yellow fever not contagious.

How apparently so, explained.

Such high authorities as Drs. Haygarth, Percival, Ferrier

Carmichael Smith, Currie, Russell, Roberts, Arnott, Christison, and others in England, deny that exhalations from the living body are capable of permanent suspension in the atmosphere, or that they can be conveyed, unchanged, through pure air to great distances. They regard it as established by an indubitable body of evidence, that the moment these exhalations come in contact with the external atmosphere, they are diffused through it; that by such diffusion, their infectious properties are destroyed, and that, though when pent up in close unventilated rooms or filthy ships they may acquire some degree of permanence, much concentration and virulence, yet, when they once pass into the ocean of air, they disappear as a drop of rain in the ocean of water. These authorities, view the property thus possessed by air to neutralize and destroy these exhalations, as a provision of nature for our well-being.

No exhalation from human bodies of permanent suspension in the atmosphere.

It was further observed that if the emanations thrown off from the living body formed permanent and powerful poisons, and if this were capable of being conveyed, unchanged, to great distances, we should be able to live only in solitude; we could not meet in society, for we should poison each other; the first symptom of illness would be the signal for the abandonment of the sick, and we should be compelled by a due regard to self preservation, to withhold from persons afflicted with disease, every degree of assistance that required personal attendance.

Consequences on human intercourse, if permanent.

Forbid human intercourse.

But our physical is in harmony with our social constitution, and not in contradiction to it. The necessity of intercourse between all the members of the human family is one of the moral exigences of our race. The policy of encouraging, facilitating and fostering that intercourse among all the nations of the earth is one of the impressive distinctions of our age. "But if it be true that plague and pestilence are capable of being imported from country to country, carrying devastation in their course, and that this calamity may be prevented and can only be prevented by placing periodical barriers between one nation and another, so as effectually to obstruct that intercourse, then there is a contradiction between the necessities and obligations of the human family, and the physical laws of their being.*"

Physical in harmony with social constitution.

* Report on Quarantine—General Board of Health.

It is as true in physic as in other sciences, that "there are more *false facts* than *false theories*," and the alarm in the public mind, last year, was sufficient and did clothe this disease with qualities susceptible of explanation, much more satisfactory, of universal application, and in exact accordance with reason, science and philanthropy. There can be no two opposite facts in nature, although it may be very difficult sometimes to ascertain and establish the true one. Whenever this difficulty occurs we must apply to general principles for explanation, and have recourse to the ordinary and well known causes, circumstances, condition, and analogies, existing or applicable.

No two opposite facts in nature.

Another ground of error existed in confounding an *epidemic* with an *endemic*. The difference does not exist merely in a greater prevalence over a wider space of the former, but in a *greater intensity* of the *materies morbi*. An epidemic is a wide pervading disease, one of whose constituents being atmospheric, and therefore diffusive, influences the type of prevailing febrile maladies, and furnishes to them *a uniformity of livery*, and this will doubtless aid in the explanation why so many creoles have been affected with a fever, having so many of the characteristics of the yellow fever last year, and especially with children, who are so much more susceptible to prevailing maladies than adults. During the existence of an *endemic fever*, this does not take place, although equally and similarly exposed. The very idea of transporting *an epidemic*, which is mainly atmospherical, from one country or locality to another, is an absurdity upon its face. The very statement of the proposition, is its own refutation with intelligent and thinking men. It is little less than arrogating an attribute of omnipotence.

Difference between an epidemic and an endemic.

What is an epidemic.

The important practical deduction resulting from this, is, that *an epidemic cannot be imported*. The principle is very clear. The facts are in exact accordance. Humboldt has long since shown, that, although yellow fever prevailed among the newly arrived *every year* at Vera Cruz, it never prevailed *epidemically* there between 1776 and 1794, although the intercourse with Havana and other places, where the disease continued to pre-

Practical deduction.

Proof from Humboldt.

vail, was quite free. If a case of yellow fever proceeding from a locality where the epidemic prevails is conveyed to another, where it does not, it must terminate with the case, as has been eminently illustrated this last year, on the various marginal limits of the epidemic. This proof of epidemic influence is shown by pointing out these limits, and here it is known mainly by its wanting those evidences of its existence which proved its presence in others. Professor Blodget's interesting communication has shown, that the principal atmospherical constituents consisted in a *high saturation*, with *elevated temperature*. Now, in these places where this epidemic showed itself, and not *having the power of spreading*, there is no evidence to show that these existed, *or only one* existed. For instance, at *Memphis*, about two hundred miles above Napoleon, Arkansas, many cases, (upwards of sixty,) were carried, but with the freest intercourse, public as well as private, the disease did not spread. The place was far from clean, but there is no proof either of high saturation or elevated temperature.

No where even apparently contagious but where the epidemic principle was present.

As at Memphis.

At *Bladon Springs, Ala.*, where the sick were taken in considerable numbers, and there existed the most unlimited communication with all, yet it did not spread, and there was exhibited no evidence of the two conditions required, or either of them.

As at Bladen Springs.

At *Clinton*, near Vicksburg, the same thing happened; there was the most uninterrupted intercourse with "infected spots," persons, and goods, but there was no evidence of an epidemic atmosphere, and consequently the disease did not spread.

At Clinton.

At *Cahawba, Ala.*, about ten miles from Selma, where it prevailed in an eminent degree, and between which places there was constant uninterrupted intercourse, the disease, although freely brought there, did not spread, but terminated with the individual cases. There existed nothing unusual in the seasons.

At Cahawba.

At *Black River*, Concordia Parish, many cases of yellow fever were carried, but it did not spread. Precisely the same occurred at Waterproof, Tensas Parish, where many cases were brought and terminated without extending the disease. A like result was noted at *Point Clair*, at *Holly Wood* and at *Gainesville*.

At Black River, Pt. Clair, Holly Wood, and Gainesville.

ville, and many other places, including our watering places, until an advanced period of the season, when, from the occurrence of the precedingly mentioned conditions, the disease became developed.

Proof at Trinity, La.

At *Trinity, La.*, a rather remarkable instance was furnished *of both conditions being required for effect*, for saw-dust was used to fill up low places in the streets, and even the earth dug from a foundation for a warehouse, was spread upon the streets; but there was no evidence of the existence of *the other condition*, extreme heat, direct (radiation) or indirect, or proof of unusual moisture by hygrometric tests. On the contrary, no epidemic influence noted on the fruit, "which were fine and healthy; musquetoes not so troublesome as usual; mould less than common," (proof of dry air;) no disease or fatality observed among animals." "Many cases of fever brought here, and ended without propagation, and no precaution used."*

At Portersville, cases not extend.

At *Portersville*, where several hundred people were assembled, and about one hundred and fifty in one inclosure, no cases occurred, although five imported cases were brought in, nursed by different persons, and two died with black vomit. The disease did not extend.†

In Rio.

Puerto Cabello.

Gayaquil.

During the existence of the epidemic yellow fever at Rio, many persons were carried to towns at some leagues distance, but in no case did it spread. The same thing occurred in the neighborhood of Puerto Cabello, and Guayaquil. The *epidemic atmosphere* did not extend to them, and consequently the other condition was wanting.

This description of cases, circumstances, and results, could be indefinitely multiplied, not only this year, but every year of the existence of yellow fever, either here or in foreign countries.

The cause of non-communication or extension.

The explanation is so obvious, on the principles to be presently laid down in this Report, that it is scarcely necessary to anticipate them here. One of the conditions deemed essential for the existence of an *epidemic* disease is wanting; either the terrene or meteorological. The cases above given, show that

* From our intelligent communicant, Dr. Kilpatrick. † Dr. Moore.

the epidemic atmosphere was not present, and the disease did not spread. Again, a sudden change in the weather occurs, the yellow fever is arrested; multitudes of fresh unacclimated people (as we have often witnessed) rush into the city, and become exposed to the very foci where it was lately so malignant, yet not a case occurs. *The meteorological condition is wanting.* But, if the weather again becomes hot and moist, with high radiation, the disease is certain to become resuscitated. Again, the cause why *cholera* passes over one town or plantation and seizes on the next, is evidently owing, according to the most satisfactory experience in England, and what has been known to follow the disease here since 1832, in the difference in the terrene or localising conditions, (filth, disturbance of soil, &c.,) and the atmospherical being, or not, *in unison.*

It was also alleged that the fever of 1853 was different from any fever with which this city had been inflicted heretofore, and *therefore* must have been "imported" from the West Indies, Rio Janeiro, Africa, "Nova Zembla," or God knows where. This has proceeded from a patriotic, but mistaken impulse, which is pretty universal, as well among savages, as those more civilized, viz: *never to acknowledge the paternity of a pestilence!* Nevertheless, the sober dictates of truth, still more unyielding and inflexible than those feelings, compels the acknowledgement, painful as it is, that the late epidemic first commenced in this city. I have shown the folly of ascribing its origin to any foreign source, and that the appearance and symptoms of the fever, did not run precisely parallel with the yellow fever of every year, is just what might have been expected. No practical man will say he ever met with them, precisely similar in type and symptoms, at every point, in any series of consecutive years. There has been left some chasm in the similitude, some inequality in the morbid excitement. At one season, the head will be the more prominent point of attack, or onus of the disease; at another, the stomach; at another the spinal system, &c., &c., giving rise to different theories

Fever the same as in former years.

Each have their types.

as to the pathology of the disease, requiring a modification of treatment; now blood-letting, to a great extent, general as well as local, as in the epidemic of 1833, requiring only local in that of 1839, bearing neither in that of 1841; not admitting the general, and requiring much discrimination in the local detraction of blood, last year, (in my judgment,) and in all very little medicine. These peculiarities are probably produced by variations in the remote cause, and the different conditions of the individual. Such is just the experience in other American cities. I think it is less so in the West Indies, from the greater uniformity of climate and condition there. Such, too, is the result of the experience in other diseases.

Although an epidemic atmosphere may prevail, disease only developed where localising conditions of filth, &c.

All epidemics, as all other diseases, must have a beginning, a starting point. That point will be in whatever part of a city or country, in which the localising causes shall exist in the greatest excess, (as will be hereafter pointed out.) This has been clearly demonstrated, by an examination into this subject in England, where it has been made evident that while an epidemic state of the atmosphere exists over the whole country, the *disease will only be developed where* there exists *also*, in more or less *intensity*, the *localising conditions* of *filth*, moisture, stagnant air, &c., (to constitute the perfect combination.) The result of the investigations of the Sanitary Commission has, most strongly corroborated these valuable facts, and in almost every place, which they were enabled to examine personally, the causes for the localization were made apparent enough, and will be mentioned hereafter. Could this Commission have been enabled to carry out the examinations they intended, the public would have been put in possession of a still larger body of most valuable facts, to form the basis of future legislation, in this most important sanitary movement.

SECTION VI.

Two agents essential to produce an epidemic—Atmospheric and Terrene—Climate what? How far heat is productive of yellow fever—Regular progress of from the South—Yellow fever zone—Limits of the epidemic of 1853*—On what dependent—Geographical limits of fever—Humidity important element in climate—Quantity of rain not sufficient evidence of it—Error of Darby in relation to the dryness of this climate—Moisture essential to yellow fever—The great causes of our moisture—Radiation—"Yellow fever weather"—Radiation of different climates—Winds—Amount of moisture in each at New Orleans.*

Having already shown proofs of the general fact of the existence of the epidemic, of its influencing the animal and vegetable kingdoms, of its extension by atmospheric and other conditions, and of the practical fact of the *impossibility of its importation*, I now proceed in more detail to specify, if not the precise elements of which it was composed, what will answer just as well for all practical purposes, the *conditions necessary for its existence*, and, fortunately for us, they can be measurably, if not entirely controlled.

Pestilences have, even to this day, been considered one of the mysteries of nature; and viewing a disease as an epidemic was deemed a sufficient answer to all inquiries in relation to its cause or nature. This does not satisfy the exactions of modern science any more than it does of the causes of tempests, storms, earthquakes, famine, and other instruments of destruction to mankind. As men were unacquainted with their causes or laws, they were denominated "accidental," although, all intelligent men now know that there can be no such thing as "chance" in the government of the world, but that there must be causes and laws of action, if we could only find them out, which is both our duty and interest. In the following pages we have attempted to analyze the METEOROLOGICAL constituents, as far as our means extended; and as it was clearly evident that these alone were not sufficient, other causes were sought out, and it was soon clearly apparent, from the facts before us, from long

Ancient opinion of pestilences.

Must be causes and under laws.

experience, from analogy, and from the records of history, that filth, impurities of all kinds, disturbances of the soil, all combined in what I have denominated TERRENE, formed an essential and indispensable link in constituting a pestilential or epidemic atmosphere.

Epidemics "shears of fate."

EPIDEMICS have been denominated the "shears of fate," the singular propriety of which I will demonstrate by interpreting one blade to consist of the *meteorological condition* and the other the *terrene, or local vitiations* to give it life, impart intensity, and produce development. Both are indispensable for efficiency. Hence then, the very natural division into

1st. Meteorological; and

2d. Terrene;

neither of which alone is competent to the production of yellow fever; the first is not a simple but compound condition, as we shall see hereafter. The second may be also. I do not propose to examine into it in this Report.

The danger is in their combination.

It is the COMBINATION of these necessary ingredients that constitutes the danger, that forms the poison and produces the element of destruction. Let us consider these separately, analyze them, see what power we have over them, so as to prevent that union which is so fatal.

The meteorology is the climate of a country.

First, of the METEOROLOGICAL: the meteorology of a city, district or country, may, without any great violence to truth, be denominated the climate of that city, &c. Its climate determines the character of its diseases, from its influence on the great law of causation, and with reference to the great principle of prevention, that is, sanitary measures, it is almost equally important. The very idea of attempting to influence these without a knowledge of its great principles to pilot and to guide us, is but groping like the blind Cyclops in the dark. This is so well understood by every scientific as well as unscientific man, that there is no description of any epidemic fever on record, of any note, in which there is not constant reference to the condition and changes of the weather as producing or influencing the disease. The testimony is overwhelming; in

no postulate in medicine is there less dispute; all practical men yield it their prompt credence.

High temperature of certain duration essential.

Temperature has been very properly supposed to have much to do in the production of yellow fever, and that the yellow fever zone proper, is restricted to limits where the temperature at midday, during the months of June and July is not less than 79°, and that the extent and malignancy of the disease is often in proportion to the extent in which it shall exceed that height where the other causes concur in a similar degree. That has been applied to the region as far North as Philadelphia very successfully, even during the last summer. It will not apply here with the same exactitude, because our temperature at midday is always above that point at that hour from the month of May to the month of September, nor is the malignancy of the disease in the proportion that it shall exceed that height here. The average temperature at midday of May and June preceding our epidemics has rarely been 81°88, and during the three epidemic months at the same period 83°75. The average temperature of the whole day for the three months has been 79°51. It rarely reaches as high a degree as 90° during the hottest parts of the day. M. Arejula, a Spanish physician and writer of eminence, says that under 23o Reaumur (82 Fahrenheit) it does not appear in Spain (I think.) In Rio de Janeiro it appears when the thermometer is at 77°. It is not a disease requiring the highest temperature for its development; indeed, I conceive this (or above 90°) rather unfavorable to its origination. The accompaniment of great humidity being essential, and with precipitation the temperature at once falls. The average tropical temperature of 80° of considerable duration, with great humidity, is doubtless essential to its elimination here and South of us. In Africa and the East Indies, a much higher temperature and higher combination may be the cause of its non-existence among them. So, on the contrary, a temperature above 80° is fatal to the plague! And thus, also, a temperature from 30° to 50° develops (with other circumstances, as in the other instances) the typhus gravior. Below this *fever* does not occur at all. Such are the meteorolog-

In Philadelphia.

Temperature preceding an epidemic at New Orleans, and during it.

In Spain.

At Rio.

Above 90 deg. too high to favor its production.

Hence it does not exist in Africa and East Indies.

Temperature required for the plague.

Do. for typhus gravior.

ical limits of these great types of disease; the distinguishing characteristics of different climates and distant countries; the avenue through which one-sixth (it is computed) of those who annually fall victims to disease reach the shores of time.

Temperature alone not sufficient.

From these remarks on the influence of temperature in the production of yellow fever, it is not at all attempted to support an opinion, which, no one who has investigated the subject, believes, that elevated temperature *alone* produces it, for were that the case, it would appear annually in regions far North of us, where it is for long lapses of time an entire stranger; for we know, that extremes of summer temperature, so far from declining in proportion to increase of latitude, is just the reverse (for a certain time) and that our *extreme heat* here, is rarely equal to what it is very far North of us. Temperature, then, is only *one* of the elementary agents to aid in giving birth and activity to our formidable foe. The same may be said in relation to its decline or extinction. As it commences usually South of us, (in the West Indies, South America and Mexico,) on an average (one year with another) at least two months in advance or about May, so it retires that much earlier, and being a fever whose ordinary duration is from sixty to ninety days, usually terminates, when with us, it is at its maximum intensity. The same principle will apply with more or less accuracy, to the regions North of us. Temperature then, although a certain range and *duration*, is absolutely necessary for its origin, is not indispensable (or has little to do) for its continuance, far South of us it becomes extinct while this high range continues—ceases here usually before frost, (the supposed great extinguisher,) or continues sometime after its occurrence, and particularly has this been the case last year and more especially in several parts of the Southwestern States.

Yellow fever commences regularly from South, and proceeds regularly North.

Limits of epidemic in 1853.

The farthest North the epidemic atmosphere extended the last season has been at Napoleon, Arkansas, about 33° 50' North, and from Tampa in Florida, to Brownsville in Texas, in latitude 25.50. The yellow fever zone, so often varying, now extends from Rio Janeiro to Charleston, and from Barbadoes to Vera

Cruz. Commencing at Rio, in January, it proceeds after reaching its acme, gradually North, reaching the Northern coast of South America, in April and May, and the West Indies and Vera Cruz, in May and June, it arrives here usually the latter part of July, and does not usually reach its Northern limit until some time in August and September. In this mere historical statement, of course, it is not intended to be implied that the yellow fever is imported from the South to the North, in this regular gradation, but merely that the physical changes inviting and producing its development becomes evolved as the season advances.

Periods of its appearance in different countries.

Among these changes it is not intended to be understood that its prevalence is in proportion to the temperature existing; there are other circumstances that influence its production, among the most prominent of which, in the deadly combination, is the presence of high saturation. This is amply and beautifully illustrated in Prof. Blodget's interesting communication in another page—where high temperature long existed with entire salubrity, but as soon as great humidity was superadded, the fever was at once developed. It is difficult to say, why this two-fold combination should be essential, but in all climatural and endemic fevers, and this is essentially one, this double constituency is a *sine qua non*. This then is another proof that removes it from the category of contagious maladies, which are entirely independent of such contingencies.

Another discproof of contagion.

The zone, as now existing, is different from what it was formerly, although the temperature is about the same, the localising conditions so much under the control of sanitary measures, have, no doubt, influenced it much. Climate (that is, its power of affecting our race) is very much under the influence of circumstances, heat, moisture, dryness, its main ingredients, can be much altered (as we shall see by-and-bye,) our mode of living also influences it. If then, we can influence healthy actions, I know no reason why morbid actions should not also be influenced. In fact, we know that they may be, for I myself have remarked it, in the various changes this country has undergone,

On what the yellow fever zone depends, mainly.

during my long residence in it. It is as important as interesting to us, to know *why* the yellow fever should prevail in Brazil for the first time in 1849–'50. It has heretofore been the healthiest tropical city in the world, and now we hear of its first advent in Chili and Peru, (March, 1854,) and in Guayaquil in 1853; nor has cholera in all its destructive diffusiveness ever been known to have overstepped the equator.

The limits within which yellow fever may occur spontaneously, (the yellow fever zone proper) is a subject of deep interest to us, and the more so, if this can be influenced, and averted as I believe it can, by the power of man. In the latter period of the last century, and the earlier decades of this, it was common, almost annually, in some cities, as far North as latitude 40°. The ground is now assumed, and will be hereafter supported in this report, that the immunity now enjoyed by them, has resulted from no change of climate, or in the constitution of the inhabitants, (technically considered,) but has *arisen from the application and enforcement of sanitary laws and regulations.* My own opinion has been long since given,* that yellow fever is gradually blending itself here with the ordinary diseases of the climate and season. Even during last year, many cases (at least a dozen) in my own practice, during the raging of the epidemic, where the distinction and unequivocal symptoms of yellow fever could not be mistaken, and where this exact type occurred in the same individuals in a former year, during the prevalence of yellow fever. The bilious autumnal fevers of this country not unfrequently put on the yellow fever type (hæmorrhage, yellowness, black vomit) when the causes productive of these are much concentrated, that is, when the two conditions exist in a high degree; the same occurs in the *tierras calientes* (the low level region) of Mexico and some of the rural districts of South America—as near Guayaquil, and in the West Indias, as at Barbadoes, where they suffered nearly as much, as in the towns, and where the negroes suffered, for the first time from it; and epidemics of yellow fever, occasionally sweep through those countries, as it has

What has changed it.

Yellow fever blending with the ordinary fevers of the country.

Occurs in the marshy districts of Mexico, South America, and West Indies.

*Report to State Medical Society.

through this, last year, showing most conclusively, that when the causes which give rise to yellow fever, exist in an exaggerated degree, an epidemic is the result, whether in town or country, and that a sufficient amount can be accumulated to produce an *endemic* fever in a locality far removed from the ordinary yellow fever region, we well know, from what has occurred at Gallipolis, in Ohio, in 1796, and at Fort Smith, Arkansas, in 1823, if not in Louisville, in 1822.

Precursors of the yellow fever at Rio.

These changes of the types of disease, is no more remarkable than that different countries should be subject to different maladies. For three or four years preceding the first occurrence of an epidemic yellow fever in Rio, in the winter of 1849–'50, there had been a gradual change in the types of fever of that country, with an occasional case of unequivocal yellow fever (as recognized by those who had been familiar with it,) until its final development into a disastrous epidemic. Coincident and cotemporaneous with this great change in the diseases of the country, were proofs "that the broad features of the climate of Brazil had altered strangely, old residents declaring that the seasons were no longer such as they remember them to have been,"* all acknowledged an unusual state of the atmosphere existed, a remarkable absence of the usual thunder storms, which were daily, at a certain hour, during the summer season, a prevalence of winds from an unusual quarter, (the Northeast) besides other unknown but acknowledged changes. These less tangible variations have not been noted, or observed, nor do we yet know of the presence there of a faithful notary of science, to record those important conditions that instrumental observation can alone render valuable.

Simultaneous climatic changes.

Another impressive instance of the effects of climatic changes in the production of disease is furnished by Dr. Blair in his recent valuable work on the yellow fever of Demarara. Here, as in Brazil, it was noted that whenever the diseases varied or changed, they were usually preceded by some variation in the *climatic condition.* Thus in Demarara preceding the long

Diseases change with the climate.

*Dr. Pennell.

Demarara.

continued epidemic beginning in 1837, it was noted and even the "planters observed that the climate had changed. The date of the commencement and termination of the two rainy seasons cannot now be ascertained or prognosticated with the same precision as formerly. Land winds prevail in the rainy season, during night and morning only," &c.* Such, too, is the result of experience in all countries—such is reasonable where meteorology is well understood, and records are made; and every where, of the variations in the climatic condition; there the results arising from them (*disease*) can be anticipated and if we shall be unable to prevent, provision will be made for them, and their influence modified and curtailed.

Do. modifies and influences treatment.

Dr. Blair notices that "extreme seasons not only always modify the type of disease, but the effects of treatment; during the depths of the rainy season, adynamic and congestive types are prevalent and marked; purgatives now do harm; mercury too easily salivates; thirst is diminished. There is increased action of the kidneys, there are local congestions, headaches, drowsiness, sopor coma, watery stools." These effects I have constantly noticed in this climate for many years.

Vital laws influenced by meteorological.

That the laws of vital action are influenced by meteorological conditions, surely we are not now to learn for the first time. Man learned it when he was first exposed to an inclement and variable sky, and has ever since used protectives against it. The foes of our race, it is very true, are not confined to these, but in the hasty generalizations of later periods these have been almost entirely overlooked, and the morbific materials have been almost solely attributed to agents that allow a more extensive speculation, and that furnish the data for a more prurient imag ination. It is the duty of philosophy to curb this dangerous propensity, to confine ourselves, as much as possible, within strict limits, and allow due justice to all

First yellow fever South of the equator.

From *Guayaquil,* lat. 2° 15′ S., the Sanitary Commission has received the *first recorded evidence known*, of the yellow fever having appeared South of the Equator, (previous to 1849,

*Dr. Blair.

–'50.) Dr. Wm. Jamison writes us, through the American Consul, of its having occurred there in 1740, and again in 1842. In the latter year it was fatal to twelve per cent. of the population. At Augas, 3,028 feet above the level of the sea, many died of the fever contracted on the banks of the river Guayaquil, but in no case was it communicated to the inhabitants.

And at unusual height of 3,018 feet, in rural districts.

Dr. Lacomb writes us from *Puerto Cabello*, through the United States Consul: "We have instances of black vomit occurring constantly in different parts of the interior of this country; lately, at Nutrias, nearly sixty per cent. of the population died of it. Also, at the Aragua Valley, in Valencia, the capital of the province, situated nine leagues from this place, many cases occurred among the creole population; especially young people. In Caraccas, five leagues from Laguayra, many cases were fatal among the creole population."

Do. in rural districts and with natives.

In *Barbadoes*, although clearly and palpably originating there from local causes, it soon spread over the entire Island, and was just as bad in the rural districts as in the town.*

Do. in Barbadoes.

Many instances were mentioned and will be found in our record, of *repetition of attack*, and the liability of those born here, (and not of creole parents, and some that were, and grown,) were very numerous, more so than has ever been noticed before, even reaching the limits of adult life, and the dread of yellow fever began to be brought home, and even experienced, by the fully developed natives. This has been attributed, during the fever, to the uncommon malignity of the disease. May be the opinion I have heretofore advanced is the true one, and I repeat, although in vivid recollection of the scenes of last year, that the clear and unequivocal type is not so distinctly manifested in the *mass of cases*, as it was twenty or thirty years ago. A hope is entertained in Charleston, that from the liability to attack of the more advanced adults, and in proportion to this retardation ot age, there "exists the strongest possible proof that our circumstances are undergoing a change of a nature calculated to sustain the opinion, that yellow fever is gradually ceasing to be an en-

Deductions from its blending with the ordinary fevers, not only here, but in Charleston.

* From Dr. Sinclair, through the U. S. Consul, to the Sanitary Commission.

demic or climatic disease among us." If this is true, I know no reason why it may not apply, also, here. The hypothesis is an interesting and important one. It is very certain, that the liability to attack a second or third time, or even oftener, occurred in Philadelphia and other Northern cities frequently, and was the forerunner of its entire departure from among them; whether as the consequence of this change, we shall not undertake to determine. I am of opinion, that in former years, *this was not the case with us;* that in latter years it has become more common, and that the fever is becoming *more and more indistinguishable from the ordinary fevers of the season and country.* If with this we can lodge the hope of its departing from among us, or that the yellow fever zone is being removed further South, then, I am very willing to entertain it; but, I wish it distinctly understood as my conviction, that this change of zone, when once established, (and man must have created it by making the localising conditions,) is determined from the exercise of man's intelligence *in controlling the specific conditions upon which yellow fever depends,* (upon which we shall dwell hereafter,) and not upon any spontaneous climatic change, or evidence of cycles occurring, without some efficient cause.—These views are not at all incompatible with preceding observations, in which climatic changes in Brazil and Demarara preceded the outbreak of yellow fever there. Climatic conditions are the predisponent, but without the localising circumstances, (the second blade or "terrene,") as we shall see when we come to state them, yellow fever can no more occur than it can in a country without subjects.

This occurs thro' man's agency.

Without some considerable elevation of atmospheric temperature, periodical or autumnal fever does not occur at all. When it occurs in cold and even in temperate climates, it is only during the hot weather, or towards the middle of summer; that a summer temperature of 60° is necessary for the production of the disease, and that it will not prevail as an *epidemic,* where the temperature of the season falls below sixty-five degrees, and disappears on the

Occurrence of fever dependent on temperature.

succession of frost.* Dr. Drake, in his great work upon the Diseases of the Mississippi Valley, remarks that the geographical limits of fever in this country, are East the Apalacian Mountains, below the 33d° of North latitude, beyond which these mountains do not extend. Below that parallel it has no Eastern limit but the Atlantic Ocean. Southwest of the Cordilleras of Mexico, and the Southern Rocky Mountains, constitute its boundaries. I have found in the City of Mexico, (situated near eight thousand feet above the level of the sea,) continued and intermittent fevers to constitute more than a sixth part of the annual mortality. In higher latitudes, it ceases in the great plains of our Western desert, long before we reach the mountains. It is almost unknown, says he, at the distance of three hundred miles from the Western boundary of the States of Missouri and Iowa, above the latitude of 37° North. In the South it does not prevail as an *epidemic* beyond the parallel of 44°, and ceases to occur periodically about 47°. The actual temperature here, last year, is shown with great particularity in tables B, C, D, T, and K. I trust there is no room for skepticism, then, to doubt the power of temperature in the production of fever, and there is as little doubt it is as much influenced by the hygrometer as the thermometer.

Its geographical limits.

Humidity is certainly the greatest when connected with a high temperature, and is most influential in the production of fever. This is exhibited in table H—showing the different mortalities of the same people, in the healthy country of Holland and Belgium, where the average annual temperature is less than 50°, and here, where it is upwards of 67°, with an average dew point of less than 43°, and here where it is near 62°, and with an average "temperature of evaporation" of less than 47°, and here where it is 64°.

Humidity affects health differently in different temperatures.

The mode of determining the amount of humidity is the most important, as it is the most recent point gained in the cultivation of meteorology, and the study of climate influ-

Its amount in the atmosphere recently understood.

* La Roche.

ences on our race. One most interesting fact has been developed, which may be considered the key-stone of the great value of this mode of investigation, viz: Under the same temperature two sections of country will enjoy a different climate and salubrity, from different *hygrometric conditions.* One will exhibit a high saturation, producing a relaxed vital system, with energies more or less crippled, and extremely destructive to health and life. The other, where the hygrometer is lower, presenting a drier atmosphere, producing a greater elasticity of body and mind, with a power of endurance to which the other is a stranger, and with a continued enjoyment of health. In corroboration of this, the testimony is very ample. Humboldt mentions that "Cumana is the hottest, driest, and healthiest among the equinoctial towns of South America." In various parts of our own country, and even in this city, the fact of the coincidence of a great degree of dryness and health is abundantly shown, and so it is in various parts of Africa and the West Indies, and it is not *until the rains occur that fevers break out.*

Fevers not in proportion to amount of moisture, but a large proportion always required

Let it be distinctly understood, also, that fevers do not prevail *in proportion* to the height of the dew point, or amount of moisture *alone*, but that they *do not prevail without a high dew point*—that is, that a large amount of moisture with a high degree of heat, is essential to the evolution or development of the high grades of fever. Our second condition to constitute "the shears" complete, is equally required for destructive effect. Moisture, no doubt, is the controlling sanitary condition *at all high temperatures.* The distinction is very important. In a preceding section, on the "cost of acclimation for different nativities," the different effects are beautifully and satisfactorily shown on the same people emigrating from a country of great humidity and low temperature (Holland and Belgium) to one of high saturation and elevated temperature. These important facts were eminently illustrated last year. With an extreme of temperature in parts of the Southwest, there continued general health, *un-*

Different effects of humidity at high and low temperatures.

til humidity was added to it. Thus the devastation was extreme. The invaluable testimony upon this subject given by Professor Blodget, through the vast means, the net work of scientific climatology which the Smithsonian Institute is spreading over our own county, is incalculable. The excessive heats of Lower Texas, the Rio Grande valley, and other districts where the thermometer rises to 112°, 115°, have a *temperature of evaporation* not above that of New Orleans, with the air at 87°. At Austin, Texas, with the air at 98°, several times in June the temperature of evaporation never rose above 78°, and at the highest air temperature was at 74°, 76°, or nearly ten degrees below the temperature of evaporation at New York, where the air thermometer did not exceed 95°. The heats of these districts are therefore endurable, and even pleasant, at a degree which would seem fatal to life, from the great evaporating power and elasticity of the atmosphere, which uniformly prevails.* Proofs.

Nor is the quantity of rain that falls in a country the best evidence of this condition. A retentive soil, flat country, extensive marshes, and large bodies of water will furnish the facilities, with a high temperature, for a great and dangerous humidity; while a rocky, clayey, sandy or absorbent soil, and considerable declivity, will rapidly accelerate with winds from drying quarters, the removal of the rain that falls. Hence, the annual precipitation is not the best test of the humidity of a country. Quantity of rain not exactly a proof of amount of moisture.

The sickly season of nearly all countries, is the rainy season, and where there is an exception to it, it almost surely exhibits a marshy, that is, a partially dried swamp, which is more favorable to the accumulation of moisture in the atmosphere than when entirely inundated. This is very clearly exemplified by the occurrences at Tampico, in 1836. The rains usually commence there in July, and are followed by intense heat. This is the period of the yellow fever. Rainy season the sickly season.

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* Letter from Prof. Blodget to me.

In the above-mentioned year the rainy season commenced two months later than usual, and there was a corresponding delay in the appearance of the disease.*

Proof at Puerto Cabello.

At *Puerto Cabello*, Dr. Lacomb states that "it is a constant and general rule that the place becomes entirely free from disease, and the healthiest in the world when *strong heat, combined with total absence of rain and dampness* prevails, the atmosphere then being entirely dry." On the contrary, "during the two last years, 1852–'53, the weather was very hot, and *very damp*, with frequent small rains; during all this period yellow fever prevailed."

Do. at Bermuda.

In the Island of *Bermuda*, a proverbially healthy place, there has occurred during the last summer, that precise combination of "unusually heavy rains, and scorching hot weather, with out anything like a breeze for days, and filth from an old stranded vessel now exposed," followed by a mortality of one in every seven.†

At New Orleans.

Probably no condition is so eminently injurious to the salubrity of New Orleans, as this great humidity, not merely of itself, but it furnishes the agency, either by solvency, combination, or otherwise, with temperature, for those influences that are so destructive to health and life here. The actual amount is shown in the tables, (and I wish I had room to show the comparison with other countries.) A very partial examination of these tables will clearly demonstrate, when contrasted with the monthly mortality, how destructive to health is a nearly (and indeed often) saturated atmosphere, accompanied with high temperature. *We have never had an epidemic yellow fever in this country, without this combination!* most of these records are before me, besides a personal recollection which extends back upwards of thirty years. I am aware that there have been counter statements, but they are entirely unsustained by records or experiments. The temerity has even gone so far as to refer to years, to corroborate it. My meteorological journal for those years show them to be void of accurate data.

Denied.

* Goupillian, from La Roche. † Communication through Prof. Blodget.

Two years have been specified, viz: 1837 and 1841, as being *very dry*, and at the same time *epidemic years*. My Meteorological Journal states for the first, that although for the whole year, the total amount of rain is small, yet there fell during the month of September, (the very month in which the mortality was more *than double that of any* other month,) *more rain fell than the average of the ten preceding Septembers!* That there fell during the preceding three months more than ten inches of rain, and that in October, which was the next most fatal month, there fell more *than double the average* of five preceding Octobers! and that of the latter, (or 1841,) *more than 50 per cent.* of rain fell that year, than the average of the preceding ten! So much then for facts and records, *vs.* memory and speculation!

But recorded proof of its correctness.

Mr. Darby, who has written a work on this country, of quite considerable authority, about half a century ago, is represented to say in it that "for eight months in the year, *after* the season of inundation, *lower* Louisiana is drier than any woodland in America." He does not pretend to sustain this hazardous assertion by any records of precipitation, or other evidences. It is not probable, with the great removal of forest growth, which tends to dry a country more than anything else, which has taken place since this was written, that it has tended to make it *more humid!* From a hydrographic survey, *one-eighth of the State is constantly under water; two-fifths of it subject to inundation!* In Louisiana, we have two rainy seasons; that for New Orleans culminates in February and July, which differs but little from that of other parts of the State, excepting, probably, West Feliciana, which in a period of thirteen years, terminating in 1833, had then *three* rainy seasons, (April, July and December,) with an annual average of 61.344 inches! The annual precipitation on Red river, near Alexandria, was 67.400 inches; of Plaquemine parish, below New Orleans, 67.080 inches, and in this city a fraction over 52 inches. From these causes, her extensive morasses, impermeable soil and flat country, Louisiana is unquestionably *now*, and no doubt, has *ever been* the most humid State

Unfounded statement of Darby.

Positive proof of its erroneousness.

in North America. These circumstances give rise to our constant fogs that are so injurious to health. Were the swamps in our neighborhood drained, and forest growth removed, these would in a great measure subside, and their morbific influences abate.

Moisture indispensable.

We do not pretend to say that the yellow fever is rife in proportion to the amount of moisture existing in the air; but we do not doubt that a large amount of it is *indispensable* for it. When satisfactory scientific investigations on this subject shall be extended to all the places of its occurrence, even that amount may be determined. Whether it is a mere vehicle for the poison, or prepares the system for its influence, or it is the combination, a large amount is certainly required for the existence of the disease. Hence then, the discrepancies upon the subject, neither alone being sufficient, but with both and a high temperature the disease is not often absent.

Proof in Flanders.

Dr. Home made some experiments to show the connection of humidity and disease in a campaign in Flanders. He carefully measured daily with the hygrometer the degree of moisture and dryness of the air, and upon comparing his tables with the register kept of the sick, he found that the progress of the disease kept pace, as far, he says, as anything of the kind can do with the humidity* of the air. The whole meteorological condition has been kept by me here for many years, including the hygrometry, and it has always appeared to me that the *direct* influence on the health of individuals, with its varying conditions, not only in yellow fever, but with large classes of disease, has always been clear and unequivocal. Its influence last year I have shown to have been very conspicuous. The special details for the epidemic months are given in the tables, as taken five times daily, with the cotemporaneous mortality; the *dates* of the occurrence of the disease would have been more exact, but could not be procured.

It is supposed there is necessarily great moisture at sea, and that where there is a foul vessel much disease should exist in

* La Roche.

"C." Meteorological Register, for New Orleans, kept by E. H. Barton.

JULY, 1853. LATITUDE, 30°. LONGITUDE, 9°.

Altitude of Thermometer above the Earth ..... 5 feet.
do. of Rain Gauge ..... 15 feet.
do. of Barometer above the sea, ... 11 ft. 141

Explanation.

ASPECT OF SKY.—0 Represents entire cloudiness, 1 " a slight degree of clearness, and so on, until 10, " which represents entire clearness

WINDS —0 Signifying calm, 1 a very gentle breeze, 2 a gentle breeze, 3 a fresh breeze, 4 a strong wind, 5 a very do. do, 6 a violent storm

Day of Month	Barometer at Sun Rise	Barometer at 9 A. M.	Barometer at 3 P. M.	Barometer at 9 P. M.	Barometer Range.	Thermometer outside, in open air, in shade, at Sun Rise	Thermometer outside, in open air, in shade, at 9 A. M.	Thermometer outside, in open air, in shade, at 3 P. M.	Thermometer outside, in open air, in shade, at 9 P. M.	Thermometer Average.	Thermometer Range.	Aspect of Sky at Sun Rise.	Aspect of Sky at 9 A. M.	Aspect of Sky at 3 P. M.	Aspect of Sky at 9 P. M.	Anemometer, Course and Force of Wind at Sun Rise.	Anemometer, Course and Force of Wind at 9 A. M.	Anemometer, Course and Force of Wind at 3 P. M.	Anemometer, Course and Force of Wind at 9 P. M.
1	30.13	30.13	30.11	30.14	.03	77°	84°	86½°	80°	81	9	5	6	6	10	N. E. 1	N. E. 1	S. 2	S. 1
2	.12	.17	.17	16.05		79	87	86½	78	81	9	9	5	6	8	S. E. 1	S. 3	S. 2	E. 1
3	.....	15	8	23.10		....	84½	82	81	..	..	5	6	6	10	.....	S. 2	S. W. 1	0
4	.14	.22	.23	25.11		78	80	83½	79½	80	5	8	1	1	10	W. 1	W. 3	S. W. 1	0
5	.24	.26	.21	25.05		78½	85	78	78	79	7	9	5	0	10	0	S. 1	E. 1	0
6	.26	.27	.25	30.05		76½	82	81	76	78	6	7	0	1	0	S. 1	0	0	0
7	.30	.33	.34	35.05		76	79	78	76	79	3	0	1	0	0	0	S. E. 1	1	0
8	.35	.36	.32	35.03		75½	77	83½	79½	79	8	0	0	0	10	N. E. 1	E. 1	S. E. 1	0
9	.36	.37	.34	32.05		77	84	84	80	81	7	2	3	0	10	0	S. E. 1	S. 1	0
10	.35	.35	.28	34.07		79	86	85	79½	82	7	8	1	0	10	0	S. W. 1	S. 2	0
11	.32	.32	.30	34.08		77	84	78	75½	78	9	6	5	0	0	0	S. W. 2	W. 1	0
12	.23	.24	.20	22.04		74	75	78½	76	78	5	0	0	0	8	W. 1	W. 1	W. 1	S. W. 1
13	.25	.28	.23	26.05		74½	73	79½	77½	76	7	0	0	0	6	S. W. 1	S. W. 1	S. 1	S. W. 2
14	.28	.27	.24	25.04		76	80	82	78	79	6	0	1	0	5	W. 2	S. W. 2	S. W. 3	0
15	.25	.27	.20	22.07		78	84	83	80	81	6	5	4	1	8	S. W. 2	N. 3	E. 3	0
16	.19	.21	.17	.18 04		78	85	83	77½	80	8	2	2	1	3	S. W. 3	S. N 3	S. W. 4	S. W. 3
17	.20	.21	.21	26.06		78	85	87	80	82	9	6	6	0	10	N. W. 2	N. W. 2	N. E. 2	S. W. 1
18	.28	.33	.28	.32.05		77	85	88	80½	82	11	6	6	0	10	S. W. 1	N. W. 1	S. 2	S. W. 1
19	.34	.35	.35	36.02		78	85	86½	81	82	8	0	6	0	8	0	S. E. 1	S. E. 1	0
20	.37	.35	.33	32.05		78½	86	89	82	83	11	7	6	0	9	0	S. SW. 3	S. W. 3	S. W. 2
21	.30	.31	.29	22.09		79	87	79	76½	80	8	8	8	1	6	S. W. 1	W. 2	N. W. 2	S. W. 1
22	.22	.23	.....	.....		74½	76	78	.....	..	4	0	3	..	..	E. 2	.....	0	.....
23	.21	.....	.....	.....		76	....	....	.....	..	..	0	..	..	..	N. W. 1	.....	.....	.....
24	.....	.....	.....	.....		.....	.....	.....	.....	..	..	..	..	..	..	.....	.....	.....	.....
25	.28	.....	.....	.....		79	.....	.....	78	..	..	0	..	..	..	S. W. 1	.....	.....	.....
26	.....	.22	.....	.20 02		....	78	....	79	..	..	..	..	..	..	.....	.....	.....	.....
27	.22	.33	.18	23.17		75½	76	78	75	76	3	0	0	..	0	0	.....	W. 1	.....
28	.27	.31	.30	33.06		71	76	81	78	76	10	1	..	..	..	N. 1	.....	.....	.....
29	.26	.28	.34	34.08		75	83½	85	78	80	17	10	..	..	10	S. 1	.....	S. 3	0
30	.....	.33	.30	32.03		79	85½	79	79	80	7	..	..	..	10	.....	.....	N. W. 2	0
31	.32	.32	.....	.21 11		77½	85	82	79	80	8	10	..	..	10	N. E. 1	.....	.....	.....
Totals,	81704	84784	72621	81715		2152	2292	2019	2036		193	103	79	6	177	N. 3=¾	N. E. 5=1¼	E. 5=1¼	S. E. 6=1½
																			calm 26=6½
Averages,	30.260	30.280	30.258	30.264		78.85	82.03	82.18	75.41		7.14	3.81	3.43	2.34	6.80	S. 13=3¼	S. W. 24=6	W. 9=2¼	N. W. 6=1½
																N. 2.33	N. E. 1.20	E. 1.60	S. E. 1.09
																S. 1.69	S. W. 1.83	W. 1.33	N. W. 1.66
Total do.	30.265					79.88						4.14				1.58			

Day of Month	Temperature of Evaporation at Sun Rise	Dew Point at Sun Rise	Temperature of Evaporation at 9 A. M.	Dew Point at 9 A. M.	Temperature of Evaporation at 3 P. M.	Dew Point at 3 P. M.	Temperature of Evaporation at 9 P. M.	Dew Point at 9 P. M.	Range.	Daily Humidity.	Radiant Thermometer in Sun.	Pluviometer.—Rain. Date.	Begun.	Ended.	Quantity.
1	76	75.6	78	75.2	78	77.3	78.3	1.8	.954		9. 30				
2	78	77.6	76	74.6	76	75.3	3.0	9.92			250 60.				
3	.....	.....	73	72.5	78	77.6	4.5	.815				1st	8.52 A.M.	9 A.M.	.079
4	77	76.6	77½	75.6	78	77.6	2.6	.893					11.09 A.M.	11.16 A.M.	
5	76	75.3	76	75.3	76	75.3	0.6	.939				2d	3.05 P.M.	3.20 P.M.	.193
6	77	76.	77	75.6	74	73.2	2.8	.917					Showers before day.		
7	75½	76.6	73	73.9	75	74.6	2.1	.914				3d	11.35 A.M.	11.46 A.M.	.326
8	74	73.6	73	72.2	77	76.3	4.1	.844					8.30 A.M.	8.10 A.M.	
9	74	71.4	77	74.7	78	77.3	5.9	.837					9.38 A.M.	9.43 A.M.	
10	76	75.0	77	74.4	77	76.3	1.9	.834					10.35 A.M.	11.05 A.M.	
11	76	75.6	75	73.8	74	73.6	2.0	.939				5th	12.25 P.M.	12.38 P.M.	3.225
12	73	71.1	74	72.5	74	73.2	2.1	.883					1.52 P.M.	3.50 P.M.	
13	73	72.6	77	76.3	76	75.6	3.7	.939							
14	74	73.2	78	76.7	77	76.8	3.6	.904							
15	77	76.8	77	75.6	78	77.3	2.3	.883							
16	76	75.3	78	76.4	76	75.6	1.1	.894							
17	77	76.8	76	72.4	78	77.3	4.9	.826							
18	76	75.6	77	73.5	78	77.3	3.8	.821							
19	76	75.3	78	75.5	78	77.7	1.7	.927							
20	76	76.	76	73.2	78	76.7	3.6	.792							
21	76	75.0	76	75.0	75	74.6	0.4	.902							
22	74	74.6	.....	.....	.....	.....	.....	.....							
23	77	73.2	.....	.....	.....	.....	.....	.....							
24	.....	.....	.....	.....	.....	.....	.....	.....							
25	77	76.3	.....	.....	78	78.6	1.7	.988							
26	.....	.....	.....	.....	.....	.....	.....	.....							
27	74	73.6	75	73.9	75	75.0	1.4	.856							
28	68	66.2	78	77.1	76	75.3	0.5	.887							
29	74	73.6	82	80.9	76	75.3	7.3	.894							
30	.....	.....	76	75.1	78	77.6	2.6	.929							
31	76	75.6	78	76.7	78	77.6	1.8	.912							
Totals,	2028	2014	1994	1847	2070	1894	924								
Averages,	75.14	74.59	76.69	71.06	76.66	70.14	3.05								
Total Averages,	.....	.....	.....	72.13	.....	.....	.....								
Drying power,	.....	2.26	.....	11.12	.....	5.27	.....								
Average do.	.....	.....	.....	6.21	.....	.....	.....								
Average temp. of Evaporation	.....	.....	.....	76.16	.....	.....	.....								

Average Radiation at Sun Rise was found to be,
9, A. M. do.
12, M. do.
3, P. M. do.
9, P. M. do.

Date.	Begun.	Ended.	Quantity.	Daily & Weekly Mortality from Yellow Fever.	Ditto from other Diseases.	Total Weekly Mortality.	Height of River below High Water Mark, which is usually about Fifteen Feet.
1st	8.52 A.M.	9 A.M.	.079	4	34	38	4 feet on 2nd
	11.09 A.M.	11.16 A.M.					
2d	3.05 P.M.	3.20 P.M.	.193				
	Showers before day.						
3d	11.35 A.M.	11.46 A.M.	.326				
	8.30 A.M.	8.10 A.M.					
5th	9.38 A.M.	9.43 A.M.	3.225	From 1st to 8th,			
	10.35 A.M.	11.05 A.M.					
	12.25 P.M.	12.38 P.M.					
	1.52 P.M.	3.50 P.M.		59	129	188	5.10 on 10th.
6th	10.32 A.M.	10.48 A.M.	.200				
	5.38 P.M.	6.00 P.M.					
7th	Gentle Showers.		.023				
	.12 M.	12.39 P.M.					
8th	12.28 P.M.	12.32 P.M.	.081				
				to 13th,			
				204	140	344	
11th	12.23 P.M.	12.35 P.M.					6 feet on 17th
	2.00 P.M.	3.30 P.M.	.387				
	3.09 A.M.	3.30 A.M.					
12th	8.15 A.M.	10. A.M.	.362				
				to 13th,			
				429	188	617	
13th	8.30 A.M.	11.20 A.M.	1.354				
	3.02 P.M.	3.12 P.M.					
14th	3.15 P.M.	3.50 P.M.	.335				
21st	2.52 P.M.	4.30 P.M.	1.300				
	4.09 A.M.	5.45 A.M.					
22d	8.00 A.M.	8.30 A.M.	.245				
25th	6.10 P.M.	6.50 P.M.	.991				6.6 on 24th
				to 26th,			
				297	84	381	
27th	5.25 A.M.	6.00 A.M.		Daily,			
	2.25 P.M.	4.00 P.M.	1.360	160	24	124	
	7.09 P.M.	9.30 P.M.		87	18	105	
29th	3.15 P.M.	4.48 P.M.	.680	128	26	154	
31st	1.35 P.M.	2.15 P.M.	.067	137	20	157	7.6 on 31st
				109	33	142	
Total,			11.708	1.554	686	2240	

REMARKS.

The record this month has been kindly kept for me by Dr. N. B. Benedict.
Much thunder and lightning during the month.
Heavy rains, alternated with hot sun. Much damp weather
Thunder and lightning noted particularly on the 5th, 12th, 13th, and 29th.

RECAPITULATION.

	Barometer.	Thermometer.	Dew Point.	Degree of dryness on the Thermometric Scale.	Degree of Moisture on the Hygrometric Scale, 1000 being sat.
Maximum,	30.37	89	80.9	15.8	0. or sat. 5 obs.
Minimum,	30.11	71	66.5	0. or sat. 5 obs.	.619
Average,	30.265	79.88	72.13	6.21	.825
Range,	.26	18	14.4	15.8	.390
Average of daily range,	5.07	7.14	3.05	.....	.....

ASPECT OF SKY.

Average, At Sun Rise, ... 3.81
9, A. M. 2.43
Midday, ... 2.54
9, P. M. 6.80

Average total, 4.14

QUANTITY OF RAIN

In inches and fractions, 11.708
No. of days on which Rain fell, 18
" nights " " " 4

WINDS.

No. of days blowing,	Direction.	Force.
From the N.	0½	2.33
" N. E.	1½	1.21
" E.	1½	1.60
" S. E.	1½	1.00
" S.	3½	1.69
" S. W.	6	1.83
" W.	2½	1.33
" N. W.	1½	1.66
No. of days calm,	6½	
Average total,		1.58

HYGROMETRIC CALCULATIONS.

At Sunrise.	At Midday.	At 9, P. M.	Average.
AMOUNT OF MOISTURE.			
.930	.703	.842	.825
ELASTICITY OF THE VAPOR.			
.893	.706	.773	.820
WEIGHT OF VAPOR IN A CUBIC FOOT IN GRAINS.			
9.600	8.489	8.315	8.798

New Orleans Register Meteorology

JULY, 1853. LATITUDE, 30°. LONGITUDE, 90°

DAY OF MONTH	BAROMETER AT				THERMOMETER (outside, in open air, in shade)						SURFACE OF WATER AT			
	SUNRISE	9 A.M.	3 P.M.	9 P.M.	RISE	SUNRISE	9 A.M.	3 P.M.	9 P.M.	MEAN	9 A.M.	3 P.M.	9 P.M.	MEAN
1	30.13	30.15	30.11	30.14	77	80	89	90	80	84	84	86	84	85
2	.12	.17	.07	.10	79	82	87	94	81	86	84	86	84	85
3	.13	....	....	.22	80	84	89	91	....	....	....	....	....	....
4	.14	.20	.23	.22	78	80	89	94	80	84	84	86	84	85
5	.24	.26	.21	.26	78	84	86	94	78	86	84	86	84	85
6	.26	.27	.23	.26	78	84	91	94	78	86	84	86	84	85
7	.30	.33	.34	.26	78	78	78	94	78	84	84	86	84	85
8	.36	.36	.36	.36	78	84	84	94	78	86	84	86	84	85
9	.36	.37	.34	.36	78	84	89	94	78	86	84	86	84	85
10	.36	.36	.34	.34	78	84	89	94	78	86	84	86	84	85
11	.36	.36	.36	.36	78	84	89	94	78	86	84	86	84	85
12	.34	.34	.32	.34	78	84	89	94	78	86	84	86	84	85
13	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
14	.36	.37	.34	.36	78	84	89	94	78	86	84	86	84	85
15	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
16	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
17	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
18	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
19	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
20	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
21	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
22	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
23	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
24	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
25	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
26	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
27	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
28	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
29	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
30	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
31	.36	.36	.34	.36	78	84	89	94	78	86	84	86	84	85
Totals,	81704	84764	79021	81712	2356	2592	2819	2939	2436	2696	2604	2666	2604	2635
Averages,	30.960	30.980	30.938	30.964	75.99	83.61	90.93	94.80	78.58	86.96	84.00	86.00	84.00	85.00
Total do	30.965				70.86									

Totals,	193	79	114	386
Averages,	6.22	2.54	3.67	12.43
Total do				4.14

REMARKS.

The record this month has been kindly kept for me by Dr. N. B. Bene
Much thunder and lightning during the month.
Heavy rains, alternated with hot sun. Much damp weather
Thunder and lightning noted particularly on the 5th, 12th, 13th, and

"D." Meteorological Register, for New Orleans, kept by E. H. Barton.

AUGUST, 1853. LATITUDE, 30°. LONGITUDE, 90°.

Altitude of Thermometer above the Earth 5 feet.
do of Rain Gauge, ... 15 feet
do of Barometer above the sea, ... 11 ft. 1.61

Explanation.

ASPECT OF SKY — 0 Represents entire cloudiness, 1 " a slight degree of clearness, and so on, until 10, " which represents entire clearness

WINDS — 0 Signifying calm, 1 a very gentle breeze, 2 a gentle breeze, 3 a fresh breeze 4 a strong wind 5 a very do. do 6 a violent storm.

Day of Month	Barometer at Sun Rise	Barometer at 9 A.M.	Barometer at 3 P.M.	Barometer at 9 P.M.	Barometer Range	Thermometer outside, in open air, in shade, at Sun Rise	Thermometer 9 A.M.	Thermometer 3 P.M.	Thermometer 9 P.M.	Thermometer Average	Thermometer Range	Aspect of Sky at Sun Rise	Aspect of Sky at 9 A.M.	Aspect of Sky at 3 P.M.	Aspect of Sky at 9 P.M.	Anemometer, Course and Force of Wind at Sun Rise	Anemometer, Course and Force of Wind at 9 A.M.	Anemometer, Course and Force of Wind at 3 P.M.	Anemometer, Course and Force of Wind at 9 P.M.
1	30.30	30.29	30.27	30.28	.03	77°	85°	89°	80°	81	8	10	.....	.....	.....	N.E. 1	.....	.....	.....
2	.27	.....	.....	.29	...	77½	.....	.....	81	..	....	10	.....	.....	.....	W. 1	S.W. 2	.....	.....
3	.....	.....	.....	.....	...	.....	.....	.....	82	..	....	.....	.....	.....	.....	.....	.....	.....	.....
4	.....	.....	.....	.19	...	77	86	88	82	83	11	.....	.....	.....	.....	.....	.....	.....	W. 1
5	30.29	.22	.18	.17	.05	77	86	88	82	83	11	10	7	3	10	W. 1	N. 2	W. 2	N. 1
6	.19	.23	.23	.19	.04	77	84	85	79	81	8	10	10	4	0	N.W. 1	N.W. 3	N. E. 2	E. 2
7	.21	.23	.22	.21	.03	78	83	79	79	78	5	3	3	4	10	E. 1	E. 2	E. 2	0
8	.21	.24	.21	.22	.03	77	84	87	83	82	10	10	9	8	10	E. 1	E. 1	E. 2	0
9	.23	.25	.22	.23	.05	77	87	75	77	79	12	10	3	6	10	0	E. 2	E. 1	0
10	.26	.26	.24	.26	.02	77	84	74	76	77	7	8	6	9	6	E. 1	E. 2	E. 2	0
11	.29	.29	.22	.23	.07	75	80	85	78	78	6	9	9	6	4	0	N. 1	N. E. 1	S. 1
12	.24	.25	.21	.18	.07	76	83	85	78	80	9	8	6	1	0	0	E. 2	E. 1	0
13	.20	.23	.17	.15	.08	75	77	83	78	78	8	3	4	2	10	N. E. 2	N. E. 2	E. 3	E. 2
14	.18	.21	.17	.18	.04	75	84	83	78	80	9	8	6	6	10	0	E. 1	E. 2	0
15	.21	.24	.18	.24	.06	75	82	78	75	77	7	8	6	6	8	0	W. 1	0	E. 1
16	.17	.19	.15	.13	.06	75	81	83	73	77	8	0	1	6	8	0	W. 1	W. 1	0
17	.11	.12	.06	.04	.06	72	77	82	76	76	10	8	6	2	8	W. 2	W. 2	W. 1	N. W. 1
18	.07	.10	.08	.07	.03	74	83	83	77	79	9	10	6	6	6	0	W. 1	W. 1	0
19	.09	.12	.07	.18	.05	74	84	87	82	81	13	10	10	10	8	W. 1	W. 2	N. W. 2	W. 2
20	.09	.11	.11	.09	.02	79	86	91	76	83	15	10	8	6	8	W. 2	W. 2	N. 2	N. 1
21	.14	.17	.13	.14	.03	75	84	88	82	82	13	10	8	10	10	N. E. 2	W. 1	N. 1	S. 2
22	.16	.22	.20	.17	.06	80	84	76	76	79	8	8	4	0	0	W. 1	N. E. 2	N. 1	N. 2
23	.18	.22	.19	.18	.04	75	82	87	81	81	12	3	4	10	10	N. 1	N. E. 1	N. E. 2	E. 3
24	.17	.21	.16	.15	.06	76	85	89	81	82	13	10	6	10	6	S. E. 1	N. E. 1	N. E. 2	S. E. 3
25	.19	.21	.18	.18	.03	77	84	85	81	82	9	2	3	9	8	S. E. 1	S. E. 1	S. E. 1	S. 1
26	.21	.25	.22	.25	.04	78	85	84	81	82	7	9	2	10	1	0	E. 1	E. 2	E. 2
27	.26	.29	.22	.27	.07	78	83	86	83	82	8	10	1	10	10	E. 1	N. E. 2	E. 3	E. 2
28	.23	.28	.24	.24	.05	76	75	85	79	78	10	8	1	2	10	N. E. 2	E. 1	E. 2	E. 1
29	.21	.26	.23	.24	.05	77	85	87	79	82	10	6	2	10	10	E. 2	E. 3	N. E. 3	E. 2
30	.23	.27	.22	.23	.05	77	85	86	78	81	9	10	2	10	10	N. E. 3	E. 2	E. 3	E. 2
31	.16	.17	.13	.13	.04	75	83	85	80	81	11	9	6	8	10	N. E. 3	N. E. 2	N. E. 2	E. 2
Totals,	87563	84921	84518	87527	131	2212	2327	2347	2284	....	265	219	115	95	277	N. 9–2)	NE. 17–4)	E. 36–2)	S. E. 6–4)
Averages,	30.194	30.222	30.181	30.181	4.68	76.27	83.10	83.82	78.75	....	9.49	7.55	5.83	3.46	7.75	8 3–9)	S.W 0–3)	W. 2–5)	calm 17–41)
																N. 1.33	N. E. 2.	E. 1.89	N.W. 4–1)
Total do.	30.194					81.25						5.34				8. 1.33	S. W. 0.0	W. 1.2	S. E. 1.50)
																1.33			N. W. 1.75)

Day of Month	Temperature of Evaporation at Sun Rise	Dew Point at Sun Rise	Temperature of Evaporation at 3 P.M.	Dew Point at 3 P.M.	Temperature of Evaporation at 9 P.M.	Dew Point at 9 P.M.	Range	Daily Humidity	Radiant Thermometer in Sun, at Sun Rise	9, A.M.	12, M.	3, P.M.	9, P.M.	Pluviometer; Rain. Begins	Ends	Quantity	Daily Mortality from Yellow Fever	Difference from other Diseases.	Total Daily Mortality	Height of River below High Water Mark, which is usually about Fifteen Feet.
1	75	74.2	80	77.1	78	77.2	3.1	.887	75	89	.....	.....	80				117	18	135	
2	70	75.6	.....	.....	78	75.6	...	.943	78	.....	.....	.....	80	12.58 P.M.	1.20 P.M.	.065	125	26	151	
3	.....	.....	.....	.....	.....	.....	...	.....	.....	.....	.....	.....	.....	12.10 P.M.	1.05 P.M.	.071	127	23	150	
4	.....	.....	.....	.....	80	79.4	...	.922	.....	.....	.....	.....	81				132	23	155	
5	77	77.0	81	77.4	79	78.1	1.1	.857	76	97	98	100	80				198	40	238	9 ft. 2 in.
6	77	77.1	78	75.8	78	77.6	1.8	.897	76	97	107	108	79				166	43	209	
7	77	76.8	77	76.5	76	75.1	3.7	.954	78	.....	111	111	79	12.30 P.M.	1.20 P.M.	.680	196	32	228	
8	76	75.1	78	75.4	79	78.6	3.4	.859	77	96	107	114	80				176	36	212	
9	76	75.6	77	75.3	77	77.4	2.4	.890	76	116	120	.....	77	1.20 P.M.	2.20 P.M.	.980	189	40	229	
10	77	77.1	74	74.8	76	76.6	3.1	.990	76	119	117	.....	...	12. M.	1.30 P.M.	.080	197	20	217	
11	77	75.1	77	75.6	77	76.8	1.8	.926	78	.....	114	.....	78	2.20 P.M.	3.15 P.M.	.550	193	32	225	
12	76	76.0	78	75.3	74	72.5	3.5	.854	75	110	117	.....	78	12. M.	1. P.M.	.150	173	31	204	
13	72	70.7	73	69.2	75	73.9	4.7	.790	75	.....	.....	.....	78				196	36	232	9 ft. 10 in.
14	74	73.6	76	74.6	76	75.7	1.7	.970	75	128	120	.....	78				193	30	223	
15	74	73.6	77	76.8	74	73.6	2.2	.956	75	.....	.....	.....	75	10.20 P.M.	12.20 P.M.	.720	191	31	222	
16	74	73.6	77	75.4	73	73.1	2.6	.880	75	.....	118	.....	...	3.15 P.M.	3.55 P.M.	1.100	193	26	219	
17	72	72.1	77	75.3	74	73.6	3.3	.934	72	.....	131	128	76	4.30 P.M.	6. P.M.	.200	191	28	219	
18	74	74.1	77	75.1	75	74.2	1.8	.899	74	125	129	.....	77	11.30 A.M.	11. A.M.	.350	208	26	234	
19	70	72.6	77	73.8	8	79.4	6.8	.834	74	137	148	132	82				192	37	229	
20	78	77.6	77	72.7	73	71.8	5.8	.787	79	130	132	129	75	3.45 P.M.	4. P.M.	.340	235	34	269	11 ft.
21	73	72.2	78	76.3	79	78.1	5.8	.833	74	127	132	132	81				244	39	283	
22	79	78.6	71	74.1	73	70.3	7.3	.914	80	.....	.....	.....	75	7. A.M.	8.30 A.M.	.250	224	34	258	
23	77	75.1	77	73.8	78	77.1	3.5	.845	74	.....	112	.....	81	12. M.	12.30 A.M.	.420	191	31	222	
24	75	74.6	78	76.1	78	77.1	2.4	.911	76	105	118	119	81				193	28	218	
25	76	75.6	78	75.7	79	78.3	2.8	.856	77	105	112	123	81				155	38	193	
26	77	76.8	78	77.3	79	78.3	1.7	.897	78	110	100	.....	81				153	32	185	
27	77	76.8	77	71.5	77	70.1	5.8	.811	78	112	.....	.....	80				119	29	148	12 ft.
28	77	74.6	78	75.8	77	76.5	1.7	.888	75	.....	.....	.....	79	12. M.	2.30 P.M.	.110	93	15	105	
29	77	74.2	77	73.8	77	76.3	2.7	.824	77	105	100	110	79	6.45 A.M.	8. A.M.	.450	117	22	139	
30	74	72.8	74	69.7	73	71.4	3.1	.721	77	102	110	112	78				100	37	137	
31	69	65.4	76	72.7	76	74.6	8.4	.743	75	102	112	94	80				98	21	119	
Totals,	2178	2164.8	2352	2.031	2290	2219	9.99	....	2292	2105	2032	1592	2118	....	....	7.016	5269	938	6207	....
Averages,	75.16	74.65	76.9	74.6	73.33	75.92	1.55	....	79.00	119.	119.63	115.53	78.44	....	....	....	....	....	....	....
Total Averages,	....	....	....	75.08	....	....	....	....	Aver. exposed.											
Drying power,	....	1.62	....	9.12	....	2.8	....	....	Aver. in shade	76.23	84.57	85.36	80.23	82.07	....	....	....	....	....	....
Average de	....	....	....	4.52	....	....	....	....	Difference, or radiation	3.	25.43	34.27	29.70	.63	....	....	....	....	....	....
Average temp. of Evaporation,	....	....	....	76.12	....	....	....	....												

REMARKS.

Much thunder and lightning throughout the month; during the intervals of the heavy rains, a burning sun, cold in shade; hot, damp, suffocating air; more "calms" than ever observed before; the average "force" of the winds very small, 1.33 by the scale. (8th,) Wind to-day occasionally from North.

The gutters, where any stagnant water left twelve hours after a rain, had gas bubbling up from below, turbid, discolored. (12th,) Rains partial, in different parts of city. (20th,) Rain to-day, accompanied with sharp blow from East.

Fogs in the neighborhood have been heavy every morning. The "clearness" of the sky, has greatly predominated during the "sunrise," and 9, P. M. observation, over those of 9 and 3 o'clock.

RECAPITULATION.

	Barometer.	Thermometer.	Dew Point.	Degree of dryness on the Thermometric Scale.	Degree of Moisture on the Hygrometric Scale, 1000 being sat.
Maximum,	30.29, on 1st, 11, 27,	91 on 23th,	79.4 on 19th,	18.3 on 24th,	0. or sat. 14 obs.
Minimum,	30.04 on 17th,	72 on 17th,	69.2 on 31st,	0. or sat., 14 obs.	.552 on 27th,
Average,	30.194	81.25	78.08	4.52	.873
Range,	.25	19.	13.2	18.3	.448
Average of daily range,		9.46	3.35		

ASPECT OF SKY.		WINDS.			HYGROMETRIC CALCULATIONS.			
Average of	At Sun Rise, ... 7.55	No. of days blowing,			At Sunrise	At Midday	At 9, P. M.	Average.
	9, A. M. 5.62		Direction.	Force.				
	Midday 3.47	From the N.	24	1.33	AMOUNT OF MOISTURE.			
	9, P. M. 7.75	" N. E.	44	2.11				
Average of total, ...	6.34	" E.	9	1.88	.950	.756	.915	.873
		" S. E.	14	1.53	ELASTICITY OF THE VAPOR.			
QUANTITY OF RAIN		" S.	0	1.33				
		" S. W.	0	0.	.897	.897	.934	.909
In inches and fractions, ...	7.016	" W.	5	1.20				
No. of days on which Rain fell,	11	" N. W.	4	1.75	WEIGHT OF VAPOR IN A CUBIC FOOT IN GRAINS.			
" nights " " "	6	No. of days calm,	17					
		Average total, ...		1.33	9.651	9.545	10.045	9.737

"E." Meteorological Register, for New Orleans, kept by E. H. Barton.

SEPTEMBER, 1853. LATITUDE, 30°. LONGITUDE, 90°.

Altitude of Thermometer above the Earth ..... 5 feet.
do. of Rain Gauge, ... 15 feet.
do. of Barometer above the sea, ... 11 ft. 141

Explanation.

ASPECT OF SKY.—0 Represents entire cloudiness, 1 " a slight degree of clearness, and so on, until 10 " entire clearness.

WINDS.—0 Signifying calm, 1 a very gentle breeze, 2 a gentle breeze, 3 a fresh breeze, 4 a strong wind, 5 a very hi. de. 6 a violent storm.

Day of Month	BAROMETER AT Sun Rise.	9 A. M.	3 P. M.	9 P. M.	Range.	THERMOMETER outside, in open air, in shade, at Sun Rise.	9 A. M.	3 P. M.	9 P. M.	Average.	Range.	ASPECT OF SKY AT Sun Rise.	9 A. M.	3 P. M.	9 P. M.	ANEMOMETER, Course and Force of Wind at Sun Rise.	9 A. M.	3 P. M.	9 P. M.
1	30.10	30.12	30.11	30.10	02	77	79	82	79.9	5		0	0	0	10	N. 2	N.E. 2	E. 3	E. 2
2	.08	.13	.10	.12	05	76	78	80	78.0	4		0	0	0	8	N.E. 2	N.E. 3	N.E. 3	E. 3
3	.13	.16	.11	.10	06	76	83	85	80.8	9		10	8	6	10	E. 2	N.E. 2	S.E. 2	E. 1
4	.05	.06	.03	.12	04	77	84	79	76.9	8		1	0	0	8	0	N. 2	N. 4	E. 1
5	.05	.08	.06	.11	06	74	77	82	77.7	8		0	1	4	10	E. 1	S.E. 1	E. 2	E. 1
6	.10	.13	.08	.10	05	76	77	80	76.7	4		0	0	0	10	S.E. 2	S.E. 2	E. 2	E. 1
7	.11	.11	.08	.12	04	75	83	80	77.8	5		10	8	6	10	E. 1	E. 2	N.E. 3	E. 1
8	.11	.14	.10	.08	06	73	81	81	77.9	4		6	6	2	10	N.E. 2	N.E. 2	E. 2	E. 2
9	.07	.07	.02	.06	05	75	80	81	76.8	6		0	1	0	0	0	S.E. 1	E. 2	S.E. 1
10	.10	.14	.12	.18	08	76	77	74	75.8	3		0	0	0	0	0	N.E. 2	W. 1	N. 3
11	.18	.21	.20	.22	04	75	76	79	76.6	4		0	0	0	1	N.E. 2	0	W. 1	E. 1
12	.21	.23	.24	.27	08	76	81	75	75.6	6		0	4	0	4	E. 1	E. 2	S.E. 2	E. 2
13	.24	.26	.18	.21	08	75	80	84	76.8	9		1	0	9	10	E. 1	E. 2	E. 2	0
14	.16	.19	.14	.16	05	74	81	85	78.9	11		10	6	10	10	0	W. 2	W. 2	S.W. 2
15	.17	.21	.16	.20	05	75	82	86	80.8	11		10	9	10	10	0	S.W. 1	W. 1	N.W. 2
16	.22	.26	.22	.22	04	76	82	85	80.8	9		10	8	7	10	0	S.W. 1	E. 2	E. 1
17	.24	.26	.21	.20	06	76	82	86	79.8	10		10	8	2	10	0	S.E. 1	S.E. 2	E. 2
18	.20	.23	.15	.18	08	75	81	85	79.8	10		10	8	1	10	0	E. 1	E. 2	E. 2
19	.17	.24	.18	.21	07	76	80	79	77.8	4		1	0	0	0	E. 1	W. 1	E. 2	0
20	.24	.28	.24	.27	04	74	73	78	76.3	8		0	0	0	0	N. 3	N. 3	N.E. 3	N.E. 1
21	.24	.28	.21	.27	07	67	74	77	69.1	10		2	10	1	10	N.E. 1	N. 3	N. 3	N. 3
22	.28	.32	.23	.25	09	60	64	70	67.6	10		10	10	10	10	N. 3	N. 3	N. 3	N. 3
23	.27	.28	.25	.25	03	60	66	71	64.6	11		10	10	10	10	N. 4	E. 2	N.E. 3	W. 1
24	.25	.31	.25	.27	06	61	68	75	66.6	14		10	10	10	10	N.E. 2	E. 2	N.E. 2	N. 1
25	.27	.29	.26	.28	03	65	74	78	70.7	15		10	10	10	10	N.E. 1	E. 3	E. 2	E. 1
26	.29	.33	.31	.32	03	67	77	81	72.4	14		10	10	7	10	E. 2	E. 3	E. 3	E. 1
27	.31	.32	.28	.30	04	69	76	82	73.5	13		10	10	10	10	N.E. 2	E. 2	E. 3	E. 1
28	.27	.30	.23	.23	07	71	76	82	72.5	11		10	10	3	10	N.E. 1	N. 3	E. 3	E. 1
29	.21	.25	.22	.24	04	68	78	83	73.5	15		10	10	10	10	0	N. 2	E. 2	E. 1
30	.23	.26	.22	.23	04	69	78	83	76.6	14		10	10	2	6	N.E. 1	E. 3	E. 3	E. 2
Totals,	90556	90651	90519	90577	159	2169	2328	2408	2168	263		171	109	118	227	N. 41	N.E. 5	E. 121	S.E. 24
																			calm, 3
Averages,	30.185	30.217	30.17	33.192	.052	72.30	77.60	80.26	74.76	8.76		5.70	5.63	3.93	7.56	8. 0	S.W. 0[illegible]	W. 1[illegible]	N.W. 0[illegible]
Total do.	30.191					76.93						5.70				N.2.52	N.E. 2.05	E. 1.56	S.E. 1.65
																8. 0	S.W. 1.33	W. 1.28	N.W. 2

1.62

PSYCHROMETER. Temperature of Evaporation & Dew Point.

	At Sun Rise. Temperature of Evaporation	Dew Point.	At 9 P. M. Temperature of Evaporation	Dew Point.	At 9 P. M. Temperature of Evaporation	Dew Point.	RANGE.	DIURNAL EVAPORATION.
	74	72.8	76	73.9	76	75.0	2.2	.843
	74	74.0	77	70.6	77	70.3	1.7	.899
	76	74.6	77	74.4	78	77.3	2.9	.851
	76	75.6	73	70.7	75	74.6	4.9	.888
	74	74.0	77	75.3	75	74.2	1.3	.965
	75	74.5	77	70.6	79	74.5	2.1	.931
	75	75.0	77	70.6	77	77.0	2.0	.974
	75	75.0	79	78.5	76	75.6	2.7	.944
	75	75.0	78	77.5	76	76.0	2.5	.959
	75	74.5	74	74.0	75	75.4	1.4	.988
	74	73.6	77	76.3	76	75.6	2.7	.958
	74	74.6	75	73.4	74	73.1	1.9	.802
	75	75.6	77	74.7	77	74.3	0.5	.899
	74	74.6	77	74.4	77	76.8	2.8	.881
	74	73.6	77	74.1	78	77.8	4.2	.848
	75	74.6	77	74.8	78	77.2	2.9	.852
	76	76.0	78	75.5	77	76.3	0.8	.871
	75	75.0	77	74.4	77	76.3	1.9	.870
	75	74.8	75	73.5	75	74.2	1.3	.900
	73	72.6	63	61.6	68	67.4	11.0	.797
	65	63.8	67	62.1	62	57.5	6.3	.880
	56	52.4	61	55.0	61	56.9	4.5	.705
	53	50.3	59	50.3	62	60.6	10.3	.689
	59	57.4	65	59.2	65	64.4	7.0	.800
	63	61.7	68	63.3	67	65.4	3.7	.782
	68	63.5	74	71.4	76	69.1	10.9	.803
	67	66.0	73	69.6	71	70.1	4.1	.815
	70	69.5	71	66.5	70	69.1	7.6	.804
	67	66.4	71	66.1	70	65.4	1.0	.755
	68	67.4	75	72.3	74	73.2	5.8	.847
Totals,	2127	21054	2206	21227	2187	21566	1134	...
Averages,	70.90	70.18	73.53	70.75	72.9	71.86	3.78	...
Total Averages,	...	...	...	70.93	...	...	...	...
Drying power,	...	2.12	...	9.51	...	2.96	...	...
Average do.	...	...	...	4.84	...	...	...	...
Average temp. of Evaporation.	...	...	...	72.44	...	...	...	...

RADIANT THERMOMETER IN SUN, AT

	Sun Rise.	9, A. M.	12, M.	3, P. M.	9, P. M.
	73	...	...	...	...
	75	...	...	...	79
	77	114	124	...	78
	77	114	124	...	...
	74	112	...	106	...
	76	...	...	...	79
	75	106	...	...	77
	77	...	...	105	77
	75	104	...	...	...
	75	...	...	...	76
	76	...	...	...	78
	75	...	114	118	76
	74	106	114	114	78
	75	111	114	114	80
	76	108	111	112	80
	76	114	114	117	79
	75	113	118	...	79
	...	...	...	...	77
	...	...	...	...	70
	67	99	105	...	69
	59	84	88	88	67
	59	99	90	104	64
	61	96	89	102	66
	69	97	104	105	70
	67	97	101	95	72
	69	97	104	118	73
	70	103	106	...	72
	67	100	110	113	73
	68	98	98	...	76
Totals,	2158	2070	1921	1508	1857
Aver. exposed.	71.66	103.	106.72	107.71	74.28
Aver. in shade	72.30	77.20	80.04	79.92	76.40
Difference, or radiation	0.64	25.70	25.78	27.97	2.12

PLUVIOMETER;—RAIN.

Date.	Began.	Ended.	Quantity.
1..	4. A.M.	5. A.M...	.250
2	5. A.M.	8. A.M.	.025
	10.30 A.M.	2.30 P.M.	.100
4..	2.50 P.M.	3.45 P.M...	1.450
5	5.30 A.M.—showers,		
	12.30 P.M.	12.50	.150
6..	Showers at 11 & 3...		.220
7	3.30 P.M.	4. P.M.	
	Showers.....		.080
8	In night.....		.200
	showers to 2 P.M.		
9	In night.....		.060
	Showers to 1 P.M....		.100
10	Showers to 12 M....		.680
	do. to 5 P.M....		
11..	Occasional showers...		.100
12	12.30 P.M.	3.29 P.M.	
	4. P.M.	—showers,	.800
13..	4.5 P.M.	4.55 P.M....	.030
20	Showers light in		.050
	night.....		
21..	7. A.M.	9. A.M...	.130
Totals.....			5.045

Daily Mortality from YELLOW FEVER.	Ditto from other DISEASES.	TOTAL Daily Mortality.
105	28	133
90	26	116
91	19	110
71	27	98
66	29	95
49	21	70
49	12	61
44	20	64
57	23	80
44	24	68
35	20	55
26	21	47
33	12	45
32	20	52
31	20	51
24	23	47
29	18	47
21	13	34
29	20	49
15	22	37
17	17	34
11	17	28
10	24	34
15	20	35
17	23	40
12	21	33
12	17	29
11	24	35
9	7	16
11	20	39

Height of River below High Water Mark, which is usually about Fifteen Feet.

12 ft.

12 ft. 8 in.

12 ft. 6 in.

11 ft. 6 in.

REMARKS.

The occurrence of thunder and lightning continued as long as the rains.
The North winds, and cool dry weather, occurred soon after the middle of the month, greatly abating the epidemic.

RECAPITULATION.

	Barometer.	Thermometer.	Dew Point.	Degree of dryness on the Thermometric Scale.	Degree of Moisture on the Hygrometric Scale, 100 being sat.
Maximum,	30.33 on 26th,	86 on 15th, 17th,	78.3 on 8th,	29.7 on 23d,	0. or sat. 14 obs.
Minimum,	30.02 on 9th,	60.22 on 22d 23d,	50.3 on 23d,	0. or sat., 14 obs.	.502 on 23d,
Average,	30.191	70.23	70.93	4.84	.857
Range,	.31	26.	28.	29.7	.498
Average of daily range,	.05 20	8.76	3.78	...	...

ASPECT OF SKY.

Average of
At Sun Rise, ... 5.70
9, A. M. 5.63
Midday, ... 3.93
9, P. M. 7.56

Average of total, ... 5.70

QUANTITY OF RAIN.

In inches and fractions 5.045
No. of days on which Rain fell, 14
" nights " " 3

WINDS.

	No. of days blowing.	Direction.	Force.
From the	N.	4¼	2.82
"	N. E.	5	2.65
"	E.	12¼	1.86
"	S. E.	2¼	1.66
"	S	0	0.
"	S. W.	0¾	1.33
"	W.	1¼	1.28
"	N. W.	0¼	2.00
No. of days calm,		3	
Average total,			1.62

HYGROMETRIC CALCULATIONS.

	At Sunrise.	At Midday.	At 9, P. M.	Average.
AMOUNT OF MOISTURE.				
	.932	.732	.908	.857
ELASTICITY OF THE VAPOR.				
	.775	.782	.816	.781
WEIGHT OF VAPOR IN A CUBIC FOOT IN GRAINS.				
	8.402	8.473	8.828	8.567

"E."

SEPTEMBER, 1853. LATITUDE, 30°. LONGITUDE, 90°.

Day of Month	Barometer at Sunrise	Barometer at 9 A.M.	Barometer at 3 P.M.	Barometer at 9 P.M.	Barometer Range	Thermometer outside, in open air, in shade, at Sunrise	Thermometer outside, in open air, in shade, at 9 A.M.	Thermometer outside, in open air, in shade, at 3 P.M.	Thermometer outside, in open air, in shade, at 9 P.M.	Thermometer Range	Aspect of Sky at Sunrise	Aspect of Sky at 9 A.M.	Aspect of Sky at 3 P.M.	Aspect of Sky at 9 P.M.
1	30.10	30.12	30.11	30.10	02	77	76	82	79	5	0	0	0	10
2	.06	.13	.10	.10	05	76	78	84	79	4	0	0	0	8
3	.13	.16	.11	.10	06	76	82	86	80	9	10	8	0	10
4	.05	.06	.03	.12	04	77	84	78	79	5	1	8	0	8
5	.05	.06	.00	.11	06	74	77	82	77	6	0	1	4	10
6	.10	.13	.08	.10	05	76	77	80	79	4	0	0	0	10
7	.11	.11	.08	.12	04	76	80	86	77	5	10	8	0	10
8	.11	.14	.10	.08	06	77	81	84	79	4	0	0	2	10
9	.07	.07	.02	.00	07	78	80	84	79	6	0	1	0	0
10	.10	.14	.12	.18	08	76	77	74	78	3	0	0	0	0
11	.18	.21	.20	.22	04	75	76	79	76	4	0	0	0	1
12	.21	.28	.24	.27	06	76	81	78	76	6	0	0	0	0
13	.24	.28	.18	.23	08	75	80	84	79	9	1	0	0	10
14	.16	.18	.14	.16	05	74	81	85	78	11	0	0	10	10
15	.17	.20	.16	.20	05	73	82	86	80	13	10	0	10	10
16	.22	.26	.22	.24	04	76	82	85	80	9	10	2	2	10
17	.24	.26	.21	.20	05	76	82	86	79	10	10	5	2	10
18	.20	.23	.18	.18	05	76	81	84	79	8	10	5	1	10
19	.17	.24	.18	.21	07	76	80	79	77	4	1	0	0	0
20	.24	.26	.24	.27	04	74	77	76	75	3	0	0	0	0
21	.24	.25	.21	.27	07	67	84	77	74	10	2	10	1	10
22	.25	.29	.23	.25	06	69	64	70	68	10	10	10	10	10
23	.27	.28	.25	.25	03	69	69	71	68	11	10	10	10	10
24	.25	.31	.25	.27	06	67	68	70	68	14	10	10	10	10
25	.27	.29	.26	.28	03	67	74	73	71	15	10	10	10	10
26	.30	.33	.31	.29	04	67	77	81	74	14	10	10	7	10
27	.31	.32	.28	.30	04	69	70	82	69	13	10	10	10	10
28	.27	.30	.23	.23	07	71	76	80	76	11	10	10	3	10
29	.21	.25	.22	.24	04	68	72	80	70	12	-10	10	10	10
30	.23	.26	.22	.23	04	69	72	80	70	14	10	10	2	0
Totals, ...	90556	90851	90519	90577	120	21634	23236	24045	21468	..	203	171	109	118	227
Averages,	30.185	30.283	30.173	30.192	.052	72	30.77	80.29	71.56	..	6.76	5.70	3.63	3.93	7.56
Total do.....					30.191										
								76.93						5.70	

REMARKS.

The occurrence of thunder and lightning continued as long as the rains.

The North winds, and cool dry weather, occurred soon after the middle of the month, greatly abating the sickness.

warm weather. There is a great mistake upon this subject; it is now well known that the main means to keep a vessel healthy at sea, is not merely to keep her clean but *dry*—by stoves, dry rubbing and other means. The evaporation from the sea has been greatly overrated. The calorific rays mostly pass beyond the transparent surface and are lost below; in proof that the temperature of the sea, when deep, is not influenced by the sun; but when we arrive "off soundings" the thermometer gives us the earliest warnings of it by its depression, the dew point is not as high far out at sea as near the shore, and but little dew falls; hence the little injury sustained from sleeping exposed to the air at sea. But when we approach a coast it is very different, and especially the estuaries and mouths of rivers, as I have ascertained by actual experiment. On the deadly coast of Africa, a few miles from land there is entire protection from the maladies of that sickly region, but near shore, and particularly near the mouths of the rivers, it is very moist and very sickly. That keen observer, Dr. Rush, attributed the difference in salubrity of the two, to "a mixture of land and sea air." Our more accurate means of research, that science now furnishes in the hygrometer, enables us to explain it with more precision.

Error in supposing great moisture at sea.

It is only so near shore.

Of the direct effect of swampy districts upon the health, even of those accustomed to them, reference is most confidently made to the sanitary condition of the four Southwestern States as exhibited in sanitary maps prepared expressly to exhibit it, made from the returns to the census bureau for 1850, showing the condition of each one of the counties of those States by the author, and published in the 5th volume of the Transactions of the American Medical Association.

Effect of swampy districts on health.

The examination into the effect of the imperfect drainage of towns under the authority of the English Government, is still more direct and applicable to the subject under consideration. I quote briefly from various parts of these valuable reports, to show the influence of it in the high latitude of 53 deg. How much more injurious must it be here. "When a street is wholly without

Effect of drainage of towns on moisture and on health.

drainage fever instantly breaks out in it." "Particular houses were pointed out, from which entire families were swept away, and from several of the streets fever is never absent." We find a very striking account of a "fever constantly breaking out in a General Lying-in Hospital, clearly traced to the influence of above fifteen hundred yards of open ditches, full of the stagnant filth of the neighborhood, (like Gormley's and others,) and to the backing up of the main drain of the premises, whereby the whole basement was flooded with every description of decomposing impurities. On the removal of these nuisances, together with a new method of ventilation, the fever disappeared. Another instance is given of a "village in a slight hollow, and badly drained, with a wide, stagnant ditch passing through it." "Here the deaths by epidemic disease were thrice as many as in a village in the neighborhood, and the scarlet fever was so malignant as to be fatal in a few hours." Sometimes, in the best ventilated squares, "the neighborhood of the cess pools, and a number of untrapped openings produce the most malignant fevers." Liverpool, which is situated in one of the best natural sites, is the most unhealthy city in England, because a large number of her population live and sleep under ground, and she has thousands of houses and hundreds of courts without a single drain of any description. "A table is given of districts in Leicester, being divided into three classes; first, culverted; second, partly culverted; third, not culverted. The proportion of persons dying of epidemic diseases are, in the first one-twelfth, and in the second only one-eighth of those who died in the third!" In some of the towns the description would fail to convey any conception, says a talented physician, of the disgusting and poisonous condition, and he exclaims "can such a state of things exist in a country which has made any progress in civilization?" Yet, such a description would well apply to many parts of this city during the last summer!

It is a matter of record that the intermittent fever in the rear of this city has greatly increased since the exposure of the swamp in that neighborhood, probably twenty to one of what it was before.

TABLE R.

COMPARATIVE SALUBRITY OF EACH WARD IN THE CITY.

Localization of *Cases* of epidemic yellow fever, occurring during the year 1853, in the several Districts and *Wards* of the city of New Orleans, (according to their division in 1850,) in ratios proportioned to the population of each.

1	2	3	4	5	6	7	8
Districts and Wards.	Estimated Population of 1853.	Number of Yellow Fever Cases *Reported.*	Ratio per 1.000 of the Population.	Number of cases from Public and Private practice unreported.	Total Number of Cases.	Ratio per 1.000 of population, of the whole.	Estimate of the Proportion of Colored to the Whole Population in each District.
1st District.							
1st Ward,..	7.179	2.567	.357	732	3.299	.459	
2nd do. ..	6.447	1.092	.169	312	1.404	.217	
3rd do. ..	9.453	1.211	.128	346	1.557	.164	
4th do. ..	9.125	1.535	.168	438	1.973	.216	
5th do. ..	8.545	794	.092	226	1.020	.119	
6th do. ..	9.639	910	.094	260	1.170	.121	
7th do. ..	10.307	2.988	.289	852	3.840	.349	
Totals,.....	60.695	11.097	.182	3.166	14.263	.234	13.55 pr. cent.
2nd District.							
1st Ward,..	6.105	365	.059	143	508	.083	
2nd do. ..	4.671	582	.124	228	810	.173	
3rd do. ..	4.089	295	.072	115	410	.100	
4th do. ..	7.389	459	.062	179	638	.086	
5th do. ..	8.561	760	.088	298	1.058	.123	
6th do. ..	13.237	366	.027	143	509	.038	
7th do. ..	5.934	318	.053	126	444	.074	
Totals,.....	49.926	3.114	.062	1.232	4.377	.087	26.17 pr. cent.
3rd District.							
1st Ward,..	12.227	566	.045	193	759	062	
2nd do. ..	5.120	891	.174	305	1.196	.233	
3rd do. ..	7.426	928	.128	317	1.245	.167	
4th do. ..	3.429	024	.007	8	32	.009	
Totals,.....	28.202	2.409	.085	823	3.232	.114	24. pr. cent.
4th District.							
1st Ward,..	3.220	1.407	.436	341	1.748	.542	
2nd do. ..	3.460	1.175	.339	284	1.459	.421	
3rd do. ..	3.347	1.371	.409	332	1.703	.508	
4th do. ..	3.169	1.114	.351	268	1.382	.433	
5th do. ..	2.114	586	.277	370	956	.452	
Totals,.....	15.310	5.653	.369	1.595	7.248	.473	12.05 pr. cent.
Grand Total,..	154.133	22.304	.144	6.816	29.120	.188	

The amount of moisture depends upon the dissolving power of temperature; the question is then, not exactly what that amount is, so far as mere saturation is concerned, for the effect of saturation at different temperatures is very different, (as shown how comparatively innocent it is in the cool, moist climates of London and Holland, compared with intertropical regions, with their elevated temperature,) but it is the influence of the *combination* at this *high temperature*, and to such an extent as to co-operate with all the powers co-existing, that are more or less incompatible with health, and especially, with those unaccustomed to or unacclimated to them.

Amount of moisture dependent on temperature.

Of the fact of a high degree of moisture in an elevated temperature, being injurious to health, we trust the above evidences are sufficiently satisfactory. The explanation, or *modus operandi* may be more difficult. That it relaxes and prostrates the system is a matter of common experience; that it prevents the elimination of effete and worn out excretions, that it debilitates, by excess of action, the healthy functions of the skin and lungs, every one will acknowledge who has experienced it—diminishing the decarbonizing power of the atmosphere which is always lessened as the temperature is high, air expanded and saturated with humidity. When the hygrometry changes to a dry air a sensation of elasticity is at once experienced; when it becomes high, languor and prostration has to be endured; that our health is influenced in a corresponding degree, is fortunately, now fully established. *High temperature* may produce the physical susceptibility—*moisture* may be the medium of agents from our second condition, and when they are all in excess, the malignancy of the disease, will be proportionate. Such has been the precise condition of things here last summer.

How great humidity acts.

That there is dew point peculiar to each of the higher classes of fever (in their aggravated or epidemic grade,) is doubtless true from what we know of the temperatures essential to their existence, and how greatly they are all injured by humidity. The dew point of yellow fever is from 70 to 80, it rarely exists long, when it is under 60°. The plague has probably a dew

The dew point limits of yellow fever.

Plague.

Typhus gravior, and cholera.

point of 10° less. The typhus gravior at from 35° to 45°; and the cholera in this climate, varies from 48 and sometimes much less to 74, and is probably less controled by its fall than yellow fever.

Sources of it here.

The *sources* of this great excess of humidity are mainly the swamps, lagoons, lakes around us and which are also the principle causes of our fogs, imperfect drainage and want of pavements.

Radiation as a cause of disease now first noticed.

RADIATION,* as a source of disease, has not heretofore, as I am aware, attracted the attention of professional men; yet, no observant practical man who has passed through many epidemic yellow fever seasons, could have failed to notice, the peculiar weather that usually exists during the *clear* days of those seasons. In fact, old experienced men out of the profession have been in the habit of denominating it "*yellow fever weather*," without analysing the conditions which constituted it. It is characterized by being *very hot in the sun and cool in the shade at the same time*—on one side of the street a broiling temperature, and on the other so cool as to urge to buttoning up the coat. This uncomfortable alternation of chilliness and heat, is productive not only of uncomfortable feelings, but when exaggerated, passes into disease—constitutes the first stage of yellow fever. It may be here only the exciting cause, developing dormant disease, from the predisposition being already present. The difference of the temperatures between sun and shade, is at these times, very great, and essentially constitutes, *with other circumstances*, a sickly season. My attention has been called to it for many years, and it has been carefully noted by me not only here, but in other countries. I have not remarked it to influence materially other diseases, beyond the class of *fevers*, except *coup de soliel*, of which doubtless it is the principal cause. During last year it occurred unusually early, in January, and furnished one of the grounds of the prediction of the great epidemic. This principle is illustrated in the accompanying Chart No. 2, and Tables D, E, N, O, to which reference is invited. A more thorough proof could be made

'Yellow fever weather' described.

* Solar radiation, derived from the difference between the temperatures of the sun and shade.

by a comparative exhibit of other years. It is too minute for this paper, but the opinion expressed is fully borne out. The unusual amount of solar radiation last summer, has been fully proved in several parts of the yellow fever region. It has been particularly noticed at *St. John Baptist*, by Dr. Delery of this city, where he remarked that "the planters found the sun's rays so intense, that they were compelled to use umbrellas *for the first time* as a protection against it," the yellow fever prevailed here very extensively. It was also noticed at *Hollywood* and at *Gainesville*.*

Shown elsewhere, at St. John Baptist.

At *Gainesville*, Mr. Fulsom had found the heat in the sun so great that he frequently rode under a tree, to avoid its intolerable influence, and for fear of taking *a chill*, he was presently *compelled* to *quit* the *shade!* The same facts were observable at Hollywood, and in Wilkinson county, in the unusual and uncomfortable difference between the temperatures of sun and shade. Dr. Benedict observed the same thing in New Orleans, as early as July, when "in riding in a gig in the streets, with the top up, it was found so cold as to compel him to lower it, to procure the warming influence of the suns rays. This was soon found so scorching as to induce him again to put the top up! and this *was several times alternated* from the great difference in the extremes of each.†

At Gainesville

At Hollywood.

In New Orleans.

These remarkable conditions would doubtless have been recorded at other places, had the attention of observers been called to them. It is probably the "fiery something," to which yellow fever has been formerly attributed by those distinguished and experienced observers, Drs. Chalmers and Lining, of Charleston. The profession may be assured that it plays a much more important part in influencing the production of morbid action, than is yet known. Its precise modus operandi I forbear to speculate on. Is it by decomposing ozone, the great purifying principle? The direct causes of the varying radiations of different climates,

Probably the "fiery something" of Chalmers and Lining.

* See testimony. † Refer to Dr. Benedict's interesting paper.

elevations and periods of the day, are quite obscure. In experimenting on this subject, I have often noticed a variation of from 5 to 10° occur in a few minutes, (from 5 to 20,) without any apparent difference in the clearness or transparency of the atmosphere or change, of the winds.*

Terrestrial radiation.

Terrestrial radiation (or that proceeding from bodies on the earth,) is the true interpretation of the danger of exposure to the night air. This exists in excess in sickly climates and seasons. It constitutes what is so much admired in the dangerous, but "beautiful blue sky of Italy," the air so clear and transparent, (upward radiation,) rapidly cools the body, chills it, and often preludes the first stage of fever. It is as tempting as hazardous in hot weather. An umbrella, portico, tree, musqueto net, *any object* intervening between the body and clear sky, protects one from it. In the thickly built parts of cities, this radiation is very small. The best radiators are cotton, silk, wool, (rotatively,) and consequently we are least protected by clothing made of those materials, in the order mentioned. We thus interpret the alledged injurious effects of sleeping exposed to the direct influence of the moon. It is always greatest on bright and brilliant nights.

Where the principal danger of night air.

Increase of radiation in proportion to increase of latitude.

For the proper appreciation of the chart and tables, it may not be out of place to state, not only that this is not merely a most unusual amount of radiation for this climate, but that the popular estimate upon the subject is a gross error, so far as it supposes that the intensity of *direct solar heat* increases as we approach the equator; *in fact. it is just the reverse!* Baron Humboldt found "the difference between the temperature in the sun and shade at Cumana, one of the *hottest, driest, and healthiest* in the lower regions of equinoctial America, never exceeded 6° 6', sometimes not more than 1° or 2°. Captain Sabine found the maximum at Sierra Leone 18°; at Bahia, on the coast of Brazil, 9°. I have rarely seen it exceed 20° in Cuba or Vera Cruz, and have often remarked how sel-

Proofs.

* The reason why persons insulated, or confined to the house, are rarely subject to yellow fever, may be that they are not exposed to solar radiation.

dom umbrellas are used in tropical countries, and how rare it is to have many trees *immediately* around their houses to protect them from "the *ardors of a tropical sun!*" There are some grounds for the belief that it either increases with elevation, or we become more sensible of it, from diminished pressure of the atmosphere, for such seems to be the case on ascending mountains. De Saussure states it as the result of his experience on his ascent of the Alps, and it was of mine in Mexico; so dangerous is it esteemed in the elevated regions of Mexico that the natives always carefully protect the loins of their horses (their weakest part) with an extra covering of skin, when in use, and often their heads. In Jamaica, while on a level with the sea, the difference between two thermometers, (or radiation, the one in the sun and the other in the shade) was at the maximum 12°; on the mountains it was nearly double. In England, it is usually found about 50°, and sometimes as high as 69°; while it has been found at Mellville Island, latitude 65° North, 55° in March, and *sometimes as high as* 90°! Captain Scoresby, in latitude 80° 19, found it *as high as* 80°. Sir John Richardson, in his late expedition to the Arctic climate, found the power of the *direct rays* of the sun so great, in a cloudless sky, that he had to "take shelter in the water while the crews were engaged on the portages!" and Captain Scoresby found that the pitch in the seams on the side of his vessel, *occasionally becomes fluid*, (which it *never did on the coast of Africa*), a temperature of almost 130°, while ice *was rapidly generated on the other, in the shade!*

Influence of elevation upon it.

Illustrations.

Let us apply these remarks, for a moment, to the economy of nature, and see if we cannot draw some illustrations in proof of the correctness of the statement. It is thus that we can account for the productions of the rapid Springs in the Northern climates, where vegetation leaps, as it were, at once into being, while, if otherwise, its productions would not have time to mature and ripen for the sustenance of man. The cereal crops are known to be so much dependant

Proofs, in its influence on the vegetable kingdom.

upon its amount, that it has become a matter even of *calculation* in England, and it is so well known that without the *direct rays* of the sun (whatever may be the temperature of the air) that fruits seldom come to perfection. So great is this radiation in England, that many *tropical plants* cannot bear the *direct rays of the sun there*, and require protection in order to reach maturity! That the indirect (or shade) temperature is not solely dependant upon the *direct*, is proved from the fact that they reach their culminating point almost always at different periods, and the exceptions here *are during the occurrence of epidemics!* In non-epidemic years the highest point is probably in May. So, in England, it occurs about *two months in advance* of their *highest temperature.*

These views, now so well established among scientific men, in their influence on the vegetable, and even the animal kingdom, extends beyond their bearing, on our profession, but I forbear its introduction, tempting as it is.

Should I not have been entirely successful in establishing the connection of radiation as one of the efficient agents in the production of yellow fever, I have, at least, pointed out a new field for philosophical investigation, that has hitherto escaped the scrutiny of pathological induction. It is certainly shown to be within the laws of the dynamic forces, and highly worthy the notice of the etiological inquirer.

Radiation worthy of farther investigation.

Pardon is asked for this digression from a subject as novel as it is interesting and important. It is clearly apparent that it is entitled to more thorough investigation than it has yet received. What is due to each climate is not known. I have long since requested the Smithsonian Institution to add it to the requirements from its meteorological correspondents, throughout the country. It would not depart far from the rules of probability to say that whatever influences the physiology of the vegetable and animal creation must also influence their diseases. In this climate, I do not consider ten years of observation sufficient to determine what is the nor-

mal amount, but believe that beyond 30° or 40° maxima, is productive of injurious influences.

WINDS.—All experience has shown that free ventilation and strong, unimpeded currents of wind are inimical to the elimination and concentration of malarial exhalations, consequently, to the production of fever; that where the winds blow strongly and freely, and find no obstacle from surrounding objects, or intervening forests, localities which otherwise, might be expected to be fruitful sources of fever, may be visited or inhabited with impunity, while similar places become insalubrious, if the air is stagnant.* Calms, says Dr. Drake, permit the exhalations from foul localities to accumulate in the atmosphere, which rests over them, but all winds operate to disperse and dilute them with purer air. Influence of winds.

By reference to the table P and Q, it will be seen that on an average of years our most prevalent winds during the summer are the East, South, SW. and SE., and by referring to the table of the hygrometry of the winds here, (or the amount of moisture each of these conveys with them, table P,) it will be found that these are the very winds which are usually loaded with the largest quantity. That table also shows that when the air becomes calm (or stagnant) it becomes still nearer the point of saturation. During the worst period of our epidemic the most frequent wind was from the East. That is a pretty constant feature, not only in our epidemics, but most others. Still more remarkable was the frequency and long duration of our calms, with all their injurious saturations and depression of the vital principle. Amount of moisture in each. Direction.

Nearly all land winds are unpleasant, if not deleterious to health, in most climates, producing a sensation of chilliness and discomfort far beyond their mere thermal influence. It is the "simoon," of most countries; in Havana and Georgetown, Demarara, it is a South wind; here, and in Texas, where it is felt so severely, it is a North wind. These winds produce a rapid evaporation from the surface of the body, causing extreme dryness, while the sun is unclouded and hot, (during the warm months,) and is excedingly uncomfortable. Fevers of a bad Unwholesome nature of land winds in summer.

* La Roche.

character are then known to prevail. It was upon this ground, mainly, that I have advanced the opinion of the protective influence of Lake Pontchartrain.

System of balances.

No one can doubt that there is a great system of balances in the natural, as in the moral world. In the animal and vegetable kingdoms a great predominance of either, is unfavorable to the other; where they are equalised, health results. Great heat and moisture promotes an excess in vegetable life. It is injurious to man. All excess tends to disease, while moderate changes are conducive to health, "all natures' difference, is all natures' peace." This has been often remarked in hot and other climates. During the late epidemic yellow fever, at Bermuda, it was remarked that "an extraordinary state of atmosphere prevails here now, very favorable to vegetable life, but dangerous to animal life and health."

We think sufficient has been said to show in what this epidemic consisted. We would not be understood to mean, that the exact amount of heat, moisture and decomposed materials, were ascertained to have produced it, and that there were no other materials than those we have enumerated. For the more exact application and showing of these influences, the meteorological journal of the three epidemic months is annexed, in detail, as noted four or five times daily, made up during the intervals of the exacting demand for our time during that laborious period, (the month of July was kindly kept for me by my friend, Dr. Benedict, and the balance by myself.) Every record was made that was in our power, conscious as we felt, that we were in the midst of the most important, and therefore, the most interesting, pathological year, that ever occurred in America, and that we should be held responsible, by the scientific part of the profession, and the public, to make every observation that could have any bearing or influence upon *it*, and therefore *our*, future; and have essayed to make a faithful statement of that gloomy period. How it will apply or aid us in influencing that future, time alone can tell. No such exact or extensive record is known to us as having been made before

Apology if records imperfect.

with which to compare it. But we trust many such, and better, will be made hereafter, should it be the misfortune of this, or any part of our country, to be afflicted with a similar calamity.

Exact amount of the materials for an epidemic not known.

The exact amount of the *meteorological and terrene causes* to produce fever, and especially, a malignant epidemic yellow fever, is not known; it may be hereafter. A distinguished authority informs us that "since the beginning of the world, the temperature and humidity of the atmosphere have, perhaps, not been twice in identically the same circumstances for eight conscutive days."*

Duration required for disease to be developed.

However this may be, and as duration is an important element in everything relating to health, there is no doubt of the fact that all the agents productive of yellow fever, whether climatural or terrene, are in the nature of things more or less fluctuating. So is the physiological condition of the individual; but I have as little doubt that it is an approximative duration around a very narrow circle that is required to produce the impression resulting in a yellow fever season; that is, that an elevated temperature, high saturation, excessive radiation, with terrene causes in large amount, shall *coincidently exist*, although they may slightly fluctuate, for a period, which, according to my observation, to overcome the physiological or vital resistance, shall be rarely less than about two or three weeks, dependent upon the susceptibility of the individuals exposed. It is under such circumstances that yellow fever rarely fails to follow. During my long residence in this climate I have rarely seen such a prolonged continuance (the above duration) of identical weather, if in excess, whether of heat or cold, dryness or moisture, but was productive of disease of some kind. Variable weather and seasons are usually healthy, though this is opposed to popular belief. Such is the play of the organism, and such are the variations required to give it tone and impart to it vigor. Professor Schönbein has given many reasons for the belief that fever arises from a deficiency of

*Arago and Schubler.

ozone. No experiments were made to test it here. If ozone is developed, as is alleged, by the approach of two clouds of different electricities, that often takes place during the existence of our yellow fever epidemics, with, as before remarked, *injurious effects*, its evolvement may be at too great an elevation above our immediate atmosphere to benefit us. If we possessed the certain power of foretelling, long beforehand, and *always*, the advent of a great epidemic, thousands of lives would be saved. I do not know that we could do as much by filling the atmosphere with ozone, which would be very costly. A writer in one of the prints during the summer advises its being "drowned out," which I thought highly plausible, if possible, the Mississippi river at such periods having usually descended so low as, if introduced, could only influence the low back streets. But the *cheapest, best and most rational mode*, after all, will be found in the practical application of the *means of prevention*, by the introduction of those sanitary measures that experience, fully tested, has shown to have saved other communities from pestilence, and restored them to salubrity. They will be fully detailed hereafter.*

Advantage of foresight and remedies.

In this early application of meteorology to disease, I ask the indulgence of the profession for the paucity of my records. Enough has been given to show that the connection is most intimate between them, sufficient to assure us of vast hidden truths, far beyond our present means of investigation; these truths are of value to science and humanity; indeed, there are no useless or disconnected truths in the great labo-

No truths valueless.

* Tables C, D, E contain the daily meteorological and mortuary condition during the three epidemic months. I would gladly add the whole year of both were the latter practicable, for the gratification of scientific men, to show how much climatic conditions influence our weather, and especially, during this remarkable year.

In interpreting the connection of meteorology with *mortality*, two circumstances are to be taken into consideration: first, the amount of vital resistance to be over come previous to the attack, (for it cannot be at once,) and second, the period to elapse before resulting in death. These, as yet, are indeterminate and irregular periods, dependent upon individual susceptibility and constitutional power. The second is easier estimated than the first, for the *average* duration of the *disease* is from three to five days. We sometimes find in the advanced period of the season that a sudden great fall in temperature produces a frightful mortality, cutting off all who are very sick, unless carefully protected; and here a little foresight of a coming change can often be put to most valuable use. In this case it is almost equally apt to prevent the further continuance of the disease, *provided the change is a permanent one.*

TABLE P.

WINDS—AVERAGE FOR A SERIES OF YEARS.

Hygrometry of Each of the Principal Winds at New Orleans, and when calm.

DEGREE OF DRYING POWER.			AMOUNT OF MOISTURE. [Saturation being 1000.]			ELASTICITY OF THE VAPOR.			WEIGHT OF VAPOR IN A CUBIC FOOT, *In grains.*		
1st	N.W.	11°.29	1st	N.W.	.677	1st	N.W.	.468	1st	N.W	5.136
2d	N.	10 .06	2d	N.	.698	2d	N.	.534	2d	N.	5.819
3d	S.W.	10 .03	3d	S.W.	.727	3d	N.E.	.630	3d	N.E.	6.847
4th	W.	10 .01	4th	W.	.740	4th	W.	.646	4th	W.	6.915
5th	N.E.	9 .28	5th	S.	.761	5th	E.	.646	5th	S.	7.181
6th	E.	8 .84	6th	N.E.	.763	6th	S.W.	.664	6th	E.	7.213
7th	S.	8 .21	7th	E.	.768	7th	S.	.743	7th	S.W.	7.229
8th	S.E.	7 .56	8th	S.E.	.720	8th	S.E.	.759	8th	S.E	8.030
9th	CALM	5 .17	9th	CALM	.929	9th	CALM	.761	9th	CALM	8.254

N. B.—To my scientific readers I observe that some few small errors in the above could only have been ascertained when the *results* were arrived at—but at too late a period to re-calculate sixty pages of figures.

TABLE Q.

Statement of the Winds in New Orleans—by Months and Seasons.

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	CALM.	EXPLANATION.
January	4.½	4.¼	5.	3.¼	3.½	1.¾	2.	2.½	0.½	
February	4.¼	3.¼	4.¾	2.¾	3.	2.¼	1.½	4.	0.¼	
March	4.¼	2.¾	5.¼	3.½	7.	2.½	1.¼	2.	0.¾	
April	1.½	2.¾	6.½	4.¾	6.¾	2.¼	2.¾	2.¼	0.½	
May	2.¾	2.¾	5.½	4.	6.¾	3.¾	1.½	2.½	1.	
June	1.¾	1.¾	6.½	4.½	4.¾	6.	1.¾	1.½	1.	Being on an average of 11 years—1835–'42 and '48–'50.
July	1.	2.	5.	5.	6.	4.	3.	1.½	3.	
August	3.¼	3.¼	4.	3.½	4.½	4.	3.¼	1.¾	2.	
September	6.0	6.¼	6.¼	1.¾	2.¼	1.½	1.¾	1.¾	0.¾	
October	6.½	5.¼	7.	1.½	1.¾	1.	2.	3.	1.	
November	5.¾	1.	4.¾	3.¼	3.¼	1.	1.	3.¼	0.½	
December	7.¼	4.¼	5.½	3.	3.	1.¾	1.¾	1.¾	1.¼	

BY SEASONS.

Winter	16.	11.¾	15.½	9.	9.½	6.	5.	8.¼	2.	
Spring	8.½	8.¼	17.½	12.	20.½	8.¾	5.½	6.¾	1.¾	Total number of days' wind each season.
Summer	6.½	7.¼	15.½	13.	15.¼	14.	8.	4.¾	6.	
Autumn	18.¼	12.¾	18.	6.½	7.¼	3.½	4.¾	8.¼	2.¼	
Winter	1st	3d	2d	5th	4th	7th	8th	6th	9th	
Spring	5th	6th	2d	3d	1st	4th	8th	7th	9th	Relative frequ'cy of each wind during each season.
Summer	7th	6th	1st	4th	2d	3d	5th	8th	9th	
Autumn	1st	3d	2d	6th	5th	8th	7th	4th	9th	

BY THE YEAR.

3d	5th	1st	4th	2d	6th	8th	7th	9th	Relative frequ'cy of each wind during the year.
49.	40.	66.¼	40.¾	52.½	32.¼	23.½	27.¾	12.½	

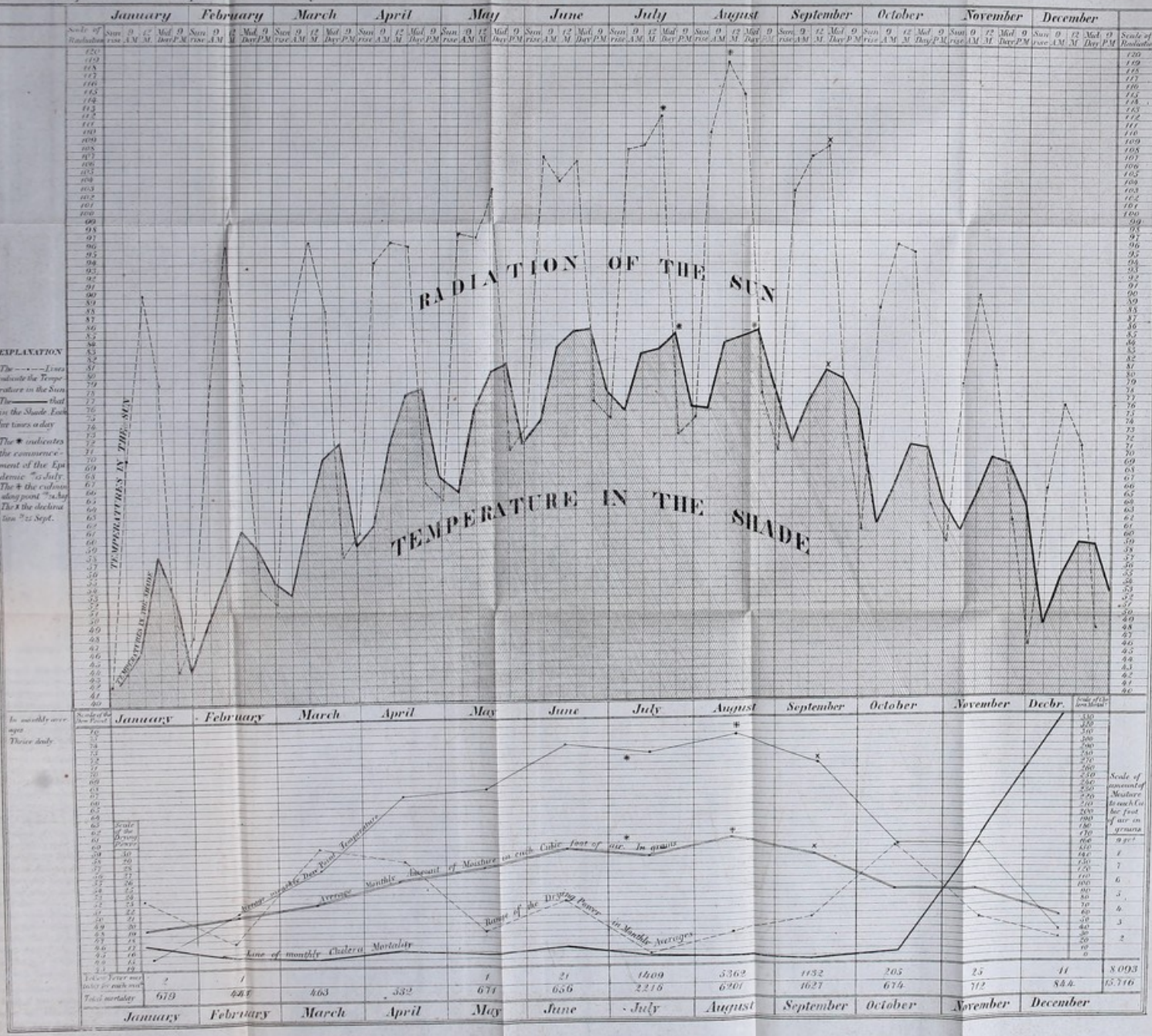
ERRATUM.

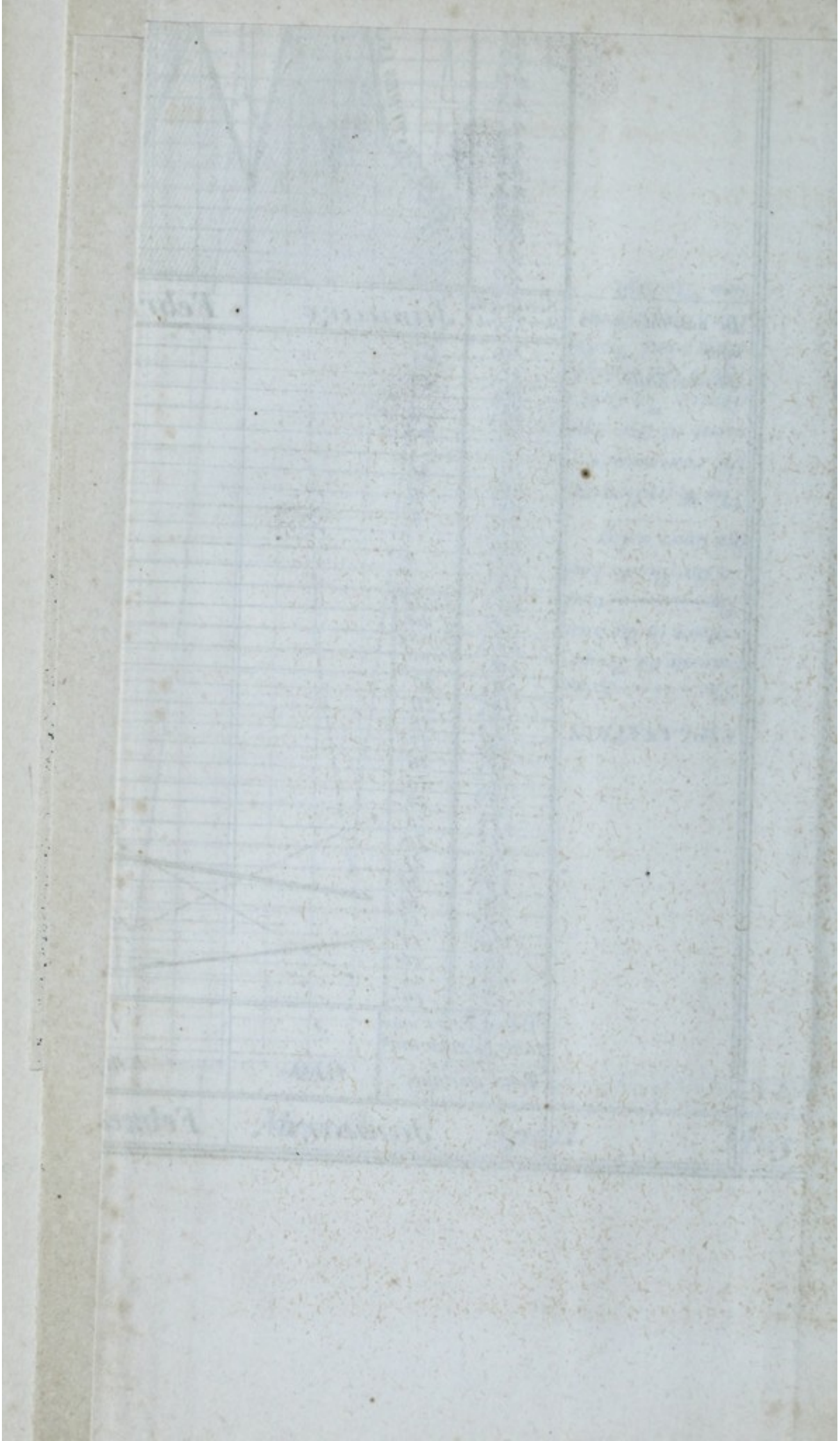
On "Radiation Chart"—opposite,—for "*Radiation of the Sun*," read Radiation.

CHART B *illustrating the Influence of* SOLAR *and* TERRESTIAL RADIATION *and* MOISTURE *in the production of* YELLOW FEVER *in* NEW ORLEANS

DURING 1853

Prepared for the Report of the Sanitary Commission BY **E.H. BARTON A.M.M.D.**





ratory of nature; if they are hidden from us to-day, their application may be made by our successors to-morrow. We can no longer plead ignorance of their practical bearing and importance; but, we are, as yet, upon the mere shores of meteorological science, "picking up the few pebbles" of truth that have been yielded to perseverance and industry, while the boundless ocean lies open before us, for exploration and discovery.

SECTION VII.

THE SECOND CONSTITUENT OF AN EPIDEMIC.—THE TERRENE.

Proposition—The Upturning of the Original Soil, together with Filth of all Kinds—The sine qua non of all our Epidemics—Proofs as far back as Sixty Years, to the Present Period—How first noticed by me—Causes of Epidemics at Natchez, Memphis, St. Francisville, Mobile, Selma, Algiers, &c., &c.—For an Endemic less necessary—For Bilious and Periodic Fevers still less, but all the same!—Why Yellow Fever does not always extend—We Know as much of the Origin of Yellow Fever as we do of any other Fever—All Countries have their Peculiar Diseases—Parallel of Yellow Fever and Plague—Extension of the Epidemic due to late Inundations in Part—At what Stage, Swamps most Dangerous—Proofs from Foreign Countries and here—Different Stages of Draining Produce Different Diseases—How and When to Drain Land, &c.

Our other constituent to produce the yellow fever epidemic, the other blade of the "shears," is the TERRENE. This is very comprehensive, and embraces all foul, filthy, organic matter passing through its decomposition, whether terrene, miasm, malaria, or what not. *Every thing terrene* that is injurious to health may be so denominated. I wish to be distinctly understood here, that neither meteorological nor terrene causes alone, is sufficient to produce the effects alluded to, and hence the great difficulty and stumbling block, when one of these is

The other blade of the "shears."

found present, even in an aggravated degree, and not the other, and the effects do not ensue.*

Epidemic yellow fever then depends upon two circumstances: first, a *meteorological*, and secondly a *terrene cause*. The *precise amount*, or constituents, of which each of these consists in their original or proximate elements, the present state of science has not yet informed us of. Of the first, I have shown the main ingredients; of the second, it is probably composed of all decomposed or decomposable matter. The varieties of fever, most probably, depend upon variable amounts of these constituents, influenced by the physiological condition of the individual, which only slightly varies the extreme force of the causes producing an epidemic. I have expressed the opinion that an *epidemic* yellow fever proceeds from a *general* distemperature of the air with local influences, and particularly with an undue disturbance of the original soil. I shall show presently that an *endemic* yellow fever depends upon a more local distemperature, with the same local influences, but in a minor degree, and that the type or malignancy depends upon the more or less extent of these causes, and finally, that *bilious or periodic fevers* depend for their existence upon the *same causes*, but in a *much* diminished degree.

From whence varieties of fever.

In examining into the cause or origin of our epidemic yellow fevers, there is no reason why we should not apply the same principles, as in initiating the cause or origin of other fevers, or other diseases. If we cannot say that we have the very precise and exact meteorological data, or the precise amount of decomposable matter, we are just as near the *truth as we are in looking into the causation of any other disease.* Overpowered by the magnitude of the disease, and bending before the authority of great names, we suffer ourselves to be blinded to the plainest facts. It is considered by some, as an act of temerity or folly, to dare to think of preventing it; that

To apply the same principles in examining into the causes of yellow fever as of other fevers.

*This, it seems to me, will explain most of the difficulties that have set them by the ears in Charleston, in relation to the occurrencces of last year, and why they *did not have the fever there*, "the *meteorological* cause" was said to be present, the other was not: the "Jacksonism" of the Mayor did not consist "in removing the two cases" that occurred, but in his praiseworthy energy in keeping the city *thoroughly clean*, in preventing the concurrence of the second, and equally essential cause, (now, the causa sine qua non.) It is a great pity some more Southern cities had not been blessed with a little of that wholesome "Jackson" energy, and common sense of duty, instead of being contented in boasting of the existence of "cleanliness" and "health!"

such ordinary things as heat, moisture, filth, and such like trifles, however combined, could give rise to this great monarch of disease, (y. f.) is but playing with human credulity! They forget, all the while, that a sudden change of temperature alone, has often deprived human beings of life, in a few hours; that vitiated air has, still oftener, killed in much less time, and that nearly all disease to which man is subject, is caused by conditions not widely different, or so minute as to defy the utmost power of detection. It is time to put aside and be done with all this stultifying and misleading mystery and awe, and boldly facing, and defying, all carping misgivings, push our scrutinies as far into the causes as our facts and reasonings will legitimately carry us.

1st proposition.

Proposition 1st; now, if we can prove that the EPIDEMIC YELLOW FEVER has *never occurred here* but in a *certain condition of things* in so long a period as sixty years, that *it has always occurred* here *when this condition was present*, and that it *has occurred* in at least three other places under similar conditions, so far as can be ascertained, of between twenty and thirty years each—then there is a *fair presumption*, if *not more* that *we have arrived at one source of its causation.*

Cause of every epidemic.

2d do.

Proposition 2d; if we can prove that our ordinary ENDEMIC *yellow fever*, occurs here and elsewhere, under certain contingencies of a high temperature, for a certain time, with a combination of much moisture and filth, that *these are never known to be absent when it does occur*, that it has occurred under circumstances, where no foreign origin could *possibly* be imputed to it, that if there should be apparent exceptions, viz: that it does not always occur where these are *all apparently present*, is it not fair to presume this to happen, rather from some defect in our observations, (and we well know how imperfectly and under what prejudices and defective knowledge these are often made) than from any deficiency in the constituents themselves, or than an occult cause? Can we not then, with all reasonable presumption infer, that the above are really the causes of yellow fever? If we prove that when these are removed, that it does not occur, is there not another proof of the sufficiency of the cause, especially for all practical purposes? And is it not at war with one of the first rules of philosophising to hunt up

Cause of our endemics.

extraneous causes, to account for that of whose origin we *have sufficient* proof? and the 3d proposition is, that these causes existing in a less degree, will *produce bilious and periodic fevers.*

3d do.

Cause of our bilious fevers.

With regard to the first proposition, I wish to be understood distinctly as stating, that *since* 1796–'7 *to the present time there has been no great epidemic yellow fever in this city, without an extensive breaking up—disturbance and exposure of the original soil of the country;* that this has consisted in digging canals and basins or cleaning them out, either in the city or its immediate neighborhood, digging and excavating the streets of the city for the purpose of laying down gas and water pipes, and relaying the streets—digging and embanking for railroads and similar purposes, in the summer season, and relyingly—refer to the Chart A, for full and conclusive proof thereof; and that the *extent and malignancy of the disease, has been pretty much in proportion to the extent of these exposures.*

Of the first proposition.

Proof.

The first epidemic yellow fever that is recorded here, is that simultaneous with excavating the earth, in digging the Canal Carondelet, and more especially its basin in 1797. I am informed by a highly intelligent and observing creole gentleman, that the fevers during the period of digging this canal were awful in its neighborhood, even with Creoles;—and that last year the sickness in the vicinity of the excavation of its new basin was very extensive, although there were few but natives and acclimated exposed to it.

Succinct origin of all our epidemics.

Of 1797.

The next most extensive yellow fever epidemic occurred during the cleaning out the same canal in 1811. Then we have the next severe epidemics of 1817–'19–'22, simultaneous with extensive exposures in the streets for pavements—large fillings up and enclosures of the batture, and the cleaning out and deepening the same canal.

1811.

1817.

1819.

1822.

Then follows the great mortality of the epidemics of 1832–'3, the largest we have ever had in this country, resulting from the immense exposures of the swampy soil in digging the Bank Canal from the city to the lake. Then follows the epidemic fever of 1837, resulting from digging the extensive trenches and canals, to drain the rear of the First and Second Districts

1832–'33.

and 1837.

The next largst mortality, and which has continued ever since, arose from the large *new canals and clearing* and exposure of the soil, between the two Canals, in rear of these districts, without regard to season, and the immense excavation of two acres of ground and with the removal of upwards of 336,000 cubic feet of earth for the foundation of the new Custom-House, in the heart of the city—beginning the latter part of October, 1848, and ending in the succeeding August, *during which period* we had a severe epidemic of cholera with a mortality of upwards of 3,600, and during the balance of the year of 243—with a loss by yellow fever of 769. During the succeeding year (1850,) the mortality from cholera was 1,448, and in '51 of 645, and in '52 of 1,326, with the addition of 597 deaths from yellow fever during these three years, for effect of all which refer to chart A.

1846-'48.

1848-'49 &c., and its consequences.

And, finally, which has contributed so much to produce the great calamity of last year (and on which mainly I founded my prediction of the fever in the preceding May)* was the extensive exposures of the earth in making a new basin for the same canal (Carondelet)—clearing out the canal—dredging the Bank Canal—extensive exposures of the earth in deepening the ditches between Conti and Common streets, and also in the rear of the third district, the digging and exposure for the erection of a levee between the two canals on Lake Pontchartrain—the large excavations on miles of streets in the centre and front of the city—for laying down gas and water pipes and making and relaying pavements—as exhibited in black lines on the Sanitary map—the extensive exposures for laying the foundation of

The specia causes for the epidemic of 1853.

* See published "transactions" (of that date, page 10) "of the New Orleans Academy of Sciences," for the details of this prediction

Is it any more unreasonable for us to predict the occurrence of disease, occurring under precedent well known conditions, than that nearly all inferior creation should have the power of foretelling future events that are essential to their safety The *instincts* of the spider—the tree frog—birds so announce to them, hours and days beforehand, a coming change in weather; the Beaver—the Bee, &c, have the power of foreseeing *months* beforehand, floods, droughts or other inclemencies of the weather, that would otherwise be absolutely fatal to their existence. Surely, this can only be derived through meteorology proceeding from a sensitiveness or means far beyond what we at present possess If a greater difficulty is experienced with us, the cause may be found, besides in that of the imperfection of our meteorological instruments—that disease is the *result* of a *two-fold condition*—a meteorological, and local or personal one, and that, as yet, observation of the influence of this combination on the human body is too limited for general knowledge With more industry in collecting and recording facts, the time may not be distant when success shall more frequently crown our efforts.

new buildings (especially on Front street,) and the excavations and exposures for railroad purposes in the rear of the first and fourth districts and at Algiers. Here then we have a combination of materials of exposure of the original soil unprecedented in our annals, probably excepting that of 1832,* which was more concentrated, and the *consequences* have been correspondently destructive, in combination with meteorological conditions (before expressed) in proof of which this mortality *continued large as long as this exposure continued*, no doubt influencing the two epidemics of 1833, of cholera and yellow fever, and causing the large mortality of the two succeeding years (see Chart A,) and *every large mortality since.*

Cholera and yellow fever highest grades of zymotic diseases.

The first proposition then, is believed to be fully sustained. Looking upon the epidemics of cholera and yellow fever as the highest of the zymotic class, (of what is called malarial disease,) requiring for their existence a great accumulation and concentration of their respective causes; the one being a disease of the cool, and the other of the hot months; and believing that an extensive exposure of fresh earth, when conjoined with filth, crowding, &c., with the meteorological causes which in the union of high temperature and great humidity have been always present, form the worst combination, the occurrence of these diseases during the period referred to are fully accounted for, and amply affirm the correctness of our first proposition.

Exposure of earth with heat and moisture worst combination.

How they were first made known.

These curious and remarkable developments occurred to me in the course of my statistical investigations and scrutinies into the *causes* of the mortality of this city, in which I have felt a deep interest for very many years. After constructing the upper part of chart A, the immense discrepancy in the mortality of the several years immediately attracted my attention, and as there could be no effect in the physical world, without an adequate corresponding cause, and as it so much exceeded that of the rural districts around us, all the changes in the physical condition of the city and neighborhood were carefully investigated and placed to their proper date, under the mortality of

No effect without an adequate cause,

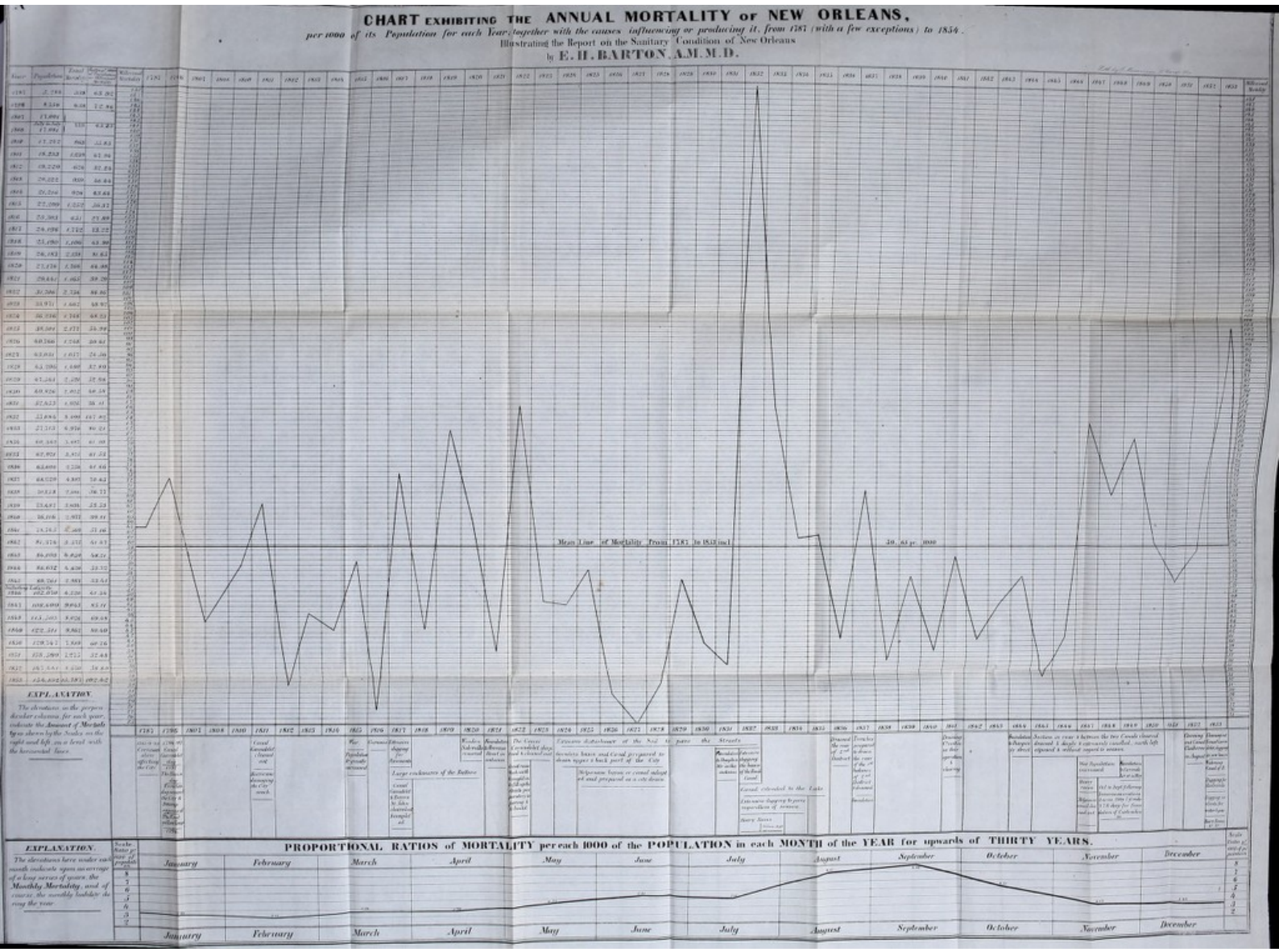
*The greatest mortality was by *Asiatic cholera* that year.

CHART EXHIBITING THE ANNUAL MORTALITY OF NEW ORLEANS,

per 1000 of its Population for each Year; together with the causes influencing or producing it, from 1787 (with a few exceptions) to 1854.

Illustrating the Report on the Sanitary Condition of New Orleans

by **E. H. BARTON, A.M. M.D.**



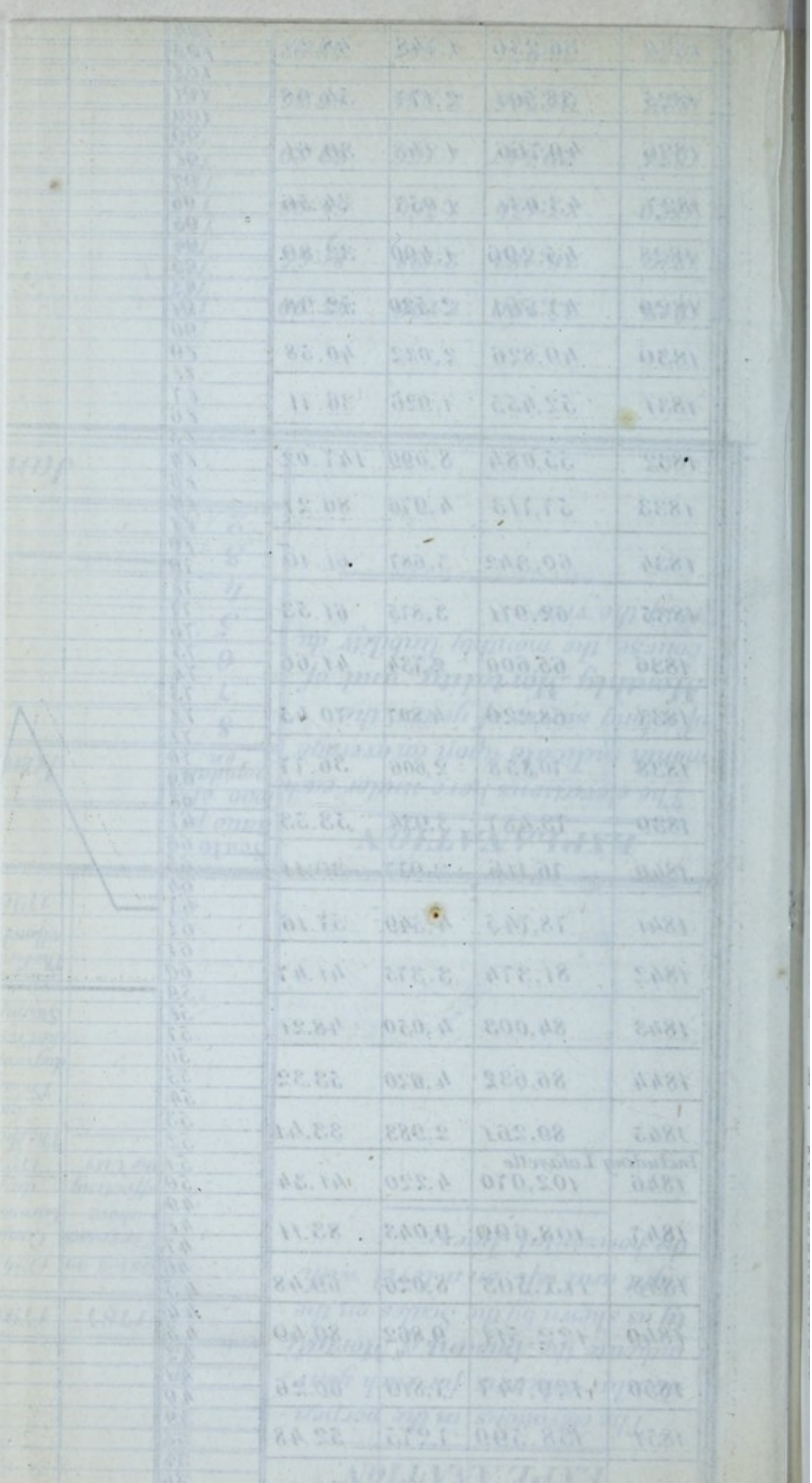
EXPLANATION

The elevations on the perpendicular columns for each year, indicate the Amount of Mortality as shown by the Scales on the right and left, as well with the horizontal lines.

EXPLANATION.

The elevations here under each month indicate upon an average of a long series of years, the Monthly Mortality, and of course, the monthly liability during the year.

PROPORTIONAL RATIOS of MORTALITY per each 1000 of the POPULATION in each MONTH of the YEAR for upwards of THIRTY YEARS.



each year respectively. The subject became interesting as I proceeded; its valuable bearing soon became apparent; a clue was evidently found to the causes of our fatal epidemics; and finally, it was clearly demonstrated by the facts collected and exhibited on the chart—in the language of the proposition—that "there has been no great epidemic yellow fever in this city, without an extensive disturbance of the original soil of the country," and this, I think, has been fully proved, There is no other to which to attribute it; no other great change either *in* the earth or *above* the earth, so far as my meteorological observations have extended, (and my investigations in this line have reached as far back as any records could possibly be procured,) and for many years back they have been made by me with great care and minuteness, in order to throw some light on this curious and important, and to us, vital subject. It has been too constant and invariable for a mere coincidence, and can be viewed by the philosophic mind in no other way than as cause and effect.*

Too invariable for a mere coincidence.

More fully to satisfy my mind in relation to the important bearings of this subject, more especially, since the appointment of the Sanitary Commission, to investigate the origin of our late great epidemic, I determined to extend my inquiries to other places, and see if similar facts and analogous results were recorded elsewhere. Accordingly, the corroboration has been most remarkable, leaving not a remnant of doubt on the mind, as to the fact or the consequence.

Prof. Merrill, (formerly of Natchez, and now of Memphis,) has clearly traced the successive epidemic yellow fevers that have

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* It is due to myself to say that there may be various errors in the materials of which this Chart has been constructed, in a country where there are scarcely any records (official) of anything relating to the vital statistics of the country (of births, deaths and marriages) The data are to be obtained at great cost of time and trouble, from sparse and occasional sources. The materials to construct this Chart have expended much of these before even their chief value was apparent, by applying them to each other They will, I trust, serve the basis of an instructive future, if we are to be instructed by any lesson derived from the past. I have taken great pains to make them as correct as my materials would allow, and do not think it contains material errors It would seem as if our object was to avoid records, to destroy the frightful facts they expose It is very true we *should be ashamed of them*, but then the humane and honest way would be to *correct* not *conceal* the truth. About four, times have we had short-lived "Boards of Health," (that is, Boards of *Record*—for they have had little other power) since 1841, and so far as their records have been published, so well: otherwise, it is *nobody's business to take care of valuable city records!* and this report has thus been much detained from the public from that cause.

in a series of years devastated Natchez, to the cutting-down, leveling and filling up the streets. "This city," says he, "is built upon a bluff; in 1816, the city authorities began to put into operation a plan for reducing the irregular superficies to what was considered a more suitable grade. During all that year a large amount of work was done, digging down and filling up streets and lots, without due regard to the maintenance of a proper drainage. The succeeding autumn the *first epidemic yellow fever* occurred, and produced a frightful amount of mortality. As soon as the shock of the epidemic had partially subsided the work of grading was resumed. No one could perceive why it should be considered the cause of the disease, and the work went on, with a recurrence of the epidemic visitation every second year, until, the population having been several times decimated by death, and business and property greatly declined, the city found itself scarcely able to continue the improvements, and scarcely worth them if made. After the dreadful visitation in 1823, the work gradually declined, and the subsequent return of the disease declined in violence and fatality *pari passu*, until the last of the series, in 1829."

Proofs of the cause of each of the epidemics at Natchez.

"Soon afterwards a new era commenced. Exuberant prosperity overspread the land. A new population was brought into the city, and in 1834–'5–'6 the grading was resumed to some extent. The doctrine of domestic origin and artificial causes had again lost ground. The voice of experience was not heard or overruled, and the penalty again suffered. Many of the older inhabitants foresaw the result in fear and trembling, and the epidemics of1837 and '9 sent many to their untimely graves. The eyes of the living were again opened to see their danger, and its causes, and since that time little grading has been done."

"Now that these experiments did render Natchez sickly, there can be no reason to doubt. The coincidences were too striking to be viewed as accidental. Besides, the same effects following the same causes, have been observed elsewhere. Private residences and plantation negro quarters have suffered in the same way; also workmen on railroads and canals—upon levees and

upon city wharves and landings, as well as persons residing in the neighborhood of such works."

And again, notwithstanding previous warnings—in 1853, at Natchez, the levelling the streets by the cutting down the adjoining banks, and superposing the fresh earth on the streets resulted in the fever. It is said to have first broken out in the immediate neighborhood where this took place—that here occurred its largest mortality, and thence it spread to the neighborhood.

Do. of Memphis.

The same gentleman has most satisfactorily ascribed the insalubrity of MEMPHIS, to the same cause, and the same effects have followed similar causes in the rural and otherwise healthy districts, on the blacks as well as on the whites.

Do. at St. Francisville and Bayou Sara.

The severe epidemic yellow fevers at *St. Francisville*, in 1827 and 1829, were to be clearly debited to the cutting down the hills, spreading the materials on the streets and grading them, digging cellars, &c., during the summers of those years, (from personal recollection) and the epidemic of 1839, at *Bayou Sara*, was equally due to the filling up, by spreading fresh earth over brushwood, and filling up low places.* And for the *only other epidemic* known to have occurred there, since its settlement, that of 1853, may with much propriety be ascribed to parts of a levee made and ditches dug—acres of saw-dust from a saw mill spread and low places filled with it, and for years previous, working extensively on the streets just previous to the epidemic, and extensive swamp leveed off and dried up in the vicinity.†

Do. at Lake Providence.

At *Lake Providence*, the decay from the extensive spreading of saw-dust over the streets and filling of lots, producing a very offensive odor; unusually low water; extensive exposure of river bank.‡

Fort Adams.

At *Fort Adams*, extensive exposures of the earth from large cavings in of the river bank.‖

Centreville.

At *Centreville*, extensive ditching and stirring up of mud in the principal streets or roads of the village—"past summer unusually wet, and heat of the sun very great."§

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* As stated to me by my friend Dr. J. W. Bell. † Dr. Brown. ‡ Judge Selby
‖ Dr. Benedict. § Dr. Wood.

Clinton. At *Clinton*, working the streets, and unusual disturbances of the soil and of back yards during August and September, and to the middle of October.*

Trenton. At *Trenton*, on the Ouachita, soil greatly disturbed by the "*improvement*" of the streets; soil brought from a distance and spread on the main street; several excavations made for new cisterns in May and June; marshes and pools near the town.†

On the La Fourche. Dr. Kitridge informed us that the fever on his own place—in the interior, *on Lafourche*, arose, most palpably, from spreading over his large yard, fresh earth from his neighborhood, not a case of the fever then existing within fifty miles of him.

Natchitoches. At *Natchitoches*, ditches of the town cleaned out in August, and a great deal of disturbance of soil, to lay down pavements in July and August.‡

Algiers. In *Algiers*, on the opposite side of the river, during the last season, extensive embankments of earth and excavations were made for the Opelousas Railroad, the fever broke out and devastated that village; of 350 hands employed on the road, 300 fell victims to it.

On the Jackson street railroad extending from this city, I am informed fifty hands out of eighty died of it.

Of the amount of mortality on *the Great Northern Railroad* I am not so well informed—their sick being brought into the city when attacked. But the tracing the fever along the lines of these roads will be found in a subsequent part of this Report.‖

So far for its influence in this state, let us extend our inquiries to the neighboring State of Alabama.

Do. at Mobile. Dr. Levert of *Mobile*, has most satisfactorily traced *every epidemic yellow fever*, that *has afflicted our sister city* for *upwards of twenty-eight years*, to *similar disturbances of the soil.* So convinced had the authorities become of its injurious influence, that a city ordinance had been passed, forbidding it during the summer, which was most unfortunately rescinded last spring, and the disturbance had again taken place to a greater extent

* F. B. Harvey. † See testimony. ‡ Dr. Crocheron. ‖ Same informed 50 per cent. of the hands died.

than ever—to accommodate the railroad, and to fill up some low lots, and the consequence have been chronicled in a corresponding calamity. I refer, with great pleasure to his valuable report among our proceedings.

At *Selma*, the occurrence of the epidemic of last season, has been most satisfactorily accounted for, in a similar manner. At Selma. "To the removal of old deposits, exhumations, the filling up of a hollow, various deep and extensive excavations for the foundation of buildings, the filling up and grading streets with it, and vacant lots. The first twenty cases of the epidemic occurred within the limits where the earth was deposited and seemed to radiate from these deposits. Digging commenced about the middle of July and continued to November—season very wet and particularly in August. Fever broke out in September.*

At Montgomery there had been considerable excavations for the purpose of laying down gas pipes, and the earth thrown up Montgomery. was stated by my informant to have been very offensive.

At Hollywood, on Mobile Bay, an unequivocal case of the spontaneous occurrence of the disease is mentioned by Dr. Benedict, arising most probably (in a boy) when the sole cause to Hollywood. which it could be ascribed, was his being exposed to the fresh earth from digging a well.† Precisely the same thing has happened in *Algeria*, and mentioned by the French surgeons, engaged in the same business, those employed in it alone suffering while all the others escaped.

At *Gainesville*, much disturbance of the soil from digging Gainesville. and "improving" roads, ditching. &c. Well dug—on cleaning it out it consisted of a sticky and stinking deposit.‡

In Charleston these disturbances are forbidden by ordinance during the summer season, from their experience of their disastrous effects on the public health. Dr. Simons, who has been In Charleston. for some thirty years their chief Health Officer, specifies in his late valuable report on yellow fever there, that "in 1842, white laborers strongly predisposed to yellow fever were employed in

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*See the interesting report of Dr. Mabray, among our proceedings. † See his interesting paper in our proceedings. ‡ Mr. Fulsom.

opening drains and other works, and transferring the earth to different portions of the city, where drains were opened and the earth deposited—there yellow fever occurred, and the unfortunate beings who performed that work were the greatest victims. The same thing occurred in 1852. At the new custom-house a number of Irishmen were employed in excavating the earth and piling; a great many were taken sick and died; the sale and distribution of the earth through the city had a baneful effect." Other instances are mentioned of the dangerous influence of excavating and exposing offensive materials in opening drains and transferring the materials to other localities, even producing sickness in a class of persons who are usually exempt.

Value of a sanitary survey.

These are some of the valuable results of the investigations of the Sanitary Commission. They would have been doubtless, greatly multiplied had it been in their power to visit personally (as was their desire) every district in the six States where this epidemic extended. There is no substitute for effective personal examination on the spot, and the public interests would be greatly advanced by a minute sanitary survey by competent men over the entire region. No geological survey has a tithe of the claims on the public interest, for salubrity is the *first* object for accomplishment for the public welfare. Public wealth is often developed by the first; the sanitary condition is much more often advanced by the other. An ignorance of the causes influencing the salubrity of cities, towns and rural districts often subjects them to the most afflictive calamities, entirely within control. This has already been made apparent by what we have already said, and will be made much more so as we proceed.

At the Chesapeake and Potomac canals.

By extending our examination into other climates we find the same injurious results have followed the upturning the earth for digging canals, opening roads, the establishment of brickyards, and cutting down of bluffs. The excavations for the Chesapeake and Delaware Canal were very fatal to its laborers and the neighborhood, costing hundreds of lives; and so was that for the Potomac Canal, above Georgetown, a very large

mortality having resulted from the excavations. The writings of Drs. Drake, Evans, Blane, Cassan, McCulloch, Caldwell, Bailey, Thomas, and many others, are replete with instances in proof and illustration, and the whole body of physicians attached to the French army in Africa have given their opinion of its injurious influence in the production of fever.

And other countries.

In Africa.

In *Martinique*, West Indies, "extensive disturbances of the soil, in the alteration and construction of roads in different parts of the island, causing great evolvement of miasm, causing the fever."*

At Martinique.

At *Fort de France*, (Martinique,) "public opinion regarded the fever as due to the *cleaning out a canal* which surrounded the city."†

Ft. de France.

The first disturbance of the original soil of a country for agricultural purposes (or the time during which it is passing through what I have elsewhere denominated the "transition period") is known to be highly injurious to health everywhere; and the devastations on the early settlers in all our newly opened districts of country are too well known but to be merely referred to in illustration, developing wherever they have occurred the worst forms of the diseases of those climates respectively. In a few years these subside, the insalubrity following the hardy pioneer along the outposts of population, to the margin of the wilderness, to each newly opened district, and then passing off like a morning cloud before the rising sun.

Same results on first cultivating a country.

The special injury in a Southern country by *unskillful* clearing and exposure of the original soil, without protecting the homestead, has subjected this and the adjoining States, at their early settlements, to calamitous devastations from the most aggravated forms of endemic fevers—consisting of algid fevers, (called "cold plague" from the coldness and blueness of the surface,) sometimes running through its course in a few hours, and to which I never thought I could discover any acclimation--and it is only since the *status* of the

Disturbing original soil cause of our epidemic.

* Dr. Amic. † Dr. Amic.

country (in these respects, clearing and exposure) has become fixed and unchangeable that Louisiana has ceased to be called the "grave-yard" of the Southwest.

Of the sufficiency of the cause to produce the epidemic here, I trust satisfactory reasons have been stated. Ordinary fevers of various grades and intensities of malignancy are produced every year by its greater or less prevalence; but the highest grade known to this hemisphere, (yellow fever,) and of such malignancy as characterized it last year in an *epidemic* form, is alone produced by such an exaggerated condition as then prevailed in a concentrated state, and from the facts presented in Chart A, I think I am justified in coming to the conclusion which I have, most deliberately, after a full reflection upon all the facts presented: that the *emanations arising from the upturning and exposure of the original soil in the summer season, together with filth, under certain determinate atmospheric conditions, has been the main, if not the special cause of every epidemic yellow fever that has ravaged not only this city, but the Southwestern part of the United States for more than half a century!* It is no exception to these statements that digging for mines, and especially, in cooler and more healthy climates (or climates less subject to *fever*) does not have the effect above alledged. My *second condition* (*the meteorological*) is wanting; that it is not always innocuous is well known, (of which I have given some evidence, and could have furnished much more.) Every climate is more or less influenced by particular pathogenic entities, giving it a liability to the evolvement of special diseases. That this has been injurious over a wide extent of Southern country, especially, of the United States, the testimony clearly proves; that it may be expected to be more mischievous in a hot and moist climate, is probable enough.

The special cause of every epidemic yellow fever in the Southwest of the United States.

From the facts adduced and which are entirely reliable—skepticism itself may well be set at defiance. It has not been

left to this late day to make these remarks for the first time, although they have not been probably as extensively generalized before, and acknowledgments and references have been made of it, in another page. This emanation from the earth may be the "*something divine*" of Hippocrates, it may be "*the something from the bowels of the earth,*" that the great Sydenham nearer approached, to which modern science and observation has added, the atmospheric condition, to furnish it the necessary element of activity.

Testimony of Hippocrates and Sydenham

If I am accused of making a bold assertion, it is, by no means, a reckless one. The valuable records in the preceding pages and Chart, will fully sustain the position under the most scrutinizing investigation on the part of the city authorities, and with its *truth* and the precaution, it *necessarily teaches*—it must hereafter *much depend for its salubrity*, its exemption from the greatest scourge with which our fine country is so often inflicted, and its future prosperity and advancement so much retarded.

It is in vain to say that the facts which the Chart exhibits, are but *coincidences*, the records I have given from other places, the multiplied instances of personal experience, now that public attention has been called to it; amply attest its probability and establish its verity. Coincidence by itself, is of little account, it is constancy which gives it importance in the relation of cause and effect and establishes the law. Can that be called mistaking a sequence for an effect—a coincidence for a cause? Is it but a hasty generalization?—is it a *post hoc propter hoc* mode of reasoning to infer a law from a constant result, *in one case of near sixty years uniform sequence* (as in New Orleans)? *in three others*, (Mobile and Natchez and St. Francisville,) *of more than twenty-eight each*, and of a vast number of others that these pages exhibit, that an exception here would but prove the rule? And if proper records and observations had been made every where in the Southern country, who knows how immeasurably they may have been multiplied? It is consolatory then to know that sufficient facts have been collected to establish a principle,

Too many coincidences to be other than cause and effect.

Ample proof.

and that our generalization has not been hasty, and it is equally important to know that it is in our power to control them!*

2d. For its existence in an ENDEMIC FORM other causes are adequate. The proposition then is that it requires an extensive disturbance of the original soil, or vast accumulations of decomposable materials to produce an *epidemic*, presuming that the meteorological conditions are present (and heretofore there have been always causes to produce them, when we have no recorded proof of their being present.) Let us proceed a step further, and this embraces our second proposition, or the causes of our ENDEMIC fevers, the difference being only in the amount and extent of causation. The distinction then between the major and minor proposition (the first and second) is, as a *general* to a *local* one. The causes are the same, differing only in degree—they are essentially identical, varying only in extent of prevalence, and sometimes in malignancy, which, it is also fair to infer, proceeds from the greater or less intensity of the original cause. Of these, a certain amount of fresh earth exposure, with other concurring circumstances produces an epidemic yellow fever and a less (supposing this earth and all filth the same, which I believe they are in effect) an *endemic*, what proportion of influence do they bear to each other? That is, the difference between the two, is the amount required sufficiently to poison the atmosphere to produce either the one or the other? It thus becomes almost a matter of calculation as a question of probability, which like all similar questions, must be liable to fluctuation within the fixed limits of possible error.

Cause of on endemics.

3d. And this brings us to our third proposition, of a lesser cause of the same materials producing our bilious and periodic fevers.

The cause of our bilious and periodic fevers.

The cause of *bilious and periodic* fevers, of all kinds, is so much a matter of common observation—is received with so much unanimity by the profession, that they need not be

*I did not desire to incumber the text more with the collection of facts upon this subject from our own State—proving the connexion of disturbance of the soil with the occurrence of yellow fever and cholera, or, it might have been greatly extended.

dwelt upon; I need only here enter my *caveat* in relation to the existence of any *specific* thing; as *necessary* to their production, (and called "*miasm*" par excellence)—but believe as I shall hereafter state more fully, that exhalations of all kinds, *whatever impairs the purity of the air, is the terrene agent*, if any is requisite, to unite with meteorological conditions and moral and physiological causes in the production of these fevers. The great error upon this subject, seems to me to consist, in supposing that *any one specific thing* is required, the effect, the disease, is one thing, but that, by no means implies that the causes producing it may not be manifold. Now it is perfectly clear to my mind, and I trust the facts and principles set forth will fully bear me out, that several conditions are pre-requisite for the effect.

The similarity of the influences, producing these various classes of fevers, is most manifestly shown by what occurs at the commencement and termination of these epidemics and endemics respectively—where the productive causes being much less in concentration, or weakened in intensity—bilious, yellow, and periodic fevers are *constantly observed running into each other, and blending their symptoms* in the same places, houses, and even individuals. A fever of a remittent or intermittent type occurs, and terminates in black vomit and the hæmorrhages. Another fever begins with yellow fever symptoms, with the eye, countenance, expression, to convince the even, inexperienced attendant, that it is yellow fever; in its progress it assumes the intermittent form, and so terminates. They are, then, clearly *convertible fevers*, dependent upon the more or less concentration of the same cause, and the susceptibility of the individual. They are constantly occurring here—even last year, bad as it was, the table F will show how common it was; baffling the most experienced to christen it. The distinction is a very important one, for it seems to settle the long disputed question of the identity of bilious and yellow fevers—that their differences *exist in degree only*—that the same may be between bilious, remitting, and intermittent

Proof of yellow and periodic fevers convertible and the same.

fevers—a difference in intensity arising from a more or less aggravation of the cause. Here are steps from the one to the other, that are no less interesting than important—not in a merely speculative point of view, but in one of the greatest practical value to the community; for, if they are the same, differing only in degree, it settles finally, the great *question* also, of the *preventive power of sanitary measures against yellow fever.* Here we find no skeptic; no one doubts that of all the great zymotic or preventible class, fever is as much or *more under the control of these measures than any of them.*

Importance of this in a sanitary point of view.

The following remarks by Dr. Pennell, of Brazil, evidently a practitioner of acute observation, as he is known to be one of enlarged experience, are quite illustrative and confirmatory of the views taken above: "In the bilious remittent of Rio, says he, the mode of attack, the position of the pains, and the *state of the pulse and tongue are highly characteristic.* The prevailing epidemic preserved these features in a most singular manner, and with but little variation."

Identity of bilious and yellow fever.

"I believe the diseases are essentially the same. They begin in the same manner, they have the same diagnostic symptoms, and no one can distinguish between them, except by their severity; a difference which may arise from a more intense form of the disease, or from a superadded poison, as already mentioned. With the exception of black vomit, I have not in the prevailing epidemic, seen a single symptom which I have not also frequently witnessed in the common remittent of the country."

"In no other way than by supposing the disease of endemic origin, can it be explained how the natives and acclimated suffer so little. Yellow fever was never known in Brazil before, and was, therefore, equally new to them, and to those recently arrived. The former have, evidently, all their lives, or during the period of acclimation, been breathing a marshy, or any other endemic poison you please, in a diluted state, and consequently suffered less from a more intense dose. The poison had for years been incorporated

Proofs in Rio.

with their systems. This is most conclusively shown from the different influence of the disease, by the various mortality on the several classes of the population, [as exhibited in Section IV,] although it is acknowledged, at the same time, that almost the whole population was affected by it.

"In no other way, than by supposing it to be of endemic origin, can it be explained, how ships come into port direct from Europe, with this identical fever on board." Of endemic origin.

How eminently applicable these remarks are to us here, all unprejudiced observers well know.

My proposition, then, in relation to the causes of our *epidemic* fevers, has, I trust, been fully sustained and corroborated by what has been shown to have occurred elsewhere (my other propositions have been equally satisfactorily proved.) If it will not equally apply to all the places where the yellow fever has appeared, it may be that there has not been *sufficiently concurring circumstances* of a congenerous nature, with the *meteorological condition*, which the Sanitary Commission has not been able to verify (from causes before stated). Again, it may explain the well understood fact, that many cases of the disease have been carried to certain villages and country seats, and have terminated with the individual, as in ordinary years, not spreading to the family or visitors. These appear to me satisfactory explanations of what has been a stumbling block, not with the public only, but with many of the profession. Why yellow fever not always break out with the apparent presence of the causes.

From the foregoing facts and observations, it is palpable enough that *two conditions* are required for the existence of an epidemic fever, viz: an atmospheric and a terrene or local cause. The proofs of it are so abundant that whenever they are omitted, it may be safely ascribed to *the fault of the observer*. In all, and everywhere, the influence of atmospheric conditions are found paramount and indispensable to the disease, and *equally so* is what is denominated "the focus of infection,"—that is, the presence of some localising filth, exposure of soil, &c. (all equivalent conditions). These are Two conditions necessary for an epidemic fever.

universal—there is believed to exist no exceptions to it. The occurrence of one of the conditions is not sufficient. Many proofs and illustrations of this have been mentioned in Section V, and they could have been greatly multiplied, not only this year, but every year of the existence of yellow fever either here or in foreign countries.

The presence of an acclimated population prevents effects proportionally to the cause.

That yellow fever should not occur at once upon all exposed, and in a fair proportion to their amount, is also satisfactorily explained, I think, by the fact, that a large portion of our population is acclimated to the disease, and is no longer susceptible. Nor do I suppose it necessary to say, in order to convince the public of the reality of the causes and effects, which I alledge, that our climate is peculiar; for there is a second condition, equally essential to the production of the effect, which may not exist in other climates, although usually present here, viz: heat and moisture. I am fully sensible that different climates have different diseases, and that the peculiarities that produce the manifestation of one kind of disease in one climate is wanting in another. The facts and principles, *as applicable here,* have, I trust, been satisfactorily demonstrated.

All climates have different diseases.

Although I look upon yellow fever as a specific disease, to which the subject is rarely liable but once; I am equally confident, that it is the result of the aggregation of circumstances and conditions, a less amount of which produces the ordinary fevers of the locality. This result I come to, after a pretty thorough personal examination of the facts, in many of those climates where this disease has been worst. I do not think this unreasonable, for we are not without analogies in other diseases, even where they are specific. Consumption is due to an impoverished diet, and bad physical and moral conditions in an unfavorable temperature, and it is eminently illustrated in Cuba, *where more of it exists* (*and particularly in Havana,*) *than in any part of America.* Measles, scarlatina, small-pox, have often arisen under certain atmospheric conditions, (warm, moist, and variable—*out of season,*) where they have defied the utmost

scrutiny to detect a personal cause, and may have arisen from some of those combinations which originally gave them birth, and that in other circumstances, with the addition of the important elements of heat and moisture, give origin to fever. Can any one inform us why *small pox* should have had its birth about the period and place of the imposture of Mahomet? *Scarlatina* and *measles* also derive their parentage from the East, and are of comparatively modern origin. *All diseases have had their time and place of commencement.* Mr. Meriam informs us that cholera and small pox at St. Iago de Cuba, immediately followed the fearful earthquake that nearly destroyed that city, on the 20th August, 1852. Some diseases have disappeared—may be, never to return—but who can predict it, and upon what grounds? Some appear at intervals of fifteen or seventeen years, as the eruptive fevers, cholera, &c.; others at periods varying from fifty to one hundred years, and attack only one particular race. The Mexican *matzahuatl*, attacking only the *aborigines* of that country, notwithstanding other races were similarly exposed to it—about once in a century. The "sweating sickness" attacked only the English, wherever they were found, whether in England or in the heart of Europe! Most climates have their special diseases or forms of morbid action. Need I mention goitre, cretinism, leprosy, elephantiasis, biri-biri? They, unquestionably arose *from some combination of physical elements*, that either do not exist in other regions, or that have become controlled by the mode of living, the refinements of civilization, the extension of the comforts of life to the lower class, and the application of sanitary laws to all the purposes of living. I see, then, no reason why we should not be satisfied with the causes enumerated, as sufficient for the production of yellow fever, and particularly as their removal prevents or expels it. Indeed, it is not affirming too much to say, that we *actually know more of the causes of yellow fever than we do of those of any known disease, beyond the class "fevers," and as much as we do of any in it!*

Don't know the real cause of any disease.

How diseases have been changed.

The influence of climatic conditions and modes of life, in

evolving peculiar forms of morbid action, is not only shown in those above mentioned, but is felt also in the great class of fevers—the typhus, of England, the great avenue to death there—is materially different from the fever of the African coast; and this differs from the yellow fever of the West Indies, which again differs from the *plague* of the East. The *parallelism of these*, as well as their points of divergence, becomes the more interesting and instructive, when we reflect that the countries are situated in similar parallels of latitude, that they have several points of geographical similitude, and there is the strongest grounds for believing that they are both entirely under the influence of sanitary measures. The *plague* occurs on the subsidence of the Nile; so does the *yellow fever* on the subsidence of the Mississippi. The plague localities are surrounded with ponds, stagnant canals, with decaying vegetable matter, exhaling their poisons to the atmosphere, accompanied with great *humidity*.* Such is precisely paralleled here. The plague is sometimes marked by jaundice (or icterosed) and black vomit, and yellow fever sometimes has buboes and carbuncles—as was the case here last year. One attack usually exhausts the susceptibility to the recurrence of the disease, in many instances, much more certainly in yellow fever than in plague. At Constantinople, which is about the latitude of Boston, there is no acclimation against plague, any more than there is in Boston, New York or Philadelphia, against yellow fever. They are both diseases requiring a great concentration and aggravation of their producing causes, (as meteorological and terrene conditions) and hence both are diseases of cities, or wherever these causes exist in an eminent degree. Both have occurred in latitudes far North of their customary habitats and birth places under strong *temptation*. The latter, in England. formerly in latitude 52; in Moscow, in latitude 57, as late as 1771, '72, with a mortality exceeding our epidemic of 1853, by at least 500 per cent.—nearly half the population dying, and a similar mortality occurred in Marseilles in 1720. The former has pre-

Parallel of plague and yellow fever.

Similitudes.

Blach vomit.

Marshes.

Moisture.

Repetition of attack.

Latitudes.

* Prof. Gliddon.

vailed under similar circumstances, as far North as 42, and even beyond it; and in Cairo, from 10th February to 10th June, 1835, out of a population of 240,000, fifty-seven thousand died of plague, or 23¾ per cent.

There is another respect in which their similitude is almost equally exact: *neither are contagious.* In their endemic form, this is hardly disputed, but when the causes producing either, are sufficiently intense to produce an *epidemic;* then *within the epidemic* influence, they are both apparently so. For it has been clearly proved, by the long and intelligent experience of the renowned Clot Bey, (so long the distinguished Physician-in-Chief to Mahomet Ali, in Egypt,) that he had never known the plague to be communicated by contact, "when *removed from the regions of malaria, and all his attempts to communicate it had utterly failed.*" It is unquestionably just so with yellow fever. *The plague often occurs alternately at Cairo and Alexandria, with constant uninterrupted communication between them, without the suspicion of contagion,* or the slightest appliance of quarantine. The same occurs in New Orleans, in relation to her numerous sister cities which have constant communication with her.

Neither contagious.

Attacks of plague most frequently take place at night, when the damp and heavy dews predispose to the disease. Such is often the case with yellow fever.*

Their points of disagreement are equally remarkable. In Egypt, the *plague* attacks most frequently the *natives*—those, in fact, who live in the greatest filth, and on the most meagre diet—and Europeans, and especially those from the North of Europe, with an appropriate personal hygiene, are rarely liable

Dissimilitudes.

*RECOLLECTIONS OF J. R. GLIDDON, ESQ.

1st. All the plagues remembered by me, (1818, '41) that is about five serious *epidemics*, began at Alexandria about November, *after the rains*, and in damp, cool weather—temperature, (thermometrically) unknown. It is also the season of the ebb of the Nile, and commencement of vegetation, (in Lower Egypt) as the slimy ooze emerges from the flood.

2d. All were temporarily weakened by the colder and drier weather of January, with its bracing N.N.W. gales

3d. All arose to their intensest action *between* February and April

4th. All vanished, as *epidemics* by 15th or 30th June

Hence, (ceteris paribus) the most deadly seasons of the plagues in Egypt, corresponded to a temperature and to an atmospherical condition—such as we had at New Orleans in February and March, 1852. [Very damp and oppressive.—E. H. B.]

to it, and thus are probably much more exempt from it than if similarly circumstanced in this region, they would be from yellow fever, although these are great protectives. In *yellow fever* these susceptibilities are reversed. The liabilities produced by temperature are very different also. Although each occurs sometime after the subsidence of the two great rivers of each country; the Mississippi begins to rise in January and February, and falls in June and July, and the yellow fever occurs in July and August, with our highest temperature. The Nile begins to rise in June, and about the 20th of August the whole valley of the river presents the appearance of a great inland sea. About the antumnal equinox, the waters begin to subside, and before the end of November the river is once more within its banks. The *plague* usually commences on or before March, and terminates towards the middl of June—the occurrence of the *inundation* puts an end to the plague—the yellow fever occurs on the *subsidence* of the Mississippi. "The experience of ages incontestably establishes that the plague *cannot exist* with a temperature above 80°, nor a little below 60°." With yellow fever it is different: a long continued temperature of about 80° *is required for its production*, and over 90°, unfavorable to its development. Nor does a lower temperature, at once, extinguish it—being usually a fever of a limited period (60 to 90 days*,—the *epidemic*, I mean,) when commencing late, it often continues after a frost, and even when the thermometer sinks below 32°, although not in the *epidemic* form—yet it usually subsides here with the occurrence of cool weather, and even when the *average* daily temperature is not below 70°, and at all points South of us it subsides when the thermometer is still at even higher grades. In other countries than Egypt, the plague has existed as a summer and autumnal disease—reaching its culminating point in August and September, as our yellow fever here. Of the extent that they are influenced by sanitary regulations, I have already spoken of the plague; I shall hereafter dwell extensively on that of yellow fever.

Acclimation.

Period of occurrence.

Temperature required for each.

* An average of about 60 days.

Egypt has no marshes (properly called), and except during the period of inundation, the climate is distinguished for its aridity. It is mainly on this account that it is famed for its remarkable influence in the cure of phthisis. Even as early as the time of the younger Pliny, he states in his letters that it was not uncommon to "send patients suffering from a tendency to consumption to the softer climate of Egypt." Influence of its climate on consumption, and why.

Such are some of the more remarkable similitudes and diversities of these two great monarchs in Eastern and Western diseases, and fortunately, the valuable records of history bear us out in the statement that *both have yielded signal triumphs to sanitary measures.*

I have stated what have been the constituents of an epidemic atmosphere (meteorological and terrene) so far as the present state of science will enable us to give them, together with the important and interesting exhibit of Prof. Blodget. I do not deny that there may be others,—that must be left to future research to find out. Both have probably existed when the epidemic developed itself; when it has not, probably but one. The localising circumstance—disturbance of the soil, or filth of every kind, (which I presume to be of a congenerous nature,) has probably been wanting. Of the same character do I view half-dried swamps that have been recently overflowed. Now, it is well known, that for several years most extensive inundations have prevailed over a large portion of our State, and over the cultivated, as well as the uncultivated portions of it. That, as these have become partially desiccated they reach the conditions of all half-dried swamps, which are known to be highly injurious to health everywhere, and with the concurrence of the meteorological conditions, they have formed that combination of circumstances necessary for the existence and spread of a great epidemic. Effect of our half dried swamps. Know as we do of any disease.

These inundations are not only connected as one of the prominent causes of our great epidemic of 1853, but with

Inundations cause of increased sickness in this State.

the cholera and sickness of preceding years. This statement is not hazarded without extensive inquiry, and is in strict accordance with all medical experience, as recorded elsewhere. The lesson taught us is full of instruction, when it shows that not only the agricultural interest of the State is ruined by these repeated inundations, but, what is far more important, the salubrity of its population. It is demonstrated then, that the most active supervision upon the part of the State authorities is not only essential for its future prosperity—but for its existence.

Why the epidemic should commence in New Orleans.

That it should begin in New Orleans is not at all strange. It must *begin, or be developed somewhere*, and it is most within the bounds of probability that it should first arise there, where should exist the greatest concentration of these causes, and the largest number of unacclimated subjects, without the necessity of resorting to contagion, or even the extension of infection, to account for it. It must also be considered that the population of the rural districts, being always accustomed to breathe a purer air, are more susceptible of an epidemic influence when it has broken out.

Late inundations promoting the spread of the epidemic.

In corroboration of the position that the general extension of the epidemic is partly due to the late inundations, and in striking conformity to it, *those parts of the State which have suffered most from the epidemic have been the greatest sufferers*, so far as we can learn, by the inundations. I quote freely from the high authority of my friend, Dr. La Roche, of Philadelphia, (probably, the highest authority now living,) who has written extensively upon the subject.

"The examples of the injurious effects of draining and desiccation by artificial or natural means, and conversely, of the beneficial effects attending *complete* draining of marshy and insalubrious surfaces, or their complete submersion, are numerous and conclusive. They establish, beyond controversy, the fact that the insalubrity of marshy localities increases in compound ratio to the degree of desiccation they have attained. They show that the greatest insalubrity and mortality in such local-

ities always coincide with the period of greatest desiccation, *short of a complete dryness;* that this effect occurs earlier in hot, than latitudes where the drying process is slower; earlier when the season is precocious, and the reverse when it is tardy." Dangerous in proportion to desiccation short of complete dryness.

"The extensive prevalence of fever during hot weather, after the overflow of river, lake or pond banks, and at the receding of the water is well known to all medical readers, and has been noticed everywhere, and at all times." "The inundation occasioned by the overflowing of the Tiber, and the disease resulting therefrom, are referred to by Livy, Dionysius of Halicarnassus, Dio, Strabo, &c. Like effects were observed and noted in the twelfth and thirteenth centuries, under the pontifical reign of Innocent III, in the fourth, under that of Clement V, and are particularly described by Lancisci, who accurately pointed out some of the causes of the disease to which they gave rise. Inundations of the Tiber.

The city of Strasbourg, in France, is not often visited by malarial fevers. In 1824, the banks of the Rhine were overflowed, and remained for some time under water. Soon after the water had receded fever began to prevail, and continued to do so *during three consecutive years.* Nor did it cease before the soil became perfectly dry." "The occurrences recorded in Italy, Germany, Egypt, India, Senegal, Algeria, and many parts of our own country. The irrigations at Oran, Karguantil, Siliebel-Abbas, and other districts of Algeria, where the practice is extensively applied to agricultural purposes, and is carried to such an extent as to occasion a sort of daily inundation. Those of some of the departments of France, as well as those resorted to in the rice plantations of this country and Italy, have been found to give rise to the same morbific effects wherever and whenever the thermometrical condition of the atmosphere is such as to aid in the extrication of malarial effluvia. "Near the walls of a large city stood a very extensive and deep pond of water, which for forty years had served as a receptacle for all the filth from the houses and streets. As long as these putrid At Strasbourg

In France and Italy.

matters remained covered with water they were productive of no mischief; but when they had so far increased as to rise above the surface of the water, a most malignant fever spread through the tract of country adjoining the city."*

At Lyn Regis.

"Dr. Robert Hamilton, of Lyn Regis, in a pamphlet quoted by Bancroft, and referred to particularly in the London Medical Gazette, describes a remittent fever, produced in that place in 1779, by a freshet which occurred from the sea. The inundations from the sea are generally followed by severer consequences, in respect to health, than those from fresh water. If they extend far they cover much low ground under cultivation, and fill many ditches which, in many situations, cannot be drained by any other means than evaporation by the heat of the sun. The intermittent fevers which follow are of the worst kind, the effect being due to the dead fish that remain, and the effluvia from the destruction of reptiles, insects, &c., and vegetables which are destroyed by sea water. The gale of 1719 was attended by such an inundation, the effects of which developed by the heats of *five successive summers and autumns*, were seen in the fevers of those years, which were more violent, universally epidemic, and more fatal than Dr. Hamilton had seen them in the last forty years. These fevers have ceased to show themselves. The country around, which was once one of the most unhealthy, has become one of the most salubrious by the *complete draining* of the Bedford level."

At Bassara as an act of vengeance.

"When the Arabs, (as we learn from Mr. Ives), wish to take vengeance on the Turks of Bassara, they break down the dykes or banks of the river, and inundate the plains. On its evaporation the water leaves a marshy sediment which infects the atmosphere, and occasions fatal epidemics. During Mr. I.'s sojourn in that country the mortality from an occurrence of this kind amounted to no less than fourteen thousand. The same effects are produced at Bassara, and to a highly destructive degree after the ordinary overflowing of the Euphrates. Of the

In Egypt.

* Precisely the circumstances under which Gormley's Canal has become so injurious.

consequences arising from simple inundation, Egypt affords a similar example, inasmuch as its season of fever commences with the subsidence of the Nile. Every one must know that equally disastrous results have often attended the overflowing of the Danube, the Don, the Tigris. The yellow fever epidemic of Laguayra, in 1797, the first known to have occurred in that place, has been referred with much plausibility to the overflowing of the river of that name."*

At Laguayra; its first yellow fever.

The same results occur on the subsidence of the Nile. The exposure is direct and immediate to a burning sun as before mentioned.

The same effects occur here on the subsidence of the Mississippi, and its early or late subsidence materially influences the result; the period of decline is the period of fever. That the inundations of the banks do not usually produce their disastrous effects until the second year, is not difficult of explanation. The ordinary condition of our swamps (not marshes half-dried) is not injurious to health, as is well known throughout the State. When this is vastly increased by a crevasse, large additions are made to the swamp water. The cultivated country is inundated, and by the natural subsidence of the water is converted into a marsh, and has to undergo the successive poisonous stages of desiccation, with the evolution of results through solar influence, which takes a season or two, fully to develope. That the first year of inundation is not injurious, clearly results from the immediate removal of filth; that the second year the effects mentioned follow as results, is proved by the following authentic data, of its influence on this city, aided and aggravated by causes I have before dwelt upon. Of the direct influence in the country we have no sufficient evidence.

Inundations here do not produce disease first year.

Extensive crevasse, inundating large part of the city and neighborhood in..... .....1816.

An extensive epidemic yellow fever in.....1817.

The hurricane inundating the city to Bourbon street, 1821.

Epidemic yellow fever in.....1822.

Always the second year.

*La Roche.

The rear of the city inundated by a storm to Dauphine street in.....1831.
The great epidemic of cholera and yellow fever in.....1832.
A severe blow drove the water of the Lake to Dauphine street in.....1846.
An extensive epidemic occurred in.....1847.
Extensive inundation of the city to Carondelet st. in 1849.
About three thousand cases of yellow fever, and an increase of more than one per cent. in the general mortality of the city above the average in.....1850.
There was a crevasse opposite the city in.....1852.
Large mortality of the epidemic in Algiers, which we have attributed to other causes, in.....1853.*

Different stages of draining produce different diseases

"The pond of Lindre Basse, in the department of the Meurthe, affords a curious illustration of the effects of the different conditions under which the malaria is generated, in modifying diseases arising from paludal infection. The first pond managed according to the triennial system common in Saloque, is two years under water, and one year dry. In the first year it is half filled, and gives rise to intermittent fevers; in the second year it is full, and typhus fevers prevail; in the third year, after being fished, it is left dry, and cultivated as a field, and in this year carbuncular affections appear. These diseases have succeeded one another as regularly and invariably as the different states of the pond for a period of *sixteen years*, and the idea naturally suggests itself that diseases that have a common origin must have a more or less common nature, however much they may differ in outward appearance." These remarkable facts have been fully illustrated by what has occurred in the neighborhood of this city, and other parts of the State, during the last and preceding years.

Northwestern limits of the epidemic.

From the following extract of a letter to me from my old friend, Judge Bry, of Monroe, Washita, who, nearly at the age of eighty, still devotes himself, although almost blind, to the

* These inundulations doubtless aided the causes to which we have specially attributed the epidemics, and epidemics have occurred from the causes enumerated, without the inundations as in 1819, '29, '33, '37, '41, &c.

cause of science, the same views are put forth as the result of his long experience in this country; it also exhibits the Northwestern limits of this epidemic. "As a general observation on the river, (Washita,) I can venture to assert that except at Trenton, where the epidemic may have owed its existence to local causes, and Monroe, where it seems to have been brought from Trenton, the valley of the Washita was never healthier. From here to the mouth of the river, (170 miles,) there has not been a case to my knowledge, nor above, as high as the Hot Springs. I expected we should have had a sickly summer and fall, from an observation of fifty years standing, to wit: when the overflowed lands of Lafourche, East of the river, are covered by the general height of all streams connected with it, late in the spring, when vegetation is far advanced, high grass, shrubs in leaves, &c., the season after the secession of the waters will be unhealthy; that is to say, that the common autumnal intermittent fevers will prevail to a much greater extent than when the rising of the waters is earlier, and before vegetation is advanced. It would be worse than useless to mention to *you* my opinion as to the cause of that effect on the sanitary condition of that part of the Washita valley parallel to the overflow of the Lafourche."

Effect of the inundation late in the spring.

"I have also observed that principally, when the waters subside, the Eastern side of the river is healthier than the Western in many localities, of which Trenton is one. The receding waters have exposed to the sun, &c., large spaces or flats on the Eastern side. I have seen the vapor exhaling from these flats wafted as very thin fogs to the Westward at the rising of the sun, as if its rays drove them across, the air being perfectly calm. There have been what is called several cases of the epidemic, which readily yielded to good treatment and good nursing, but, in my ignorance, I believe that they were the common autumnal fever, assuming the type of the prevailing disease."

Effect of exposure after inundation.

Can it be any longer doubted, then, that the extensive in-

undations to which the State has been subjected for the preceding four years, has been one of the efficient agents in the production and spread of an epidemic unparalleled in our annals, and from a concurrence of the causes we have mentioned?

Observation and experience must precede science. *We* have had experience without observation, and if we will not be bettered by our own sufferings, may be, we will by that of others —let us then see what has been the farther result in those nations which have grown wiser and better by the combination.

At Demarara.

"By draining and clearing at the British colony of Demarara, within 6° of the equator, success has followed in rendering the cultivated portion of the deepest and extensive morass, probably, in the world, a healthy, fertile, and beautiful settlement.

Near Philadelphia.

"A large peninsular of land between the Delaware and Schuylkill, adjoining the city of Philadelphia, called the Neck, was formerly in its unreclaimed state, subject to the devastations of annual bilious diseases. Draining, banking, and cultivation have converted the marshes into fields and gardens, and the spot which once reeked with pestilence, now yields a rich harvest to the hand of industry, and promotes that health which it once destroyed. Another impressive instance of the effects of cultivation in reclaiming a swampy and sickly district to healthfulness and prosperity, is derived from the history of

Near Calcutta.

Calcutta, and the country around it. That city, built in a morass, on the banks of the Hoogly, was originally a speedy and almost certain grave to Europeans, who resorted to it for the purposes of commerce. But a well regulated police within, and the thorough cultivation of the environs without, have entirely altered its condition. The same is true of various other cities in the province of Bengal. The examples in illustration of our subject could be multiplied a hundred fold, were it necessary, to show that disease and mortality are receding before the efforts of industry, and life is prolonged by the enterprise of man. In some of the worst of marshy lands, where the thrifty Dutchman has robbed the sea of its domains, and which

he only retains by his dykes, and by pumps worked by wind-mills, the effect of constant cultivation has powerfully counteracted those causes which at Walcheren, a few years back, nearly destroyed an English army. In Holland.

"The Pontine marshes were once the home of a thrifty, active, and healthy population. It then contained thirty-three towns—now nothing meets the eye of the traveler but here and there a solitary post-house, tenanted by wretched beings, rapidly sinking under the effects of various influences. It owed its former condition to its large population and constant tillage—to the extreme attention paid to draining the deposits of stagnant water, which accumulated upon it; to the acqueducts traversing it in all directions, affording pure and wholesome water; and to the protection afforded by groves. The present condition, is owing to the entire neglect of cultivation—the destruction of the acqueducts, pouring their contents over the campagna, giving rise to numerous stagnant lakes—the forests cut down—the whole region presents one wide scene of desolation and ruin. Near Rome.

"There are some precautions to be exercised, however, in these drainings, of which it is necessary to be apprised, for history is not without examples of its occasional lethiferous influence. First, then, partial drainings, or reclamations, are much more dangerous than the condition of undisturbed nature. Submerging swamps is probably less hazardous than partially draining them, for from the experiments of Williams, the evaporation from the surface of moist land, covered with trees and other vegetables, is *one-third greater* than from the surface of water, and it is a well established fact, that the *moister the earth*, the *more dew falls* upon it (under a similar exposure.) Experience has fully confirmed these views. The protection afforded by forest growth, acting as a screen, to impede the wafting of exhalations from recent clearings, has been often recorded in the history of medicine, and perhaps may be the reason why the ancients consecrated the woods in the vicinity of Rome to Neptune, in order to secure them from the Precautions necessary. More humidity than water.

Value of woods.

axe. To the final removal of these woods has, with some reason, been attributed an increase of danger to the unprotected city. Near St. Stephano, on Mount Argental, a convent is situated, which was famed for the salubrity of its air, but, since the forests which surrounded it have been cleared, it has become unhealthy. At Villitri, near the Pontine marshes, the cutting of an intermediate wood occasioned immediately, and for three successive years, fevers and other diseases, which committed great ravages. The same effect was discerned from a similar cause, near Campo Salino; and analogous examples might be adduced from Volney, Lancisci, Donas, and others. In our own case, a range of forest growth could be easily left to protect us from the additional emanations evolved, until *effectual reclamation* and *cultivation* shall have dissipated every possible danger.*

The baleful effects of our half dried swamps.

I should do great injustice to this part of my subject, were I to pass over the local influence derived from the conditions of *our half cleared and half drained swamps* in the rear of this city, on the epidemic of the *last season*—with their large, open, sluggish conduits, reeking with the most filthy materials it is possible to conceive—the refuse and drainage of a large portion of the city—of the half dried and pestiferous basin and canal of Gormley, with the offensive soap and tallow factories—vacheries, and dung heaps near it—in the immediate vicinity of which broke out some of the earliest and worst cases of the epidemic, and whose entire neighborhood, in proportion to the population, probably, occurred a larger mortality than any other section of the city. (See Sanitary Map.) And I now reiterate my firm and unalterable conviction, that it is utterly futile and deceiving the public and ourselves, to anticipate the enjoyment of health here, while the most thorough correction is not made in these and other hot-beds of pestilence. In fine, until the thorough drainage with covered canals—made in the cool sea-

* The above quotation is derived from an introductory lecture to my class when Professor of the Institutes and Practice of Medicine in the Medical College of Louisiana, in December, 1835, and *published then* Had the warning been taken and the advice heeded, the disastrous results of clearing and draining, *in the mode it was done*, would not have followed—in the *large increase* of our mortality ever since. But, we are in our infancy, and infants require many lessons. Is that of 1853 sufficient?

son—should have existed long enough (a year or two) for an undergrowth to cover the soil—now desiccated—then the clearing may take place, leaving rows of trees on avenues and streets, to absorb bad air, but not sufficient to prevent thorough ventilation. The imperfect manner in which this has been done, ever since 1846, and even before—about which time progress was made in the GREAT EXPOSURE IN THAT DISTRICT, is shown by the rapid manner in which the mortality has been gradually increasing—resulting in an average annual mortality (inclusive of last year) of 6.86 *per cent. to the entire city population.* This is shown on the Chart A, so as to defy all skepticism, and is derived from official documents.

Result of its improper exposure since 1846.

A remarkable instance, illustrative of these views, is furnished by what has occurred in British Guinea, during the last half century. The yellow fever has occurred there in determinate or oscillatory periods approximating to a metonic cycle (of about nineteen years). The only atmospheric element that has been specially referred to, to which adequate efficiency could be properly ascribed, was the agency of the wind (the heat and moisture there, is always abundantly great). The direct effect of these was to produce a most unusual elevation of equinoctial tides—even to the extent of thirteen feet; the consequence was, as the country is very low—embankments being now required to keep out the sea—the draining canals that take away the filth of the town (Georgetown) are imperfectly emptied—the river deposits its detritus in the neighborhood—a vast embankment is formed from the accumulation of these alluvial depositions, in and about and before the town, and precisely co-incident with the acme of these accumulations is the outbreak and development of epidemic yellow fever, and which is *exactly limited to this condition.* When this ceases, and this embankment disappears, the sea, now encroaching and washing it away—together with a clearance of all these estuaries, by its scavenger influence—*the yellow fever disappears.* Farther to show that this is cause and effect, *so long as the period of deposition and exposure continues, so lasts the disease—when this*

The two conditions.

Illustrated in Demarara.

And in different years.

ceases, so ceases the disease. At the termination of the last century, three years sufficed for the purpose; so in 1820–'21–'22; but, during the last occurrence, it continued about ten years—*1835–'46. Heat and moisture exists to a great extent in these low countries, robbed of the sea; so here were both blades of my "shears." Now, whether those were emanations from the *newly made* or *newly exposed earth*, formed of these alluvial depositions—producing vegetable or animal effluvia or poisonous animalculæ, in concurrence with atmospherical conditions—is not material to my purpose, or necessary to show. It is the *conjunction of the two*, with the almost inevitable effect that I wish to point out, and further, that during these epidemic visitations, "atmospheric changes and occurrences of *an unusual character* are ordinarily apparent," and wherever proper attention has been paid to these, they have never been found to exist. Hence there occurs a satisfactory exhibition of all our epidemic requirements, terminating in the epidemic itself. Dr. Candido, a distinguished physician of Brazil (Rio), avers the same thing. He states most distinctly that "in addition to filth of various kinds, certain meteorological states were required to develop the fever at Rio, and these were, a temperature above Reaumur 20°, 77° Fahrenheit and humidity."*

And in Rio.

SECTION VIII.

Localising conditions continued, and farther specified—Value of pure air—Peculiar air of cities—How and when made impure—How much spoiled every day, and value of ventilation. Bad air spoils the water—How to procure it good—Bad water promotes intemperance—influence of cemeteries—ditto of privies, street filth, &c., &c.—How much of the air from these causes will kill a bird—a dog—a man—Best pavement—What best houses—effect of low empty lots—What is not miasm—What is—Drying power not cause of fever—Fundamental proposition—Effects must arise from adequate causes—Cause of yellow fever known—Parts of cities where always breaks out—Proofs—How spread—Exact value of spontaneous cases—

* Blair.

Several mentioned—What they prove—Prescription to produce yellow fever—The cause of yellow fever proved—Philosophical rule—Clear deduction—Practical value—Hope for New Orleans—Our duty–Value of truth in Medicine–Health first great object in government—Insalubrity of a city punishable offence.

Let us proceed to the second branch of the localising conditions in the production of yellow fever.

This subject would hardly admit of an array of facts, or attempt at argument in its support in the present enlightened and advanced state of society, had not some doubts been thrown upon it, and their influence impugned of late.—Indeed, in few things is the progressive march of the age we live in more strongly characterized, than in the efforts to improve the sanitary condition, by the removal of the filth and offals of society, as destructive to its welfare, as the effete and worn out parts and excretions of the human being is to it individually. The care bestowed on these objects is at once a test of high civilization and of personal refinement, and the performance of one of the very first duties of civil government, as highly conducive to the preservation of the health and lives of its citizens. The history of man proves this in every age and nation; and as attention to these indicates the progressive improvement of nations, so, their neglect, in a similar manner, is a conclusive proof of their decline. In no countries are these more eminently illustrated than in what we read in the history of the successive rise and decline of ancient and modern Egypt and Rome, in their several revolutions; and it is farther demonstrated most clearly, that with this blessing comes a higher tone of public and domestic morals—greater elevation of character—improvements in the comforts and enjoyments of life—and with them a greatly increased average duration of it.

Attention to sanitary measures a test of civilization and refinement.

At this enlightened day to believe in the existence of an effect without a cause, is to confess one's self an atheist. To express a conviction of the impossibility of man's altering or influencing his physical condition, and, of course, all its consequences, is to acknowledge one's self a fatalist. The Su-

Providence influences man through secondary causes.

preme Being acts upon and influences all conditions and circumstances on earth, *through the means of secondary causes.* These act by laws impressed on man's being throughout his existence, and there exists as surely *laws of disease* as there are *laws of health.* If a man infringes on the latter he falls under the influence of the former. In other words, in some climates—some circumstances and conditions in which man is placed, either willingly or unwillingly, knowingly or ignorantly, his health suffers as a *consequence.* If these are changed he regains his health. All *hygienic and sanitary* regulations, all *curative processes* are based upon these principles; without them we are *brutes*—nay worse—for many of them apply remedies to ailing conditions. Disease may be considered a *resulting* punishment for an infraction of the laws of health. In civilized communities, where life is highly valued, preventive or corrective laws are made, that this should be avoided, and special bodies are designated to point them out, and see them enforced, and to take care of the health of society, that the great mass are ignorant of; and these are called in our country "Boards of Health," "Health Departments," &c.

Illustrations.

The localising conditions consist of filth and impurities of all kinds, in the largest sense, constituting the great physical enemy of the well-being of man, as street and kitchen offal, the refuse of stores, the drainage of sugar and molasses hogsheads, of stables and vacheries, with deficient ventilation, slaughter-houses, soap, tallow and bone manufactories, privies, cemeteries, swamps, and the defective drainage of towns; it is concentrated in hospitals and crowded dwellings, where many diseases originate, and others cannot be cured without removal. It exists, to a proportionate extent, wherever there is a defect of domestic and personal cleanliness; in fine, *whatever impairs the purity of the air we breathe, the food we eat, or the water we drink.* They are all resolvable into the first, for it is through it mainly they obtain access to our aliment and drink, and through the lungs reach the source of all vitalization.

Filth the great enemy of health.

What it is.

It has been as truly as beautifully said,* that though we

* Girdlestone.

do not see the air, we feel it, and what is more, we breathe it. We live by breathing it, insomuch that it has been well said, that as plants are the children of the earth, so, men are plants of the air; our lungs being, as it were, roots ramified and expanded in our atmosphere; and this, in fact, is the chief avenue by which the filth and damp of towns that are not well drained and cleaned introduce their poison into the human constitution. The putrifying refuse, whether animal or vegetable, solid or liquid, becomes dissolved into various kinds of gas, all the more commingled with the common air as this is damp and warm. These principally constitute the special difference between the air of urban and rural districts. It is estimated that at least one-third of the life of civilized man and even much more in cities; (nay, if it was reversed, and say that more than two-thirds of our time) is spent in the confined and, to a certain extent, deteriorated atmosphere of houses and apartments, where there necessarily must exist defective ventilation, where the atmosphere has to be breathed over and over again, with all its organic matter running through every stage of decomposition, besides other sources of vitiation, surprise should no longer be felt that a city atmosphere abbreviates human life.

Indispensable nature of pure air.

Amount of time spent in the house.

There is a peculiar air hanging over and constituting that of large cities and all extensive aggregations of human beings or animated life. The more sensitive of our race easily perceive it. Asthmatics are sensible of it, on entering or leaving a city, —children—delicate females—convalescents—those in feeble health; indeed, it is experienced by most persons on leaving a close city atmosphere, and particularly if proceeding where one is exposed to the influence of sea air; and this is apparently independent of ventilation, for, although to the *windward* of it you are still sensible of the *city air*. When acting as Chief Health Officer at Vera Cruz, during the Mexican War, it became my duty (as Surgeon U. S. Army and Chief Health Officer) on one occasion, to visit a mariner on board a vessel that had arrived some hours before, and anchored some two or three

Peculiar air of cities.

miles from the port, to windward. I found it a case of yellow fever, which was then prevailing in Vera Cruz—the vessel having come from a healthy port. She had not communicated with the shore, except through her first officer; so neither the wind nor the officer could have communicated it. It is a curious and well known fact, that oil, thrown upon the waves, will pass to windward as well as to leeward. Such may have been the case in the instance just cited, although I would not wish to be understood to mean, that all ærial poisons are not more readily conveyed by the winds. Indeed, we know they are so. I only desire to express the opinion, that it depends upon a concentrated city atmosphere, which, under certain circumstances, no wind can dilute to innocuousness, it may become diffused by expansion, as the temperature is greater. This is experienced in all large cities; and in all, there are portions where this impure air exists to a much greater extent than in others. This is more eminently true of the Northern cities, where there is such a difference in elevation, dryness and ventilation, than here. Still, there are localities here where these differences exist to a notable degree, and which are the special hot-beds of pestilence wherever it exists, as in the neighborhood of St. Thomas, Madison and St. Mary streets, the triangle, about Gormley's Basin, some of the front streets of Lafayette, and finally, the Seventh Ward. These are damp, filthy, crowded and badly ventilated, and the results are such as should call forth the corrective influence of a paternal government. There is said to be a street in Charleston, never visited by yellow fever, on account of its great cleanliness; and there are healthy and sickly parts of all cities, as we shall by-and-bye point out. Now, it is evident, the nearer we make a city approach the condition of the rural districts, the nearer it will reach a state of salubrity. Our neighboring parishes had an average mortality, in 1850, of less than two per cent. The average for this city, for the last seven years, has been near seven per cent. The difference is seldom more than 40 per cent., according to the reliable investigations of vital staticians, (between town

It spreads everywhere.

Parts of cities most filthy, and therefore sickly.

Proofs.

Test of a city's insalubrity when it departs from that of its neighborhood, and shows it to be artificial.

and country), while here we find it more than 350 per cent. That this enormous difference proceeds from removable causes, will be shown hereafter. There are few cities but what would be ultimately depopulated, did they solely rely upon their own native population for increase, from the results of the concentration of their own filth and congenerous sources of vital degeneration. All, and especially sickly cities, owe more or less to immigration, their growth and progress. Hence, their special value to us, as important means for our advancement and prosperity.

Every time we breathe, and this is repeated about eighteen times per minute, we vitiate the air taken into the lungs, by retaining a portion of one of its constituent elements, which combines with our blood, refreshing and purifying it—rendering it fit for the purposes of life—whilst we return, the remainder, with an additional ingredient, quite unfit to be breathed over again, either by ourselves or any one else. Hence it follows, that were a person shut up in a small chamber, perfectly air tight, he could not live through a single day. Each individual in the course of the night, vitiates about three hundred cubic feet of atmospheric air, rendering it totally unsuitable for the purposes of respiration; and no room should be tenanted that does not furnish *at least* six hundred cubic feet of air to each individual occupant. The inspectors of prisons in England recommended not less than one thousand cubic feet for every prisoner, as being "essential to health and preservation." It is known, that a canary bird, suspended near the top of a curtained bedstead in which people have slept, will generally, owing to the impurity of the air, be found dead in the morning. And it is computed that the population of a crowded town, by the mere natural action of the lungs, in the course of twenty-four hours, vitiate a layer of air as large as the whole area inhabited, at least a yard in depth or thickness—to say nothing of the amount spoiled for all the purposes of respiration by fires and furnaces, lamps, candles, gas and all manner of deleterious manufactories. Indeed, were it not for the provi-

Amount of air required for respiration.

Size of rooms.

Amount of air vitiated in a crowded town per day.

dential arrangement, that the air thus vitiated by the lungs becomes at the same time heated, and is therefore always in motion to ascend, making way for fresh air to take its place, we should be in constant danger of suffocation whenever we were in a room without a draft, or in a town without a wind stirring. This shows us the importance of so constructing streets and courts as to make the most of the *natural movements* of the atmosphere in the climate in which the town is built. For instance, in this city, to obtain the most perfect ventilation of our streets and thoroughfares, during the summer and autumnal months—the most important period, when our salubrity is most liable to be influenced by bad air—the streets should, were it possible, run East and West and North and South, and always be at right angles, to prevent obstruction and permit perfect ventilation.*

Absolute necessity of ventilation.

How promote this.

These valuable reports are so full of important practical matter, and so applicable to our situation, that I am tempted to quote extensively from them. It is proved by them, "That the rate of sickness and mortality, of the working classes in their populous towns, is much greater than that of the same class in the country districts, and much greater than that of these classes in the same towns, where dwellings are better drained and better ventilated. It is proved, that the greater liability of the working classes to the most afflictive and painful disorders, does not arise from deficiency of food and clothing, but from their living, usually with no alternation, in narrow streets, confined courts, damp dwellings and close chambers, undrained, unventilated, uncleaned. It is proved, that they suffer most severely in those cases where they spend the day in crowded workshops, or where they live in cellars, or sleep in rooms on the ground floor, or in chambers that have no chimney place, or other vent for vitiated air. It is proved, that in such situations, the average duration of human life, is at least twenty years less than it otherwise might be; and that, during this curtailed period of existence,

Necessity of drainage.

Diseases not from defective food and clothing among the poor, but from crowding and filth.

Cost of removing filth but a small part of the annual cost to relieve,

* Vide Report General Board of Health of England,—and table of the Winds here.

the working power of those who live, is seriously diminished, and much more in their capacity for enjoyment, by a constant depression of spirits and health, and by the active attacks of fever, cholera, scrofula, and consumption. It is proved, that this excess of mortality falls most heavily—first, on the infantile portion of the community, and next, on the heads of families, between twenty and thirty years of age. It is proved that the burdens which are thrown by this excess of sickness and mortality on the poor's rates—to say nothing of infirmaries and dispensaries—of friendly societies and of private almsgiving, is such as to exceed the cost of effecting those improvements which would suffice to make the average health of the working classes nearly equal to that of the rest of the community. And it is further proved, that there is an incalculable amount of demoralization, attributable to the same causes, and that an effectual bar is thus put to the intellectual, moral, and religious improvement of this large portion of the community."

Resulting demoralization.

The influence of crowding, production of bad air, and the want of ventilation, is eminently illustrated on the crews of collier vessels on the Thames—although well fed, in the prime of life, confined at night and in bad weather to the narrow limits of the forecastle, the sickness and mortality is large. Such is the cause, also, mainly, of the immense mortality on board immigrant ships, crossing the Atlantic. In Northern latitudes they die of typhus and cholera; in tropical climates of yellow fever, and the mortality, everywhere, has been proved to bear a pretty accurate proportion to the closeness of the crowding. The deleterious agent, consisting of the effete excretions, has been proved, experimentally, to consist of highly putrescent organic matter, mingled with the expired air. That it is, when re-introduced into the living body, liable to be highly injurious, may be inferred from the fact of the careful provision made by nature for its incessant elimination from the system. That it is small in amount, is no objection to the intensity of its

The poison from crowding is organic matter as well as carbonic acid.

action; for to the physiologist it is well known, that a minute quantity of a powerful agent—the putrid matter introduced on the point of a needle, in the inspection of a dead body—a single drop of concentrated prussic acid, placed in the mouth of an animal, is sufficient to destroy life. It is in our crowded bed-rooms, in unventilated schools, upper dormitories, in overcharged wards of hospitals and jails, that this effete matter taints the air, and, entering the blood, poisons the system.* It has been before said, that this expired air consists of two ingredients—carbonic acid, which mixes with the atmosphere, on the principle of diffusion, whilst the other, being an animal excretion, no longer held in solution in the colder external air, is deposited and particularly clings to woolen articles or bedding—clothes which are well known to retain this offensive smell a long time. Hence the value of frequently airing these domestic articles.

Comparison of air with food.

In an examination before a committee of the House of Commons, the venerable Dr. Farr had occasion to state, the relative value of pure atmospheric air, as vital food to the grosser elements of bread, flesh and water, and said, most forcibly: "If a human being be deprived of these aliments, he dies in a period varying from eleven to nineteen days; but, if atmospheric air be excluded from his lungs, he dies in a minute; therefore, the relative value of atmospheric air to bread, flesh and water, is as fourteen days to one minute, and the *deterioration* of the atmosphere in which human beings are residing, produces a deleterious effect on life, in proportion to that deterioration."

Necessity of ventilation.

The necessity of *ventilation*, and the injurious effect of a stagnant state of the air, has been noticed as far back, by medical writers, as the time of Hippocrates. By reference to the Table of the "hygrometry of the winds," it will be seen, that while it is *calm*, that it is most replete and of course, with all that moisture can dissolve or hold in suspension, and that, consequently, active perflation is indispensable to purification. It is well known that where the wind blows freely and strongly, or finds no ob-

* Granger.

stacles from surrounding objects, localities, which otherwise might be expected to be fruitful sources of fever, may be visited or inhabited with impunity, while similar places become insalubrious if the air is stagnant.* "Calms," says Dr. Drake, "permit the exhalations from foul localities to accumulate in the atmosphere which rest over them; but all winds operate to disperse and dilute them with purer air." The late Professor Hallè, one of the magnates of the Medical School of Paris, in an able report on the condition of the river Bievre, near that city, pointed out the fact, that the pernicious effect of the fœtid exhalations issuing from the river, are harmless in situations, where the atmosphere circulates freely, and is renewed by strong and unimpeded currents. †

Organic matter always in air.

In the proceedings of the British Association, we find an interesting report by Dr. Smith, on the air and water of towns, which is too important, from its direct applicability to the subject before us, to pass over without culling a portion of its interesting matter. "If," says he, "air is passed through water, a certain amount of organic matter poured off from the lungs, is to be detected in it." By continuing this process for three months, Dr. Smith detected sulphuric acid, chlorine, and a substance resembling impure albumen. These substances are constantly being condensed upon cold bodies, and in a warm atmosphere, the albuminous matter very soon putrefies, and emits disagreeable odors; this is the ordinary smell of close rooms, producing offensiveness, when space is disproportioned to the number of occupants. Such was eminently the case last season, in yellow fever rooms, when not properly ventilated. By eramucausis, this substance gives rise to carbonic acid, ammonia, sulphuretted hydrogen, and probably to other gases. By collecting the moisture of a crowded room by means of cold glasses, and also dew, in the open air, it was proved that the former was thick and oily, capable of decomposition, and productive of animalcules, while the dew was beautifully clear and limpid. Large quantities of rain water have been examined by Dr. Smith, and

* La Roche. † La Roche.

he says: "I am now satisfied that dust comes down from the purest air, and that it is simply coal ashes." The rain water of Manchester is considerably harder than that of the neighboring hills. This can only arise from the ingredients obtained in the town atmosphere; but the most curious point is the fact, that organic matter *is never absent*, although the rain continues for several days. The state of the air is closely connected with that of the water; what the air contains, the water may absorb, and what the water has dissolved or absorbed, it may give out to the air. It was discovered that all organic matter in filtering through the soil, is very rapidly oxidized. The nitrates he found in the London water, prevent the formation of any vegetable matter, so that none can be detected, even by the microscope, after a long period. In summing up the results obtained; Dr. Smith remarked, that the pollution of the air in crowded rooms, is really owing to organic matter, and not merely to carbonic acid, that all the water of large towns contain organic matter; that water purifies itself from organic matter, in various ways, but principally by converting it into nitrates—that water can never stand long with advantage, unless on a large scale, and should be used when collected, or as soon as filtered.

Notwithstanding rains.

Water absorbs whatever air contains.

Water rapidly absorbs noxious gases, and is always injured when exposed to their influence. In this city the cisterns which usually furnish most of our drinking and cooking water are commonly placed in close proximity, in our narrow back yards, with the privy, bituminous coal, and all kitchen and house refuse, and sometimes becomes so much impaired in its purity as to be utterly unfit for use. Professor Hoffman has stated that such is the capacity of water that one thousand gallons of it will dissolve twenty-five gallons of nitrogen, one thousand gallons of carbonic acid, fifty thousand gallons of ammonia, the very gas which escapes so largely from privies, and the police filth of every dirty town, carrying with it vegetable and animal matters in a high state

Absorptive power of water.

* Grainger.

of putrescency. From hence it will be seen how important it is that the drinking water, and that used for domestic purposes, should be brought *underground* from the *rural districts* at a distance, and that the plan suggested on the erection of the British House of Parliament, to ventilate the building by the introduction of *air from the country*, was a very wise one.

Value of rain water if kept pure.

Experience has already shown that those who use rain water in preference to *any other*, and more especially, filtered river water, are much less subject to *cholera* when it prevails, than those who use any other kind of water, and of course, it follows in congenerous affections, as diarrhœa, dysentery, the bowel complaints of children, &c., indeed, experienced men are so well aware of this, as sometimes, to have the water *boiled*, they allow their sick in some delicate disturbances of the digestive organs, and keep it well corked for use. The effect of boiling it, is to purify it, by removing the noxious gases it contains, and for the deposit of its principal earthy materials. In large cities where the water is very apt to be impure, it can scarcely be used alone, hence the temptation to mix it with alcoholic beverages, giving grounds and furnishing temptation to intemperance, and it is a valid one. To support this holy cause then, and to keep up the healthy habit of drinking water alone, the water must be kept pure.

Moral and physical condition dependent on similar circumstances.

The real and true relation, between moral and physical degradation, is now beginning to be correctly appreciated under the improved sanitary states of all classes of society, and the important truth is being demonstrated, that the moral as well as the physical condition may be greatly ameliorated. Ministers of the law, as well as of religion are discovering that the scavenger and the architect are among their best allies.*

How food injured.

Food is injured by bad air, and more particularly by moisture, as flour and all the ceralia—meat by moulding, and speedy putrefaction, and salt food, as fish, pork, &c., by the salt attracting the moisture of the atmosphere, and liquifying. Sugar and molasses also attract moisture, and are injured by heat,

* Rogers.

ferment and become acescent, run off and impair the purity of the atmosphere, and thus all are injured by the climate, and add their mite to impair the general salubrity.

Injuries resulting from cemeteries.

There is probably no climate in America where the vicinage of *cemeteries* would and does do, so much damage to public health, as here.* Rapid and prolonged decay results from the great moisture of the climate, and comparatively small desiccative power. Burying, almost universally above ground, (in the cemeteries of the city) the mortar connecting the brick work soon splits, giving exit to injurious exhalations from the within decompositions. The force of the gases (and especially under the augmented temperature of summer, when they are most injurions) are often so very great as sometimes to burst the leaden coffins, (when made of it,) and always to escape through the pores of the wooden ones, and to split the metalic ones and the brick and plastered work of the vaults, contaminating the atmosphere for a great distance around. In no case then, if permitted in cities, should a dwelling be permitted nearer to these yards than several hundred paces, according to the frequency of interment.

How soon bodies decay.

The period in which the body is undergoing decomposition, varies according to its age and size, the season, and the more or less exposure and completeness of the tomb. The sextons inform me, that three to six months is an average period. Let it be longer or shorter, the process is constantly taking place, and any visitor to the grave-yards can easily satisfy himself that the confinement of the decomposing bodies is too imperfect for the safety of the community.

Number of bodies to the acre annually.

In those countries where tombs are not used, the body is disturbed for the repetition of the interment, before it shall have become indistinguishable from the soil. The amount of space recommended in countries more regardful of the public health than here is that there should not be much above one hundred burials annually in an acre of ground. In some of our cemeteries in and near the city, that do not embrace many acres, thousands are buried in every year.†

* See Map. † See Cemetery Report—Table G.

The following regulation, (introduced by Lord Palmerston,) which is in force in the burial grounds of London, is eminently applicable to those in this city, if they are to remain, and those without the city, that "no interment shall take place within ten yards of any part of the boundary of the city cemetery, and that the intervening space shall be planted with shrubs, evergreens and trees, in such a manner as shall promote the absorption of any deleterious emanations, and at the same time permit the circulation of the air. Also, that the cemetery shall be underdrained, so as to prevent the accumulation of water in the graves and vaults, and that no grave shall be opened until after a lapse of fifteen to twenty-four years, according to the age of the parties."

Regulations in London.

The sentiment now almost universally prevails, that intra-mural interments should be forbidden, as no less inconsistent with due respect to the remains of the dead, than with a safe regard to the health of the living; and that, as perfectly compatible with both, the beautiful custom, so full of delicacy and taste, so accordant with some of our most sacred feelings, should be encouraged, of erecting rural cemeteries, on spots retired, and distant from the busy hum of human intercourse that the holy feelings due to the last remains of our kindred and fellow-citizens should not be obtruded on by either levity or business, but be in harmonious association with that beautiful kingdom that God has made for our comfort and enjoyment.

Intra-mural interments substituted in rural cemeteries.

Probably, there is no cause so productive of bad air, and so difficult to be gotten rid of here, as NIGHT SOIL and *street and back yard filth.* It is *the great difficulty* everywhere. In this city, we are peculiarly situated in regard to both; we cannot dig pits of more than two feet anywhere without coming to water, and in the back parts of the city, to half that distance, this being dependent mostly upon the amount of rain recently fallen, not on the height of the river, as supposed. This makes it the worse, as in the summer season most rain falls, and the evolution of the gases greatest and most injurious. Hence, open pits (as night soil is lighter

than water, and is always on the surface, giving its noxious gases to the atmosphere) are not applicable to our position; and street filth is not required for manure in our fine alluvial soil. If we reflect for one moment upon the offensive fact, that near five thousand six hundred tons of night soil, and about fifty thousand tons of urine are exposed here aunually, to undergo the process of fermentation and decomposition, exhaling their noxious and poisonous gases to the atmosphere we breathe, and absorbed by the water we drink, contaminating our most private recesses, (for there they are generally located,) where the air being mostly stagnant, it is apt to remain permanently. The amount of manure from domestic animals, of kitchen offal, is at least as much more—of more than five thousand bodies, buried within the city limits—of street and gutter filth, constantly undergoing decomposition—with its frequent *upturning and spread upon the streets*, (not *immediately* removed, however, as it should be,) by the scavengers—probably, four times as much more. Then, we have the frightful aggregate of upwards of three hundred thousand tons, the larger part of it of organic decomposed and decomposable matter, submitted to the putrefactive fermentation every year, under our very noses, besides that from gas works, tallow and soap chandleries, &c., &c., in an area of seven and a quarter square miles, together with the baneful influence in almost every direction, of swamps uncovered and covered by forest growth, and all this in a temperature which, for nine months in the year averages 73°.31, while there is an average humidity during that period of .820, or within .179 of actual saturation! This is bad enough if it cannot be remedied, and too bad if it can!

Amount of filth exposed to constantly, and to be disposed of.

The area of the city temperature and moisture.

On investigation by the General Board of Health of England, on the influence of *livery stables and vacheries*, they were found to be so injurious as to be denominated "fever nests," and so pernicious even to their own tenants (cattle) that the manure was ordered to be kept in covered receptacles; and in relation to slaughter-houses, they were found not only injurious to health, and offensive to sight and smell, but the poisonous atmosphere

was even found to injure the quality of the meat, disposing it to taint, and promoting its rapid putrefaction. In some of these houses, the meat would scarcely keep sweet thirty hours, and such I have found to be, on inquiry, a general fact here.

The special gases, the principal effluvia eliminated from privies and the other sources of vitiation just mentioned, is known to be composed, mainly of sulphuretted hydrogen and ammonia, and experimental physiology* has shown that one cubic inch of this gas, in 1500 cubic inches of air, will kill a *bird*, and one cubic inch in 800, will kill a *dog*, and that a *man* cannot live, where the air he inspires is impregnated with a 300th part, and suffers in a corresponding degree when a less proportion of these poisonous gases exist. Matteuci informs us, that sulphuretted hydrogen is the only body, which, having acted on the blood, even in very small quantities, renders this fluid incapable of being arterialized by oxygen.

Amount of this gas to poison a bird.

A dog.

A man.

Streets, as a source of disease, are much dependant upon the qualities of the soil of which they are composed. If sandy, although to the eye, cleaner, they *absorb and retain* all the filthy materials of a liquid nature, that falls upon them, until an elevated temperature gives them back to the surface, in the more, and indeed, only poisonous condition of an æriform compound: this, it is well known, constitutes the most dangerous ballast of ships, and it is from this cause. The "cleanliness" of such streets, is illusive—deceiving, by appearances, their vicious deposits—*concealed, not destroyed.* Streets of clayey materials and partly of sand and vegetable mould, such as compose our streets, whose absorbent power is less, retain, on the irregularities of the surface, what is not absorbed or passed off, and exhale it to the atmosphere, keeping up a high degree of saturation, with it in solution.

Streets as a source of disease.

What good and bad.

Houses, in a climate like ours, should be so constructed as to promote the maximum of ventilation and the minimum of moisture and temperature. Where these are not fulfilled, with a proper protection from the inclemencies of the weather, (hot

Houses.

* Thenard & Dupuytren.

How to be constructed.

and cold) they fail in their objects. The admission of light, too, is important in the construction of a dwelling, to the enjoyment of health and the prevention of disease. It renders disease milder when it occurs, and makes it more readily amenable to medical and other treatment. There is reputable medical testimony to prove, that some diseases, in dark alleys and cellars cannot be cured, without it. Dark corners and places in dwellings are always the hiding places of dirt and filth, and particularly in the habitations of the poor.

Empty lots as a source of disease.

Our *empty squares and half filled lots*, are pregnant sources of disease. These require as much, or more, attention than streets, as they *are eight or ten times* more extensive and more replete with every kind of filth. Often, in secluded, unventilated spots, they constitute so many receptacles and fountains for the evolution of that poisonous material that is so fatal to the public health. Hence then, the vigilance of the authorities is ten-fold more required *there*, than in the streets, where so much negligence takes place before the very eyes of the community. Little is done (while they are neglected) to purify the atmosphere, if these efforts, limited and spasmodic as they are, shall be confined to the streets, if they should be left to private apathy and indifference.

The true miasm is whatever impairs the purity of the air.

The various hypotheses based upon the supposition of a *specific* something, which is denominated MIASM, eliminated by the decomposition of organic matter has been shown to be so utterly untenable by its several opponents respectively, of any *one thing* possessing this multifarious and mighty power, that we have for many years abandoned the whole as untenable, and that of the "drying power," among the rest, which, having nothing definite in the form of reasonable experiment to support it, or rather in defiance of it, and in the very face of experiments which utterly disprove it, that I have long come to the conclusion that there is no such *specific agent*, but believe them all right and all wrong, when exclusive, and that *whatever impairs the purity of the atmosphere is pro tanto*, for the time being, *the miasm*, or rather the *mal-aria*. In a practical report,

such as the present is intended to be, it is no place to offer the the explanations which have satisfied my mind in relation to what is called the "*laws of miasm.*" We profess to deal with well established and incontrovertible facts and to make them the basis of all our suggestions for future improvement; we may, nevertheless, be pardoned if we find it requisite *for necessary explanation*, to exercise the privileges belonging to the first advance in science, and brush away the cobwebs, and show what this alledged cause *is not.* We then proceed to show that the explanation which they have attempted, in relation to the *disturbance of the soil*, is utterly irreconcilable with the facts, and *it is for that purpose* that we depart from the purpose laid down for our guidance in this paper.

Supposed cause of fevers.

The cause of this influence, indeed the cause of all what is called *malarious* fevers, (bilious and yellow fevers inclusive) has been ascribed to "the *drying process*" in soils recently or not long since saturated with water, without direct proof, with no allegation of experiments, and with no other evidence than that there "has been a hot sun and preceding moisture." Now, I might content myself in stating, that the hygrometer is the only recognized suffcient test of the existence of this "*drying power*," *and the amount of moisture in the atmosphere*, and there is neither allegation or evidence that this has been used. That when these injurious influences take place in the *highest degree*, *the drying power is at its minimum*, and that the moisture is usually then at its maximum; the meteorological tables accompanying this Report, show this in a most conclusive manner.

No proof.

Explanation of Dr. Ferguson's hypothesis.

The main ground furnished by Dr. Ferguson, who is the author of the hypothesis, is, that during the period of a great drought in the hilly districts of Spain, the streams were dried up, and the British troops were encamped in their beds and hollows, (I quote from memory,) and so fatal was the fever resulting, that all Europe thought they were annihilated! To experienced Southern physicians it is well known that there are *no places* so fatal to health as these beds and similar apparently *dry hollows and their outlets*, and that it is in proportion to their insulation from ventilation, and that it consists of a stagnant,

damp and poisonous air; that it was this that was so fatal to the British army, and not the drying process. There is no doubt that if the Dr. had experimented with the hygrometer it would have informed him that the air was *saturated with moisture* during the greater part of every night, and that if he had dug into the beds of the late streams he would have found water not far distant.

Solution required for absorption into the system.

All the theories of miasm singularly fail, in attempting to prove too much. A specific miasm, eliminated by decomposition out of organic matter, must and should, as is alledged, produce disease under all circumstances; so far as lining the lungs it is composed of organic matter, passing the most delicate membranes into the system, is deemed utterly incompatible with that demonstration made by our able colleague,* viz: that nothing can pass through those membranes *unless in a state of solution*, in which state the organic character must be lost! the physiological condition of the individual, and the existing meteorological state being entirely out of the question.

Why it can't be the "drying power."

The advocates, however, of the influence of the "drying power," do not so interpret the modus operandi of their agent, nor present us the philosophy of it. Malignant fever is most apt to seize an individual about daybreak. This is supposed to be owing to an alledged great fall in the thermometer at that time, instead of ascribing it to a change in the *physiological condition of the individual then always occurring*. The most frequent hours for the attack of malignant disease (yellow fever, cholera, plague, &c.) being after midnight, or early morning hours, *being precisely those periods* known from statistical investigations, as most fatal to human life, or when it is most apt to terminate, three to six. The real difference between bed-time and day-break is only three to four degrees, by *actual observation*, and this, too, is always a *gradual, regular decline*. Now, if it is due to any meteorological condition, it is to the hygrometer, for I have often noted a difference of half a degree in the temperature of evaporation between day-break, my usual time of making it,

So from a physiological cause, or hygrometric.

*Prof. Riddell.

and half an hour to an hour before; that it is that much *lower;* the evaporating power is that much greater; that it rises at daybreak; while I can perceive no difference in the dry bulb thermometer, placed by its side. Again, a fall, a moral emotion, anything that suddenly shocks the nervous system, and particularly, during the existence of a mortal epidemic, produces the development of the disease, although, but for this, no such occurrence would probably have happened. The "drying power" is most active at midday, and is at its minimum at night, when the air is almost saturated with moisture, and often entirely so in sickly seasons, as during our epidemic last season, yet, yellow fever, as well as the whole zymotic class, is very apt to occur at this time, and in seasons and regions where this exists in the greatest degree, is precisely there where they are most rife, and where the *drying power is greatest, and the air elastic, is just those where there is most health!* During the greatest droughts, there is always a provision of nature in the subsoil for the necessary supply of moisture, as well as in the atmosphere. The term is but one of comparison; were there *no moisture* existing at the time, vegetable as well as animal life must cease. I have often noted, during what was called great droughts, the air, at my morning observation, *saturated with moisture*, and during the "dry season," on the elevated plateaux of Mexico, I have seen the dews so heavy as to wet the road half an inch or more in depth, which at first I attributed to rains during the night, and many a time have I descended from my horse at daybreak to examine it. The country is rarely sickly when simply dry. The driest portions of the Southwestern States are the healthiest, as may be seen by reference to the maps I have constructed of those States, derived from the mortuary returns of the last census, and published in the fifth volume of the Transactions of the Am. Med. Ass. Pensacola, Mobile, Bay St. Louis are dry more in appearance than in reality.* Their absorbent soils permit a percolation of water to the clayey subsoil, but a few feet below, beyond which

Always moisture in the atmosphere.

Absorbant soils only apparently cleanly.

*I have tried for years, in vain, to procure a record of their hygrometrical condition.

it cannot proceed, and it then becomes a reservoir for an evaporating temperature, whenever this occurs. That this is reasonable, is demonstrable from what we know of subsoil moisture under a high temperature. I know it further from my own experiments. That this was the case at the disastrous encampment at Walcheren, where the moisture could be easily reached by thrusting a walking cane into the sand, and the notoriously fatal spot opposite Lisbon is as remarkable for its luxuriant mushrooms as for its mortality, and we very well know that these flourish only in very moist situations. The periods and places of the occurrence of the epidemic of last year, as traced out in Prof. Blodget's interesting communication, showed most conclusively, that the epidemic, only broke out as the country became moist, that as long as it continued dry, whatever was the temperature, and it was very elevated, health remained; and finally, what is better established, from long and well attested experience, than that one of the most prolific sources of foul air and bad smell in ships, has been the putrescent matters absorbed and retained by gravel, sand and other earthy substances used for ballast, and that however apparently clean ships are kept by washing, they are never as healthy as when this process is effected by dry rubbing by the "holy stone," as it is called. The "drying process" always exists in the proverbially healthy occupation of ploughing, which is only injurious during the *first* process or year of exposure. The simoon is a *drying blast.* It sucks up our fluids, and desiccates everything it reaches, but it has never been accused, so far as I have heard, of producing *fever*, much less *yellow fever.* Nevertheless, I so far agree with these gentlemen as to ascribe much influence to the drying power in the production of influenza, pneumonia, catarrh, rheumatism, and even *cholera*, &c., but so far as my experience and researches have gone, not bilious or yellow fevers, and these experiments have extended over many years and climates, and during the worst fevers known in the South.

Conceals, not destroys filth.

Healthy as long as dry.

Let us repeat, then, our conviction, that *no one agent* produces what is termed malarial fevers, but that they depend

for their existence upon *the two-fold condition* expressed in the former part of this Report.

A two-fold condition requisite.

A fundamental proposition, an imposing truism of sanitary science, is, that every effect springs from some adequate and commensurate cause. This is a law of nature, as applicable to disease as to anything else. No disease can arise and pervade a country, or section of country, or even attack a single individual, without being due to some atmospheric, local or personal cause, the discovery and extirpation of which will at once arrest its further diffusion. The curative physician seeks for the causes of disease, for the purpose of more thoroughly comprehending their mode of action upon the human economy* in order to apply the proper remedy. The sanitary reformer pushes his inquiries into the "field of causation," for the purpose of *preventing* those ills which it is the province of the other to palliate or *cure*. The one endeavors to ameliorate the ills to which individuals at present prove subject, while the other has a far nobler, and philanthropic object, to prevent the ills to which whole communities are subject.

No effect can arise but from an adequate cause.

Difference of curative and preventive science.

If, in the present state of this interesting inquiry into general and special causes, we find certain effects invariably to follow, and in the same relation, it requires no great sagacity to ascribe the one to the other; nor any rare gift of prophecy, to foretell that, on the occurrence of the one, we may reasonably expect the other. Such are the circumstances that characterize the occurrence of yellow fever in this climate, the *invariable sequence* to *extensive* disturbance of the original soil, with the atmospheric and local conditions to be pointed out in more detail presently. There are many diseases with whose causes we are utterly ignorant, at present, but with which we shall doubtless become acquainted hereafter in proportion as we acquire a more accurate and minute acquaintance with the laws and constitution of the atmosphere of the climate we live in, and with the physiology of organic

Cause and consequence.

Must be a cause for every disease.

*Rodgers.

life. It is thus with leprosy, elephantisis, syphilis, and most of those now recognized as due to specific poisons. In relation to epideme cholera, we may be ignorant of its precise cause, but in the progresss of a study of the conditions which influence it, we will become acquainted with the accessory, preventible and instigating local circumstances which *influence* it, the localising circumstances that are *under our control.* So of yellow fever; the *exact* amount of causation, either local or general, the *sine qua non*, to its production, we can scarcely measure, from defect of accurate and precise observation; yet I am most fully impressed with the conviction that we are sufficiently acquainted with its ordinary causes to *prevent it*, which is the only valuable or practical part worth knowing. If we can control these then, we shall be exempt from this terrible scourge. It is particularly here that false facts and imperfect information have done so much injury, and thrown a cloud upon the subject it is so difficult to dispel. If then, we can clearly prove the *places, the very spots and parts of cities* that are the favorite haunts, *nidus, birth-place and field of growth of this disease, if with increase of the alledged cause, the effect is in proportion multiplied, if with its limitation the effect is also limited,* and if with this removed the effects also cease it will go far to show, not only the *cause* of the disease itself, but of its *preventives*, and will prove a valuable lesson to us, worth all the theories and hypotheses of visionary dreamers from the time of Paracelsus to the present day. A careful inquiry into the facts will I trust, satisfy all fair minds that the common sense of mankind has not been mistaken in attributing the prevalence of this disease to the causes mentioned, not only here but abroad. The record presented in the Chart, ought, I humbly conceive, convince all. The Sanitary Map of the city will show the influence of these localising conditions. No city that we are acquainted with but has these infected spots. The main peculiarities which distinguish them, are filth of every kind, moisture, stagnant air, heat, and a crowded population, aided by the

And as much of that of epidemic yellow fever as any other.

Because we can trace its origin and the causes producing it.

accessory circumstances of intemperance and bad habits. They are usually situated in those parts of cities where filth is most apt to accumulate. In Northern cities, with a declivity to the river, or part about the wharves, as in the neighborhood of "Fort Hill," as it is called, in Boston, has been its hot-bed there from time immemorial; so about the "slips" and wharves and docks in New York, Philadelphia and Baltimore, where are the egresses of their filthy sewers—the concentration of all the polluting detritus of these cities. And so of the "infected districts in Norfolk, which is confined to a space of two or three hundred yards, and mostly made ground." And so of the most parts of Charleston and Savannah. In New Orleans it is not limited, as it is in them, to these localities. It, however, exists here on the river bank, because at this season (August and September) the river is low and the bank exposed, leaving an extensive surface—the common receptacle of all kinds of filth—and here, or not far distant, we find the large amount of unacclimated population; but it first breaks out and spreads in St. Thomas and Madison streets, St. Mary street, about the Markets, at the triangle, Gormley's Basin, &c. &c., (see map, as before mentioned)—*all filthy, crowded and badly ventilated localities.* These are plague spots—they exist in all cities that are badly policed—the sores first fester and mature here, and the bad air or virus is generated and multiplied as the season advances—extends to the neighborhood, and if it meet with a congenial atmosphere, throughout the city—and from an endemic of a locality, it becomes, with concurring causes, a wide spread epidemic. If otherwise, if a more dry or less impure air is met with—if more attention has been paid to sanitary measures—it is more limited, and its progress can sometimes be measured as to its surface, extent and even height, day by day. Such has been the result of experience in New York, and measurably in Philadelphia, and the "infected district" can be and has been "fenced out," and its gradual extension actually calculated as so many feet per day. This cannot be

Seats of these causes in all large cities.

Why limited.

And how extended.

shown here for two reasons: 1st, because these conditions themselves are always more or less combined and extensive; and 2d, the presence of an unacclimated population would prevent its being so clearly shown. It exists in the air—it is the consequence of the causes mentioned—it is the poisoned, infected atmosphere, and not individual—not contagion. A person taking it in the infected spot, and going into a pure atmosphere, has never been known to extend it. If it is taken to a congenial atmosphere, it contributes to its further extension. In this city and in the country during the last year, there existed an epidemic influence (as formerly explained); the congenial atmosphere was nearly everywhere, more or less aggravated by localising circumstances, and the disease spread extensively, and more particularly where those localising conditions existed in excess, (as above mentioned.) This was the case, too, at Algiers, where the disease has not extensively prevailed many years, (although only across the river), produced by extensive disturbance of the soil, for railroad purposes, and followed by a large mortality throughout the village. These localising conditions existed, probably, *everywhere*. Many of them have been mentioned in a former page. For the sake of the verity of history, and for the inestimable value they promise for the future, a full and scrutinizing investigation should extend over the entire region that was reached by this disastrous epidemic, that *all* the facts be collected and recorded, and promptly, too, before oblivious memories and fabulous statements shall bring to doubt the real features, and the authentic history of this remarkable year be lost, and we realize, in after times, as opposite and parallel to most those in Carpenter's work on the yellow fever of this country—mostly made up of a tissue of statements, both at home and abroad—that have been exposed and refuted over and over again—many of which are personally known to me to be without any real foundation, of which I had made record at the time of their occurrence. It has been also proved from the embarrassment the Commis-

Statements to be of future value should be made up at once.

sion has met with in eviscerating the real facts, even from the more recent transactions of last summer.

Nor is the rocky post of Gibraltar an exception to the requirement of a localising condition from filth, &c., for the production of yellow fever. Although it has the appearance of great cleanliness without, as all military stations have, yet within, the houses are admitted to be, and are notorious for their filth, crowdedness, and want of ventilation, and even the disturbance of the earth in the vicinity, has been noticed to have had a most injurious influence on the public health. "Two successive epidemics of yellow fever, namely those of 1804 and 1813, broke out in the same spot, the dirtiest in Gibraltar, Boyd's buildings, and the epidemic of 1814 broke out at Cavellero's buildings, a place which competed with Boyd's in its state of filth and pollution." "Whenever," says Mr. Armil, "the epidemic breaks out in Gibraltar, it has always commenced in the filthiest spot and this was the case in the late visitation." The same facts have been demonstrated by the best authority, to exist at Barbadoes, Jamaica, and other parts of the West Indies, at Demarara, &c.

Gibraltar very filthy within the houses, and crowded.

The city of Havana is situated on a closed bay of six or eight miles in circumference, land-locked on every side with lofty hills, with the exception of one narrow outlet to the sea, at the North, with marshes about the estuaries of the several small streams that empty into it, bringing the organic detritus of the surrounding country, mixing its fresh with the salt water of the ocean, occupying near two-thirds of the marginal circumference of the bay.

Bay of Havana.

This bay receives all the filth of a city containing near two hundred thousand inhabitants—is in many places very shallow, exposing, at low tide, (the tide here being three to four feet) extensive surface, with all kinds of putrefiable materials, to the sun. The water of the bay is often very offensive. All vessels pump their bilge water into it. It cannot be changed; it is so full of decomposing materials that the British naval service has a standing order not to use the water for any purpose on board their ships of war. From experiments made with it, it putrefies

Causes

Of the insalubrity of the city.

on standing a *single* day, while sea water taken at a distance of fifty leagues from land, requires *three* days. The streets of the city proper are very narrow, (about twelve feet wide,) and very badly ventilated, from being irregular, and very crooked, and there is a high wall still further obstructing it. The habits of the mass of the people are of the very worst description, and from the high price of food of every kind, (from the heavy tariff imposition of a despotic government,) the mode of living is wretched in the extreme. That yellow fever should exist here every year, is not at all astonishing, with a high temperature and great moisture. It has even been contemplated to make another avenue to the sea, so as to produce a current and occasional change of water in the bay, which would prove a most salutary measure.

Description of Vera Cruz.

Vera Cruz, although built upon a sandy plain, is but a few feet above the level of the sea. The wells are from six to eight feet deep. There are extensive swamps and low grounds around it, emptying their sluggish currents into the sea, under its very walls; impairing its qualities so much, that, together with the filth of the city, which is emptied into it, it is in the same condition as that noticed above in the bay of Havana, and during the rainy season (the sickly season) ponds are formed in other directions outside the walls. These are about fifteen feet high, and materially obstruct the ventilation of the city, and have been found to be so injurious to the public health, that I deemed it an act of duty to solicit its removal to windward or seaward, so as to permit perflation from that quarter during the summer season (of 1847.)

Cause of its unhealthiness.

The habits of the lower orders are extremely filthy, and the public quarters and forts, when taken possession of by the American army, could not be exceeded in filth. That this should be a chosen seat for the yellow fever is not at all astonishing. I possess the official records to show its influence on the denizens, and on the Mexican army for a number of years, which I will state in another page when I come to show the influence of sanitary measures on sickly cities.—

Let it suffice now to say that it has fully earned the reputation of being one of the most sickly cities in the yellow fever region.*

I state, then, as a universal fact, with the *exceptio probat regulam*, that filth of every kind, with heat and moisture, with sufficient duration, produces yellow fever. The records upon the subject are so affluent, they absolutely so crowd the historiesof the disease, that it is really embarrassing to select from them, and many volumes would not suffice to trace and embody them. Cause of yellow fever.

Finally, and to leave not a doubt upon the subject, if we can produce instances of the presence of yellow fever, where there has been *no possible intercourse or communication from abroad*, or from any *extraneous sources* whatever, as far as human scrutiny could ascertain, should not the most skeptical yield up their doubts, provided we can satisfactorily ascertain and point out the existence of the causes and conditions I have alledged. It is through such demonstration that we reach and develop the important and impressive truth, that in the concentrated filth which localises it within the geographical limits of its range, (though it has been sometimes assumed to have had a foreign origin,) we present

* The causes productive of yellow fever, are so thoroughly understood by all those who have practiced much, and long, in tropical regions, it is so well defined and so accurately known, that even a prescription is furnished by them, for its sure and rapid production, it is as follows:

"Take, of soldiers newly arrived in the West Indies, any number; place them in barracks in a low wet situation, or in the mouth of a gully, over the brink of a dry river, or on the summit of a mountain, and to leeward of a swamp, or of uncleared ground, and where there is no water, or only bad water; give them, each, twenty-two inches of wall in their barrack rooms; let their barracks be built of boards, or lath andplaster, and have neither galleries nor jalousied windows, but close window shutters, and a hole or cellar under the flooring for containing mud or stagnant water, and holes inthe roof for the admission of rain, the windows only fourteen inches from the floor, so that they may be obliged to sleep in the draught of air; let them have drill every morning on wet ground, and when fasting; guard mounting and all kinds of fatigue not in the morning or evening, but during the hottest time of the day; when on sentry, no shade to keep off the direct rays of the sun; bad bread, putrid meat, few vegetables, plenty of new rum, especially in the morning; discipline enforced by terror and punishment, not by reward and promotion; an hospital similar to the barrack room, without offices, always crowded, plentifully supplied with rum, scantily with water; a firm belief in the doctrine of contagion, and a horror of approaching any person affected with yellow fever. Let these directions be attended to in Trinidad, or even in Barbadoes, [and he might have added New Orleans,] and especially when the air is stagnant, or charged with noxious vapors, subsequently to long droughts, the soldiers will soon die, some of them with yellow fever, some of them with black vomit, and those first in the rooms where these directions have been *most faithfully observed*." Prescription to produce yellow fever!

This recipe is eminently applicable to New Orleans, and will ever produce the results, as long as it is so "*faithfully followed*."

Great value of the spontaneous cases.

Settles the subject.

the *spontaneous cases*, where nothing of this kind *was possible*, where the only agents known to be present, were a combination of filth or decomposable materials, or disturbance of soil, (their equivalents,) with the meteorological conditions; an epidemic atmosphere! It is precisely here, then, where it was impossible to arise from any other source. The cases presented by Dr. Benedict, of this city, as occurring in a secluded spot in the interior of the country, about a mile and a quarter back of *Hollywood*, are exactly of this character. This intelligent and observing physician, with no theories to support, but with a fine talent for scrutinizing observation, here accidentally pitches upon no less than seven unequivocally *spontaneous cases*, and after the most diligent inquiry, finds that it was *impossible* they could have arisen from any imported or extraneous source; and here he discovers every condition that he afterwards learned that I deemed important for the spontaneous occurrence of epidemic yellow fever, viz: disturbance of soil, unusual humidity, (great rains and heavy destructive mildew,) elevated temperature, great radiation, (that is, great and distressing difference between temperatures of sun and shade,) and cold nights, ultimately*. These are valuable proofs of my position, conclusive to science, and valuable to humanity.

At Hollywood.

Hardly less valuable and corroborative, were the cases occurring at *Gainesville*. Here the cases were clearly *spontaneous*, without any possible origin, (either personal or through goods,) but from the soil, as mentioned in another page, high temperature, intense radiation, epidemic atmosphere, fruit rotting extensively and prematurely, native cows dying without obvious cause.†

At Gainesville.

Do. in Washington.

Dr. Kittridge, the respectable member of the Legislature from *Washington*, states to me, unequivocally, that when the yellow fever first occurred on his plantation, there was not another case of it within fifty miles, and that it arose soon after his extensive yard was spread entirely over (in order

* See his interesting paper. † See Mr. Fulsom's report.

to raise and level it,) with fresh earth from the neighborhood. (This was mentioned in a preceding page, for another purpose.)

The case of Mrs. Selby, the wife of Judge Selby, of *Lake Providence*, breaking out in a remote part of the town, without possible intercourse with any one. At Lake Providence.

At Trenton, it originated spontaneously, from the causes mentioned; several families struck with it at the same time, in different parts of the village. Trenton.

In the town of *Franklin*, in this State, the disease both spontaneously originated and terminated in it, with no sufficient evidence of its importation, and no local cause assigned for its origin. In Franklin.

The case of the "*Black Warrior*," in *Mobile Bay*, affords another striking instance of its spontaneous occurrence, in an epidemic atmosphere.* The first *Mobile cases* clearly appear to have originated in the neighborhood, where there had been considerable excavations for railroad purposes, and the spreading of it to fill up low lots. (For details I refer to Dr. Levert's valuable paper.) Black Warrior. At Mobile.

The eruption of the fever at *Selma*, was clearly due to the same cause, and is in precise parallel with the earlier cases at Mobile; excavations—cutting down embankments and spreading the fresh earth on the streets and low lots exposed to the intensity of a scorching midsummer's sun. Dr. Mabry, in his interesting paper, clearly and unquestionably shows that the fever originated from these causes. Selma.

"At *Demopolis*, Ala., same *spontaneous cases occurred*, being insulated and at a distance, and having no intercourse whatever with the case of fever existing;" "nor were the nurses more liable than other people."† Demopolis.

At *Saluria*, Texas, spontaneous cases occurred, without even the suspicion of communicated infection. ‡ Saluria.

At *Port Gibson*, the same thing occurred, where no possible communication with the sick could have occurred. § Port Gibson.

* Dr. Benedict. † Drs. Ruffin and Ashe. ‡ J. H. Brown. § Dr. Wharton.

Baton Rouge.

"At *Baton Rouge*, a number of cases occurred without intercourse, or suspicion of it, with other cases, on the river bank under the bluff." *

Centreville.

At *Centreville*, La., the first case spontaneously occurred in a mulatto, sleeping near an extensive rotting bank of chips, &c. Wind blew steadily over this bank on the village, and the disease progressed. †

Natchitoches.

At *Natchitoches*, the two first cases evidently spontaneous. ‡

Washington.

At *Washington*, La., the three first cases had not been exposed to yellow fever. §

Martinique.

In *Martinique*, W. I., "yellow fever always developed spontaneously." ‖

Bermuda.

In *Bermuda*, the spontaneous occurrence from local causes was equally satisfactory: an old hulk, that was very offensive. ¶

Barbadoes.

From direct information, which the Commission has received from *Barbadoes*, the first case clearly originated in a native, having a pretty stagnant gutter at his door, from decomposed animal matter from a slaughter-house and a piggery in his yard; he died of black vomit." In fifteen days the disease broke out near a crowded church yard in a low situation—here four died in one house—it was confined to this locality for some time, but finally spread over the island." The majority attacked were natives. **

Rio Janeiro.

At *Rio Janeiro*, the yellow fever "broke out in a particularly offensive spot—low, crowded, ill ventilated lodging houses;" abundant sources for it in low, flat grounds, in filthy, ill drained streets, frequently turned up to dry, the neglected receptacles of all kinds of impurities, *in conjunction with atmospheric changes.*"

Local spontaneous origin from filth, &c.

"The city is situated on a bay, nearly land-locked, with little tide—sandy and occasionally clayey soil, night soil thrown every night into the bay, and becomes very offensive from the flux and reflux of the tide." The first cases were clearly of *spontaneous and local* origin—the first, in one of the above described boarding-houses, a Danish sailor, direct from Finland, and the second belonging to a vessel that had come from Bahia, which

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* Geo. A. Pike and Judge Carrigan. † Dr W. B Wood. ‡ Dr. Crocheron. § Dr. T. A Cooke. ‖ From a communication from Dr. Amic, Doctor-in-Chief, to the Sanitary Commission. ¶ From printed testimony from Bermuda. ** Dr. Sinclair.

at the time was healthy, and no others of the crew fell sick, and the next ten or fifteen cases were all from this filthy neighborhood."*

But there are other evidences of its spontaneous origin here, no less satisfactory. "Several masters of vessels, without being questioned, declared that they entered the harbor with the fever on board, although coming direct from Europe; that as soon as they approached the coast and came within the influence of the breezes from shore, their men fell sick with fever."† And several vessels are mentioned whose crews took the disease soon after arriving in port, without intercourse with the shore.

Spontaneous occurrence at sea.

Do. on arrival in port.

"Many persons in the country around Rio, caught the fever, though they had no communication, direct or indirect, with the sick,‡ being evidently—as in the case of the shipping—within the influence of the epidemic atmosphere. While those farthest off were not so influenced, and the disease carried among them, did not extend."

"It is a curious circumstance, and may perhaps tend to elucidate the origin of yellow fever in Brazil, without having recourse to a specific source of infection; that for the few years previous the fevers of the country, evidently not infectious, but of high temperature or marsh origin, have clearly been changing their characters. The genuine remittent has been but little seen for the last three years. In 1847, '48, and '49, it was replaced by a fever of its own class, popularly known by the name of polka, but, in reality, a remittent, and during the present year (1850) it has been replaced by the yellow fever—a disease, also with similar features.§

Change of type appear from change of climate.

Nearly every one of the Inspectors General of Hospitals, of England, in the West Indies, admit yellow fever to be of *local origin;* and Dr. Rush most feelingly and eloquently recounts and laments the different opinion, he, at an early period entertained of its contagiousness, and died firm in the conviction of its domestic origin.

Opinions of Inspectors General of Hospitals.

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* Dr. Pennell. † Dr. Pennell. ‡ Ditto. § Do., and report to Sanitary Commission, by Dr. Pennell, through U. S. Consul, R.G. Scott, Esq.)

The spontaneous occurrence of this disease in ships from Northern climates, as soon as they have reached a tropical latitude, having foul holds, are numerous and entirely reliable. Holds of ships are worse than cellars, (proverbially unhealthy as these are, when damp and filthy,) for they have the deleterious addition of bilge water, in slight motion, with refuse of every kind, concentrated in an elevated temperature of stagnant air, my colleague, Dr. Axson, shows it to have occurred in the ships; illustrates the same fact: that this fever pursues or breaks out in such ships at sea, and in port, that it is often confined to them, and that it is only finally gotten rid of by the most thorough cleansing. The ample records furnished by Dr. La Roche, in his interesting article on yellow fever, in the April No. for 1853, of the Amer. Med. Journal, and in the second Report on quarantine and yellow fever, presented to the British Parliament, in 1852, furnish the amplest attestation of the *local origin and local cause*; they all concur to prove, without the shadow of a dissent (both the land and sea causes) that filth and fresh earth, (the principle evolved being probably the same,) with atmospheric conditions, has produced, and by sequitur, will produce yellow fever—that *it originates it, and that the cause, of yellow fever is known.* And I know of no rule of philosophy where we have produced an effect and with a sufficient cause for it, that compels us to look beyond it. This is most happily in strict accordance with the principles that run through the whole system of causation in other diseases—(and why should yellow fever be an exception?) the stronger the cause, the stronger the effect, under the same circumstances. That a fever of the highest grade of malignity known in this hemisphere, should proceed from the greatest concentration of influences known to be injurious to our race, that in a minor degree produces the prevalence of diseases of the same class, of a lesser grade, has been shown in a preceding page. As yellow fever is at the head of its class in the Western Hemisphere, so plague *arising under analogous conditions*, is at the head of its class in the Eastern Hemisphere, and as plague for a long series of

In ships at sea from Northern ports.

Cause of yellow fever known.

centuries *has been shown to be under the control of sanitary measures*, (and would be now, but for the *fatalism* of the Turk, that makes no improvement, and is wrapped up in his contented ignorance and *statu quo*,) so, yellow fever can be controled by the same sanitary measures; and this is really the only valuable part of the subject. It lays down the important foundation of *prevention*, it erects there a stately structure, on which should be emblazoned in lasting letters of living light, SANITARY REFORM, and let us look to it, with the same sacred duty we owe to our stricken city, as we do to those monuments that remind us of the birth of our political rights and national independence. And if we cannot prevent it—if an Almighty Providence, in his wisdom, has cursed us *beyond all the other nations of the earth*, and we have no remedy after FULL TRIAL, let us hug our chains, as the condemned, and, like the bigoted Turk, display our philosophy, and bear it!

And is controlable.

The foregoing views so fully corroborate the highly important "conclusions" of the General Board of Health of England—drawn from the most reliable living authority,* and are so fully explained by the principles applicable thereto, contained in these pages, that I cannot avoid inserting them here.

Conclusions of the General Board of Health relative to yellow fever.

"1. That yellow fever epidemics break out simultaneously in different and distant towns, and in different and distant parts of the same town, often under circumstances in which communication with infected persons is *impossible*.

Conclusions of General Board of Health of England on yellow fever.

"2. That yellow fever epidemics are usually preceded by the occurrence of individual or sporadic cases of the disease, which sporadic cases are likewise common in seasons when no epidemic prevails.

"3. That yellow fever epidemics, though occasionally extending over large tracts of country, are more frequently limited as to the space over which they spread, often not involving the

* Kindly sent me by a member of it—Mr. Chadwick—through our minister in London, Mr. Buchanan.

whole of a town, and sometimes not even any considerable district of it.

"4. That yellow fever epidemics do not spread from district to district by any rule of gradual progression, but often ravages certain localities, while they spare entirely, or visit very lightly, others in the immediate neighborhood, with which the inhabitants are in constant inter-communication.

"5. That yellow fever epidemics, when they invade a district, do not spread from the houses first infected to the next, and thence to the adjoining, and thus extend as from a centre; but, on the contrary, are often confined to particular houses in a street, to particular houses on one side of a street, to particular rooms in the same house, and often even to particular rooms in the same story.

"6. That in general, when yellow fever breaks out in a family, only one or two individuals are attacked; commonly the attendants on the sick escape; and when several members of a family are successively attacked, or the attendants on the sick suffer, either the epidemic was general in the locality, or the individuals attacked had gone into an infected district.

"7. That when yellow fever is prevalent in a locality, the most rigid seclusion in that locality affords no protection from the disease

"8. That on the other hand, so great is the success attending the removal from an infected locality, and the dispersion of the sick in a healthy district, that by this measure alone the further progress of an epidemic is often arrested at once.

"9. That such dispersion of the sick is followed by no transmission of the disease, not even when the sick are placed in the wards of a hospital among patients laboring under other maladies.

"10. That no one of the preceding facts can be reconciled with any other conclusion than that, whatever may be the exciting cause of yellow fever, it is local and endemic in its origin; and the evidence of this conclusion are therefore cumulative.

"11. That the conditions which influence the localization of

yellow fever are known—definite, and to a great extent, removable; and are substantially the same as the localising causes of cholera, and of all other epidemic diseases.

"12. That, as in the case of all other epidemic diseases, in proportion as these localising causes are removed or diminished, yellow fever ceases to appear, or recurs at more distant intervals, and in milder forms.

"13. That consequently the means of protection from yellow fever are not quarantine restrictions and sanitary cordons, but SANITARY WORKS AND OPERATIONS, having for their object the removal and prevention of the several localising conditions, and where such permanent works are impracticable, the temporary removal, as far as may be possible, of the population from the infected localities."

Now skepticism must yield up its doubts, and even sophistry can no longer contest the demonstrated truth. A certain combination of conditions, in certain localities produce in thousands of instances, yellow fever. There are rare exceptions to it, these conditions are known—*they are the same in all.* The effect is the same, and the instances are innumerable—the attestators are intelligent and perfectly reliable. There is no assignable motive why they should testify falsely, and it is all in accordance with the common sense and common experience of mankind. Can any thing, short of mathematical demonstration, make it stronger? Could it properly be attributed to the sole agency of the above means in a *single unequivocal instance*, it would be no longer expedient to look to contagion or importation for additional agency; yet we have unnumbered thousands to prove our position. One cause, which is equal to an effect, is always sufficient to account for it. If another be associated with it, which neither increases nor decreases the effect, I do not know by what rule of logic it can be supposed to be instrumental in the production of it. All other views are subsidiary to this, the *true practical value;*—for, if the public mind is *satisfied that the cause is known, the remedy is palpable enough.* It will be no longer

No room for skepticism.

Demonstration.

Its vast practical value.

a question of dollars and cents, it will no longer be a question of the inconvenience of a part of the citizens leaving the city for a few months; it is vastly more. It is a question of life and death, between the hecatomb of victims offered up to ignorance and neglect, and the enjoyment of health and the comforts of life at home. It is between New Orleans as a mere factorage, for she is nothing more, with this constant liability, and New Orleans in the full exuberance of salubrity, unequaled in her climate, with fine promenades, public gardens and parks, with railroads connecting her on one side with the Atlantic cities and the old world, the cradle of the human race, the favored haunts of science and civilization; on another with the granary of the world, and on the West, on the sun sitting on the golden regions of California. Her name will no longer be a theme for aversion and alarm; she will no longer be the "plague city"—the "sepulchral city." It will then be a pride and boast to hail from New Orleans. Surely this is worth striving for, and we shall prove that all this is within our power, that it only requires us to put our shoulders firmly to the wheel, and that you are bound by every principle to own the impulse which duty prompts, and a sense of self-preservation and a just pride aids us in carrying out. These, then, are the promised fruits of this commission, and should they be realized, no small honor in coming time, will redound to him who originated the plan, and the council which adopted and put it in execution.

The importance of knowing the cause of a disease.

The practical importance of knowing the cause of a disease consists in the *means it directs us to use in the way both of prevention and treatment,* and it is for that reason that we have dwelt so long upon it. It is thus also, in the forcible language of Mr. Chadwick, "getting at the antecedents, and mounting to the sources," we reach too, the origin of orphanage and widowhood, of intemperance, and above all, the fountain of the greatest mass of moral evils; and it is *here* that our remedies become ultimately the most radical, effective and praiseworthy.

Prevention is better than cure. It is infinitely less costly, and more easily accomplished. Ten or twenty thousand dollars, judiciously disbursed, may prevent the occurrence of a fever, or an epidemic, that millions cannot cure or pay for, in the loss of life, character, business, &c. For the sake of convenience, and for the purpose of facilitating investigation, aiding the memory, and grouping those diseases proceeding from congenerous causes, statists have classed them into certain divisions, such as have been presented in our record.* The class zymotic embraces those which, in the main, distinguish one country from another in a sanitary point of view, such as epidemic, endemic, &c., (fevers, intestinal diseases, &c.) where this class is large, as it is in this city, being five times greater than it is in Northern cities, the place is esteemed sickly, and when small, the reverse. This class is in a great measure *under the influence of sanitary regulations*, and called "preventable," because they *can be prevented*, and the attention paid to and the efforts, made in their prevention is also a test of high civilization, and the estimate that people entertain of the value of human health and life. The mortality that is *unpreventable* is, in most countries, a constant quantity. In England it is estimated at between ten and eleven per thousand of the whole mortality.

Prevention better than cure

The great value of knowing the cause of disease (and the fatal consequences of a mistake) so far as to be enabled to prevent them, is so forcibly set forth by that eminent man, John Hunter, (on the diseases of Jamaica,) that I quote them: "In military physic, the great improvements to be made are not so much in the *cure* as in the *prevention* of diseases, which depends altogether on a knowledge of their cause. If diseases arise from the air, contaminated from the foul ground of a camp, or the exhalations of a marsh, it can only be avoided by a change of situation, or by taking care not to come within the sphere of activity of such noxious causes. Let it be supposed for a moment that a mistake should be

Fatal consequences of a mistake.

* Table F.

made, and that the camp or remittent fever be not considered as proceeding from their proper causes, but believed to depend upon *contagion*. It is evident that complete destruction to all must be the consequence of such an error, and in medical history there is reason to fear more examples than one of this might be produced!" How singularly, and how prophetically has this great man portrayed the condition of things in New Orleans! and how truly he says that "destruction" must ensue from such an "error." If full faith is put in the "importation of the disease" as necessary for its prevalence," and "contagion should mark its footsteps," our city would indeed, be likened to our State emblem! and like the pelican *foster in our bosom the poison that is sucking our vitals*, then may we bid adieu to all *sanitary measures*, and to any hope of our amelioration and advancement!

This entire subject is so vast and so important; the materials are so abundantly developed by the humane investigations of the English Government, and kindly distributed, and much of it is so applicable to our situation, notwithstanding the difference of climate, that the temptation to quote far exceeds the limits allowable to this report. In the report "on the experience in diseases, and comparative rates of mortality," by Mr. Lee, it is abundantly shown by all that has been said of the destructive ravages of fever in small towns, and even in *villages*, in various parts of the country, "that diseases of the class termed preventable, are not inherent in, essential or peculiar to places of dense population." That the remedy is, that "the air is to be purified by *immediate removal before decomposition*, of all organic matter, and other refuse capable of producing malaria, and town visitation will be as little required, irrespective of forms of streets, courts, &c., and the density of buildings," and his deductions are that he can find no valid reason why towns *should be more unhealthy than the most salubrious spot in the country!*" That "one-half of all the existing disease and mortality is in excess, and preventable!" That "excessive mortality ought to be prevented by

Disease not essential to dense population.

means compulsory on all parties, without exception. And he comes to the conclusion that all the causes point to *localised filth, accompanied with moisture*, as the great cause of disease and death" in that latitude. Had those conditions existed here, with our high temperature, *yellow fever* would have been the certain result. He goes on farther to state, as a conviction from his inquiries, that the great mass of the people lose nearly half the natural period of their lives by such exposures; and he came to the conclusion, after examining a large number of towns, that "the *inevitable* mortality of the kingdom is not greater than ten to one thousand per annum, while in some it rises as high as sixty-nine or more. And the remarkable fact was elicited from the inquiry, that let the district be ever so unhealthy, or ever so salubrious, the *inevitable mortality is nearly a constant quantity.* He goes on farther to say that typhus, the great preëminent scourge of the country, is essentially independent of, and unconnected with geopraphical position, climate, physical contour, geological strata, or other uncontrolable circumstances. That there is no *intrinsic* connection between density of population and a high rate of mortality, and the avocations of the people: that where neither surplus water nor organic filth is removed by drainage, there the greatest destruction takes place, without reference to any other consideration, and that the ratio of mortality is directly proportional to the badness of the drainage."

Localised filth the cause of all disease.

Typhus independent of climate.

All depends upon removing filth and moisture.

He farther states, in his conclusions, that, "although the poor are the chief sufferers, yet no class of society escapes the pecuniary consequences of preventable disease—that the use of narcotics and habits of drunkenness, are, in numerous instances, developed and increased by defective sanitary arrangements, and that, in twenty-nine places visited, the pecuniary loss on *one years' excessive sickness,* funerals, and lost labor, is about *equal to the first cost of complete works* for water supply and drainage in the same places." And that THE MOST PERFECT SANITARY ARRANGEMENTS ARE THE LARGEST PECUNIARY ECONOMY, and the cost of *preventable dis-*

The rich suffer as well as the poor.

The cost of preventable diseases equal to the whole public income

eases is equal to the whole public revenue of the country! He concludes his most valuable paper with a number of suggestions, from which the following will fulfill our present purpose, viz: "*that a penalty should be exacted* on all places where —upon an average of seven years—

1st. The mortality has been greater than 20 to a 1000 of the inhabitants; or

When penalty on the public authorities to be exacted.

3d. Where the proportions of deaths from epidemic, endemic, or contagious diseases has been equal to 1 in 400; or

4th. Where the average of all who have died has not exceeded thirty-five years." How eminently applicable these remarks are to us!

Proportion of preventable mortality.

The amount of "preventable mortality" is more than half of the whole mortality. Last year it was more than five times that amount here. In every epidemic year it is largely increased, of course, and this has been shown to be *pari passu* with the increase of the causes assigned—that is, with the preventable causes.

Origin of disease.

Poverty, filth, intemperance, wretchedness and crime have a similar paternity. Disease originates from them, and, taking the winds of the morning, it spreads itself to the uttermost parts of the earth. Wherever it finds food it localises itself and becomes developed, and hence, under a certain concentration, the inhabitants of the palace, as of the hovel, become its victims. Hence, all the world is interested in sanitary measures—in eradicating the seeds of disease, and thus make a brotherhood of all mankind. Had not a concentrated malignancy, from filth and bad habits, in a congenial atmosphere, on the banks of the Hoagley, have given a rise to epidemic cholera, the human race might have been saved that afflictive scourge. But why limit it to cholera? The same principle may be applied, with equal justice, to yellow fever, plague, leprosy, the venerial disease—nay, *is there one disease* to which man is subject, that is not the result of the

Of cholera.

rupture of some one or more *of those great hygienic laws* which the Almighty has laid down for our guidance?

A civilized, refined and humane government is known from the care bestowed on the health, and the value set on the lives of its citizens. In a *Republican* government it should be considered a joint-stock concern, and we should put in practical action the first law of our being—self-preservation. Carelessness in such governments—a neglect of this, its *most* important concern, is as unexpected *a priori* (as they are all joint sovereigns, and unfortunately depend *too much* on what is ignorantly supposed an *individual* concern,) as that those who live by the sickness of others, should be almost the only originators of laws and means to *prevent* sickness! Yet such is the fact. The profession of medicine is the true philanthropism.

Evidence of civilization.

Originators of sanitary laws.

In a society of laws and a Representative Government, where the governed give up a part of their rights and property, too, for the proper preservation of the remainder, it is clear that there is no more sacred deposit in the hands of the representatives of these rights than that of our health. My neighbor may commit such a nuisance as may destroy the health or comfort of my family. The law takes away from me the right to interfere. The power is with the body politic, who represents and with whom is deposited my rights, and as rights and duty are correlative, it becomes the duty of society to interfere and abate it. A flagrant case is put to show how clear the *principle* is. The body politic is bound to abate *nuisances*, however small, or is *responsible for the consequences!* If a bridge across a street or highway is defective and a citizen becomes injured in consequence, the corporate body is amenable.

Legal claim of the civil power to protect health.

By the constitution of our country, no one is allowed to injure or take away the life of another, without being compelled to repair the one through his property and means, and suffer for the other the felon's penalty. It has been demonstrated, that the great mass of the mortality of this city has arisen from *preventable causes*; on whom, then, should fall the merited penalty of this neglect? Our late distinguished countryman, Dr. Rush, with a prescience which often

Original opinion of Do. Rush.

accompanies true genius, said: "To all natural evils, the author of nature has kindly prepared an antidote. Pestilential fevers furnish no exception to this remark. The means of preventing them, are as much under the power of human reason and industry, as the means of preventing the evils of lightning and common fire. I am so satisfied of the truth of this opinion, that I look forward to the time when our courts of law shall punish cities and villages, for *permitting any* of the sources of malignant fevers to exist within their jurisdiction." The General Board of Health of England, with the Earl of Carlisle (better known in this country as Lord Morpeth,) at its head, says: "The British Parliment has legislated on the conclusions submitted, with an accumulation of demonstrable evidence, that the causes of epidemic, endemic, and contagious diseases, are removable; and that the neglect, on the part of the constituted authorities, to remove such causes, as far as they are obviously within their control, is *a punishable offence!* The foundation which the legislature has thus laid for the physical, and consequently for the moral, improvement of the people, is recognized. Half a century ago, it was said by a great physician and philanthropist, that the time would come, when the legislature would punish communities for neglecting the known means of preserving the public health, and that prediction the British Parliment has been the first to realize." That "philanthropist" was our own great countryman, Dr. Benjamin Rush, of Philadelphia.

First Legislative action upon it.

If, then, we have arrived at this important fact, to what cause *yellow fever is to be ascribed*, if we can no longer plead ignorance, as an excuse for inaction, *we have no further excuse for its continuance among us*, and I do seriously think, that it is as much the duty of the civil authorities, to *keep this city free from yellow fever*, as it is to keep it *exempt from any other controlable calamity!* This is bold ground, and I intend it to be such. I have not come to it hastily; but *that* is not the question; *is it the true ground?* Have the reasons I have adduced, from the investigation the subject has undergone in the preceding pages, been sufficient to convince our people that we have been suffering under *controlable evils?*

As much the duty of city authorities to keep off yellow fever as it is to protect life in any other way.

That is to be the *true ground* before the people now. If I am not greatly deceived then, in this much cherished idea, REFORM is the great watchword applicable to our situation, and no stone should be left unturned to remedy the evils of the past, and arrest the downward march of everything.—Leaving, then, the great principles of philanthropy, of benevolence, of intelligence, nay, even of self-preservation, out of the question,—those which usually move great communities to action,—let us appeal to the mere *pecuniary interests* of the public. That alone, is motive sufficient to move most bodies, as low and sordid as it is. With no position on this continent, if on the globe, equal to it as a mart of commerce; where nature, for that purpose, has done everything, and man nothing, (for health exclusively,) we are permitting every village of yesterday to outstrip us in the race of population, of wealth, of public monuments, of social improvement, and intellectual enjoyment; and last, but what is first in importance, HEALTH, we stand positively lowest in the scale. Every little village, wherever situated, enjoys a salubrity that is our due. This is a painful subject; it is one that is humiliating, nor would I have referred to it so often, were it deemed irremediable. It is not so. If once, when our population was forty-three thousand and thirty-one, (in 1827,) our mortality did not exceed 2.22 per cent.! and in many parts of the country it *does not exceed half this now!* If, in former times, this country enjoyed a salubrity almost primeval, has the soil so changed, the climate become so deleterious; has additional population evolved such a poison, or *have we become* so deteriorated by the golden dreams that most persons entertain on first visiting this country, that no efforts were necessary to acquire it, that it only required to stretch out the hand and gather, and that the primal injunction, "by the sweat of your brow shall you earn your bread," is no longer applicable? If such has heretofore been the prevalent opinion, as it should seem it has, the sad events of 1853 are sufficient to disabuse it. That calamitous visitation

Reform the great question now.

Its sacredness.

A shameful and disgraceful neglect; yet may prove a great blessing.

Certain result if sanitary laws established.

may yet prove a great blessing to the country, if it shall have brought home to our people the sanitary and salutary lesson, that all the facts we have garnered, the principles we have evolved, and all the hygienic laws and practical results which can be so obviously deduced from them, when once fully adapted and rigidly enforced, will insure to New Orleans an exuberance of health, it has never yet attained, and cause her to rival, in salubrity, the healthiest large cities on the globe!

SECTION IX.

RECAPITULATION OF CAUSES AND RESULTS.

Meteorological causes—Special terrene causes—Greater care required in fast growing cities—Can't acclimate to filth—Tracing the progress of the disease by digging—Filth, inundations of the coast and throughout the State. SANITARY MAP *of the city—Application of principles—Location of filth and disease, the same, the one resulting from the other, in each ward, with the ratios to population—"fever nests" "and plague spots,"—the mode of spread of the fever.*

Before proceeding to the application of our *remedies*, it may be best, in order to be thoroughly understood, to make a recapitulation of our positions.

Not of foreign importation.

The duty of tracing the *outbreak of this fever*—its *origin* and *transmissibility* has, in the division of duties, devolved upon my colleague Dr. Axson, and most ably and graphically has he performed the task; clearly demonstrating that it was not from foreign importation that it was derived, but, although connected with foul ships from *European* ports, that it was due to domestic birth and growth, whether at the Levee or elsewhere, and that at its *divers origins*, there was no necessary connection the one with another. Now it becomes my duty, under the resolution in *exposing the sanitary condition of the city*," to show what and where those causes were. They have before been referred to in general, wherever it has been attempted to

demonstrate their applicability—the influence of such causes in similar and in different climates, their direct bearing upon former epidemics, and on their influence in the rural districts, and I now proceed to show their special influence in the production of the late epidemic.

The causes assigned were two-fold, and these formed the constituents of the epidemic—1st, METEOROLOGICAL, and 2d. TERRENE.

To the 1st. belonged A—a long continued range of tropical temperature preceding the outbreak—the average at midday, of the two preceding months of May and June (instead of being a month later) being nearly 83°, and which continued throughout the epidemic. B.—An unusually high hygrometer, which continued and increased, exhibiting an almost saturated atmosphere. C.—Heavy rains. D.—unusually high and distressing radiation. And E.—An unprecedented intensity and continuance of stagnant air. The unusually early establishment of this tropicoid condition, in the elevation of winter temperature, to that of spring, and of spring to that of summer, thus anticipating by more than a month, the usual evils of autumn, with an aggravation of the burthens ordinarily incident to it, with the extraordinary combination of those which preceded them, were the main ATMOSPHERICAL ELEMENTS which composed it. These are stated in detail in the tables and for the three epidemic months—four or five times daily.

Meteorological or climatic causes

2d. The TERRENE CONDITION was composed—A.—of the upturning and exposure of the original soil, in the cleaning out the canals Claiborne, Carondelet, Marigney, &c. The immense exposure in making a new basin on Bayou St. John; digging on St. Paul street to Bayou St. John; digging ditches and clearing between Conti and Common streets, making a new levee and ditch on Lake Pontchartrain, the digging and embankments on the Northern, and Jackson street railroads, and extending up within half a mile of Carrollton—approaching the river and extending near twenty miles in the rear of the plantations—in the centre of the city, the exposure of the subsoil for *water*

Special terrene causes.

Earth exposure.

pipes in Bourbon street, near the Water Works (where some of *the first cases occurred*) New Levee and Post 84, and other parts, to the extent of about a mile, and for *gas* probably as much, and principally in Apollo and to Nayades and Dryades, in Galvez and Perdido streets, and* repaving Annunciation, Royal and Chartres streets.

B.—Extensive digging and embankments of earth at Algiers, opposite the city—being almost eighteen inches high, and eighteen feet wide, ascending the coast for about twenty miles, running from half mile to a mile from the river, in the immediate rear of the plantations.

C.—The exposure of the naked bank of the river for about six miles, many parts of it made a common receptacle of, and reeking with garbage and filth of all kinds, exposed to the sun and rain, without a single police officer, to prevent its being made a common deposit for these nuisances, or covering or throwing them into the river, besides the fermenting drainage of sugar and molasses hogsheads on the Levee.

Streets. D.—The filthiness of the streets, privies and back yards, a matter of common observation by the public, and complaint in the newspapers, the gutters often twelve hours after a rain, which had washed them clear, bubbling up with a gas through dirty water.

Unfilled lots. E.—The large number of unfilled empty lots and unpaved streets, in various parts of the city, and particularly in the Fourth District, which was much the most severely scourged with the fever in proportion to its population—these low lots being a receptacle for, and exposing filth of all kinds and stagnant putrid water.

Open drains. F.—The large open drains in and near the city, including the large ones in rear of the First and Second Districts, and Gormley's Basin half filled with the refuse of its district.

G.—The nuisances of soap and tallow chandleries and the

* The extent of the excavations for these purposes in successive years, I have in vain sought for. In 1837, I have been informed the yellow fever was very fatal to those employed.

large collection of manure near the vacheries of the Fourth District. Manufactories.

H.—The interments *within* the city of six cemeteries, the receptacle of 7,063 bodies during last year, to lend their important aid in corrupting the air. Interments.

L.—The numerous *slaughter-houses* in the Fourth District, and the many large *vacheries* and livery stables, with their offensive and polluting exhalations Slaughter-houses, &c.

K.—The crowded, filthy and unventilated dwellings, in low, damp situations, many in half-drained and unpaved lots and courts, with filthy, stagnant water under the floors. Damp, crowded and filthy houses.

L.—And about sixty thousand of unacclimated population which has been added to the city since the last severe epidemic of 1847, and we have aggregated together materials to produce an epidemic, and the food to support it unprecedented in this country.

No man who is acquainted with these circumstances should be at all surprised at the disastrous results which followed; there was no difficulty in predicting it *a priori;* but our great misfortune here is that the people are ignorant and *kept ignorant* of the condition of things. Delusive assurances are constantly dinned into our ears of the "cleanliness and salubrity of the city," which after a while, deceives even the more intelligent, and produces carelessness and quietude of the public mind, when the most ceaseless vigilance is urgently called for, from our position, and *no official Board has existed for years, whose special business it should have been to attend to this important concern!* The large addition to our population is not properly estimated, nor its results, and some explanation is necessary. A population of exotics, unacquainted with the requirements of hot climates, huddled together, in close, damp, unventilated apartments, with filth, poverty and intemperance, furnish materials in every climate for epidemics. In more rigorous regions, of typhus; in the hotter climates of every class of *fevers*, from the mildest to the most malignant. In cities of rapid growth, there is always a tendency to an Public kept in ignorance. In fast growing cities a large proportion of immigrants.

excess of this kind of population, where the people increase faster than the city itself, buildings of an appropriate kind are not found; hence the diligence and the surveillance that is required on the part of the civil authorities to extend that species of guardianship over these materials of its labor as well as of its wealth, and future growth and prosperity, which they are usually ignorant of. The more dense the population, that is, the nearer men and habitations approach each other, the more curtailed the term of life, especially, in a hot climate. Filth accumulates where there are no pavements, as in many parts of our city, where was the greatest mortality last season. The poisonous matter sinks into the soil, a dangerous compost is formed, which, from the closeness of the habitations, ventilation does not and cannot remove. During rainy seasons, (the season of heat and fever,) its tendency is to spread, and when the temperature becomes favorable by elevation, disease results. That this is not always the case when they are apparently favorable to its production, only shows that these require time for their peculiar combination and physiological susceptibility to develop it *although sickness of some kind or other is always present.* The constitution is slowly undermined, and the duration of life materially curtailed. It is then, erroneous to suppose that these rookeries are not injurious to health, because they do not *always* produce *fever and yellow fever.* There is neither necessity nor propriety in denominating this "*want of acclimation.*" The accusation is no less a slander upon the climate than it is upon decency. Filth is offensive to the mass of mankind, instinctively—as injurious to his health and well being. It would be much more so, were it not associated with habits and exposures that tend to harden and invigorate, and thus render the system able to bear what to another, totally unused to it, and more delicately raised, would be early fatal. Man cannot become so acclimated, (or so habituated to it) that it will not affect him; with climatic conditions he can, because God made one, and man the other; it is at war with the elements of his being, it dilapi-

Greatest mortality where no pavements.

Mortality not from want of acclimation.

No acclimation to filth.

dates the very foundation of life. In another page it has been shown that more than sixty per cent. of the *natives of Egypt* at times fall victims to their endemic fever, the plague, *born and brought up in the midst of it*, and in at least two parts of our country, Petersburg and Bristol, no native reached the years of maturity until certain physical conditions, on which they depended, were altered; and the miserable, squalid and unhealthy condition of the crowded and cellar population of all cities, is ample proof of the fact. That man may become acclimated, that is, accustomed to certain atmospheric elements, such is the elastic power of his constitution, is admitted as a fact of universal experience, and is explicable under physiological laws, but to attribute the mortality that has occurred here to his wanting this attribute, arising from these conditions, leaving other things entirely out of the question, *is a poor and baseless excuse for indolence and carelessness*, and a reflection upon the habits of our people—a stain upon the public authorities, and exhibits an ignorance of the climate and of its influence on man.

To what extent acclimatable.

The test of the salubrity of a city or country is hardly to be estimated by its influence on the native population; if so, what is esteemed the most healthy region would be misnamed, for there are but few countries that are not favorable to those born there. Hence it is that *we* denominate the coast of Africa, Batavia, Calcutta, &c., the most fatal to human health and life, (in Rio, *New Orleans* is classed among them!) yet, the natives of these countries respectively, do not so denominate them, and in fact, we know that they enjoy great physical health and vigor. But who ever esteemed a place sickly where *he* lived! it is one of those pardonable weaknesses we can as easily forgive, as account for. Hence then, *the true test of the salubrious condition of a country must be in its friendliness to the stranger—the facility of its being reconciled to the requirements of his constitution*, and not merely to the native—the acclimated—the habituated to all its otherwise noxious impressions, and such is the resiliency of man's constitution,

The true test of the salubrity of a country.

that he can almost become reconciled to anything—*except filth!* —Let me be understood: acclimation literally means, that the constitution can become reconciled to that which forms the climate of a place—that is, its *atmospheric conditions of heat, moisture, &c.* This has nothing to do with what I have elsewhere denominated the "terrene" conditions. Habituation to the things around us is often called "acclimation," and can often be procured by a few months' residence, but it is not *acclimation*, it is only a fixation of habits and a reconcilation to the things about us, the rupture of which is the cause of so much diversified sickness to travelers of all kinds, new soldiers, &c.—in fact, to all who break the habitual course of ordinary life, that regular routine which is so conducive to lengthened existence, and which the system has become so reconciled to as to adopt it as one of the laws of its being.

The meaning of acclimation.

The difficulty here, then, is not that of *acclimation properly considered*, for this can be easily acquired, but it is to those noxious causes (filth &c.,) that are injurious every where (and to which there can be no acclimation), the more so, where heat and moisture are superadded to them. The climate of this place, then, is not lethal *per se*, but by those factitious conditions imposed upon it, which we have the power, and it is our sacred duty, to remove. Hence then, away with the nonsense about the difficulty of acclimation, which only tends to blind the ignorant; if we are to have a healthy city, we must have a *really clean one.* It is the first; it is the second; it is—in the paraphrase of Demosthenes—*the last essential requirement.* However it may be, it formed an aggregation of materials, with the meteorological adjuvants, sufficient to produce yellow fever, in any part of the present and former yellow fever regions, if in the East, a *plague;* it far exceeds the prescription to *produce* yellow fever, mentioned in a note at page 371, which in the opinion and experience of eminent men accustomed to investigate yellow fever for a long series of years, was amply sufficient for its origination.

The real need.

The compound origin, then, is a clear and unequivocal one,

and rests on contingencies, which after a most thorough examination, I am fully convinced, the ability, the science and ingenuity of man *can* counteract. The task, too, is not such a gigantic one. It can be accomplished without difficulty, by public wealth (not much), by public spirit, of which we have plenty for purposes not half so valuable, and more by *public determination*. A hundred-fold more of each has been wasted upon objects, not a thousandth part of the worth of this—nay, whose value sinks into insignificance in comparison. Can any thing be too expensive? Can any object be nobler? Can any earthly blessing compare in magnitude, to restoring salubrity to a wealthy and populous city, and thus putting her in a condition to fulfil her great destiny, *if it succeeds*! But, in order to succeed, it has to be done *completely*—no half-way measures, no temporary expedients; they are failures to the great public now, will again fill this city with mourning, and are disgraceful to the intelligence, and a stain upon the philanthropy of the South.

All remediable.

Before proceeding to the remedies for the disastrous condition we have taken so much trouble to point out in detail, the result of which it was so easy to predict before hand, let us dwell for a moment, on the immediate and direct effect of these agencies, which have to light us through the investigations of the Commission, to show how demonstrably applicable our positions are.

The statement of the amount of disturbances of the original soil, shows that this as *much exceeds that of former years*, as the mortality exceeded that of any other, except from the combined effect of *cholera and yellow fever*, in 1832! That at Algiers it commenced with it, most obviously aggravating, if it did not originate the fever there, (as it did in the city in 1797) causing a large mortality—300 out of 350 hands employed on the railroad, dying of it; that this disturbance extended up the coast, being at a distance from the river from one to one and a half miles; that following up the line of the road, the villages of McDonogh and Gretna successively bore the brunt of its influence; that the unprecedented amount of fevers on

Tracing the progress of the fever from the city, into the country.

plantations, near and in the rear of which these embankments were made, of Mrs. Waggaman's where the sickness was great and the mortality large, of Mr. H. R. W. Hill, where the sickness was unprecedented—nearly every one suffering from it—Mr. Hill himself and another gentleman falling victims to it; that on the Jackson Street Railroad, from the heart of the Fourth District, the mortality was fifty out of the eighty workmen employed, and from the whole of that district probably much greater than from any part of the city; that this effect was added to on the Great Northern Railroad, nearly 50 per cent. of the force employed, having died of it.* That this road extended within half a mile of Carrollton, where the mortality was very great, of this disease, (and I believe, for the first time,) thence some ten or fifteen miles in the rear of the plantations of the Messrs. Kenner and others, where sickness and mortality marked in its track the devastation of this fever; probably the first time the yellow fever was in any of these rural districts on either side of the river. That the probable reason why it was not so destructive in the rear of the Second District of this city in the more immediate neighborhood of the exposure from digging the Carondelet Basin, was that it consisted (with rare exceptions) of an acclimated population, who almost alone were exposed to it, although the sickness with them was very great.

Effect of inundations.

Why rural districts in other States do not suffer so much.

Why fever late in some places.

That the tracing this fever throughout the Southwest, (so far as we have been able to extend our investigations,) there have been similar disturbances of the soil, or other adequate causes of localization; that the *extensive inundations*, to which various parts of the State has been subject for divers years back, has been one of the principal causes of greater infliction on and near our great streams, than in States not thus subject, and consequently, this is the cause *why they have not thus suffered in their rural districts;* that these devastations did not occur at once, but just in proportion, (as seen by the Report from Prof. Blodgett) and as soon as the other condition (the other "blade

* The actual mortality here could not be procured—the sick were usually sent to the city, when taken.

of the shears"—always essential) was present or matured, viz: the occurrence of a sufficient amount of moisture.

In the resumé of our facts, principles and deductions, for the purpose of making the subject more clear, satisfactory and conclusive, I present the—

SANITARY MAP OF THE CITY.

Let us illustrate our principles still more closely, and apply them to the actual condition or our city during the last year, by inviting an examination of the Sanitary Map we have prepared after so much labor*, presenting the *localization of all the cases of yellow fever of the year, in the separate Wards*, together with the main causes which produced them, delineated on the Map, thus furnishing the *argumentum ad hominem*, or practical test of the truth of our principles.

We sat out with certain propositions in relation to the cause of our epidemic and endemic yellow fevers, and gave the facts and reasonings thereon. We have given the record of the experience of other cities and countries, in strict corroboration of our views. From reasoning a *posteriori*, we have stated in advance, by an *a priori application*, that an epidemic disease of the worst form, must occur as a result of existant conditions.† That prediction was most fully verified. I now proceed to a still more practical application, by exhibiting the Map, having marked on it the locations of the various nuisances, to which, theoretically and practically, we refer as the main cause of the epidemic, (and I use the term in an extensive sense, embracing the principal causes offensive to health,) together with the localization of near 23,000 cases of yellow fever, which I have collected from private and public sources, and the presumptive locations of the balance (about 6,000), making in all a total of 29,120 cases.

Application of reasoning.

I desired to construct a Map exhibiting sanitary districts, formed solely of portions of the city having contiguous similar

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* In the construction of this Map, I have received most invaluable aid from Major S. G. Blanchard, of this city. Mr. D'Hemecourt, the Surveyor, and the able Street Commissioner, have also lent me their kind assistance.

† Published Report of the Academy of Sciences, of this city, for the year 1853.

sanitary liabilities. That would have been rather more exact, provided I could have obtained the amount of population in each, so as to show the *comparative influence.* That I found, after full trial, impossible. I then determined to adopt the division by Wards, such as they were when the United States Census was taken, in 1850, as I would then have a standard for ratios—presuming that to furnish the necessary data, and from which I could compute the increase of population, in the three years that had elapsed since 1850. Accordingly, that was adopted as the only possible plan. After completing the collection of the localizations, as far as it was possible, I then proceeded to apply them. Upon scrutinizing the only returns sent here from Washington, in which there was any division by Wards, I found the population of three Wards in the First District enumerated in one aggregate, and the *slave* population left out altogether; and as a most remarkable and unusual number of cases of yellow fever had occurred with that portion of the population (and it is believed) for the first time, and were included in my localizations, it was absolutely necessary to embrace them. To surmount these difficulties, I had to consult all the census returns of the city and State for the last seven years. These I found so utterly discrepant that I had to calculate at last upon a comparison of each, and various probabilities, and make the best approximate estimate of the total population of each Ward the subject was susceptible of, and accordingly present table R, not as the exact population, but believed to be as near it as it was possible to get.

Difficulties in computing the population.

City returns not reliable

Again: in order to avoid making the Map too large, or on so small a scale as to be indistinct, it was necessary to exclude the exhibition of some important agencies, to which great efficiency has been ascribed in the production of the fever, viz: basins and canals that have had their filty detritus exposed to the atmosphere, levee dug and embanked, and the low swamps and open drains of the entire neighborhood.

Map too small.

The number of *cases* of yellow fever occurring in the city during the year are estimated to have amounted to 29,120

Total cases of yellow fever.

At an early period the Sanitary Commission issued a circular, requesting professional gentlemen, and others, to transmit to it a statement of the localities of their yellow fever cases, and all other cases of the zymotic class. A few responded at an early day, in full; most of the others were personally solicited by me. The gentlemen whose names* are mentioned in a note, below, kindly furnished data, which, with those before mentioned, amount to..... 7,624

Cases from private practice.

The Howard Association promptly furnished its records, and from it, and several of the members, who attended cases not recorded on their books—what was called "outside cases"—and from the various public institutions, mentioned in another page, was procured the localization of..... 14,680

From public sources.

To these is to be added those of the Charity Hospital and some other institutions, which do not record what part of the city the cases come from that they receive, were equally distributed in the different Wards, in the *proportion* these Wards had *already furnished the known cases*—these amount to..... 3,872

From Charity Hospital.

The Sanitary Commission, after a full examination of the list and the localization of the distribution, and of those who had furnished them, that from some portions of the city few physicians had complied with our applications, were of opinion that 2,994, distributed among the four districts, according to these apparent deficiencies, would be a fair equalization. They were accord-

Balance how distributed.

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*The following professional gentlemen have kindly responded to my application for the localization of their yellow fever cases, and are entitled to the thanks of the Sanitary Commission therefor, viz: Drs. Benedict, Copes, Henderson, Wood, Poelman, Kovaliski, Axson, Dalton, Rhodes, Davezac, Cantrelle, Seguin, Lemonier, Lindsay, Hart, Stone, Picton, Fenner, Zehender, Cenas, Baldwin, Mather, Sunderland, Batchelder, Smith, Stille, McElvy, Ball, Campbell, Dodson, Adler, Quilling, Bensadon, Wedderstrandt, Kennedy, Jones, Beugnot, Moss, Wetzell, Jaubert, Barbe, Pecquet, &c.

The members of the Howard Association have kindly furnished me their Book of Record, and Messrs. Bouillemet, Whithall, Willis, Robertson, Nimmo, Shaw, Conniffe, and various others, have ably supplied me valuable details about localities, "pest houses," the character of the cases in different localities, &c. &c., which, with the aid of my brethren, above, furnish great additional value to the observations and deductions connected with the Sanitary Map.

ingly divided among the several Wards of each District, upon the principles just laid down..... 2,994

29,120

Explanation of Table R.

Accordingly, I present table R, which presents in its first column the *Districts and Wards*, separately; the second column furnishes the *estimated population;* the third, the cases occurring in *private practice*, as reported to me, and in such public institutions, in which the localities were noted, amounting to 22,304. These, as being more definite, are calculated separately, and their ratios placed in the fourth column. The fifth contains the estimated *unreported*, and upon the principle stated above; the sixth furnishes the *aggregate* of the whole, and the seventh, the *ratios* these bear to the population in the second. The last column furnishes the estimated proportion, *in population only*, the colored bear to the whites in each District, as they are less susceptible of yellow fever than the latter. I wish I could add the proportions of the already acclimated, in each, also, but that was impossible.

It is to be deeply regretted that it is found necessary to form *estimates*, instead of *calculations from precise data.* As the subject was one of vast importance to the community, extraordinary pains and labor were expended to make the results approximate to truth as near as possible. It is believed to do so, and will be obviously useful for most practical purposes.

Sources of information.

In presenting these important details, in procuring the localizations from my professional brethren, and the philanthropic members of the Howard and other Associations—from examining the *localities* of the various nuisances—the "pest houses"—the unpaved, filthy yards, and low lots and squares—(ponds, in the rainy or sickly season)—basins—canals and open drains, and the filthy materials thrown from them—the exposure of fresh earth—the cemeteries—vacheries, livery stables—slaughter-houses and unpaved streets, to which so much evil has been so properly and so justly attributed—information has been obtained, opinions received and facts gathered, so much in accord-

ance and corroboration of the sentiments so fully expressed in other parts of this Report, that it seems to be tautology to repeat them here. Nevertheless, as facts, however, portrayed to the eye and of localities near and around us, known to all, have, usually, a more lasting impression upon the mass than theoretical principles, or statements from abroad, however strong, appropriate and well founded—attention is invited to the delineation of these various sources of disease on the Sanitary Map, and then to the table R, to show the *consequences* of them. So clear and convincing are these facts, when brought to explain each other, that longer skepticism on the subject is set at defiance. Let us, then, scrutinize them under the following circumstances: 1st. If, on examination, it is found that when the various sources (above enumerated) are found, and there, likewise, has prevailed the yellow fever, and almost in *precise proportion to their existence.* 2d. If this fever has prevailed there, not only in numerical proportion to the population, but in *proportionate malignancy.* 3d. If we find that all antecedent experience which has influenced society in the establishment of sanitary measures, is here confirmed and corroborated. 4th. That our city has been suffering a frightful calamity, resulting in great injury to the population, and a ruined reputation, *and from removable causes;* and, finally: 5th. That all, or nearly all our past calamities *could have been prevented!* Surely, there will be no longer any hesitation as to the adoption of the most efficient and speedy measures, not only to correct them and prevent their repetition, but to set *ourselves right in the eyes of our countrymen and the world*, to whose public opinion none are too exalted and none are too low to be independent of, or uninfluenced by, as well for the sake of the direct interest of the city itself. But to the proof—and I shall commence with the upper part of the city:

Propositions.

And results.

THE FOURTH DISTRICT.

This district is estimated to have contained, in 1853, fifteen thousand three hundred and ten inhabitants, without including a large proportion of recent immigrants, the whole of which,

for the year, has been estimated, in another place, at about five thousand, divided among the four districts in a very disproportionate degree. These, of course, were first subject to, and earliest felt the epidemic influence, and living mostly in impoverished circumstances, were crowded together in the cheapest and most comfortless dwellings. The number of cases of yellow fever in the entire district, is estimated to have been seven thousand two hundred and forty-eight, of which five thousand six hundred and fifty-three were reported to me by the physicians in attendance, in which also are included those from the Howard Association, and other institutions, and the balance allotted, by the Sanitary Commission, from public institutions and physicians not reporting. Being at the rate of four hundred and fifty-two per thousand of the population; more than double that of any of the other districts.

Population and number of cases in 4th District.

Ratio per 1000

Let us see how this can be reasonably accounted for.

Causes.

1st—In this district there are but two pavements. These are of cubic stone blocks, and are very good, as far as they go. One extends across the entire breadth of the district, near the river, and the other one-third lower down and about one-half of the breadth. There are several extensive plank roads, (which are delineated on the map,) but much the largest part of the district is not paved at all, and especially the sickliest portion.

1st—Want of pavements.

2d.—This district has a vast number of unfilled squares and lots, below the level of the streets; some of which are even built upon, on piles or bricks, having water almost constantly under the houses, which are of wood, old and rotten, and during the rainy season, (which is the sickly season,) become *ponds*, and often very nauseous ones too, and are at all times the receptacle of filth and impurities, the drainings of the yards. These are also mostly noted on the map.

2d—Low lots or ponds.

3d.—Three extensive *cemeteries* exist in the district, in which were buried, last year, near three thousand dead bodies. It was in one of these that the offensive exposure of bodies occurred, so painful to the public.

3d — Three cemeteries.

4th.—Not far from the centre of this district, was the earth exposure, necessary for laying down the Jackson and Lake Pontchartrain Railroad; and within its limits exist one of the most dangerous and disgraceful nuisances in the city, the half filled Gormley Basin and Canal, the common receptacle of the drainage and filth of a large portion of this and the adjoining district, bordered by most offensive tallow and soap manufactories.

4th—Earth exposure and Gormley's basin and manufactories.

5th.—Probably almost equal to any of these, are the low, crowded, filthy lodging houses, particularly in Adele, Rousseau, and St. Mary streets.

5th—Crowding houses.

6th.—And finally, the extensive butcheries and vacheries.

These amply account for any amount of sickness, when united to the remarkable meteorological condition of the year, to the entire satisfaction of any inquirer after truth, and who will apply the best recognized principles of medicine to its explanation.

Slaughter houses, &c.

With special reference to the wards themselves, it may be said that the *First Ward*, which has the largest ratio of insalubrity, that a very large portion of it in Adele, Rousseau, and St. Mary streets, were but a series of low, crowded, and filthy "pest houses," inhabited by the lowest class of people, with scarcely any pavements, and many unfilled lots and stagnant reservoirs of putrid water. The proportion here was five hundred and forty-two per one thousand.

1st Ward—Causes and proportion.

That the next worst ward, *the Third*, contained all the cemeteries, and most of the vacheries; on the lower portion it was bounded by the new Jackson street railroad, (five-eighths of whose laborers fell victims to the epidemic) and the swamp. The proportion here, was five hundred and eight per thousand.

3d do.—and do.

That the next worst *ward*, *the Fifth*, contained all the butcheries, and many low empty lots or ponds. The proportion here was four hundred and fifty-two per thousand.

5th do.—and do

That the *Fourth Ward*, which is the fourth also in the ratio of cases, more than three-fourths of the cases actually occurred immediately around and in the vicinity of that horrid nuisance,

4th—and do.

Gormley's Basin and Canal, and the extremely offensive soap and candle factories about them, the rest of the ward being comparatively healthy. The proportion is four hundred and thirty-three per thousand.

2d—and do

The Second Ward has numerous low lots, (or rather ponds,) houses on unfilled lots, small crowded tenements, and few pavements. The proportion here is four hundred and twenty-one per thousand. The boundaries of the ward are shown on the map.

The character and malignity of the cases in portions of this district eminently illustrate the position, that wherever the causes enumerated existed in excess, the virulent character of the disease was usually proportioned, and that there existed there a concentrated influence, inimical to human health and life, that set at defiance, in a great many instances, all skill in medicine, and all the resources of art and kindness. Two of these have been particularly reported to me, viz: the vicinage of Gormley's Basin, and Adele, St. Mary, and Rousseau streets, near it, in the immediate neighborhood of both of which places, the epidemic had some of its earliest victims. Of the first, an intelligent physician, who had a large and painful experience, reports to us, that he "Here witnessed the disease in its most "malignant and revolting aspect. It was not in individual cases "only, that it thus showed itself, but the type in the district "was uniform; day after day I was reminded most forci- "bly of Boccacio's graphic description of the plague in "Florence; they almost uniformly bid defiance to every "variety of treatment. From the very inception of the dis- "ease, dissolution was stamped upon their countenances, "with a distinctness appalling to behold. Not only this, but "even in the small minority that recovered, their recovery "from the fever was followed by the appearance of furun- "culi from the crown to heel; and in one or two their shat- "tered frames sunk under the drain which followed their "maturation. The condition of this portion of the city was "disgusting and revolting beyond all expression; filth of

Malignity of the cases in proportion to concentration of the cause.

"every character crowded the streets, gutters, pavements, "and even the houses in many instances.

Remarks and observations of the same tenor have been made to me by various members of the Howard Association in relation to the cases in Adele street, and its neighborhood, where they so nobly devoted their time for the benefit of suffering humanity.

1st District—Population and cases.

The First District, or next in order, is estimated to have contained 60,695 inhabitants—11,097 cases of yellow fever were reported to me by the faculty and members of the Howard Association and public institutions, the balance, or 3,166, was estimated by the Sanitary Commission, upon the grounds already stated, from public institutions, and physicians not reporting—producing an aggregate amount of 14,263, and a ratio to the whole population of 234 to the 1,000.

The difficulty in accounting for the sickness here is no greater than in the district above it. True, it has more pavements, but a very large portion is without them, and they are of the worst kind (or pebble pavement)—but very partially protecting from evaporation or absorption. The sanitary condition of the whole river front of the First and Fourth Districts was doubtless influenced much by the extensive disturbances of the soil on the opposite side of the river, the wind blowing almost every day from that quarter, and also from the foul ships in front of them.

1st Ward—Lynch's Row Whitney's pickery.

The *First Ward*, bounded by Felicity, Benjamin, Magazine and the river—exhibits the largest ratio of sickness. Here existed the spots of *Lynch's Row*, and a nearly similar one on Tchoupitoulas street, and many other houses in the neighborhood consisting of crowded, filthy tenements, with unpaved yards, privies running over and into the streets, the nests of the lowest and most intemperate population, and so of Whitney's old pickery and of similarly offensive blocks in Pacanier and other streets. These fever fountains have been for years the receptacles and manufactories of pestilence. Whenever an epidemic has visited the city, whether yellow fever, cholera, ship fever, &c., here have been its favorite haunts. "Lynch's Row" is enti-

tled to the pre-eminence, for, I am credibly informed, that during the epidemic cholera in the winters of 1848–'9, no less than 108 dead bodies was taken from it in a very short time. It is conspicuous for its filthy and crowded condition, with overflowing privies and bad ventilation, as they all are. To which add an extensive river front with the banks the receptacle of filth, the batture embracing ponds, with exposure of soil in relaying Annunciation street, during the summer, and intercourse with filthy ships, and the condition will fulfil any expectation of insalubrity, however exaggerated. The number of cases traced to and allotted to it is 459 per 1,000.

Blocks in Pacanier and other streets.

The next worst *Ward is the old Seventh*, formed by the new Canal, Circus and Canal streets, and the swamp. Here we have an extensive disturbance of the soil for laying pipes for five or six squares down Perdido street, from Philippa—the Girod street *Cemetery*, where was buried during the year 638 bodies —the filth from the dredged canal, and the open canals and drains and receptacles of filth from the upper part of the city and swamp in the rear, and the fever nests of *Hoey's and Cole's Rows*, near the Work-House, consisting of small crowded filthy rooms, badly ventilated, with bad supplies of water. This ward is but partially paved, with the same kind of pavement as in the first—the cross streets not at all; in this ward are located two extensive *Hospitals* and the *Gas Works*, occupying several squares, having large open drains and the swamps just in the rear. The number of *cases* of yellow fever in it was 349 per 1,000.

7th Ward.

Nuisances in.

The *Second Ward* having for its limits, Magazine, Felicity and Thalia streets, have scarcely any pavements, the open Melpomene drain extends nearly through its centre, extensive disturbance of the soil occurred for the laying of pipes in Pyrtania, Apollo and Bacchus and Clio streets, and Gormley's Basin and Canal immediately adjoins it. The proportion of sickness was 277 per 1,000.

2d Ward.

Causes.

The next in rank is the *Fourth Ward*, margined by Thalia, Camp to Julia and down Julia to and with the canal. This is characterized by having the open drains of part of the Melpomene, with its refuse of city filth exposed to the atmosphere, the open Triton Walk conduits and the stagnant canal, with the

4th Ward.

Cause.

exposures for laying down pipes in Prytania and Camp streets, Apollo and Bacchus streets, extensive exposures of earth for several squares (5 or 6) in Erato street, from Dryades for the same, also at the lower end of Calliope street, for the same and for railroad purposes. The ward is but partially paved and very badly drained in the rear, and very low, and badly supplied with water for the purposes of cleanliness. The proportion 216 per 1,000.

The *Third Ward*, bounded by Benjamin out to Camp and down Camp to Julia, and thence to the river, embraces the crowded thoroughfares and dwellings about the market and in North and South streets; the fever brooding place of 82 *Julia*, better known as *McConant's* or *Mitchell's Yard*, *Leed's Row*, on Melicerte street, the old German Theatre on Magazine street, and about the "triangle" with their crowded, filthy and bad ventilated rookeries, with a large exposure of batture in front, and its filthy bank and wharves—the result here is 164 per 1,000. 3d Ward. Fever nests.

The *Sixth Ward*, within the limits of St. Charles, Canal, Circus and Julia streets, is well paved (but with pebble stone only) and contains the dangerous nuisance and fever spot of *Kirwan's Row*, in Philippa street, sometimes known as "*Irish Row*," and was the theatre of a large mortality last year from the crowded, filthy and unventilated condition of its rooms—the same objection holds to the confined and crowded buildings around Poydras Market, and the filthy and immoral receptacles in Perdido street, and the "fever nests" produced by the large *livery stables* vitiating the atmosphere of an extensive neighborhood, near the very centre of the ward, and having the refuse of extensive hotels. The proportion is 121 per 1,000. 6th Ward. Fever nests. Causes.

And lastly, the *Fifth Ward*, bounded by Julia, St. Charles, Canal and the river: this ward is similarly placed, and being the location of the principal hotels and restaurats, is exposed to their refuse, with their susceptible subjects of recent immigrants and strangers, its bad sanitary condition must be attributed largely to the disturbance of the soil in preparing 5th Ward. Causes.

to erect the large number of new buildings in front, and in taking up and preparing for new pavements there, and for gas, and water; the extensive batture and filthy river banks and wharves, and the large livery stables in its limits. These last mentioned wards were not visited by the fever until a late period. The proportion here is 119 per 1,000.

2d District. Population and cases.

THE SECOND DISTRICT.—This contains an estimated population of 49,926, with 3,145 cases reported to me by private practitioners, and occurring there, known to the Howard Association, with an allotment of the balance to make up 4,377 cases, or 87 per 1,000. The cause of this immense difference is obvious enough, and although the several wards differ in their proportions of these cases, the causes are as manifest as their great difference in amount.

2d Ward. Causes.

Ward No. 2, bounded by Canal, Rampart, St. Louis and the Swamp, having more than double the amount of the average of the district, or 173 per 1,000 embraces in its limits all the *cemeteries* of the District, (of *four squares*) and in which were buried last year 1,163 bodies, the open and half stagnant Claiborne and Canal street drains, and the filthy conduits in the rear, the receptacle of a large portion of the foul and corrupting materials of the upper part of this portion of the city, and vicinity, and the influence of the swamps and open drains beyond.

5th Ward. Causes.

The Fifth Ward, immediately North of this to St. Philip street embraces the open canals, Carondelet and Claiborne, the recipient of the filth of the upper portion of the city and not beyond the influence of the large exposure of earth made for this canal and its new basin, and its enlargement. The proportion here is 123 per 1,000.

The most of the balance of the cases in this district occurred in the front portions of the third, fourth and sixth wards, in the vicinity of the markets, and in the disgusting and horrid purlieus of this neighborhood, in the first few blocks of *Main street, Philip and Ursuline streets, and in Gallatin street.* Language fails in portraying the loathsome ex-

hibition which these *fever manufactories* presented; they can only be paralleled by some of the plague spots in the first and fourth districts. A large portion of them consist of boarding or rather lodging houses, occupied, many of them, by crowds who only sleep there, eating and working out, with no privies, (these being monopolized by the tenants on the ground floor,) the streets and levee opposite are used for this purpose; small rooms are sometimes occupied *by whole families;* some use them for raising fowls and dogs, and as receptacles for vegetables for market, and the refuse of the unsalables of the market, from day to day, with little regard to removing the half decayed relics. No doubt these conditions were greatly aided by disturbing Chartres and Royal streets, for relaying pavements, and Bourbon street, for laying down large water mains. An active and efficient practical member of the Howard Association, who attended in this part of the district in his report to me says that "along every street where *paving or digging* for laying the water pipes was carried on *the disease was remarkably more intense*, and also, from actual observation, here and in St. John Baptist, the mortality was greatly in proportion to the rooms or houses being nearer the ground." The filthy state of the river bank opposite, (the river being very low, as it always is during our epidemics,) and particularly that portion devoted to the drainage of sugar and molasses. The balance of that district is comparatively healthy, being well paved, with a large proportion of acclimated population, which aids much in explaining the comparatively inefficient influence of the pestiferous spots pointed out, on the population.

Fever nests in front of the 2d District described.

Is it at all astonishing that pestilence here has its favorite haunts? Is it not more astonishing that it does not exist here, and in such places every year—nay, all the year? Nothing shows clearer to my mind the conviction of the true explanation of the views put forth in a preceding section in relation to the necessity of the existence of *two conditions* for this class of fevers. It surely is a munificent and merciful dispen-

The reason why yellow fever, &c., not all the year, and why limited to 60 or 90 days.

sation of Providence, otherwise, the local population of such tainted spots that I have pointed out would be entirely cut off, and why is it that yellow fever epidemics have a limited duration of from sixty to ninety days, whether it breaks out early or late? the meteorological change always ensues, *with—drawing one of the conditions* on which the pestilence depends!

3d District, Population and ratios.

The Third District contained an estimated population of 28,202, in which 2,409 have been reported to me, and 823 have been allotted to it, (as before explained of the other districts) making 3,232, or 114 to the thousand. This is a large number for that district, and arises mostly from the crowded and filthy condition of localities and houses devoted to purposes such as I have just described about St. Philip and Main streets; these are their rookeries in and about Enghien and Moreau streets, the dirty, rag depository on Ferdinand street, a four story block, the receptacle of every species of outcast filth; cheap lodgings for immigrants, and the poorer and more reckless of the laboring class, requiring always the closest surveillance on the part of the civil authorities to prevent their creating and evolving a poisonous atmosphere that will infect the neighborhood, and in no situation is the paternal kindness and vigilance of municipal government more conspicuously shown, than in correcting and repressing the haunts and manufactories of disease, crime and vice. It is arresting it at the fountain head, it is ascending to its *sources*. The cupidity of landlords who lease, and the sub-lessor, even to the third and fourth classes, who does it under him, the sole object of whom is to derive the largest profit out of the smallest space, and the least trouble, doles out to the poor occupant the least possible space; these, in many instances, are immigrants, who are ignorant of the pregnant fact that crowding here is much more dangerous than it is in cold climates, where they come from; it is also composed of a large portion of our valuable laboring class, who are mostly reckless, and also ignorant of or unable to apply any measures

Consequences on the community.

of personal hygiene; the consequence is the inexorable penalty, in loss of health and life; the neighborhood becomes infected, and the community suffers directly, and indirectly, for the support of hospitals, infirmaries, and orphan asylums, the repression of crime and vice, the extension of disease, and also in the loss of labor, that is one of the main ingredients in its wealth, and in loss of character

Most of the cases in this district were from *public practice*— (that is from eleemosynary associations,) showing at once the character of the subjects and the sources of the disease. The balance of the district exhibits a very low milesimal insalubrity. The disturbances of the soil, in digging for laying down pipes, and the cleansing out drains, and exposing their detritus to the summer's sun, and the filthy bank of the river in the neighborhood, being the common deposit of filth, here existing the greatest insalubrity, (this nuisance has been a common cause of complaint for years,) together with the polluting air of a cemetery, in which was buried during the year 2,446 bodies, aided much in adding to the number and force of the epidemic here. The map shows the location of these, and reference to Table R will exhibit the state of each of the wards, here and throughout the city.

Cause of insalubrity.

In the allotment and distribution made of the cases to the several wards and districts, it will be seen that there is a vast difference in numerical ratios. It is to be borne in mind, however, that there is a great difference in the relative number of the acclimated in each of the districts, being greater in the respective districts in the inverse ratio of the number of cases, but, most manifestly, in insufficient amount at all to diminish the force and nature of the conclusion come to, that the cases occurred in precise proportion to filthiness and crowding, and the other conditions named of the several localities specified, and some of these in the Second and Third Districts, would nearly vie with some of the worst in the districts above, and had the proportion of unacclimated subjects been greater, the number of cases would more nearly have equalled some of the worst fever nests and plague spots up town.

The number of acclimated population diminishes the ratios.

Algiers.

The condition of the population on the opposite side of th river, is not embraced, directly, in our investigations, and hence it has not received that attention we have devoted to this, and our information is less definite and special. The white population is estimated to have been about 3000, and there was probably fully half that number of cases of fever. This was, no doubt, mainly caused by the large disturbance and exposure of the soil for the railroad and levee.

Population, ratio and cause.

Origin of the fever.

It is well known that the disease commenced at its various headquarters—pest houses and infected localities, and the filthy shipping mostly from Northern and European ports, about the same time; that it continued in most of them throughout the season, that in a very few (probably but one) it attacked the most susceptible subjects only, and then abated for the nonce; that it always seizes the most susceptible first; that this is usually in the filthiest, worst drained and paved, and worst ventilated and most crowded portions of the city; that here it seems to gather force and strength, and extend to neighboring portions, that this was specially verified with us, and that to show the nature of pavements alone, it was at least a month and even more after the epidemic broke out, before it reached the paved portions of the city, and those grades and classes of society that paid more respect to their hygiene—personal and domestic—that so influential are these in their protective capacities, that some susceptible families and subjects, living almost in the midst of the infected districts, escaped, almost entirely, by proper attention to them; that, finally, the whole city atmosphere seemed more or less tainted with the influence and extension of the poison, as the *materies morbi* became more matured and the resisting power overcome, as if the multiplication of decay, disease and death consumed the ozone or purifying element in the atmosphere. It thus seemed to form an electric chain—the links successively feeling the influence until the whole becomes affected and surcharged. Northern cities are differently situated from ours in their variations of elevation, and of course, in their atmospherical relations, an epidemic yellow fellow has *consequently never prevailed throughout their entire extent.* So true is it, that the

How the fever spreads from locality to locality.

Difference in Northern cities, and cause.

conditions we have taken so much pains to point out, find illustrations and applicability every where.

There is no arguing against facts,—the most unprejudiced—the most unequivocal testimony is furnished by intelligent men who have no theory to support, in the fullest corroboration of the practical views set forth in this report. And it requires nothing but a visit and familiarity with these haunts of disease and festering sores to convince the most skeptical that filth (crowding is the same thing—for it speedily generates it) high temperature and humidity produces yellow fever,—and yellow fever of the worst form,—that its type usually depends upon the concentration of the productive causes, with individual exceptions, with strong resisting power—the *exceptio probat regulam*,—that from these *foci*, it emanates as by radiation and expansion —dependant somewhat upon the direction of the wind, and thus contaminates the entire community (where the conditions can be assimilated.) These facts are conclusively shown by the manner in which the disease originating in these centres—spread during the last summer. And it is well known that where yellow fever is not the result (as this is confined to a certain class of subjects) nearly all other diseases are aggravated by it, by lessenning the tone and vigor and resisting power of the individual. All then are interested even to the extent of the health and lives of their families, in the earliest adoption and strictest application of sanitary measures—and to be coerced with the whole force and funds of the body politic.

No resisting plain facts.

Why all interested.

With all our labor, and it has not been small—we have proved little more than has been proved a thousand times before,—that one of the most efficient agents in the production of yellow fever is filth of all kinds. May it be estimated as a corroboration of antecedent and well established facts and convictions;—may it make a *practical* impression at home, since they have occurred in our midst, and been but the application of the pregnant facts occurring in localities, that cannot be forgotten by those who witnessed them. If there are other opinions,—as would seem, by our having done so little heretofore to prevent

The occurrences around us more apt to be impressive.

these terrible results—they have been gravely rebuked by the occurrences of the year, and must now yield to the demonstration before us, "*opinionem commenta delet dies—natura judicia confirmat.*"

No man can say—or ought to say—that he can dodge—or is uninterested in this question. If he is no longer subject to *yellow fever*, yet vitiated air affects the sanitary condition *of all.* Is there one so insulated that has the effrontery to say, he is not interested in what so deeply affects the welfare and prosperity of society, pecuniary, commercial, social, moral, religious? if so, society should arise in its might and banish the wretch from among us,—he is no longer fit to participate in the numberless blessings for which we are indebted to the kindness of a merciful Providence.

Proportion of natives and those born elsewhere in New Orleans.

The largest portion of the population of this city, has had their nativities out of the State. The United States census of 1850 informs us, that *but one-third* of the population only claims a *Louisiana* nativity or 38,337,—that 18,136 derive theirs from other portions of the United States, and that 55,541, or nearly half come from foreign countries, leaving out the colored population altogether. The proportions in which they have been affected by the epidemic, is stated in table H. On the "cost of acclimation"—Section III. It is evident that this large immigrant population, forming more than two-thirds of the white population of the city—and constantly augmenting in a still greater ratio, claims the greatest value—in measurably making this city what it is (and what would it have been without them?) and every consideration in a hygienic point of view, for they form the element of its future growth and destiny.

SECTION X.

REMEDIATE OR PREVENTIVE MEANS.

How far man can control temperature, moisture—Influence of wooden houses—Best pavement—How to influence winds—Whence their bad qualities. How and when streets to be

cleaned—Custom elsewhere—Empty lots as a source of disease—Other causes, Gormley's Basin. Streams of running water in the streets. Difficulty as to privies—The great one—How remedied—Value of drainage—No farther burial in cities—Best water, what—City water and city air the same—Plenty of water required for health. Surveillance in erection of houses—Certain buildings forbidden in cities for a two-fold reason—Influence of social habits on yellow fever.

In the practical application of these important measures, the only value of the preceding investigations—we propose treating them in the same order we have heretofore embraced.

HEAT AND RADIATION (i. e. direct and indirect.)

To say that man has no influence on meteorological conditions, is to degrade him to the level of the lower animals. Man is, probably, the only animal that understands how to arrange temperature to suit him and apply it to his diversified wants, and has been defined by some naturalists "a cooking animal." Temperature when too great is controled by domestic covering of various kinds, by large rooms with lofty ceilings and by occlusion. St. Paul's in London, is said to be 10° cooler than the surrounding buildings (from its vast extent), and so of all large rooms. By excluding reflected temperature and keeping the rooms dark, we can here procure a temperature, seldom exceeding 82° 4'. So great a difference does this make when effectually done, when aided by thick walls to prevent the transmission of heat, that we can in this way approach the average temperature of the latitude. The depression accomplished in this way, at the North, between in door and out door temperature, is so great that some physicians there, have given it as their opinion, that it may be even hazardous to health! Large rooms with the power of perfect occlusion here, would answer many valuable purposes. They would not only be cooler, but supply a body of fresh air, and if opened at proper times only, be drier. No one, rightly informed, dreams of a high temperature being the *sole* cause of yellow fever; otherwise it would prevail over half the habitable globe. That a prevalence for some

Man's influence on temperature.

months of a range from 80° to 88°, is essential to its production has been shown in another place, and is undeniable. With an average temperature *throughout the day* of about 79° during *the five warm months*, every mode by which we could protect ourselves from direct and reflected temperature should be adopted, planting trees in the public squares and broadest streets, furnishing shade and pure air during the day, and absorbing the noxious gases during the night, encouraging the erection of verandas to our houses, erecting an extensive shed on the river bank, where is the greatest exposure of the unacclimated population, and serving for recreation when the business hours and business season is over, during the sickly period of summer, streams of water constantly passing through our streets during the day (not night,) would greatly promote this important and healthful purpose, the more so as the temperature of river water is much below that of the air.

On a larger scale.

The important *practical* question then is answered, that by these means we have much control over temperature. This is done on a large scale, by extending our improving hand into the neighborhood, removing the forest growth, and draining the swamps and cultivating the soil. We not only lessen the amount of moisture thereby, which does so much injury, but exchanging the moist to a dry condition, we increase the perflation thereby, and hence by increasing evaporation (the drying power) and lowering the dew point, we really lower the temperature to our feelings, at least 5° during the warm months now, and it would be greatly increased with the improvement suggested. This has actually been already accomplished here in relation to temperature to a certain extent, by our more extended clearings creating increased ventilation, beyond that enjoyed in 1807–'10, for by comparing Lafon's tables at that period and ours now, there is an average depression of about 3°, while the extremes are less.* The influence of temperature is so great on health that it has been ascertained in London

Actual proof here.

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* See chart to Report to State Medical Society.

from actual observation, that a depression of 10° *in winter* is fatal to 300 additional of its *poor* weekly!

It is perfectly obvious, the nearer we can make a city approach the country of its vicinage, as to heat, moisture, dryness, and cleanliness, and all those conditions which conduce to purity of air, and of course, salubrity, we shall, in the same proportion, improve it. There are few rural districts in the United States much more healthy than those in our neighborhood. The average mortality during a very sickly year, when the United States census was taken, made it amount to about two per cent., which is a convincing fact that the climate is not sickly *per se*, but has become so from superadded conditions. Let this encourage us to renewed exertions and bring it back to what it has been and *ought to be*.

Just how it ought to be.

Moisture, probably the most important meteorological condition that influences the health of man, is the moisture in the atmosphere, I mean that condition which is beyond and measurably independent of rain. This is *measured* alone by the hygrometer, its destructive influence when conjoined with a high temperature is well known and has been dwelt upon in the preceding pages. Rains, in ordinary seasons serve to deplete temporarily, the atmosphere (as shown by the hygrometer,) not so last summer. There was almost constantly a high dew point, indicating a repleted condition, productive of a want of elasticity in the air, a constant sense of great fatigue, easily induced, an exhaustion of nervous energy and a constant demand upon the system for a fresh supply of power to sustain the flagging energies of life; the perspiration became offensive "funky" that no washing could long remove, and may have aided in giving rise to the opinion entertained by many of the faculty, that they "could detect a yellow fever subject by the smell alone."

Moisture.

Most fortunately for us, this most destructive agent can be greatly controlled by a removal of the multiplied causes of its existence in this city and neighborhood, which has been pointed out, as our unfilled lots and squares, (in wet seasons made ponds of) unpaved and half paved streets, (as pebble pavements may

How removed and remedied.

be denominated), and back yards, our partially drained vicinage, open conduits and neighboring swamps. Hence the constant fogs to which we are subject, the dampness of our stores and houses, immeasurably increased by the erection of buildings directly on the damp soil, (the floors thus lasting only three or four years), instead of being at least a foot above it, for the purpose of ventilation. The first stories of all buildings are more damp, and consequently more unhealthy, than those above them—moisture not being an elementary constituent of the atmosphere, but only held in suspension by it. The Italians know this so well, by long experience, that they only occupy the upper apartments for sleeping. We are thus, measurably, above its reach, and the higher the better, especially during the existence of mortal epidemics, and particularly during those hours when we are most susceptible of disease (at night.) That poisonous exhalations that affect our health are limited to the lower strata of the atmosphere, from whence they arise, there is little doubt. Whether it arises from its combination with moisture, it has not been certainly ascertained, although most probable. As a practical proof of these views, it is well known that when in Constantinople, Aleppo, and other cities of the East, Europeans retire to a domestic quarantine, during the existence of the plague, they escape the disease by confining themselves to the upper floors of their houses. In like manner in the lower districts of Maryland, Virginia, the Canadas, and Georgia. Those persons who sleep in the upper stories are, during the autumnal season, most exempt from bilious fever.

Italian custom.

In the East during the plague.

Wooden houses here, besides decaying sooner, are more liable to partake of all the Hygrometric (as well as thermal) properties of the atmosphere, than brick, and hence should be discouraged as more prejudicial to health in this climate. Doctor Rush has said, that in the yellow fever of Philadelphia of 1793, the greatest mortality took place in wooden houses. This certainly accords with experience here and in Savannah. In Northern cities much improvement in salubrity has been ascribed to

Why wooden houses bad

the abandonment of wooden materials in the construction of houses, and in London, an exemption from the plague since the great fire of 1656. The liability of liquid filth to sink into and adhere to wood, will aid much in accounting for its insalubrity, besides the meteorological explanation of its great liability to decadence. It was a noted commendation of an Emperor of old, that he "found Rome built of brick, and left it of marble." I trust it will be the distinction of this generation to substitute brick or stone for wood in all cases in this city.

Experience elsewhere.

A large portion of all this can be remedied by a *perfect pavement*, which, for this climate, should consist of *materials that would neither admit of absorption nor evaporation*, by a *thorough*—not partial—(for then it is much worse) *draining of the entire neighborhood*, and *then* a renewal of the forest growth. Here ventilation comes in to the aid of temperature in the desiccative process. By having the drains covered, by filling up all low lots—if these are done effectively, and the system of draining duly adjusted—it *must be* drier in the city than in the country. But if the roofs of the houses are of shingle, and no pavements, and imperfect drainage, the water that falls settles or sinks mostly in the soil, sapping the foundation of the houses, rendering the floors damp and filling the air with vapor, or remain in the soil until an elevated temperature brings it forth in all its fatal combinations.

Thorough drainage.

Paving necessary.

The best protection that exists against most of this, exists in a *pavement* that will neither absorb or retain water or anything else; that is, one that neither permits absorption or sinking into the soil, nor exhalation from it; that, while it is perfectly convenient for all the purposes of communication, either of pleasure or business, at all hours and seasons, rapidly carries off the water that falls upon it, which, to us here, is of almost equal importance. This is nearest fulfilled by one of iron, by cement of different compositions; next, with cubic blocks of stone, united by cement; then, of thick plank, and *lastly*, by round or pebble stone. To these last, the objection is very

What constitutes a perfect pavement.

decisive, as it fulfills but in a very partial degree the primary objects mentioned. It permits both absorption and exhalation, and especially retains, in its numerous interstices, all the filth that falls on it. There is another objection to it, in the difficulty of keeping it clean. It requires ten times more labor than those do which are smooth, and the practice is freely indulged of allowing the dirt so scraped up to remain for hours or days in the streets, to be washed into the gutters by a transient rain, or trampled in by travel, before removal—thus doubling the labor and increasing the danger—while all that the others require *could be exacted* (without much burthen) *from the front proprietors daily.*

The city may be made drier than the country.

If, then, the pavements (in streets and backyards,) are all perfect, the city would be *actually drier* than the country, a most important accomplishment for every purpose. With abundance of water, filth is easily removed *before decomposition*, and we thus, at the same time, obtain *two* important objects, the prevention of moisture and the removal of filth.

Proofs of the value of pavements.

The value of pavements in the prevention of disease, is known in all cities, in every quarter of the globe. It has been eminently illustrated in Philadelphia, Norfolk, Louisville, indeed, in every city on the continent, and beyond it. They are more eminently applicable in a hot climate, with a constant reservoir of moisture beneath, than elsewhere.—It is recorded of Vera Cruz, that so great was their influence that after that city *was paved, there were eight continuous years of exemption* from yellow fever, notwithstanding there was a constant accession of foreign population from abroad and the interior!

The drainage by machines, in the rear of the city, should be so effectual that no water should exist within two or three feet of the surface, and that, no doubt, can easily be done. They have already materially lowered the before invariable level of the water beneath our city and suburbs, and the land has *apparently risen* near a foot in consequence.

It is satisfactory to know, that we can both moderate the

amount of rain liable to fall, and the amount of moisture as shown by the hygrometer. An extensive, dense forest growth not only invites moisture, (that is rains,) but retains it. Its removal, in clearing the country, is known by experience, to dry up springs, and actually lessens precipitation. I found by measurement, (with my rain gauge,) about one-third less rain in the vicinity of Vera Cruz and Havana, than Baron Humboldt did more than half a century before, most of the original growth being removed by a reckless clearing. The Spaniard cuts down, he never plants, as seen wherever he has established his foot. Spain is probably the most denuded country in Europe. Both the soil and climate of Cuba have been impaired by this wretched system, the seasons altered and the country impoverished. The same has been effected in that beautiful country, Mexico; the foot of Attila has been planted there, and comparative sterility has followed, and were it not for what Baron Humboldt calls "the force of the climate," in many parts of it, sufficient nutriment could scarcely be raised for the support of its inhabitants; and, as it is, occasional famines desolate the population. Such, also, occasionally occurs in our own states, from our rather reckless clearings; the rain gauge has not been sufficiently long in use to measure the exact differences.

Influence on amount of precipitation.

Clearing the low country then, and thoroughly draining it, dries it, and as it has been shown, greatly tends to improve its sanitary condition, is urgently demanded here.

As stagnation of air is always accompanied with most moisture, the converse is equally true. WINDS disperse it, and powerfully add to the desiccative process; and this is in proportion to the *force* with which they blow, and the quarter whence they come. By reference to the table of the "hygrometry of the winds," in the annexed tables P and Q, the amount that each brings to New Orleans, on an average of a series of years, is shown. That from the Northwest having the least, and that of the Southeast most. By clear-

Influence of winds.

ing the country, not only is the *force* of these winds increased, but probably their frequency. "*Force*" of the winds is explained on the caption of the tables, and from actual experience, it has been ascertained, that the quantity of fluid removed from the system, (or surface exposed,) is found to be nearly three times as much in a "moderate breeze," and upwards of four times as much in "a fresh wind," as in a calm or stagnant state of the atmosphere.

Their properties.

To winds have been attributed various *occult* qualities, with special powers; these we pass over, as below our notice, the accuracy of modern science demands something more definite. There are certain qualities which we know they possess, and they are expressed in the above tables. The much dreaded Chamsin, Simoon, Puna and Harmattan are known now to derive their deadly properties mainly from their possessing the *desiccative property in excess*; whatever else they may contain is more a matter of inference. When, for instance, winds blow over certain marshes, or other places, it is deemed that they derive certain properties, from the effects that follow; and this is found in certain countries as an invariable sequence, as that yellow fever never occurs unless where there is a great accumulation of filth, hence it is inferred, that there is some essential connection between filth in the one case, and certain qualities in the marsh in the other. Our epidemics are always accompanied with the predominance of the East and Northeast winds; these blow over marshes, (our Pontines,) mostly covered with a forest growth, which, although not impossible to drain and clear, are far beyond our present resources. These East and Northeast winds, are those also which predominate in Savannah during their epidemics. "For twelve miles they pass over the margin of the river, absorbing the moisture and the poisonous gases on its margins." They have been remarked from an early period, and are called there the "Samiel of Savannah."

But there are winds that bear deleterious properties, and that usually predominate in our autumnal seasons which are in our

power, and it becomes our duty to correct, viz:—the *North wind*. This wind blows over the six or eight miles of swampy ground. between Lake Pontchartrain and the city, conveying to us whatever is injurious from it, and is almost entirely under our control, that is, so far as *these deleterious properties* are *concerned*. With these corrected by perfect desiccation, clearing and planting, (shrubbery, grass, &c.,) we shall then enjoy the *protective qualities of the Lake breeze*, so much needed from that quarter, and which gives to New Orleans what no Southern city has, viz:—protection from the *too great* desiccative properties of this wind at a period of the year, (the autumn,) when a certain amount is required for health.

Our influence on the North wind.

The *removal of filth*, as the cause of impure air in cities, and all its baneful consequences, is, at once, the great difficulty, and the first duty of the municipal authorities of all cities, inasmuch as the lives of the citizens is of more value than anything else. And yet, how incompatible with this very natural feeling are the main expenditures of city councils and what a small fraction of the revenues of cities is devoted to the *Health Department!* When the *true interest* of bodies politic and social are *understood* and appreciated, it will be altered.*

Small revenue devoted to preserving health.

As the first great cause of our *epidemics* (the disturbance of the original soil) is certainly the most deleterious, a city ordinance should be passed forbidding it, *to any extent*, during the season of elevated temperature, that is, from May to October, for any purposes whatever; and so of analogous conditions, clearing out and exposing the filth of canals and impurities of all kinds, of half-dried swamps, &c., of the great exposure of filth by deposits on the river bank, and the duration of the exposure of street filth, after it is collected or *spread* upon the streets.

To forbid the turning up fresh earth in hot weather.

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* In the estimate for the expenditures required for Health in New Orleans for 1852, it was deemed that $10,000 was sufficient!—The *direct expenditures* were more than *seven times* that amount and from foreign sources, hundreds of thousands were obtained, and the city injured to the extent of millions! Not to be benefited by an experience that ought to have been so valuable, but to pass the wave of oblivion over it as of the hundred lessons before; this year's estimate for *the same was also* $10,000, while $15,000 was to be devoted to the requirements of the *law expenses*—showing their relative estimation, out of a revenue of $1,600,000! A fair specimen of our reckless injurious follies!

Back yards fountains of filth.

We next proceed to that source—the fountain head of the contamination of city air—we mean the *back yards*, where all the offals and filth of families is concentrated, including privies. As this requires a different action in the present or contemplated condition, we shall separately consider it, and proceed, first, to recommend a mode to get rid of the former.

Filth removed before decomposition,

Every yard should be paved in *cement* and graded to the street to facilitate the removal of rain and refuse water, and prevent it and filth of all kinds, being absorbed into the soil, and constitute a sore to fester wherever the temperature is sufficiently elevated to invite it, which is the case here, nearly the whole year. In each yard should be a well constructed sink below the hydrant and falling into covered drains which should lead to the street sewer. The entire offal of each family should be thus carefully run off daily *before decomposition* ensues, and this great source of domestic indisposition *prevented* by thorough domestic cleanliness, and this is only to be effectively done by abundance of water, the solid parts to be conveyed *directly* to the dirt-cart, notice of its arrival being given by a small bell—the cart should be a close one.

And before sunrise.

It is our deliberate conviction that all street and yard filth should *in this climate*, be removed before *sunrise*, (at least in the hot season) before the influence of the morning sun has had power to exhale the poison of the compost to the atmostphere, and before drays and carriages or rains have spread it again on the streets, and the dirt-cart should *immediately* follow the scraper, and by *sunrise* every thing be found clean. This night work is done in New York, and although not sufficiently done, *yet it can* be, and *ought to be*, and particularly *here*. In the city of Mexico an excellent custom prevails of enforcing upon tenants the duty of sweeping their half of each street to the centre by *sunrise* every morning, and thence it is removed by the public carts. This could be most reasonably and should be, exacted here on all streets where the corporation has incurred the additional cost and the occupant enjoys the additional privilege, of having square blocks placed before his property. It should be required for seven

Cus om elsewhere.

months *daily*, and for the balance of the year *weekly* might suffice. The dirt should be removed to the rear of the city. This, with the water running in the streets (as advised by our colleague Professor Riddell) would effectually answer the important purpose of keeping the portions mentioned clean and pure.

Bank of river kept clean.

No filth must be left on the *banks of the river*, and a special police be detailed when the river is in a falling condition, which is precisely that period of the year when it is most dangerous to the public health, (viz: July, August, and September). See tables C, D, and E.

Low lots filled up.

All lots lower than the crown of the street should be filled up immediately.

Vacheries and manufactories removed to a certain distance.

Livery stables and vacheries, containing over four head of cattle, should be removed beyond any square containing fifty population or ten dwellings; the same of all *slaughter-houses*, *soap, bone and candle manufactories*, or others creating nuisances; all chimneys connected with any manufactory or trade injurious to the public health (as defined and interpreted by your Health Department), should be removed summarily, if the offensive material or quality cannot sufficiently be got rid of by the chimney being elevated high enough to consume it, or extending it beyond the atmosphere of our dwellings.

Gormley's basin filled and planted.

Gormley's Basin should have lime spread over it and filled up, and the space planted with trees and shrubs, and the place appropriated to the public as a square for recreation and refreshment; the canal leading from it, together with Melpomene, and all the draining canals, covered, and when cleaned out—which should always be done in the winter season—their dangerous filth immediately removed to a distance, and in bulk, and lime spread on it.

Running water in the streets.

Our project contemplates *running water constantly* through the streets *during the day*, and all the draining canals, and as the temperature is, on an average, at least five degrees colder than the temperature of the air, it would aid much in cooling the atmosphere of the city.

Whenever *stagnant water* is exposed to the sun in moderate

temperature, vegetable infusoriæ, of the class algæ, and also fungoid vegetation, appear rapidly.* Many tribes of these vegetable productions appear to die with great rapidity—sometimes in one or two days—and then decompose. Immediately after these, animalcular life appears. Stagnant water is the most favorable to this order of vegetable productions, which, in giving rise to animalcular life, appears to keep pace with the animalized excreta discharged in the house drainage of towns. This insalubrious order of production is indicated by the smell in stagnant or nearly stagnant ornamental waters, such as the stagnant portions of the Serpentine rivers, which have excited so much declamation. Certain degrees of motion in water are unfavorable to the production of *algæ* and other infusorial plants, the tissues of which are destroyed by swift motion, but a large portion of them are found in slow running waters or open canals with little traffic. The same round of life and death also takes place in open and shallow reservoirs, and in open cisterns, where the water is frequently changed.

How efficient

Light, however, appears to be necessary to the production of infusorial and fungoid vegetation, and their formation is prevented by such covering as excludes the light and heat of the sun.†

Light required.

Night Soil.—This is one of the greatest nuisances of large cities—probably the greatest—as tending more to the deterioration of the purity of the atmosphere than any other, and is the most difficult to be got rid of, where declivities are not large and water power great. Its large amount—the poisonous qualities of the gases extracted from it constantly, in a high temperature—lie at the foundation of all health and police laws. Its exclusion from the body after the purposes of life have been served, and its removal to such a distance as no longer to contaminate the air he breathes, are almost equally essential to healthy existence. In our position, water is so near the surface of the earth (say from two feet to six inches), dependent upon

Night soil one of the greatest difficulties.

* Report General Board of Health of England.
† Report General Board of Health of England.

the amount of rain that has recently fallen, in digging a pit to receive it, water rises, and the surface of the night soil is always near the surface of the earth, offending the olfactories and vitiating the air, situated, as it usually is, in the *least ventilated* part of our premises. It is proposed, then, that privies be built above, or partly above the surface of the ground, in cemented brick work and proper water closets, with the curved tube, rendering it impossible for any gas to escape from them. From near the top of this pit is a tube or pipe, at whose exit is a strainer, to the street drain, admitting only the liquid part. It thus becomes mixed with the water *constantly passing* through the streets, and is at once conveyed away and its impurities destroyed and sunk in the larger body of water with which it is mixed (one part to two hundred parts of *water being found to neutralize all its impurities.*)* Where this is not effected—or in the condition in which the privies are now throughout the city—immediate steps should be taken that every chamber or pit containing night soil should be rendered air-tight, and *connected by a ventilator* (a tube of an inch in diameter will suffice) *to the kitchen chimney;* and as there is almost always a fire there, and consequent upward draft, the gas would either be decomposed by the high temperature or carried so high in the atmosphere as not again to descend. When the pits become full, they should be emptied, and whenever this takes place, deodorizing substances should always be used, and probably the aqueous solution of the chloride of zinc is the best. As some families are disposed to neglect this important duty, to the great annoyance of their neighbors, it is recommended that the *vidangeurs* be licensed here, as elsewhere, under special instructions from the Health Department;† that no privy be emptied but by its cognizance, and that period be recorded in a book kept for that special purpose, stating the street, house, &c., so that it may be known to this Department who neglects that important duty. All should be thoroughly emptied and deodorized in May and June. An inspection of the records will show who is delinquent.

How remedied.

If not water closets, remove gas through the chimneys.

Swamps and Drains.—Running water in the streets absorb the vitiated gases, removes the lighter filth, dilutes the worse and

* By actual experiment. † Without cost.

Effect of running water through the streets.

refreshes the atmosphere. The larger drains should be covered, for reasons stated in a preceding page, thus having all the advantage of underground sewers. A full and perfect drainage is of great importance to the city. To the extent it has already been carried, it will have accomplished much good for our *future*, when it shall have been perfected in the manner stated. It has already materially lowered the line of former invariable level of water. The valuable space gained has been large. It has been found the invariable result of the extension of drainage in other cities that the portions so drained and those paved have greatly improved in health, in proportion to their proper extension, and that drainage alone vastly improves the entire neighborhood.

Swamps to be drained.

The swamps in the neighborhood must be effectively drained, and that hot-bed of pestilence removed, and the distinction is really very small whether one dies of yellow fever or any other disease of the zymotic class—intermittent, bilious fever or bowel complaints. These, and particularly the first, have greatly increased since the last eight years, during which the imperfect system of drainage and clearing has been progressing in the rear. No! The drainage must be *at first, thorough and complete* :— the forest-growth may then be removed with safety, when a new under growth shall have sprung up out of the recent marsh, to protect the otherwise exposed soil.

Cemeteries in the city closed.

The inevitable ills resulting from the SIX CEMETERIES mentioned in a preceding section, can only be effectually remedied by forbidding further interments in them, and invite the proprietors for the sake of the living, to select a more appropriate and retired spot, more free from the encroachment of any future crowded habitations. The propriety of selecting a much more remote spot, will be the more apparent, when I mention, that a cemetery once occupied the very centre of the business mart of this great city, near and about the corner of Canal and Camp streets! and another where the present basin of the Canal Carondelet has been dug. Say, what would have been the consequences had *they* been continued? And yet we still have most of the present city cemeteries in comparatively central positions, in close proximity to large mercantile and crowded populations! Surely,

our progress of extension is not to be arrested, by the injury liable to be sustained by the vicinage of corruption, or by awe of or regard for their lamented remains!

That the mortality is not greater immediately around them to the natives, (of which we are ignorant) may arise mainly of its consisting of an acclimated population, though *it must be* injurious to all, as materially aiding to impair the purity of the city atmosphere. (That it is highly injurious to the unacclimated—See Sanitary Map.) It is now a common sentiment, almost universally prevalent, that intermural interment, is injurious to health, and should be strictly forbidden by law.

Plenty of water of the best kind.

Pure Water and an abundance of it, are as essential to health as the air we breathe In this city the capacity for obtaining both is unlimited. The river water from the great length of the stream, has deposited most of the organic particles that shorter streams obtain from the washings of the earth by rains, and when its mineral admixtures are deposited by infiltration, it bears the reputation of being one of the finest waters in the world. Nevertheless, there is a general concurrence, ancient and modern, that water that has fallen in rural districts and percolated through a sandy soil and there collected, is the purest and best adapted to all the purposes of life. Rain water is known to contain an appreciable amount of iodine, and has a marked influence on affections of the urinary organs, on dyspeptic complaints and intestinal diseases. Nothing is more essential to health than pure water. Rain water when collected in the closely built parts of cities, not only collects the filth and soot off the roofs, and atmosphere, but the gaseous impurities with which the air is impregnated; and it has been demonstrated, that however long the rain has been falling, foreign ingredients will always be found in it. This water should be filtered as it comes from the roof through the gutters into the cistern, by passing through a bed of charcoal, and its power of absorbing atmospheric impurities and a nidus for musquetoes checked by having a float of wood on the surface of the water in the cisterns. If, notwithstanding all these precautions, animalculæ should be found in it, and the liabili-

Water how impaired.

How purified.

ty of being a breeding place for musquetoes, as all stagnant waters are, may be obviated by placing small fish in the cistern. The presence of animalculæ in large numbers, and it is believed that few cisterns are without them, indicates the existence of animal and vegetable matter usually in a state of decomposition, which invariably acts injuriously, if the water containing them, is used largely for the purposes of food, and the effects will be the more immediate and marked when the animalculæ are large and numerous. The German naturalist Ehrenburg, as the result of very extended observation, established the fact that the existence of visible animalculæ, generally indicates the presence of a lower series of invisible animalculæ descending in magnitude to the smallest monad of the most simple structure, so small that there is probably no smaller organized creature on which it can feed, which as is commonly conceived, by arresting organized matter on the very limit of the organic world, and converting it into its own nutriment, it furnishes in its turn, sustenance to higher orders of animalcular life.*

Town water is town air.

The above high authority then states it as an aphorism that those who drink water which has stood for some time exposed in a town, *drink town air*, whilst they who drink water brought direct from an elevated rural district, without such exposure, are *drinking country air!* All this is easily understood, and the water in our hydrants is liable to the same objections, so far as exposure on the water works mound makes it so, although it is not as much so as the cisterns in our back yards, exposed to the contamination of every vitiation there arising, and the more so, if in the thickly built parts of our city.

But water is not only demanded as a necessary of life, for its own purity, but is required for purifying our clothes, houses, yards, streets, and it is utterly impossible to keep anything in a cleanly and healthy state without its abundant supply for all these important purposes. For these reasons, the water works should belong to the city, and every house that is built should *compulsorily* (by city enactment) be supplied with it.

From the peculiarity of our climate and position the sani-

* Report Annual Board of Health.

tary condition is so much influenced by the *structure of our dwellings* that no building should be erected without due surveillance of the authorities. This could not be reasonably objected to, as it is but an extension of that care for the *health* which is exercised for the *lives* of the citizens in causing buildings to be made sufficiently strong, and in the protection of *property*, providing against the combustible nature of materials in the thickly built parts of the city. The controlling the moisture and crowding are the great enemies we have to guard against. These are corrected by ventilation and space. Every floor should be raised *at least* six inches, and the higher the better, above the level of the crown of the street before the door, and have corresponding outlets, front and rear, for ventilation, always open.

Surveillance on buildings.

Houses should be so constructed as to enjoy most advantages from ventilation with such opening to Southern quarters as to have, if possible, the advantages of the drying and enlivening powers of the wind and sun in the yard, and when practicable, on streets at right angles from the river, so as to enjoy the refreshing and purifying influence of the currents of water. Of course, all houses cannot embrace *all* these advantages; we mention those which are best, and the principle on which based.

Direction of houses.

Not more than a *certain per centage of ground* should be used for buildings, so as to admit ventilation and light. From the high value of ground in cities men take advantage, consult only their own profit in the erection of buildings, the object being to realize most out of the space, by over crowding them with houses unfit for the residence of human beings, regardless alike of the propagation of disease and the increase of mortality. The safety of the community, (which is the supreme law) requires imperatively that such a selfish disregard of public rights and interests should cease.

Only a certain amount of ground to be built on.

The amount of *pure air* necessary for respiration has been before stated, and in the surveillance of buildings particular

notice should be taken of the size of sleeping rooms corresponding to the number of occupants.

How dampness of stores removed.

It is recommended that the dampness of stores and storehouses, as well as dwellings, so common here, be removed by a free use of stoves; for dry goods, and many other articles, it would be invaluable, and aid materially in the ventilation of *all rooms* for *every purpose*, *chimney flues* for draughts should be made in *every room*.

Why certain buildings not to be in thickly built places.

No hospitals, jails, poor-houses, asylums, or buildings liable to be much crowded, should be permitted in the thickly built parts of the city, either to impair the purity of the air, or be injured by its impurity, but removed to the neighborhood, where their inmates can enjoy the advantages of a free ventilation.

I cannot close this part of our subject, of the local causes and remedies for our insalubrity, without referring, as a faithful historian, although most briefly, to the influence of social habits on yellow fever, and especially, during its epidemic prevalence, as it is the result of my now very lengthened experience in it, that no cause is equally influential.

Influence of social habits.

Civilization, which has so much lengthened the catalogue of human ills, is—in this instance—to be debited, either truly or falsely on the balance sheet, with not a few of the moral and physical ills with which society is burthened. Drinking, as a social habit, barely dates back beyond two centuries. In a hot climate its destructive influence has been found cotemporaneous with the habit, acting in a line with all its injurious influences. The triumphs of temperance, and the disastrous effects of over indulgence in this debasing vice, were never more conspicuous and lamentable than during our terrible visitation last summer and fall.

Effect of intemperance.

During the whole course of the sitting of the Sanitary Commission, as a court of inquiry into the causes of the epidemic, and its great mortality, the inquiry was usually made of those we examined, of the influence of social habits,

(intemperance,) upon the liability to the disease, and on its results. The answer was almost uniformly, that it not only *increased the liability to attack, but greatly lessened the chances of recovery.* This is most singularly and impressively illustrated, by the record I have received from the "Sons of Temperance," showing that of these about five hundred remained in the city during the epidemic, of which, only SEVEN fell victims to it; the proportion being 1 in 71.42, or 1.40 per cent.; the mortality of the balance of the city, "of those who remained," under similar circumstances, being 1 in 15.43, or 6.48 per cent., or nearly five times as many. A more valuable commentary on the advantages to be derived from temperance here, during the most malignant fever this country has ever experienced, cannot be found in those annals of philanthropy. May its record long exist as a standing monument of its protection against pestilence, and speak, trumpet tongued, as a warning to the South, against its alliance with disease.*

Proportionate mortality.

The explanation of the cause of the value of temperance, is perfectly apparent to the dullest comprehension, for it is a truth that holds good in every climate, that in proportion to the healthy state of the digestive organs, which intemperance always injures, sooner or later, is the constitution enabled to resist the causes of disease, and to pass through it more safely when under its influence. This is eminently illustrated in those two most formidable diseases, yellow fever and cholera, whose throne and citadel are these important organs; and could the per centage be ascertained, of the exact difference in mortality, in cases where these organs were lessened in their power of vital resistance from intemperance, and where they were in their original integrity, it would form a most valuable argument in favor of temperance; especially in a hot climate, where it is so much

*In conference with contractors for variou species of public works, as canaling, original or cleaning out; digging, or exposure of fresh earth in various ways; the difference in health and capacity for labor, in favor of those abstaining, and those indulging in ardent spirits, furnishes a triumph to the cause of temperance, that should cause its adoption everywhere.

more injurious than in others, that was ever furnished to the public.

During the existence of the yellow fever in *Vera Cruz*, in 1847, it was announced by me, (as Chief Health Officer,) that any man who went from a debauch into yellow fever DIED, no exception could be found to it; it is believed the announcement had a most salutary effect.

SECTION XI.

Comparison of New Orleans with other cities, and application of the subject—Penalty incurred by man congregating in cities—Highest class of disease in different climates produced by it—Proofs of high civilization—How extensive fires produce sickness—Effect of sanitary measures in Louisville, Norfolk, Wilmington, Charleston, Savannah, Mobile, &c.—Climatural parallel with the Southern cities—Value of the Mississippi River as a scavenger, &c.—The delusive cleanliness of cities on a sandy foundation—Vera Cruz; its mortality, civil and military, under Mexican, contrasted with that under American domination—Triumph of sanitary measures.

Foundation of all sanitary laws.

There is no more convincing argument, or more satisfactory proof of the positions taken, and the principles laid down in this Report, than by reference to what has been done by our sister cities on this continent. The illustrations from abroad, of the value of sanitary regulations, personal and general, are coeval with our race; indeed, ever since man congregated in cities. Disease is the result of the transgression of the natural laws; *these laws must be understood, to be complied with.* The organism of man should act harmoniously with the laws of matter. In a state of nature, and in a congenial atmosphere, this is so. When the luxuries and refinements of life are carried to a high degree, man pays the penalty of his enjoyments, by a subtraction from his original stamina. It is by restoring these, and a removal of the impediments to their free exercise resulting from his congre-

gating in cities, that constitutes the requisition and lays the foundation of all sanitary regulations. Man must forego the advantages flowing from this social aggregation, with its high cultivation of intellect, its advancement in scientific pursuits and the mechanic arts, and the greater refinement of intercourse and manners, and domestic comforts, or correct the inevitable evils of crowding, filth, bad ventilation, and the predominance of vice, or pay the penalty in greater brevity of life, and the multiplication of human infirmities. This penalty is very sure, varying from twenty to forty per cent., or more, between urban and rural districts, that is, between the use and abuse of sanitary laws. This great mortality is usually embraced in that class of maladies, denominated by Dr. Farr (who first introduced the term) zymotic, consisting of the class of diseases of epidemic, endemic, and contagious qualities. These differ in intensity in proportion to the concentration of the cause, varying in grade from the mildest ailment up to a disease of ferocious malignity, differing in type and name according to climate; having for its head in the North the typhus gravior of authors; in the East, the plague; and in the West, the yellow fever, as crowning monarch of the whole, exhibiting the result of the greatest intensity or concentration of causes producing them, respectively. These are not mere speculative opinions, they are the result of years, if not of ages, of experience, corroborated by the product of daily and hourly observation. When duly considered and properly appreciated, it is the wisdom of the present gathering the fruit of knowledge from the lessons of the past. High civilization and a proper estimate put on human life, is known by the enlightened application of these principles. The prosperity of communities, the health and happiness of individuals, and the moral standing of societies, in a great measure, depend upon them.

Penalty of congregating in cities.

It is wisdom from past experience

The best proof of this position is that by the application of sanitary laws—the duration of man's life has been materially increased, and diseases have been greatly lessened in numbe[r]

Proofs.

and especially in intensity in those countries in proportion to their application. Formerly the plague swept off millions, and returned either annually or every few years, it is estimated that but a few centuries ago, half the human race, then existing, fell its victims within a short period, while now it is limited to the dominions of the Turkish fatalist, who applies not these laws. In the early part of this century yellow fever devastated the Southwestern parts of Europe. It has yielded to the hand of improvement. Investigation in England, has laid bare the causes of typhus and the hand of amelioration is fast lessening its ills. In our own country, the application of these laws has almost entirely driven yellow fever from the North of Charleston, and there it occurs but rarely and greatly lessened in malignity, and the thorough understanding and application of them will drive it to regions where they are entirely neglected.

The effect of the application of sanitary measures in improving the salubrity of a city have been mostly anticipated, in the preceding part of this report, the skepticism existing here, the vital importance of the subject and the ignorance of the fact (the improvement, whenever it has taken place, being attributed to other causes) will excuse our dwelling a little longer on them, in their illustrative application.

The filthy parts of cities alone subject to yellow fever.

It has been before stated that our Northern cities were formerly as subject to yellow fever as New Orleans, and that at least one of them has suffered as much or more from it than this city, without excepting the late extraordinary outbreak, that in each of those cities it was *confined to a locality*, more or less extended—that these were *proverbially the most filthy parts of those cities*, that these cities have special sanitary liabilities varying from difference of elevation and drainage, which we have not, that these portions have *always* been exempt from yellow fever, that they have been healthy since they have extended their pavements and been secured, that they all have constantly a careful police, and that water has extended throughout their limits, and that they have never been without an intelligent and vigilant health department. that to these causes

are justly attributed by the intelligent and observing of their own people, the immunity they enjoy from yellow fever, that the late apparent exception in the case of the bark Mandarin, at Philadelphia, last summer, is in entire accordance with what has been stated, for it was well ascertained by me when there, that the first cases of yellow fever did not originate from that vessel, nor did any of her crew take the disease, but it arose from the negligent police of the neighborhood, especially made so by being the outlet of two half emptied sewers, that this disease was confined to very narrow limits, that it was constantly visited by persons from a purer atmosphere without extending the disease, that in this immediate neighborhood, there had been an extensive fire, a few years ago, and the houses had been rebuilt and improved, and that although in contact, as it were, with this "infected neighborhood," but two cases occurred out of 170 known to have taken it. Fires here like those in London and Hamburg, and every where, if followed by better buildings, have had a fine effect on the sanitary condition of the locality. But when they have not been so followed or a summer had intervened, they have become plague spots, from exposing their cellars, privies and filth of all kinds, and their collections to sun and rain, which have been verified from the fires in Charleston, Savannah, Wilmington, being one of the probable, if not main causes of several severe epidemics in those cities, so well is this understood among them, that fevers have been predicted from this cause alone.

These views will be strengthened as we come South. The city of *Louisville* was formerly subject to annual bilious fevers of great intensity, she was in fact, once called the "Graveyard of the West," being subject to bilious fevers, rivaling yellow fever in malignity, and which threatened to depopulate the town. In 1822, it amounted to 4.64 per cent. In some families nineteen out of twenty were sick at the same time; some families were entirely cut off. There was then but one street paved, and at least eight ponds within the town limits. By draining, paving, and a suitable police, it now

In Louisville.

Effect of paving and draining.

enjoys a salubrity equal if not superior to any large town in the West.

Norfolk.

Norfolk was once one of the sickliest cities on the sea-board, and frequently subject to yellow fever. By draining, paving, and filling up her low lots, the collecting reservoir of humid filth of all kinds, she has ultimately become entirely salubrious. From a letter from Dr. Upshur, with which I have been favored, I quote freely. He says: "Many years ago, miasmatic fever was a very common disease in Norfolk, during the autumnal months. *No case, however, originated in the paved parts of the town.* Within the last five years a vast amount of paving has been done, and we now have very little intermittent or remittent fever. Indeed, our sanitary condition has improved *pari passu* with the *paving of streets, filling up of lots*, and increased attention to the cleanliness of our streets, and other sanitary regulations; so that from having been the most unhealthy of the Southern parts, our city has of late become a proverb for its healthiness. Our mortality averages only twenty per month, out of a population of sixteen thousand," which is only one and a half per cent. or, fifteen in a thousand, which, if true, exceeds that of any town of its size, either on the sea-board or in the interior, and confessedly wrought from being one of the sickliest by *sanitary regulations.*

Paving and draining.

Wilmington.

Wilmington was once proverbial for her severe bilious fevers, and occasionally, yellow fever. She is situated on the banks of the Cape Fear river, (here fully half a mile wide with extensive marshes and low grounds beyond,) on sandy hills, having an argillaceous base, with a more or less admixture of an alluvial soil; springs issue from these hills, constituting slow, sluggish streams, with various stagnant ponds, receiving the drainage of the town, when it does not sink into the sandy soil of the place, it being thereby concealed from the public eye is probably, as injurious to the public health as if exposed, as in either case it only awaits the meteorological conditions to become actively noxious. In the former case the condition is

Delusion of a sandy soil.

worse, as it is deceptive, leading us blindfold to repose faith in a security that is delusive. This is particularly the case when the clay sub-soil is not distant, as in Mobile, and other towns along our Gulf coast and on the Atlantic, to which the moist filth sinks, not so low, probably, as the line of invariable temperature of the latitude, and never too low to be acted on by a very hot summer.

Under this condition of things sporadic cases of yellow fever occurred nearly every year, and a bilious fever of a malignant grade; and finally, a severe epidemic yellow fever, in 1821, demanded the urgent attention of the citizens of the place, when the above condition was altered, pools filled up, culverts opened, filth removed, neighborhood cleared, and sanitary measures fully established, and with these have eventuated the re-establishment of excellent health.

Effect of drainage and clearing.

Charleston.—This city lies but a few feet above high water mark of the bay before it, and is partly formed of made ground. This port has usually been found to be particularly unhealthy. It lies on a peninsula, almost surrounded by the rivers Cooper and Ashley, the neck cut up by creeks and ponds, and extensive swamps in the neighborhood. The ponds and creeks have been filled and drained; the low grounds and lots filled up, leveled, and thoroughly drained by underground sewers; a careful avoidance of disturbing the *original soil* of the streets, &c., during certain months, for gas, water, or other purposes; the constant study of her meteorological condition by her intelligent faculty, and the establishment and *enforcement* of sanitary regulations have had the effect of so improving her condition that from being one of the sickliest, she has become one of the healthiest cities in America. I quote from a recent report on the yellow fever of Charleston, by one of her oldest and most repectable physicians, (who has been her Port Physician and Chairman of her Boards of Health for near thirty years*): "In proof I say these plans have been progressively going on, and in proportion has the healthiness of the city been improved, and

In Charleston effect of drainage filling up.

No earth disturbance.

*Dr. T. Y. Simons.

while the public authorities are gradual, nay, I may say, actively pursuing this plan, I firmly believe it will be the cause of making the city not only one of the healthiest among commercial cities, but may possibly *make us, in a great degree, if not entirely, exempt from yellow fever, and should it occur, lessen its virulence and mortality.* From long experience and observation, I regard it the solemn duty of the public authorities to go on with this plan, regardless of expense, not only for the preservation of health, but for the extension of commercial prosperity." These are valuable practical facts, the result of long years of experience, from high authority, (as most of us know personally,) and uttered in an enlightened city, where such advice will be appreciated.

Savannah.

The city of *Savannah* has been greatly improved by the exchange of the dry-culture for the wet in the extensive rice swamps in her neighborhood, and her mortality has been reduced *to about half* of what it was before.

Clearing and draining.

To the soil of Savannah the same objection is applicable as of Wilmington and others, it is mostly of a porous sandy nature, and all sorts of putrid debris become accumulated and incorporated with it, the offals of city life, and instead of pure sand or earth, which may have originally constituted the surface of the ground, a species of compost is formed and an active fermentation and decomposition is taken on, whenever there is heat and moisture enough to produce it, * this the true cause why she has heretofore been so sickly, although now so much improved.

Why a rainy season not always required for sickness where a sandy soil.

The verity of the explanation that has been given, in relation to the sickliness of sandy soils, is shown in the fact, that it does not always require a *continued* rainy season to evolve or produce the degree of humidity deemed essential for the development of fever. Rains in such a position may have fallen long before. This occurred at the Bay St. Louis during her disastrous epidemic fever of 1820, "the spring season was uncommonly wet and rainy—converting a large portion of this extensive plain

* Waring.

into a sort of temporary marsh, with standing water in many places covering considerable areas of land"—"the district is imperfectly drained by bayous, and in many places, during the wet season, the water stands in pools upon the surface until it disappears by absorption and evaporation,"—"the drought then continued thence from June to October."* Experiments with the hygrometer would have settled the point of the presence of moisture or not—that there was an abundance of water a few feet below this loose soil could have been easily enough shown; I have long essayed to procure the hygrometric condition of this neighborhood and of cities similarly situated, in vain. Assertion supplies the place of fact, an apparent condition takes place of the real one, and we have an additional false fact substituted for the truth, another stumbling block to the progress of medical science.

Parallel of New Orleans with other Southern cities.

In relation to all these Southern cities and towns it would be very instructive, were all the materials at hand to run a parallel between them and New Orleans. Their meteorological conditions have many marks of similarity. Our winter temperature is not so low, our summer temperature not higher: our enhanced hygrometrical condition is more or less in excess, *but it is more under control*, for our swamps are more susceptible of drainage: the precipitation here is somewhat greater, but then it is in our power, in part, to correct this, not only in relation to its amount, but to hasten its discharge in neighboring reservoirs. It cannot become absorbed here and thus retained as it is with them. Underground sewerage and thorough surface drainage then can probably do more for New Orleans that it can for them. ALL THE FILTH that collects in and about New Orleans can be removed by these and other means, for we have only to throw it upon the surface of the *great and unequal scavenger*, which a kind Providence has mercifully offered us and which we so blindly refuse to use, (to the extent we should) to wit: the mighty river before our door, while the above cities have but three or four feet of tide and but a few feet elevation above it, giving

All our filth can be removed.

* Dr. Merrill.

and *returning* the mixture, but rendered worse by the addition, or to sink into their absorbent soils to return upon them as a concentrated poison, at uncertain periods, when the other requisite—the meteorological condition shall occur.

Attributes of the Mississippi river.

Let us do justice en passant, to our noble river: a wide pervading influence for evil has been attributed to our great benefactor—that resistless stream so pregnant with blessings to us when managed rightly,—be the credit then where it is due. It is well known and admitted that all sluggish streams in hot climates, even those that admit of a moderate tide of two, three or four feet, by uncovering its banks, bars or islands pregnant with organic remains are highly injurious to health. The *Mississippi has none of these attributes*, it is a deep stream (of 100 to 150 feet) throughout its passage in Louisiana,—it is a rapid stream (of from two to five miles per hour) always productive of a salubrious ventilation, and when low, uncovering mainly sand-bars *within its banks*,—it has little or no organic matter in it; and hence its overflows required for the cultivation of rice would not be so injurious as other streams which are different. The offensive materials on its banks opposite the city is derived from the shipping and the city refuse. For these reasons probably fewer rural districts in our country are more salubrious than those situated immediately on its banks with the swamps at a distance covered and protected, so different from the sluggish tide water streams throughout our country, on few of which can the autumnal season be passed in safety.

Cause of the salubrity of the rural districts.

Mobile.

The comparison of *Mobile* with New Orleans in relation to their hygrometrical condition I cannot make, because that of our sister city has not been made by her scientific men; but, excepting her Western quarter, she has as much to increase or to give intensity to that worst condition as New Orleans. Her average annual precipitation is larger by more than *four inches* than ours, (years 1840, '48.)* If her streets are comparatively dry and clean on the surface, it is but to deceive one, a sandy soil with a substratum of clay, not far distant, only conceals that which with

Probable humidity.

*North—N. O. Journal, 1851.

us can be washed off, and deludes with a semblance of cleanliness without the reality, while the *festering poison only awaits the meteorological condition to lend it wings and give it virulence.* That such is the fact is rendered probable from the circumstances, the explanation given, the rationale and the results, and is fully justified from what we find to be the case in other countries similarly located. I need only refer here, in illustration and corroboration, to the malignant fevers of Walcheren, whose situation is much like it. The fevers of Pensacola, of Bay St. Louis, of Galveston, of Vera Cruz, are thus mainly accounted for, all of which clearly demonstrates, *that there is no substitute for an impermeable pavement in a hot climate.*

Only apparently clean.

Proofs elsewhere.

The distinguished Dr. Fordyce seems also to have been of the same opinion. In his fourth dissertation, he refers to the "insidious and dangerous character of these sandy soils. Perfectly dry and being clear from wood, with water only a foot or two from the surface, so destructive to the British army on a sandy plain in Flanders, and again to a region in Peru where water is every where to be found at about seventeen inches below the surface of the earth, although the country is itself barren for want of water, and uninhabitable from the number of dysenteries and semitertians that take place in it."

In Flanders.

Vera Cruz is another instance in the midst of the yellow fever zone, still more unfavorably situated than any that has been mentioned, and proverbial for its pestilential climate, that I have some scruple in referring to. For several reasons I am urged to do so, however, by my colleagues, as furnishing a great and direct triumph to sanitary measures.

Vera Cruz.

Triumph of sanitary measures.

From the extent and fatality of the *vomito* here and the seizure and occupation of it by the American army, being in the very nick of time for its devastations, it was fondly calculated in Mexico and extensively believed in Europe, that here the American troops would meet a worse enemy in the climate, than in the army of our foe.

The position of Vera Cruz is peculiar, it is situated on the Western shore of the Gulf of Mexico, in latitude 19° 15' North, on a sandy plain, elevated about five feet above the level of the sea, in the rear of the city are sand hills varying in height from twenty to forty feet, and distant from 10 to 1500 yards, between

Description of city and its neighborhood

these and the city during the rainy season are large pools of standing water, extensive marshes extend to the Southwest, covered more or less with mangles and other brush wood, with numerous small lakes or ponds, these empty into the sea along the South wall of the city and are the principal means of furnishing water to the mass of the inhabitants, and is largely influential in the production of the insalubrity of the place and have been complained of for centuries. The city is paved with coral rock obtained from the sea. It is surrounded with a high wall (about fifteen feet) so greatly interrupting ventilation, that as Chief Health Officer of the place in 1847, I strongly advised its being pulled down as it faced the sea, or to windward. The streets were formerly kept very filthy, and the place very badly supplied with water either for domestic use or cleanliness. Such was its condition when taken possession of by the American army under Gen. Scott, in March, 1847.

In order to make the comparison as just as possible, between the *Mexican and American regimé*, the periods under consideration shall be as approximative as possible, that is, immediately succeeding each other; hence, for the Mexican, I take the years 1845–'46 and the two first months of 1847. The civil and military I am fortunately enabled to seperate, and they are both derived from *official sources*. For the American, I commence after but two months of possession, when the greatest mortality incident to the recent conflict, was in some degree abated, although this continued large throughout the season, resulting partly from this cause and partly from the hospitals of the place being made the general hospital of the army invading Mexico, and hence was greatly increased from this cause, and from the large number of camp followers and retainers and others carried there, in part by curiosity, and the period embraced in the comparison comprehends *only the most sickly months* in the year on the part of the Americans. The civil and military mortality are also separate and are all derived from *official sources*.

PER CENT.

The ratio of the mortality of the *Mexican civil* population during the years 1845–'46 was..... 6.28

Civil mortality, and military during Mexican regime.

The ratio of their *military mortality* for the years 1844–'5–'6 and part of 1847 was ascertained, but the amount of the force was not clear, it is put at somewhat less than it was found in 1847, which is probably one-third too much. The ratio of mortality to the strength assumed, is..... 13.90

The ratio of total mortality to total cases admitted into their hospitals is..... 19.49

The ratio of mortality, of the *diseases of the skin*, which were very numerous *were omitted*, would be.... 25.70

The proportion of deaths by *yellow fever* to the whole cases admitted were..... 85.23

And the proportion dying of yellow fever to the estimated strength was..... 7.95

Do. of each during American regime.

The total mortality in Vera Cruz, in 1847, during the AMERICAN REGIME, embracing only the *five sickly months* from first May to first October, of the *civil population*, including *strangers and foreigners* of every kind, not officially attached to the army, was (by official returns to me) according to the estimated population, and consisting too, mostly of the most reckless people on the face of the earth, and comparatively few acclimated, to 3.52

The mortality of *the military* during the same period, embracing soldiers, quarter-master's men and all attachés of the army, including those left in the hospital on the departure of the army for the interior (a very large number,) the men sent from that army from time to time, to the general hospital at Vera Cruz, the army consisting mostly of undisciplined soldiers, unaccustomed to the climate, was..... 4.46

One-third of this, or 33.18 per cent. consisted of yellow fever.

The mortality of the first infantry, embraced in the above, is entitled to a separate consideration:—it garri-

soned the city the whole summer, and is a fair comparison with the mortality among the Mexican soldiery. The aggregate force was 2,047, and the aggregate mortality 74, or..... 3.61

(Inclusive of a proportionate mortality by yellow fever of 14.80 per cent.)

Let us analyze this statement a little more in detail.

It appears then that the average mortality of the *civil population* at Vera Cruz, (during, of course, the *Mexican regimé*) amounted in the years 1845–'6, to..... 6.28

The mortality of the civil population about one-half, and of the military about one-fourth during the American in comparison with the Mexican regime.

While the *same population* under the *American regimé*, in 1847, compared, not of settled citizens acclimated measurably to the soil exclusively, as before; but of these, and incorporated with them all that large class of reckless camp-followers of a victorious army, with all their dissipated habits, amounted to..... 3.42

And that the mortality among the *Mexican military* at the same place, during the years 1844–'5–'6 and part 1847, amounted to..... 13.90

And the mortality to *cases*..... 25.70

Of which the vomito or yellow fever, constituted of it. 85.23

While among *our military*, including attachés of the army of every grade, the mortality amounted to..... 4.46

While in the First Infantry (military alone) amounted to but..... 3.61

The bare statement of the foregoing valuable facts, is its own best commentary: it is furnished as an instance of *the influence of sanitary measures in a hot climate, on unacclimated people*, even under the influence of peculiarly unfavorable circumstances.

After the lengthy recommendations given of sanitary measures in the preceding pages, it would be little more than repetition to say more than that these views were carried out with military precision, and that it consisted in the strictest policeing, rigidly enforced, at the earliest hour, and the strictest temperance advised; tropical fruit, and particularly if unripe, forbidden. The city was divided into districts, and responsible agents and physi-

cians appointed to each, and required to report to the Board, at short intervals, the state of each, together with the number and character of the diseases occurring.

SECTION XII.

Resumé.—We shall now bring this Report to its close with the following RECAPITULATORY PROPOSITIONS AND COROLLARIES.

1st. That the insalubrity of New Orleans, which has now continued for so many years—with some remarkable exceptions—is not natural to her, or *necessarily* incidental to her position; that it is the cause of the high price of everything, and the direct means of retarding her progress to prosperity, and which will continue to exist until effective measures are taken to remove it.

New Orleans not sickly, per se.

2d. That the direct and *inevitable* change of *climate alone*, is not the sole cause of the mortality of immigrants, but the union of the climatic with the terrene conditions under *different circumstances*, were the efficient agents in the destructive influence on each class of people as pointed out according to nativity; that man cannot become acclimated to the second cause, or terrene (filth, &c.) any where, and that the acclimation to our first cause (or atmospheric) would be trifling, if the conditions constituting it, were so modified, as was clearly shown to be, in our power.

Mortality not owing to want of acclimation.

Can't acclimate to filth.

3d. We have endeavored to prove what were the CONSTITUENTS of the epidemic yellow fever of 1853, that they consisted of certain atmospheric and terrene combinations; that these causes, so far as we had the means of ascertaining, were confined to the limits of the fever district; that it began with these causes and ended with them, throughout the limits of the epidemic region, and that when these ceased, so terminated its influence on man.

Epidemic constituents.

4th. That one of these causes, (the atmospheric,) is more or less present here every summer, and that when the second (or terrene) exists in sufficient amount, an *epidemic* is the certain

result, so far as near sixty year's experience will go to prove it; that this terrene condition is mainly composed of extensive disturbances, or upturning and exposure of the original soil of the country; that without this there has been no such *epidemic*, although, between the occurrence of some of them, long periods have elapsed; and that its ravages or malignity appears to have been pretty much in proportion to the extent of that disturbance.

The efficient cause of all our epidemics.

5th. That for the existence of an *epidemic*, a wide pervading atmospheric cause being one of the essential elements, an *epidemic disease cannot be imported*, and that as a contagious disease cannot depend upon a *general cause* for its existence, but must derive its qualities from a specific one; epidemic yellow fever is consequently not a contagious disease.

Epidemic not importable or contagious.

6th.—That to constitute an *endemic yellow fever*, the difference of which from an epidemic was fully pointed out, that the *apparent contagion* was only the extension of the epidemic principle, a lesser degree of the same, or what was believed to be equivalent, (filth of all kinds, and decomposing materials) with a lesser degree or intensity of the first or atmospheric constituent, were essential.

Requirements for an endemic.

7th.—That when these causes did not exist in a sufficiently high degree to produce *yellow fever*, intermittent, remittent bilious, or other periodic fevers were the result, demonstrating by the clearest analogy that they proceeded from the same cause, and that they differed only in degree and intensity, a major amount of the very same materials being required to produce yellow fever, as a minor one does for bilious or periodic fevers.

A lesser am't required for periodic fevers.

8th.—That all these fevers are produced from *local causes*, more or less extensive, and that the fevers, the result of these, were limited to these bounds, that these causes are well understood, and were extensively pointed out in detail, that wherever the epidemic *extended*, there were *causes to localise it*, that where these did not exist, the cases of the epidemic *conveyed there did not extend*, and that consequently, that all these fevers arising from bad air, are no more contagious or infectious the one than the other, the liability to them is limited to the bad or infected air

Local causes and local effects.

and personal susceptibility; and finally, that these are *of the greatest importance in their practical bearing on sanitary measures.* And,

9th.—That the temporary epidemic cholera which occurred here early in December, it was shown, depended also, upon two conditions, an atmospheric and a terrene; that the first of these was different from that required to produce epidemic yellow fever, although the second was believed to be the same. Cause of epidemic cholera.

From all which the following corollaries were deduced; viz:

1st.—That an *epidemic yellow fever* in New Orleans, if produced by the causes stated in our third proposition, as believed, being known, is *controlable*, that is, PREVENTABLE. Epidemics controlable.

2d.—That an *endemic* yellow fever, arising from the same or equivalent causes, as above, although in a lesser degree, can also, be mainly, if not entirely controled. Do. of endemics.

3d.—That the causes of bilious or periodic fevers being known also, to arise from a smaller amount, or more diluted condition of the same circumstances, although more general and extensive, and more dependent on personal hygiene, it is in the power, as it is the duty of the civil authorities to mitigate, if they can not entirely control them; and finally: Do. of periodic fevers.

4th.—That it was demonstrated, that by the proper application of curative measures, by the establishment of proper sanitary laws and police ordinances, rigidly enforced and effectually carried out, New Orleans can be made as healthy as any city in America; and that it was not only the interest of the city to accomplish these important purposes,—but that— New Orleans can be made healthy.

5th.—A penalty could be as much *enforced upon the civil authorities for neglecting the removal of conditions subversive of health and life, as for any purpose* for which society was formed. Claims for legal enforcement.

Proofs and illustrations were furnished of the influence of sanitary regulations in various cities of the old world and on this continent, and what they had accomplished in removing

causes of disease and restoring sickly cities to the enjoyment of salubrity.

Her prosperity alone depends upon health.

A comparison was instituted between New Orleans and other American cities, and particularly with Southern cities, with a running commentary on their comparative liabilities and immunities, and the important result was come to, that our city was far from being in an irreclaimable condition, and that she could compare favorably with any of them.

Intelligence synonymous with health.

It has been as truly as beautifully said, that intelligence is not only synonymous with moral power, but with health.* Health manifestly depends upon our observance of certain laws, which the Providence of God has entrusted for our guidance, which are recognized by all mankind and are instinctive. When these laws are broken, punishment (that is, disease,) inevitably follows, sooner or later; but it is in our power, as it is our duty, to comply with them, and exert the faculties He has given us for our welfare. We can only know the future from the past; it is the part of wisdom to know that like causes produce like results, under similar circumstances. The constant recurrence of yellow fever in the epidemic form, whenever there have been large disturbances of the soil, and *never otherwise*, in so long a period as SIXTY YEARS, and in proportion to that exposure, must be something more than a mere coincidence: it seems to the Reporter as well attested as any fact in history or science, as too intelligible to be misunderstood; invaluable as a warning, and the memento on that Chart as plain to us as "the handwriting on the wall" to the prophet of Israel. No less palpable, and as little to be disregarded, are the "plague spots" which have been demonstrated here, as in other cities, that here, in the midst of filth of all kinds, are the true birth places of disease. and it was equally clearly shown how much it was in our power to remove them, and that it was our duty and interest to do so, not merely on account of present prosperity, but even from a higher consideration, the promotion of the

The real cause of our fevers.

All cities improved by sanitary measures except New Orleans.

*Marx Willis.

great interests of religion. Our reputation abroad for salubrity is ruined, reform is now only left us. All cities, wherever situated, whether in the old world, the highly favored seats of renowned monarchs, covered with marble, drained and watered by works that are still the wonder and admiration of the world, or in the new, the selected marts of far enriching and enterprising commerce, have been subject to epidemics; which, like the monaxysinal diseases, the trials of infantile life, stand as tests of the constitution. Many quail and sink under the trial. New Orleans has stood many such trials; she is now at a crisis, and it will depend upon her people to say whether she shall recuperate or not. Her consulting faculty, (this Commission,) have pronounced her entirely susceptible of cure, *if their advice is followed*, otherwise not. A new era has manifestly sprung up, it is signalized by the appointment of this first Commission of inquiry into the real, not suppositious, condition of New Orleans. We look upon it as a proof that the great reformation so much needed, and without which no permanent prosperity is to be expected for this city, is about to commence; that the influence of sanitary measures is at last to be attempted, and we can not avoid the prediction, that it will eventuate as it has in all other places, in future prosperity and advancement. Nothing else is now wanting to repair the errors of the past, and it does no violence to probability to foretell from them the most brilliant future. If the Sanitary Commission shall not succeed in convincing their fellow-citizens of this, and that the same principles are applicable to our city as to all others, which is the true practical object of their appointment, then that appointment will have been superfluous. But, if we shall have shown by unmistakable facts, figures and argument, that we have nothing peculiar in our climate or position, but what is entirely accessible to amelioration and amendment by the hand of reform; that our city may be restored to salubrity; that her reputation for perennial pestilence shall be

The certain result of proper measures adopted here.

no longer applicable; that upon the broad foundation of SANITARY MEASURES we can erect a monument of public health, and, that if a beacon light is erected on its top, and *kept alive by proper attention*, our city will soon be second to none in this first of earthly blessings; the appointment will not have been made in vain.

SECTION XIII.

RECOMMENDATIONS.

We accordingly offer to the Council the following recommendations:

1st.—To adopt the system of *Sewerage*—the system approved of by the Sanitary Commission, as reported by our colleague, Prof. Riddell—embracing streams of running water constantly through the streets, from the river or otherwise, from March to November, during the *day* only.

Sewerage.

2d.—The *drainage*, in the most complete manner, of the neighboring swamps and levees on Lake Pontchartrain, to keep out the Lake water. This is to be effected by machinery and *covered drains*, and these to be dug in the winter season. After this is fully effected, in the opinion of your Health Department—

Drainage.

3d.—The *removal of the forest growth*, excepting for avenues and parks.

Forest growth

4th.—The completion of the pavage of the city (removal of the round stone) by square blocks, united by cement, and the avenues may be (temporarily) by thick planks.

Paving,

5th.—The purchase and extension of the Water Works to every portion of the city, with fountains in each of the public squares.

Waterworks.

6th.—An *extensive shed* the entire front of the business part of the city.

Shed on river.

7th.—To plant trees in all the public squares and principal streets.

Trees.

8th.—To fill up *Gormley's Basin* and make a public square of it. Gormley's basin.

9th.—To make *covered drains* of Gormley's and Melpomene's Canals, and all the other drains of the city. Covered drains.

10th.—That the *slaughter-houses* be removed to such distance from the city, and all *vacheries* and *livery stables* having over six animals, removed to squares having fifty population and ten dwellings. The same of soap and tallow chandleries, or other manufactories or pursuits that have a tendency, in the opinion of your Health Department, to impair the purity of the city atmosphere. Slaughter houses vacheries and Livery Stables.

11th.—The adoption of a *system of privies*, according with the recommendations in this Report. Privies.

12th.—To *discontinue interments* in the city limits. Cemeteries.

13th.—To prevent any but the most superficial disturbances of the soil of the city or neighborhood, from 1st May to 15th October. Disturbing soil

14th.—To establish a *Health Department* on the plan detailed in the next section. Health department.

15th.—To establish a quarantine station, not nearer than eight miles from the city, as a branch of the Health Department. Quarantine.

16th.—To carry out fully the system of privies described in another section of this Report.

And finally; to order at an early day, a complete *Sanitary Survey* of the city before the warm weather sets in, under the instructions of the Health Department, of every house, lot and back yard in the city, to be most thorough and searching for every cause of disease, with plenary authority for that body immediately to abate it. To ascertain from every family the number that have not been vaccinated. Sanitary survey.

A book of record to be kept, wherein shall be recorded the reports from the Inpsectors of the special condition of every square in the city, with plans and diagrams, for present action and future reference, blanks being furnished by the Health Department, enumerating the duties and objects of the inspection. Book of record.

SECTION XIV.

Ordinance for the Establishment of a Health Department for the City of New Orleans.

Be it ordained by the Common Council of the City of New Orleans:

SECTION 1.—There is hereby created a Health Department for the City of New Orleans.

SECTION 2.—This Department shall be constituted by the appointment of the City Council, in Joint Session, of a Board of not less than three Physicians of the City of New Orleans, eminent for their services, experience and practical knowledge of sanitary laws and influences, who shall have resided in the city at least ten years, and whose term of service shall be five years.

Health Department to consist of Three Physicians.

SECTION 3.—It shall be the duty of said Health Department to elect, on its first meeting, one of their number as presiding officer, who shall preside over its deliberations; be the organ of communication with this Council and the Public, and draw up the annual report.

President and his duties.

SECTION 4.—It shall be the duty of this Department to have surveillance and control, under the orders of this Council, over everything that may affect the salubrity of the city of New Orleans, or have a tendency to impair the same; to visit and inspect all hospitals and infirmaries for the reception of the sick; to see that they do not admit any contagious disease; that they are kept in a cleanly and not crowded condition, having not more than one patient to every one thousand feet of space. They shall visit and inspect, likewise, all Jails, Lock-ups, Asylums, Boarding, or other Houses, liable to suffer from overcrowding or filth; Manufactories, Livery Stables, Vacheries, Slaughter-houses, and any place which it has reason to believe there may be a nursery of filth, impairing the purity of the air. That the space allowed in lodging-houses for each individual shall not be less than six hundred cubic feet of space for each adult. To see that the cemeteries are in a proper condition, with the power of removal for neglect.

Duties of said Health Department.

Penalty for obstructing Inspectors of Health Department.

SECTION 5.—All persons occupying houses for lodgers, or where the said Department may have sufficient reason to believe there may exist a breach of this Ordinance, are hereby forbidden to obstruct the examination of the same by themselves or their Inspectors, under a penalty of fifty dollars for the first offence, one hundred dollars for the second, and five hundred dollars for the third, or taking away the license. And this sum shall be sued for and recovered before any Court having competent jurisdiction, and the said amount recovered shall be accounted for in the expenditures for the support of the same, and it shall be the duty of the City Attorney to prosecute for the same.

SECTION 6.—This Department shall keep an office in some central building, to which shall be placed in their special care, all the mortuary records of the city of New Orleans, and shall appoint their own Secretary, which office shall remain open during the usual hours of business, and the books and records of said Department shall always be open to the inspection of the members of this Council. Office and Records.

SECTION 7.—It shall be the duty of this Department to have prepared and keep blank books for the following purposes:

1st. One containing an accurate record of each and every burial in each of the several cemeteries appertaining to this city, in which shall be recorded the name, birth-place, sex, color, age, period and place of residence in this city, and the cause of death of every one buried in any of said cemeteries. Book of Record for each branch of the Health Department.

2d. A book to record the weekly or other reports of the Dispensary and other physicians, (hereafter mentioned.)

3d. A book to record the daily and weekly statements of the Inspectors, (hereafter mentioned.)

4th. A book to record the reports and applications of all the vidangeries.

5th. A book to record the reports of those selected to make the sanitary survey, from time to time.

SECTION 8.—It shall be their duty to select and license the Inspectors or Health Wardens for the city, whose number shall not exceed nine, and who shall serve, under the instructions of said Department, and whose duty it shall be to point out and order to be abated anything that may, in the opinion of said Department, impair the salubrity of the city. They shall also, license all Undertakers, Vidangeries, Sextons, and no others shall be recognized or perform the duties appertaining to those several callings, without such license, under a penalty of two hundred dollars. And it shall be the duty of said appointees to obey all the lawful orders of said Health Department relating to their said duties. And, further, it shall not be lawful for any Sexton to bury or any Undertaker to convey any body from or into the city of New Orleans, without having previously received an order to that effect from the Health Department, under the aforesaid penalty; and for a second offence, to be liable to a penalty of double the amount, and to be deprived of their license. Number of Inspectors or Wardens. Duty of. To license Undertakers, Sextons, Vidangeries. Penalty and duty. A permit fr'm Health Department to authorize a burial. Penalty for infraction.

SECTION 9.—It shall be the duty of said Inspectors, in the Districts to be appropriated to them by this Department, to be constantly occupied in visiting their several Districts, and to give a written report of the condition of every house, back-yard, privy, open lot, street, alley and building, mentioned in section four of this Ordinance, in writing, each week, under such Duty of Inspector.

blank heads and instructions as the Health Department shall furnish.

Duty to have nuisances removed.

SECTION 10.—It shall be the duty of said Health Department to cause to be rendered at the expense of the proprietor or occupant of any house or premises, where there shall exist any nuisance—and everything is denominated an *nuisance* that, in the opinion of said Department, shall impair the purity of the air of the city—within a delay not exceeding one day in summer, and six in winter.

Empty lots to be filled.

SECTION 11.—It is hereby ordained that every empty lot shall be filled six inches above the crown of the street within sixty days after this Ordinance shall take effect. And that no

Cemeteries disused.

Cemetery within the thickly inhabited parts of the city shall any longer be the receptacle for the burial of the dead, after the 30th April, inst.

Duties of Vidangeries.

SECTION 12.—It shall be the duty of the Vidangeries to have a permit from said Department previous to cleansing any privy, stating in their application, (which shall be duly filed and recorded in a book appropriated to it,) the number, location and proprietor of the house whose privy it is his intention to clean.

Cemetery certificates.

SECTION 13.—It is hereby made the duty of the physicians of this city, and of the families of all deceased persons, and attendants on such deceased, to give such information in relation to each deceased person as is required in section 7th

From whom.

of this Ordinance, under a penalty of fifty dollars, without which no burial certificate shall be issued, unless the Health Department is satisfied it *could not* be procured.

Districts nine, and on Dispensaries and Physicians to attend poor sick.

SECTION 14.—This city is hereby divided into nine Wards, in each of which there shall be established a Dispensary, under the instructions and surveillance of the Health Department, where medicines shall be distributed to the poor gratuitously, on the certificate and prescription of the Dispensary Physician of said Ward, on his being satisfied of the inability of the sick to pay for the same, which certificate shall be duly recorded as a voucher for the same.

District Physician—appointment, qualification.

SECTION 15.—The City Council shall elect immediately, and hereafter, in the first week in January of each year, a physician, duly qualified by experience of at least five years in this city, of the diseases of the climate, of education, of which a diploma from some recognized, respectable Medical College, shall be required, and of good moral character, to each Dispensary District.

Duty of ditto.

SECTION 16.—It shall be the duty of said Physicians to attend the poor of said Districts, respectively, gratuitously prescribing for them at the Dispensary, at some regularly

appointed hour, and at their houses, when they shall be unable from disease to attend the said Dispensary; to vaccinate said poor, and to report the condition. as to salubrity, and of the character of the diseases prevailing, and a record of each case prescribed for, to the Health Department, in writing, weekly—in default of which the power of removal is hereby given to said Department, and temporary substitution, until his place shall be regularly filled by the Council.

To examine quarantine.

SECTION 17.—The Health Department is hereby required to inspect the Quarantine Stations, which shall be considered but a branch of this Department, and advise with the Quarantine Physician on all subjects relating to his duty, and to see that the several officers attached to the Station perform in a proper manner, the duties required of them by law. And it is made the duty of the Quarantine Physician to report the condition of all vessels arriving at this port from any other port, as to cleanliness, and of the number and sanitary condition of her passengers and crew, and especially if any contagious, infectious, or febrile diseases shall be on board, and report. This shall be done (if the immediate advice or the action of the Health Department is required) at once: otherwise, weekly. It shall also be its duty to prepare from time to time, in conjunction with the Quarantine Physician, such rules and regulations as may be required for its government, subject to the approval of the Council.

Report and duty of its Physician.

To publish advice during an epidemic,

SECTION 18.—It shall be the duty of the Health Department, during the existence of any epidemic disease, to publish instructions to the public, succinctly embracing short advice on its prevention and treatment.

Meteorological record kept and published weekly, with Cemetery returns weekly.

Annual report

SECTION 19.—It shall be the duty of said Health Department to keep a Meteorological Register, and record the temperature, barometer, winds, amount of rain and hygrometry of the atmosphere at least three times a day. To make and publish a weekly report of the number of interments in the city cemeteries, with such particulars in section seven as said Health Department may deem of interest to the public, with an abstract of the weather during the same period, and an Annual Report, with all the particulars bearing upon or appertaining to the salubrity of the city, with such suggestions for its improvement as it may recommend.

Compensation.

SECTION 20.—The compensation of the President of said Department shall be $3,000 per annum, and to each assistant $2,000 each; to the Secretary $1,200; and for office, stationery, blank books and blanks, and aid in organizing the office the first year, $2,000, or as much as may be required. To each Dispensary Physician $600 per annum; to the Inspectors, each

$500 per annum—to be paid monthly, on the order of the President of the said Department, and it shall be his duty to settle annually with the Comptroller the expenditures and receipts of his Department in January of each year.

Sanitary Survey.

SECTION 21.—It is hereby ordered that an immediate SANITARY SURVEY be made of the entire city, under the instructions of the said Health Department, who shall issue printed instructions to the Inspectors in blanks, and a plan of his District, and such other aid as they may require to facilitate it, embracing the following particulars, viz: The condition of every yard, whether paved or not, and how cleaned; the number, extent, and location of all lots that are below the level of the crown of the street; if supplied, and how, with water; the number of tenants and boarders in each house; the construction of each house—of wood or brick; the condition of the privies; the condition of every drain, canal and basin, and cemetery, and manufactory, slaughter-house, livery stable, and vachery, in each District; the condition of the levee and bank of the river and swamps contiguous to districts bordering thereon.

This inspection shall be recorded as the first in the Book of Record of Inspection, showing the exact condition of New Orleans on this foundation of a permanent Health Department for said city.

SECTION 22.—The Health Department is hereby authorized to furnish health certificates to the shipping, of the condition of the city, and to charge for the same $2 each to the domestic shipping, and to the foreign $5, and to account for the same in the annual settlement with the Comptroller.

SECTION XV.

Modes of Raising the Means necessary to Defray the Cost of the Recommendations.

No additional tax.

The large means required to carry out fully the views of the Sanitary Commission, and which is deemed requisite to restore this city to salubrity—to enable her fully to compete with any city of this Union, either in relation to health or the great purposes of commerce, we are fully sensible, she could not, at once, bear, under her ordinary resources, and it is farther obvious, that crippled as she has been, by the calamities of years, she

cannot now sustain a heavier load of taxation than she is now laboring under. These, we fear, (if men submitted to) would farther tend to paralyse her recuperative energies, and put her beyond the possibility of competing with her more fortunate rivals.

It becomes our duty then, to point out some *extra means* beyond the ordinary resources of the city revenues, to accomplish objects in the highest degree urgent and important in themselves, and which we deem indispensible to her entire salubrity. Nor do we doubt could these objects be effected, she would be as healthy as any city in the Union. If some of these modes of raising this extra revenue are evils in themselves, they are certainly much less than those they will aid in effectually and permanently removing, and be of but a temporary character in themselves.

1st.—The city Council might reasonably expect from the fund derivable from the sale of swamp lands.....$200,000

Sale of swamp lands.

2nd.—Three years ago a recommendation was made by the late *General Council of the city*, that an application should be made to the EIGHTEEN States directly interested in its salubrity, to induce them to unite in recommending to the General Government to transfer to this city 200,000 acres of public land, for which purpose it created a Board called "*The Permanent Sanitary Board,*"—whose duty it was made to initiate the necessary steps to obtain it. That Board organized and drew up a Report—in which the claims of New Orleans was set forth,—through which it was clearly demonstrated that *there had been expended* by this city and the State of Louisana for the actual and prospective population of these States not less than $2,000,000, and that it was morally and equitably right, that that sum ought to be considered due. The Report was approved of by the Board, but there required an outlay of some $200 or $300 for printing, &c., and as there was no sum appropriated nor could be procured, nothing far-

Public lands from the United States.

ther could be done. The claim is deemed a *just* one, and if the proper steps were taken, a large sum could most probably be raised from it.

A reconstruction of that board is recommended, or its duties might be devolved upon the health department. As this will require time, no amount is put down as arising from this source.

McDonogh's bequest.

3d—The estate of the late John McDonogh, will have a contingent fund to be available after some years. It is believed that a considerable sum could be raised from this source; it could be used on the basis on which a sum could be obtained on credit, say..... $35.000

Tonnage duty.

4th—The President of the United States has advised, in his message to Congress, that a tonnage duty on all vessels visiting the several ports and harbors, be left at the disposal of the States respectively. This would be just, as enabling each to collect a large amount of money, required and received in proportion to the importance of the port, to be appropriated to the wants and requirements of these ports, to facilitate the various advancements and conveniences of commerce.

There would be a very large amount derivable from this prolific source, say only.....$500.000

Loan from McDonogh's estate.

5th—The final adjudication, by the Supreme Court of the United States, of the large estate of Mr. Mc Donogh to the cities of New Orleans and Baltimore, leaves subject to the control of this city a large sum, which it has been proposed to invest in railroad stock. It is conceived that the *first* interest of New Orleans is its *salubrity;* all else should be considered subsidiary to this. Railroads are the *second* great duty of this city; but without health, they only make a great winter factorage of it. *With health*, railroads will make it second to no city on the continent. Its salu-

A TABLE

OF THE

Deaths in New Orleans during the year 1853;

Shewing for each Class of Diseases the total Mortality, and that of each Month;

ALSO, THE SEXES AND COLORS WITH THE AGES AND PLACES OF NATIVITY;

COMPILED FOR THE SANITARY COMMISSION BY D. MACGIBBON, M. D.

DISEASES.		MONTHLY MORTALITY. January.	February	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	SEXES AND COLOR. White. Males.	Females.	Colored. Males.	Females.	Sex, but not color stated. M.	F.	Color, but not sex stated. White.	Colored.	Neither sex nor color stated.	AGES. Under one month.	Do. one year.	Do. five years.	Do. ten years.	Do. twenty years.	Do. thirty years.	Do. forty years.	Do. fifty years.	Do. sixty years.	Do. seventy years.	Do. eighty years.	Do. ninety years.	Do. one hundred years.	Above one hundred years.	Not stated.	NATIVITY. New Orleans.	Louisiana, Mississippi, Alabama, Ga. S. Carolina & Texas.	North Carolina, Virginia and Maryland.	North Western States.	Southern States.	British America.	Great Britain.	Ireland.	Germany.	France.	Holland and Belgium.	Austria, Poland, Prussia and Denmark.	Switzerland.	Spain and Italy.	West Indies, Mexico and South America.	Not stated.	Total.
CLASS I. EPIDEMIC.																																																		
Yellow Fever	7849	1				4	31	1521	5333	992	147	20	4	3293	2413	27	21			37	5	1	1	90	196	197	1308	3310	1238	436	189	94	15	3			325	87	5	34	63	112	7	132	1447	3199	221	58	82	1	15	6	3962	
CLASS II. ENDEMIC.																																																		
Cholera	585	25	3	2	31	9	14	3	1		6	177	332	324	157	51	48	1	2	1	1		1	28	85	30	61	149	160	39	22	8	2	3			56	73	2	3	1	4	1	6	149	301	7					1	585	
Cholera Morbus	35	2	1							8	4		13	7	17	8	3							2	1	6	2	6	8			4	2	1			4	2	1						1	1					35	
Cholera Infantum	73	5		2	5	15	6	8		5	9	6	7	9	38	37	9	3	1	2	1			33	19			9									14	23	6						1						73	
Dysentery	232	17	10	8	13	22	23	30	16	14	29	35	13	136	73	15	6	1		2			4	33	24	8	18	48	31	23	14	3	1	2			15	32	1	3	3	1	2	8	29	15	6	3				1	232	
Dysentery, Chronic	38	4	6	2	1	4	1					10	10	23	8	4	3							1	3		3	20	8									4													38	
Diarrhœa	225	26	8	7	16	26	23	29	25	14	17	14	16	133	68	13	6			5	2	1	5	45	37	10	14	31	25	15	6	3	1	1			22	23	1		1	3	8	7	24	15	6	3			1	1	225	
Diarrhœa, Chronic	42	3	3	2	2	7	1	3				11	8	23	11	5	2						1	4	6			9		4	1	1					2	4							1						42	
Malignant Fever	34				6	10	12	6						19	6								1	7				9									1	2													34	
Pernicious Fever	152	4	4	1				18	54	52	16		3	77	52	10	7	2		4			1	7	33	17	14	32	16	9	5	3	2				16	9	2		1	3	2	6	13	9	2					1	152	
Congestive Fever	77	5			2	3	11	19	25	9		2		51	21	3	2							6	6	7	6	26	10	5	3						10	5	1						15	2						77	
Remittent Fever	29	1	2	1	1	1	7	9	2	3	1	1		15	9	3	2							1	2	1	1	5	3	1	1						2	1							1						29	
Intermittent Fever	58	2	2	3	2	5	2	6	10	1	2	2	2	27	7	2	1			1				5	2	1	1	7	5	3	2	1					2	1							1						58	
Bilious Fever	21					3	5	7	2			3	1	16	1									1	1			5	3	1	1						1	1													21	
Typhus Fever	103	15	9	13	7	6	9	18	13			3	4	7	55	43	2							1	8	12	7	18	26	12	6	3					14	6	1	1		4	4	36	7	2					1	103	
Typhoid Fever	146	13	7	5	17	12	9	10	21	24	7	8	13	78	50	9	8	1						4	9	13	18	38	32	12	5	3					10	7	2	4	1	3	3	12	6	3					1	146	
Other Fevers	69	8	6	6	2	4	3	5	17	3	5	1	3	38	25	3	1						1	9	11	3	2	14	12	2	1	1					9	8	1			1		3	12	6	1	1				1	69	
Erysipelas	58	1	2	1	3	2		6	1	2	1	1		12	8	3	1							1	2			6	2	1	1						2	1						2	1						58	
Croup	35	8	3	4		3	1	1	2	5	3	3	2	17	11	3	4							13	11	3											11	3						2	1						35	
	—1954	133	65	54	89	144	166	1704	5338	1122	243	318	431																																					
CLASS III. MONONYMAL.																																																		
Pertussis	44	3		1	3	5	3	7	5		8	5	4	14	22	2				2	3			14	18	2	1	2									4	8		1					2						44	
Measles	124	1	6	5	20	33	30	2	1	2	1			44	49	9	17			2	3	1	2	27	44	8	5	1									9	31	3		1				2	1					124	
Scarlatina	126	20	24	20	17	23	13	1	1	1	1		4	61	39	9	9	2		4	1	1		18	59	26	6	1	3								7	13	1						3						126	
Variola	17—311	2	6		2	3	2		1	1				9	3	1	2							2	4				2								5	2							1						11	
CLASS IV. VARIABLE.																																																		
Scrofula	17	2	1		2	4	3	1	1			2	1	8	1	3	4			1				1	5	2	2	1	1	1							3	2	2		1				1	1					17	
Marasmus	100	5	3	7	1	13	7	10	11	9	14	11	9	45	41	7	5							8	40	30	6	1	2	3	3	1					7	34	1	1		1	6	2	15	9	1					1	100	
Debility	213	8	6	3	22	43	26	22	30	13	15	11	14	93	84	12	15			3	4		37	66	59	3	4	4	11	4	7	15	6	2	2		43	97	1	3		3	2		16	9	1	1				1	213	
Teething	143	3		5	12	24	12	11	15	17	14	15	15	66	54	20	2							2	73	58	4										7	50	3		1	4			4	1					143	
Dropsy	84	9	3	2	4	8	2		10	12	13	5	5	34	27	9	12			2				2	10	4	2	11	13	14	5	9	3	2			6	23	2			4		10	10	2						84	
Hæmorrhage	16	1	1	2	2	3					6		2	9	6	1								1	3			1	3								2	6							1						16	
Gangrene	24	1	2		1	3			1	1	5	6		15	1	2								1	3			1	3	1							1	1							1						24	
Cancer	10	2			2	1			1	3	1			2		4								1				1	3								1								1						10	
Abscess	9			1	2			4			1	1		6		2	1							1														1														9	
Non-Visible	13			1	6	3						2	1	3	2	1	1			1	4			1													10	13														13	
Other Diseases	89	21	13	11	5	2	6	3	5	2	1	2	5	36	26	7	3			2	2	2	13	11	5	2	6	8	11	12	2	2					9	9					4	2								89	
Not stated	1150—3855	100	66	78	39	27	57	113	345	115	83	85	61	612	433	26	25	1	35	8	10	109	199	95	48	84	179	83	39	22	14	5	1			280	193	2	2	1	3	1	6	252	42	8	2	1	3	3	1150	
CLASS V. NERVOUS.																																																		
Apoplexy	127	10	11	6	13	7	10	21	17	8	4	8	12	77	35	11	4			1				1	3	2	20	22	23	13	10	7	6	1			17	6	1			3	2	3	10	13	2	1					127	
Congestion of Brain	111	7	3	5	7	8	10	12	21	12	10	4	12	57	29	11	6			3				2	15	7	6	9	16	11	13	5	3	1	1		10	10				3	2	3	15	9	2					111	
Cephalitis	134	5	3	4	8	9	10	18	35	27	4	6	5	62	43	10	7			10	2			7	37	28	4	8	3	10	5	4	1	2			10	25	3			3	3	1	6	8	1					134	
Meningitis	61		4	1	12	5	6	7	10	7	1	5	3	24	20	10	5				1			3	9	2	3	3	3	1	1						2	5	1			3	2		3	3						61	
Epilepsy	13		1			1	2	4	1	2	1		1	7	2	3								1	1	1	1	1	1	1							1	1													13	
Hydrocephalus	24		2		3	3	4	4	1	1	1			12	8	3	1			1				1	11												1	1													24	
Convulsions	963	22	16	22	28	42	53	44	167	39	26	30	26	216	167	22	9	3	2	20	12	9	98	14	120	17	11	3	3	1	1					1	54	142	3	2	2	1	3	11	6	1	1					963	
Tetanus	69	3	5	2	2	2	3	3	6	5	5	5	5	33	15	4	4			2	1			1	3	4	2	3	6	3	1	1					1	17	1			1	2		7	6	1					1	69	
Trismus Neocatium	144	10	9	6	8	8	5	14	13	25	15	15	16	56	42	8	9			2	1		146	1	2	1	1	1	1	1	1						144														144	
Paralysis	15		1		1	4	1		1		2	1	1	6	4	4	1								1	1	1	1	1								3	1					4		1						15	
Other Diseases	18	2	4	2	3	1	1				1	1	1	4	3	2	1							1	1			1	3								1	1													18	
	—1163																																																	
CLASS VI. RESPIRATORY.		60	38	49	35	36	105	135	209	131	69	72	86																																					
Laryngitis	6	1	1	1	1	2								1	3					2				1		3											1	2													6	
Bronchitis	64	7	5	8	8	5	2	3	6	4	2	3	3	29	16	5	11			4				6	10		6	3	12	3	3						4	6							1	1					64	
Pleurisy	19	3	1	1	1	1	1		1					7	7	2	3							1	2		1	2	3	1	1						1	2													19	
Pleuro Pneumonia	17	1	2	3	4	4					2		1	13	2	2								1	2		1	6	1	4							1	1													17	
Pneumonia	167	21	23	27	27	11	11	5	10	8	8	5	11	68	39	19	7			1	1			1	19	23	7	15	27	21	12	9	4	1			13	19	1	4	2	1	1	1	15	4	1	1					167	
Consumption	735	73	70	73	66	72	49	53	60	57	60	60	62	372	206	89	68			8	4		4	25	46	16	62	236	154	77	46	22	3	1	1	70	44	8	17	16	19	3	15	12	1	44	17	1	3	4	9	4	735	
Catarrh	30		3	4	8	1	4		1	4	4		1	12	2	6								1	3	1	2	1	1								1	4													30	
Asthma	7								1	2			1	2	1	1									1																											7	
Other Diseases	42	3	2	7	7	3	6	2	5	1	3	2	1	26	9	8				1				1	3	4	2	5	2	1	1						6	1							1						42	
	—1099																																																	
CLASS VII. CIRCULATORY.		109	110	124	123	102	73	63	84	76	79	71	84																																					
Pericarditis	9		2			3	2		1					7		1	1									3	1	1	3		1							1													6	
Organic Disease of Heart	19	3	5		1					4	2	4	7	12	4	3				1	1			3				6	1	1							1	1													17	
Other Diseases of Heart	41— 69		2	4	10	8	3	1	4	3	1	1	4	16	8	4	1			1	1			2	1	2	1	3	6		4	2	1				7	2		1			1	1							28	
CLASS VIII. DIGESTIVE.																																																		
Gastritis	35	4	2	3	8	6	4	2			1	3		18	9	2	4							8	7			5	1	10	1						2	3	1				1								94	
Gastro-Enteritis	97	4	3	4	15	6	6	10	9	7	13	6	14	36	26	12	12			7	13	4		3	10	13	6	3	1	1	1						11	6	2	1	2	1	1	1	3	1						72	
Enteritis	133	7	8	8		12	17	19	28	13	6	7	8	56	45	10	2			5	31	20	3	5	6	11	7	7	5	3	1	1					15	14	3	1	2		5	7		1						102	
Peritonitis	24	2	1	1	2	3		3	4	2	1	3	2	11	5	3	4	1			1	2		1	2	1	4	6	1								5	1													24	
Cancer of Stomach	8	3	1		1	1	1	1						3	4		1								1			1	1								1	1													8	
Worms	19	2	1	1	3	2		4		2	1			4	2		1							4													3	1													19	
Colic	6		1			2	1	1	1					2	1	1	1								1	1		1									2													6	
Tabes Mesenterica	21					1	8	5	1			1	3	13	5	1	2							1	7	2	1	1									2	4													21	
Ascites	20	2			1	2	4	4				3		13	3	2	2							1	2			4	1	1							2	3													20	
Other Diseases	27	3	5	6		1	3	3	1	3		2	1	7	14	6				1	1			1	2	3	2	6	3	1	1						1	2	1													27	
Hepatitis	38	4	4	2	2	4	3	1	4	6	2	3	2	22	11	4	1							1	3	2	1	3	4	1	1						6	2													38	
Cirrhosis	6				2	1	1	2						5	1										1	1		1	1								1													6	
Jaundice	4					1			1	1		1		1	3									1																											4	
Other Diseases of Liver	12— 450	1		2		2	6							8	1	1								1		1		4	1								2	1													12	
CLASS IX. URINARY.																																																		
Urinary	6		1						1	2				3		1									1	1		1									1														6	
CLASS X. OF MALES.																																																		
Of Males																																																		
CLASS XI. OF FEMALES.																																																		
Child Birth	39		1	1	5		1	1		4	3	1	3		15																						5	2					8	3						39	
Puerperal Fever	15		2	1		2	1	2	1	1	2	1			14																						2						3							15	
Cancer of Womb	6		1				2		1	1		1			4										1													1	2												6	
Other Diseases	15— 54				2	2	2	4	2			2	1		13										1	2	1	5										3	1												15	
CLASS XII. LOCOMOTIVE.																																																		
Rheumatism	12			2	2	2	2	1		2	1		1	5	6									1	1			2	1								2	1													12	
CLASS XIII. INTEGUMENTARY.																																																		
Integumentary	7					1	2			1	1		1	3	1	3								2	1												1	1													7	
CLASS XIV. OF SENSES.																																																		
Of Senses																																																		
CLASS XV.																																																		
Old Age	53	6	7	1	1	1		3	5	1		9	9	13	15	6		1												1	6	8	17	7	6	1	9	6				1	9	3		1		1	34	
CLASS XVI.																																																		
Still Born	346	23	27	26	21	18	42	31	35	30	44	23	26	102	72	15	14			102	24	13	346														346														346	
CLASS XVII. CASUALTIES.																																																		
Casualties	61		7	5	3	2	2	3	3		15	7	5	15	44	5	3	1						4	3	1	2	5	7	16	8	3	2				9	4	1		1	1		14	2	3					61	
Sun Stroke	33						9	7	5					16	6	2												8	6								6														33	
Drowned	105		5	6	4	6	13	10	13	15	6	8	10	70	6	2	2			1	2	1		1	2	1	2	13	2	1	1						20	3							1						105	
Burns and Scalds	18					1	2	2			2			9	3	1	1							1	1			1	1	1							4	3													18	
Hydrophobia	6— 211						1				1	2		2	4										1	1			1	1							2														6	
CLASS XVIII. EXOPATHIC.																																																		
Poisoned	4		2				1				1			3	1													2									2														4	
Wounds	47— 51	6	4	4	10	2	2	6	2	4	3		2	33	7	6	1							2		4	2	5	16	3	1	1					13	2	1						10	2						47	
CLASS XIX. ENDOPATHIC.																																																		
Intemperance	123	9	5	8	7	9	14	14	13	15	8	12	9	91	23	4	5							5	34	27	19	19	7	1	1					10	4	3	2	2	3	1	25	7	1	1	1	1	1	1	123	
Syphilis	6	1	1		1	1		1			1			3	2		1								1			1									1														6	
Suicide	14— 143	1		1	2	2		2	1			2	3	11	2									1	1			3	1								6														14	
CLASS XX. TREATMENT.																																																		
Treatment	3				1					1		1		1	2													1									1														3	
Total	15,633	581	463	456	530	671	856	2705	8291	2027	874	712	844	9189	6437	1007	1000	7	7	283	98	55	820	1005	1226	699	1085	2314	2093	931	449	206	83	40	18	1	1495	1037	89	111	112	183	225	267	2967	1359	282	76	108	39	83	23	15,633	

[TABLE N.]

Meteorology of New Orleans, for the Year 1853.

MONTHS.	Thermometer—Outside. Average at sunrise	Average at 9 A. M.	Average at midday	Average at 9 P. M.	General average.	Range.	Temperature of the Mississippi	Dew Point. Average at sunrise.	Average at 9 A. M.	Average at midday.	Average at 9 P. M.	Average for the month	Range.	Temperature of Evaporation. Average at sunrise.	Average at 9 A. M.	Average at midday.	Average at 9 P. M.	Monthly average.	Range.	Drying Power, or force of Evaporation. Average at sunrise.	Average at 9 A. M.	Average at midday.	Average at 9 P. M.	Monthly average.	Range.	Barometer. Average at sunrise.	Average at 9 A. M.	Average at midday.	Average at 9 P. M.	Monthly average.	Range.	Moisture. (1000 being saturation.) Average at sunrise.	Average at 9 A. M.	Average at 9 P. M.	Monthly average.	Range.	Extremes of Moisture. Maximum. (1000 being saturation.)	Minimum.	Weight of Vapor in a cubic foot, in Grains. Average at sunrise.	Average at midday.	Average at 9 P. M.	Monthly average.
January	44.22	48.93	53.96	49.06	47.09	37.50	47.24	42.36	45.50	46.95	44.93	28.2		43.51	53.54	48.21	48.38			1.86	8.39	2.98	4.08	23.2		30.287	30.355	30.290	30.322	30.313	.79	.953	.777	.938	.882	.541	0 at 26 obs'ns.	.459	3.531	3.890	4.123	3.851
February	50.10	56.14	63.03	54.93	56.05	40.50	42.68	48.24	50.72	52.52	50.48	36.4		49.35	57.21	53.96	53.54			1.86	12.31	2.13	5.43	17.4		30.243	30.266	30.204	30.420	30.238	11.7	.945	.606	.926	.845	.464	0 " 26 obs'ns.	.536	4.294	4.535	4.908	4.579
March	55.83	63.45	69.29	61.16	62.43	35.00	56.23	54.19	55.56	58.70	56.17	34.2		55.09	61.58	59.06	56.64			1.64	13.73	2.40	5.92	30.4		30.263	30.294	30.235	30.259	30.262	.54	.946	.642	.910	.832	.649	0 " 29 obs'ns.	.351	5.187	5.282	5.973	5.381
May	66.03	76.00	83.22	72.19	73.82	28.00	69.85	65.01	67.50	68.82	67.11	23.9		65.58	69.90	69.83	68.43			.87	16.11	2.63	6.53	28.5		30.257	30.290	30.241	30.251	30.260	.33	.969	.609	.921	.833	.613	0 " 29 obs'ns.	.387	6.447	6.531	7.436	6.804
June	75.51	83.40	85.26	78.76	80.73	21.00	76.58	72.58	72.20	74.82	73.29	14.6		73.48	75.53	75.86	74.95			1.02	12.72	3.37	5.70	19.1		30.226	30.264	30.228	30.230	30.237	.33	.969	.665	.892	.842	.474	0 " 29 obs'ns.	.526	7.188	7.592	8.023	7.601
July	76.85	82.69	82.18	75.41	79.88	18.00	81.52	74.59	71.06	70.14	72.13	14.4		75.14	76.69	76.66	76.16			2.26	11.12	5.27	6.21	15.8		30.251	30.281	30.239	30.254	30.256	5.66	.899	.663	.884	.815	.560	0 " 3 obs'ns.	.491	9.028	8.732	9.648	9.136
August	76.97	83.10	83.82	78.75	81.25	19.00	84.46	74.65	74.40	75.92	75.08	13.2		75.14	76.96	76.33	76.13			1.62	9.13	2.83	4.52	18.3		30.260	30.280	30.258	30.264	30.265	5.07	.930	.763	.842	.825	.390	0 " 5 obs'ns.	.610	9.600	8.480	8.315	8.798
September	72.33	77.60	80.26	74.76	76.23	26.00	82.33	70.18	70.75	71.80	70.93	28.0		70.90	73.53	72.96	72.44			2.12	9.51	2.90	4.84	20.7		30.194	30.222	30.181	30.161	30.194	.25	.950	.756	.915	.873	.448	0 " 14 obs'ns.	.552	9.651	9.515	10.045	9.737
October	67.37	67.09	72.38	65.58	66.81	39.00	71.06	58.08	58.87	61.99	59.31	42.6		60.10	64.25	62.67	62.34			4.29	13.51	3.59	7.13	30.1		30.185	30.217	30.173	30.192	30.191	.31	.932	.732	.908	.857	.498	0 " 14 obs'ns.	.562	8.402	8.473	8.828	8.567
November	60.83	65.10	69.80	64.00	64.92	39.00	59.91	58.06	59.85	63.68	59.46	33.4		59.70	63.73	62.13	61.85			2.77	9.95	3.52	5.41	20.0		30.236	30.261	30.202	30.228	30.231	.55	.876	.649	.889	.804	.650	0 " 9 obs'ns.	.350	5.761	5.870	6.520	6.053
December	49.61	52.80	56.93	52.74	53.06	9.32	43.31	45.42	48.22	47.58	46.07	40.8		47.70	53.58	50.74	50.67			4.19	8.71	5.16	6.02	17.3		30.331	30.355	30.293	30.337	30.329	.32	.921	.726	.893	.846	.480	0 " 8 obs'ns.	.520	5.842	6.069	6.206	6.059
								29.969	30.007	29.976	30.141	30.033	.91	.892	.745	.844	.823	.463	0 " 14 obs'ns.	.537	3.626	4.230	4.167	4.007
Total averages	62.69	68.94	72.41	67.13	67.79	27.36	63.34*	68.95	70.64	63.00	61.78	24.97		61.72	66.25	64.66	64.01			2.28	11.57	3.31	5.70	21.97		30.225	30.261	30.210	30.256	30.224	2.28	.929	.694	.896	.859	.514	16½	.485	6.546	6.599	7.147	6.724
Annual averages	67.79							61.78						64.01						21.97						30.224						.859							6.724			

* I am indebted to Prof. Forshey for this column; it was made at Carrollton, eight miles above the city; and is the average of nearly three years preceding April, 1853.

[TABLE O.]

Meteorology of New Orleans, for the year 1853.

MONTHS.	Radiation; Solar and Terrestrial. Average at Sun Rise.	Average at 9 A. M.	Average at 12 M.	Average at 3 P. M.	Average at 9 P. M.	Aspect of Sky; or amount of Clearness in Tenths. Average at Sun Rise.	Average at 9 A. M.	Average at Midday	Average at 9 P. M.	Monthly Average	Winds.—Their Direction and Force. North.	Force.	Northeast.	Force.	East.	Force.	Southeast.	Force.	South.	Force.	Southwest.	Force.	West.	Force.	Northwest.	Force.	Average Force.	Calm.	Am't. of Rain. In inches and fractions.	Periods of Rain. During Days	Nights
January	.71	23.83	32.71	26.15	1.25	5.32	5.16	5.74	7.74	5.98	14	1.91	34	1.88	34	1.78	11	2.40	03	1.50	1.	2.	2	1.50	4	2.61	1.93	04	3.198	4	4
February	.65	23.40	34.72	29.10	.84	3.28	4.71	3.16	6.40	4.38	44	1.94	31	2.0	32	2.0	51	1.95	4	2.37	34	2.38	2	1.62	24	2.88	2.14		4.608	5	4
March	1.13	25.57	36.00	16.86	1.12	5.66	4.12	3.85	5.38	4.59	29	1.97	44	2.0	34	2.08	54	1.98	44	2.16	3.	2.68	1.	2.0	14	2.33	2.06	04	6.870	8	4
April	.96	22.56	18.87	17.14	1.17	5.03	5.43	5.98	8.93	6.33	34	1.46	22	1.96	34	1.35	54	2.17	24	1.46	24	1.52	24	1.55	14	2.42	1.77	1.	1.848	2	1
May	.96	21.18	16.96	21.65	.73	7.22	7.19	4.77	7.09	7.04	64	1.75	22	2.41	54	1.89	41	2.26	24	2.08	24	2.08	14	1.28	1.	1.25	1.82	1.	3.946	5	9
June	.83	23.15	18.28	20.89	1.66	7.44	6.86	4.62	8.36	6.82	04	2.00	84	2.06	74	1.76	74	1.66	24	1.86	14	1.66	14	1.06	14	1.86	1.72	2.	1.757	11	2
July	0.30	25.9	25.15	26.78	1.67	3.81	3.45	2.54	6.86	4.14	04	2.33	14	1.20	14	1.64	14	1.00	34	1.69	6.	1.83	24	1.33	14	1.66	1.58	04	11.768	18	4
August	.30	25.43	34.42	29.36	.63	7.55	5.62	5.46	7.0	6.34	24	1.33	44	2.11	94	1.88	14	1.55	04	1.33	0.	0.00	5.	1.20	1.	1.75	1.33	17.	7.016	11	0
September	.64	25.71	25.78	27.79	2.12	5.70	5.63	3.90	7.56	5.70	4	2.82	50	2.05	124	1.86	24	1.66	0.	0.00	04	1.33	14	1.28	04	2.00	1.62	3.	5.043	14	3
October	.39	22.04	24.83	24.06	.53	5.51	5.86	5.32	7.63	6.03	10	1.97	60	2.54	94	1.89	04	2.00	0.	0.	0.	0.	14	1.33	14	2.66	1.54	14	5.175	3	3
November	1.13	14.48	19.49	11.99	6.36	4.73	5.23	5.36	7.05	5.73	44	2.21	5	2.38	94	1.82	3	2.08	04	1.00	04	1.00	04	1.00	24	2.11	1.69	24	7.632	6	3
December	3.20	10.95	17.38	12.25	4.57	5.21	4.68	4.54	7.00	5.35	64	2.55	24	1.92	6	1.83	04	2.50	14	1.60	04	3.50	2.	1.87	44	2.05	2.21	24	4.566	7	4
Averages	.92	22.27	24.52	21.24	1.88	5.48	5.31	4.63	7.41	5.70	67	2.02	48	1.99	63	1.82	37	1.92	304	1.41	214	1.52	233	1.44	233	2.16	1.78	37	62.641	94	32
Average Means		5.99					5.70																				1.23				

The "Aspect of the Sky" is taken on a scale where 0 represents entire cloudiness, and parts of the sky, clear up to 10, entire clearness; and the Force of the Wind, on a scale from 0, representing calm, up to 6, a violent storm.

brity, and *its reputation for salubrity*, must *precede it, now its reputation is gone.*

The amount to be derived from this source is very large, say.....$400.000

6th—A special tax on the property of absentees is not constitutional, but some means should be devised by which to apportion, somewhat more equitably than is now done, the various incumbrances of civil government—the benefits and burthens; and particularly during epidemics. these latter are very onerous on those who remain to discharge faithfully their duties to society.

The authorization to raise a certain sum by lottery to be solely appropriated to the removal of the causes influencing the salubrity of the city.

Here then is the enormous sum of.....$1.435.000 besides the contingencies that have not been estimated, but little more than half of which, would make New Orleans one of the healthiest cities on the continent, and one of the most desirable residences; put her in the front rank of American cities, and with her railroads, defy all competition.

The following table was prepared for the purpose of aiding to fill up the three first columns in the table in the Introduction, so as to extend the averages over as large a number of epidemics as possible, with no intention whatever of publishing it. It is furnished now at the unanimous request of the Sanitary Commission, as embracing important views of our comparative condition but little known, and upon which most erroneous opinions are entertained.

The climatology of the year has also been most carefully compared with that of the preceding epidemic years and found entirely to correspond. It has also been comprehended with the averages in the other columns, and adds its important mite in their verification.

This table farther shows, that with the exception of the remarkable year 1853, produced by the most unusual concurrence of causes—that it is *certainly* in our power to say shall never occur again—that the yellow fever *is not increasing* among us; that the present year stands in comparison with others but as the tenth, and still does not forbid us to entertertain the sanguine hope, expressed elsewhere, that if the suggestions as to its prevention are fully carried out, we may be enabled to drive it entirely from among us.

Since the "Report on the sanitary condition of New Orleans" was put to press, important corroboration of its views in relation to the causes of our epidemics has been obtained—besides those mentioned in our "Introduction," in relation to this year. If necessary, they can be comprehended in a supplemental report—wherein, with other documents intended for our report, but necessarily excluded—I propose to state the meteorological elements of epidemic yellow fever in other climates and places, in corroboration and illustration of what has been found here.

E. H. B.

COMPARATIVE TABLE.

Estimate of the Salubrity of New Orleans, as affected by her Epidemics.

1st—of Yellow Fever.

YEAR.	Total mortality.	Mortality from yellow fever.	Total population, (actual and calculated.)	Miles-emal. Ratio of total deaths to total population.	Miles-emal. Ratio of total of yellow fever to total population.	Relative mortality of each epidemic.
1817	1,772	600	24,196	73.22	24.79	3d.
1819	2,138	425	26,183	81.65	16.23	9th.
1820	1,766	400	27,176	64.98	14.71	11th.
1822	2,734	808	31,706	86.86	25.48	2d.
1829	2,520	900	47,561	52.98	18.92	6th.
1832	8,099	400	55,084	147.02	7.26	14th.
1833	4,976	1,000	57,713	86.21	17.70	7th.
1837	4,807	1,300	68,229	70.45	19.05	5th.
1839	3,934	800	73,487	53.53	10.88	12th.
1841	4,549*	1,325	78,745	57.16	16.82	8th.
1847	9,043	2,318	108,609	83.11	21.34	4th.
1848	8,026	872	115,503	69.48	7.54	13th.
1849	9,862	769	122,511	80.49	6.27	15th.
1853	15,787	8,101	154,132	102.42	52.55	1st.
1854	10,564†	2,484	160,823	65.69	15.44	10th.
Totals,	80,577	21,624	.....	.....	.....	....
Averages,	5,371	1,441.60‡	76,777	73.30	18.30	....

The same as affected, 2dly, by Epidemic Cholera.

		From Cholera				
1832	8,099	4,340	55,084	141.02	78.78	1st.
1833	4,976	1,000	57,713	86.21	17.32	3d.
1848–'9 (of '48)	8,026	924	115,503	69.48	7.99	4th.
1849	9,862	2,081	122,511	8.049	16.98	2d.
1852	8,670	1,080	147,441	58.80	7.32	5th.
1853	15,787	554	154,132	102.42	3.59	6th.
Totals,	55,420	9,979	.....	.....	.....	....
Averages,	9,236	1,666.16‖	.....	89.73	21.99	....

To complete this table to the present period, and render it more satisfactory, it was necessary to *estimate* many of the past months, as well as some *future returns* for 1854; for, there being no authorized Board of Health, or of record, to enforce returns from the cemeteries, several have reported in the early part of the year irregularly, and sometimes omitted it altogether. I have been able to procure a reliable return for January; for parts only of February, March, April, and May, and have had to estimate the balance; for the rest of the year to the 18th of November, the *returns* are about the same as usual. That in relation to yellow fever is, no doubt, as reliable as at other times. The balance of the year has been estimated.

* Including Lafayette hereafter. † Partly estimated ‡ The mortality from *yellow fever* in *epidemic* years, thus forms 26.84 per cent. of the whole mortality. ‖ The mortality from cholera in *epidemic* years, thus forms 18.03 per cent. of the whole mortality.

REPORT

OF THE

SANITARY COMMISSION

OF

NEW ORLEANS,

ON THE SUBJECT OF

CITY SEWERAGE.

Pure air and pure water, are foremost among the most essential requisites for the maintainance of human health. When human beings aggregate in densely crowded cities, they are naturally apt, in various ways, to pollute the air which they breathe. The only sure way to avoid this consequence, is to observe, unremittingly, the strictest rules of cleanliness. The refuse of food, the bodily excreta of men and animals, and all kinds of matters tending to putrefaction, should never be allowed to vitiate the air of a city with noxious emanations; but should be promptly removed beyond its outer precincts, before the putrefactive process sets in.

For the removal of city sewage, water, where it can be made available, is preferable to all other means. Hence the customary constructions of gutters, drains, and sewers; the most important conditions pertaining to which are, first; an abundant distributed supply of pure, healthy water; and second; sufficient declivity in the sewerage channels, to insure the speedy transit of the sewage water to a distance.

In respect to the first condition, perhaps no large city in the world is more favorably situated than New Orleans, considering that we are nearly on a level with the Mississippi river, running past. This water is healthy, and of unusual chemical purity, containing, ordinarily, less than one ten-thousandth part of dissolved matter. It bears, on an average, one fifteen-hundredth part, by weight, of harmless mineral sedimentary substances. Light cannot penetrate its turbid, rapid, tortuous currents; it is, therefore, almost entirely devoid of infusorial and cryptogamic organisms, which vitiate the waters of other more quiet rivers. Its volume is so vast, (near 15.000.000.000.000 cubic feet of water annually,) that the sewage of a thousand cities could not sensibly contaminate it, for it must be borne in mind that each and every portion of its flowing mass, in turn, comes repeatedly to the surface, where it is impressed by the influence of atmospheric air, also incessantly renewed. It is mainly in this extended, chemically active plane, that the putrescent animal and vegetable remains, contributed from half a continent, are oxydized and rendered harmless.

For several months in the year, the river water, admitted through the perforated Levee, will flow spontaneously through the street gutters, to any amount required. In other months, when the river is low, the water can be made to flow in like manner through the gutters, by being artificially lifted, say by steam power, at a mean, to a height of about six feet. It would be preferable to supply the gutters from a continuous canal, made to run parallel with the river, in the body of the Levee. This canal reservoir should be carefully floored with planks on a level with the base of the Levee, and also bridged over on a level with upper surface of the Levee. The accumulating river deposite could then, when necessary, be conveniently removed. The channels for the ingress of river water, need be comparatively few; the exits should correspond, in number and position, to the street gutters leading from the Levee, towards the swamp in the rear of the city.

It is our opinion, that each side gutter of every densely populated street in this city, running from the Levee back, should be thus made to bear a small but constant stream of water, direct from the river, in addition to all that is supplied by the present city Water-Works. This

would result in an increase of the amount of water to be raised and emptied into the Bayou St. John, or Lake Pontchartrain, by the draining machines; and arrangements, if necessary, in contemplation of this result, should be made with the drainage companies. In connection with these measures, we would suggest that *silt-boxes* be constructed under most of the present bridges, for the purpose of intercepting and detaining the sedimentary matters borne along by the gutter currents; serving as temporaray recipients of street dirt, &c., in a way which we shall, further along, point out more fully.

In respect to the available declivity for sewerage, New Orleans is less favorably situated than most other cities. From the base of the Levee, back to Claiborne street, almost a mile, there is about eight feet of fall; being near one vertical, to six hundred horizontal. Beyond Claiborne street, there is scarcely six inches fall for near a mile and a quarter, to the Bayou St. John, reckoned at its medium stage of water. It is true, a little more declivity is commanded by the draining machines, but not enough to warrant the construction of ordinary covered sewers, that could be expected to keep themselves clean. With unlimited pecuniary means, we might, by carrying our sewers deep enough below the surface, occasionally pumping from a low to a higher level, drain this city, as many other cities are drained, by a complete system of covered sewers, discharging the sewage water either into the Lake or the river, as might be thought preferable. In addition to this achievement, we might effectually drain even the subsoil to the depth of several feet, rendering it practicable to have cellars to our houses and stores.

But it seems to us that these works, namely, a complete system of underground sewerage, and a general system of subsoil drainage, for the city of New Orleans, are not feasible at present. We have, however, come to the conclusion, that for house drainage, and the drainage of our squares bounded by the streets, nothing can be more appropriate, in connection with the use of river water and silt-boxes, as previously suggested, than the lately improved London system of pipe sewerage.

In the application of pipe sewerage to the houses and squares of this city, the plan of back drainage, or drainage from the rear of premises, would be by far the most efficient and economical. The branch pipes,

preferably of impervious stoneware, two to four inches in diameter, should originate in grated syphon traps, in the back yards of dwellings. They should enter the mains by curves, tangentially, in the direction of the current. The main pipe sewers, proceeding from the interior of the square, should be of smooth equable calibre, three to six inches in diameter, and should be carried with a regular declivity, and in the most direct route feasible, so as to disgorge themselves into the running water of the lowest adjacent gutter, and where practicable, they should terminate just outside the grating of the silt-box. Through these channels all the dirty service water from houses, including the liquid sewage from privies supplied with running water, should be habitually discharged. In 1835 MM. Labaraque, Chevalier and Parent du Chatelet, sanitary commissioners of the French Government, investigated fully the effects of mixing the liquid sewage from water-tight privies with water. In proportions less than one to fifty, the unpleasant taste disappeared, and in proportions less than one to one hundred, no odor whatever arose from the mixture. We may therefore safely allow the liquid sewage from water closet privies, to be mingled with a thousand times more river water running in the street gutters, without fear of the least unpleasant emanation.

Upon the introduction of this system of pipe sewerage for houses and squares, there would very seldom follow the necessity of removing the house drains, mostly open gutters, at present in use. These might still serve to convey away surplus storm waters; and moreover, they might at times be called in requisition for ordinary drainage, in case the sewerage pipes should be temporarily out of order. The solid refuse from kitchens, fire-places and stables, and the solid ordure from privies, would still, as at present, require special removal.

We will now present, under distinct heads, additional remarks upon most of the several items, constituting the plan of city sewerage above alluded to, which we regard as specially adapted to the requirements and circumstances of New Orleans.

Street Gutters.

With the view of rendering our remarks clear and explicit, we will designate by *leading gutters*, the gutters of those streets running in a direction transverse to that of the river; that is, leading from the Levee

directly towards the swamp: and by *cross gutters*, the gutters of the streets running parallel with the river.

The grade of the present leading gutters will do. It would however, probably be better in some localities, if the bottom of the gutters were some inches lower in relation to the houses, banquettes and streets. The cross gutters, and others, that from their position or direction, cannot be made to bear incessant currents of river water, should, in most localities, be raised a few inches, in accordance with the occasional practice of our city surveyors; so that at their junction with the leading gutters or silt-boxes, the bottom may be about on a level with the surface of the running water, at medial stage. Thus, while as before explained, the leading gutters are continually giving conveyance to fresh running rills from the river, the cross gutters will ordinarily be dry: and instead of being receptacles for stagnant water as at present, their functions will be limited to carrying off the rain water which falls from the clouds.

Silt-Boxes.

At the street crossings, where the water-bearing gutters intersect the cross ones, each and every rill of running water, should lead through a capacious covered reservoir or *silt box*, corresponding in position with the present street bridges. The cubic capacity of these silt-boxes, varying in different locations, should be, (reckoned below the usual level of the gutter water,) from thirty to seventy cubic yards. The depth would vary from two to six feet, the end nearest the river being deeper than the other by a foot or eighteen inches. In width they would in different places vary from two and a half to seven or eight feet; and in length from twenty to fifty and sixty feet. The bottom should be well laid planks, the sides and ends of brick and mortar work. Like the present bridges which they are designed to replace, they should be covered by strong planks resting on sleepers, or by appropriate slabs of iron resting on iron bars. The covering of whatever nature, must be conveniently removable, for the occasional purpose of removing from them the sedimentary deposit which they are designed to collect. The gutter entrance and exit, should be guarded by a two inch grating, to prevent the ingress of dead animals, floating vegetable offal, and other improper things. Along side the silt-box, and corresponding in grade with the gutter, there must be laid beneath the street, say a four inch pipe of iron or earthern

ware, protected by a fine grating, and susceptible of being stopped or opened at pleasure. This pipe is for the conveyance of the gutter water, during the times occupied in cleaning out the silt-box. On these occasions, the silt-box being surcharged with mud and matters of deposit, the entrance of gutter water is prevented, the contained supernatant water is bailed or pumped out, and the remaining solid and semi-solid contents shovelled into tight carts, and at once removed to a distance; either cast into the river, or preferably, carried far in the rear of the city, there to be used either in filling up swamp lots, or in the manufacture of a compost for communicating fertility to the poor pine lands across the Lake.

Pipe Sewerage of Houses and Squares.

As already stated, we deem the improved London system of pipe sewerage, to be well adapted to our wants and requirements, in the drainage of houses and squares of ground. What we wish to accomplish, is the delivery of sewage water into the water bearing gutters or silt-boxes, in the most economical and efficient way. The plan of back drainage through impervious pipes laid beneath the surface of the soil, is unquestionably the best method of accomplishing this. On an average, the length of the drainage current to the water bearing gutter, will be, by the back drainage plan, reduced to about one-half what it is by the present system, and as a matter of course, the rate of fall will be nearly twice as great.

For full information on all the details of the London system of pipe sewerage, and all matters connected therewith, we would refer to one of the many able sanitary publications by the British General Board of Health; namely, "*minutes of information collected with reference to works for the removal of soil water or drainage of houses and public edifices, and for the sewerage and cleansing of the sites of towns.*" London 1852, 208 pages, 8vo., illustrated by a colored map and 137 wood cuts.

The average English prices for earthenware pipes for sewerage, were in 1852, as follows:

Internal Diameter of Pipe.	Price per running foot, reduced to Federal Currency.
2 Inches	5 Cents.
3 "	6 "
4 "	7 "
6 "	10 "
7 "	13 "
9 "	18 "

They are probably cheaper now. Imported from England and deliv-

ered in this city, free of duty, they might, at the outside, cost twice as much as the prices enumerated. For our use, it will seldom be necessary to sink the pipes more than a foot or eighteen inches beneath the surface of the ground; the laying of them will, therefore, be comparatively inexpensive. The following estimate will probably be found near the total cost of the sewers ready for service, including all the essential accessories:

Diameter of Pipe.	Cost of laid Sewer.
2 Inches	20 Cents.
3 "	24 "
4 "	28 "
6 "	40 "
7 "	50 "
9 "	65 "

In the parishes North of Lake Pontchartrain, where clays, sands and marls of various qualities are found, and where there is abundance of pine wood, earthenware or stoneware pipes, such as are required for sewerage, might be successfully manufactured, so as to be furnished much cheaper than those imported from England. It would, however, be best to begin the system, by the importation of pipes, leaving to private enterprise their subsequent domestic production. The importation should be made by the city, and to those requiring them within its corporate limits, the pipes should be furnished at cost.

We herewith present an estimate for the sewerage of a square of ground, 300 by 400 feet, on which there are, say thirty-six (36) tenements. For the better elucidation of the subject, reference is made to the accompanying ground plan, drawn on a scale of 200 feet to 1 inch. A square 300 by 400 feet is seen sub-divided by dotted lines into 36 lots. The relative position of the banquettes or sidewalks, the cross streets, the leading streets with their water-bearing gutters, and the proposed silt-boxes, are all shown. The silt-boxes are indicated by a black parallelogram, thus ▬. Arrows point out the direction of the gutter currents. The system of pipe sewers for the drainage of the lots and tenements for the whole square, is shown by A, B, C, D, E, F, Table IV. as originating in the several lots, and disgorging into the silt-box at A

ESTIMATE.

150	feet,	6	inch	pipe (A. B.)	laid at	40 cents.....	$60
150	"	4	"	(B. D.)	"	28 "	42
350	"	3	"	(D.F.D.E.C.B.)	"	24 "	84
1900	"	2	"	For the service of sinks, the fluid of water closets, &c., allowing rather over 50 feet to each tenement, laid at 20 cents.....			380

Two silt-boxes, for, usually, each square, will have to pay for two silt-boxes, each costing, complete, say $250..... 500

Total cost of sewerage improvement for the whole square....$1066

This makes a total average cost for each tenement of $29 61.

In some localities there would be no expense for silt-boxes, but, perhaps an equal additional expense for carrying main-pipe sewers beneath streets, from one square to another, so as to empty into silt-boxes or water bearing gutters.

R. H. Chilton, Esq., merchant, was requested to procure for the use of the Commission, a late English price-current of sewerage pottery. Since the preceding estimate was made, we have received from him the following letter, accompanied by a list of prices, from John Doulton, Jr., of Liverpool; which list, with the figures illustrative, we think proper to annex.

Vide Tables I. II. III.

NEW ORLEANS, 30th March, 1854.

Dear Sir:—I herewith inclose you Doulton's schedule of prices (illustrated with cuts) of stoneware tubes, suitable for drainage: and will contract to deliver on board ship at Liverpool, at prices according to the schedule, at the rate of $4,80 (four dollars and eighty cents,) per pound sterling, payable upon delivery of bills of lading.

The freight varies. About thirty shillings a ton may be taken as an average. The tubes weigh, for two feet lengths of four inches diameter, fourteen pounds; of six inches, twenty seven pounds; of twelve inches, eighty pounds; and of eighteen inches, one hundred and forty pounds.

The insurance would be one and a half per cent. Earthernware is is among the articles intended to be admitted free of duty.

Yours Respectfully,

R. H. CHILTON.

To Prof. J. L. RIDDELL, *Member of the Sanitary Commission.*

DOULTON'S PRICE CURRENT,

*For Glazed Stoneware Tubes, Sewerage Pottery, &c.**

STRAIGHT TUBES, with socket joints, for drainage, and conveyance of water.—Table I, fig. 0.

IN THREE FEET LENGTHS.

Diameter of bore,	1½ inch.	2 in.	2½ in.	3 in.
Price per foot,	3½d.	4d.	4½d.	5d.

IN TWO FEET LENGTHS.

Diameter of bore,	4 inch,	6 in.	9 in.	12 in.	15 in.	18 in.
Price per foot,	6d.	8d.	1s. 1½d.	1s. 8d.	2s. 6d.	3s.

* John Doulton, Jr., (of Lambeth Pottery House, London,) manufacturer of glazed stoneware tubes, &c., St. Helens, Lancashire; Liverpool stores, 70 Soho street.

BENDS.—Table I, fig. 1, 2, 3, (Doulton's numbers.)

Diameter of bore,	2 inch.	2½ in.	3 in.	4 in	6 in.	9 in.	12 in.	15 in.	18 in.
Price per bend,	1s.	1s. 1d.	1s. 3d.	1s. 9d.	2s. 3d.	3s. 6d.	5s. 6d.	8s.	10s. 6d.

JUNCTIONS.—Table II, fig. 4, 5, 6, (Doulton's numbers.)

Bore of main tube,	2 inch.	2½ in	3 in.	4 in.	6 in.	9 in.	12 in.	15 in	18 in.
Price per junction,	1s	1s. 1d.	1s. 3d.	1s. 6d.	2s.	3s. 6d.	5s 6d.	7s. 6d.	10s.

JUNCTIONS.—Table II, fig. 7, 8, 9, (Doulton's numbers.)

Bore of main tube,	2 inch.	2½ in.	3 in	4 in.	6 in.	9 in.	12 in.	15 in.	18 in.
Price per junction,	1s. 4d.	1s 6d.	1s. 8d.	2s.	2s. 8d.	4s. 6d.	7s.	10s.	12s 6d.

SYPHON TRAPS,—Table II, fig. 10, (Doulton's number.)

Bore of tube,	2 inch.	3 in.	4 in.	6 in.	9 in.	12 in.
Price, each,	2s.	2s. 6d.	3s. 6d.	5s.	7s. 6d.	10s.

GULLEY DRAINS WITH SYPHON TRAP,—Table II, fig. 11, (Doulton's No.)

Bore of tube,	2 inch.	3 in.	4 in.	6 in.	9 in.
Price, each complete,	3s. 6d.	4s. 6d.	6s.	9s	14s.

TRAPS FOR IRON-FLAP,—Table II, fig. 12, (Doulton's number.)

Bore of tube,	3 inch,	4 in	6 in	9 in.	12 in.
Price, each,	1s. 3d	1s 6d.	2s.	3s 3d.	4s. 6d.

GULLY TRAP FOR IRON GRATING,—Table II, fig. 13, (Doulton's No.)

Diameter,	12 inch.	15 in.	18 in.
Price, each,	8s	12s.	18s.

EGG SHAPED TUBES, in two feet lengths, with socket joints, for drainage.—Table III, fig. 14, 15, 16, 17, 18, 19.

Diameters,	20 by 15 inch,	16 by 12 in.
Price, per running foot,	3s. 6d.	2s. 6d.

Diameters,	12 by 9 inches,	8 by 6 in.	6 by 4 in.
Price, per running foot,	1s. 6d.	1s.	8d.

Diameters,	4 by 2½ inch.
Price, per running foot,	6d.

GLAZED STONEWARE WATER-CLOSET PANS, WITH SYPHON TRAPS,—Table III, fig. 20, 21, 22, 23, 24.

Price, each complete, ... 7s. 6d.

The numbers (No. 1, No. 2, No. 3, No. 4, No 5,) correspond to Doulton's price current. The different models can be ordered by those numbers.

Street Scavenger Service.

Supposing the improvements before set forth, to have been made and in operation, the city could be kept twenty times more cleanly than at present, for perhaps one-fourth the current expense vainly incurred in contracts for street cleaning. Let it be made the duty of each owner, tenant or occupant, to have his banquette and his portion of the street, to the middle thereof, carefully swept or washed, and the dirt swept into the gutter of running water fronting his banquette, and the more solid parts pushed past his premises towards the receiving silt-box, provided his property front on an open water-bearing gutter; otherwise, let it be his duty to transport the sweepings to be emptied in the water just above the nearest silt-box. All this to be accomplished daily—say, before eight o'clock in the morning, Practically, the inhabitants of

each row of houses from street to street, will find it economical and satisfactory to club together and hire this service performed. The expense will thus be found much less than the present *pro rata* taxation for street cleaning, and the work will be likely to be performed in a prompt, efficient and satisfactory manner, which cannot be said of our street cleaning under the contract system. The whole matter should be clearly defined by municipal ordinances, with provisions for accomplishing with promptitude through corporation employees, whatever might be neglected by private persons.

Removal of Garbage and Ordure.

The solid refuse of kitchens, of butcheries, of stables, markets and manufactories, as well as the solid contents of privies, will still, as at present, require removal by hand. But as water will abstract and convey away such portions of these effete matters as are most prone to take on the process of putrefaction, the necessity of their frequent removal will be very much lessened. The refuse of butcheries, manufactories, large hotels, markets, stables and privies, should be removed by the proprietors. On stated mornings, as frequently as experience might prove necessary, corporation carts should traverse the streets, for the purpose of gathering up the general kitchen offal, which should be placed by the house-holders near the edge of the banquette in boxes or barrels, to be emptied into the carts, and finally cast into the river, or at least transported to a distance. It is probable that this expense of cartage may hereafter be voluntarily born by people in the neighborhood of the city, engaged in the fattening of swine.

Removal of the Deposit Accumulating in the Silt-boxes.

In the operation of this system, all the mud and dirt which now disfigures our streets, would tend to accumulate in the silt-boxes. From time to time, it would be necessary to cart this accumulated deposit away. This should be done at the expense of the city. This silt-box sediment would be a valuable ingredient in an artificial compost for fertilizing the barren pine lands across the Lake; and its value for this purpose, may at a future time, secure its systematic removal free of expense to the city.

How the Expenses of these Improvements, and of their Maintenance should be borne.

The river water, for the maintenance of perpetual rills in the lead-

ing gutters, should be furnished at the expense of the city treasury. Where the street gutters require modifying, this should also be done at the expense of the city treasury. So, likewise, additional cost with the city draining machines, and the expense of a drainage canal to the Lake, should such a measure be resolved upon. The silt-boxes should be constructed at private expense, as before mentioned; yet, to secure efficiency and uniformity in the system, they should be made under municipal direction and inspection, and when duly approved and received, should be kept in repair by the city. The first cost of the silt-boxes should be met by a local tax upon the grounds, not the improvements which naturally drain into them. For instance, the South half of a square near Canal street should pay for the silt-box at its Southwest corner, and the North half for the one at its Northeast corner.

In the back drainage of squares by pipe sewers in common, the common sewers should be laid at the expense of all draining into them, by a tax *pro rata* upon the habitable capacity of the several buildings. If subsequently, other connections were made with the sewer, the person or persons so connecting should refund equitably to the owners of the properties originally contributing. Since these common sewers should be placed so as to lead by the most direct route practicable to the nearest or lowest adjacent silt-box, it will be necessary that the proprietors of the ground either consent and arrange among themselves as to the right of way for the impermeable subterranean pipe, or that some laws be provided, as in England, by which this matter can be properly adjusted. House sewerage, and the connection of the same with the common sewers, must of course be at the individual expense of the proprietors. The whole system, including the essential details of house sewerage, should be carried into effect under competent municipal inspection, and on a uniform and well matured plan.

In regard to the obligations upon proprietors to meet the expense of pipe sewerage, and its concomitants, it will be proper that whenever the city shall have supplied the adjacent leading gutters with running water, the municipal authorities should, under certain regulations, have power to order and enforce the laying down of pipe sewerage, and the building of silt-boxes. In other instances, where two-thirds in amount of assessed value of the property owners, assent in

writing to the introduction of pipe sewerage, and the building of silt-boxes, it should be compulsory upon the balance to adopt the improvements, and contribute thereto, as before set forth.

Objection against a connected System of Pipe Sewerage for New Orleans.

We are of opinion that it would be practicable to adopt the entire London system of pipe sewerage for this city as far back as Claiborne street, if means could there be provided for a suitable outfall and proper disposition of the sewage water. It is true, the main pipes would be required of very large size, and the total expense would be vastly greater than the cost of the system which we have recommended. The greatest objection to the plan is the difficulty, if not impracticability of ultimately disposing of the sedimentary part of the sewage. To remove the sewage from Claiborne street, deep subterranean canals might be formed, running to the bank of the river, into which the sewage might be pumped. These canals however, would frequently get obstructed by deposits of mud, and they would be difficult and very expensive to clean out. Should the main pipes terminating at Claiborne street be made to disgorge into a receiving canal, designed to be drained into the Lake, as at present, such canal, as well as the main pipes near it, would of necessity become frequently choked with matters of deposit.

General Effects of Sewerage, as Recommended.

Should the system of drainage and sewerage, which we recommend as specially adapted to this city, be put into complete operation, we should expect that the following general effects might be noted.

Along the gutters of the leading streets, would constantly run little rivulets of inodorous river water, which becoming more and more clear as it receded from the river bank, leaving all sedimentary matter in the silt-boxes, would enter the draining canals in the rear of the city, limpid almost as the waters of the lake. The draining canals would not fill up as they do at present, and nine-tenths of the current expense of cleaning them out, would be avoided.

The silt-boxes would be the recipients of the sediment, dirt and filth which now form an unwholesome coating to our streets and banquettes. No unpleasant emanation could proceed from the silt-boxes, because the sedimentary matter would be constantly covered with fresh running

water. When these recipients of sediment became two-thirds filled with deposit, it would be proper to have them emptied, which could be conveniently and readily accomplished. Thus on an average, they would always be two-thirds full of liquid water supernatant above the compact mud. They will therefore be found, now and then to serve a purpose of incalculable value, in furnishing a ready and abundant supply of water for the extinguishment of fires. Not only will their contained water be conveniently and immediately available, but by opening to a sufficient extent, the sluices connecting the appropriate street gutters with the canal reservoir in the Levee, the silt-boxes can be so promptly replenished, as to be kept continually full.

The gutters of the cross streets, designed solely for carrying off rain water, would ordinarily be dry and clean. No backed up, stagnant, fetid water, green with algoid growths and alive with animalcules; no parti-colored kitchen slops, foul soap suds, or other nameless fluid mixtures repugnant to the senses, would greet the eyes and the olfactories of the passer by.

The subsoil upon which our city stands, consists mainly of exceedingly fine quartzose clay, being a pure earthy deposit from the turbid waters of the river, in former times. Water permeates this subsoil very slowly. It is naturally almost deficient in putrescent elements; nor can it give transit to gaseous emanations from the deep underlying, unexplored strata, to an amount sufficient to be prejudicial to human health. Let us but keep the surface clean and sweet, let us abolish from our midst, all stagnant pools of water, and all exposed reservoirs of putrefying filth, and let us moreover effectually drain the swamps in our neighborhood, and New Orleans will probably become as noted for its salubrity, as it now is for its devastating epidemics.

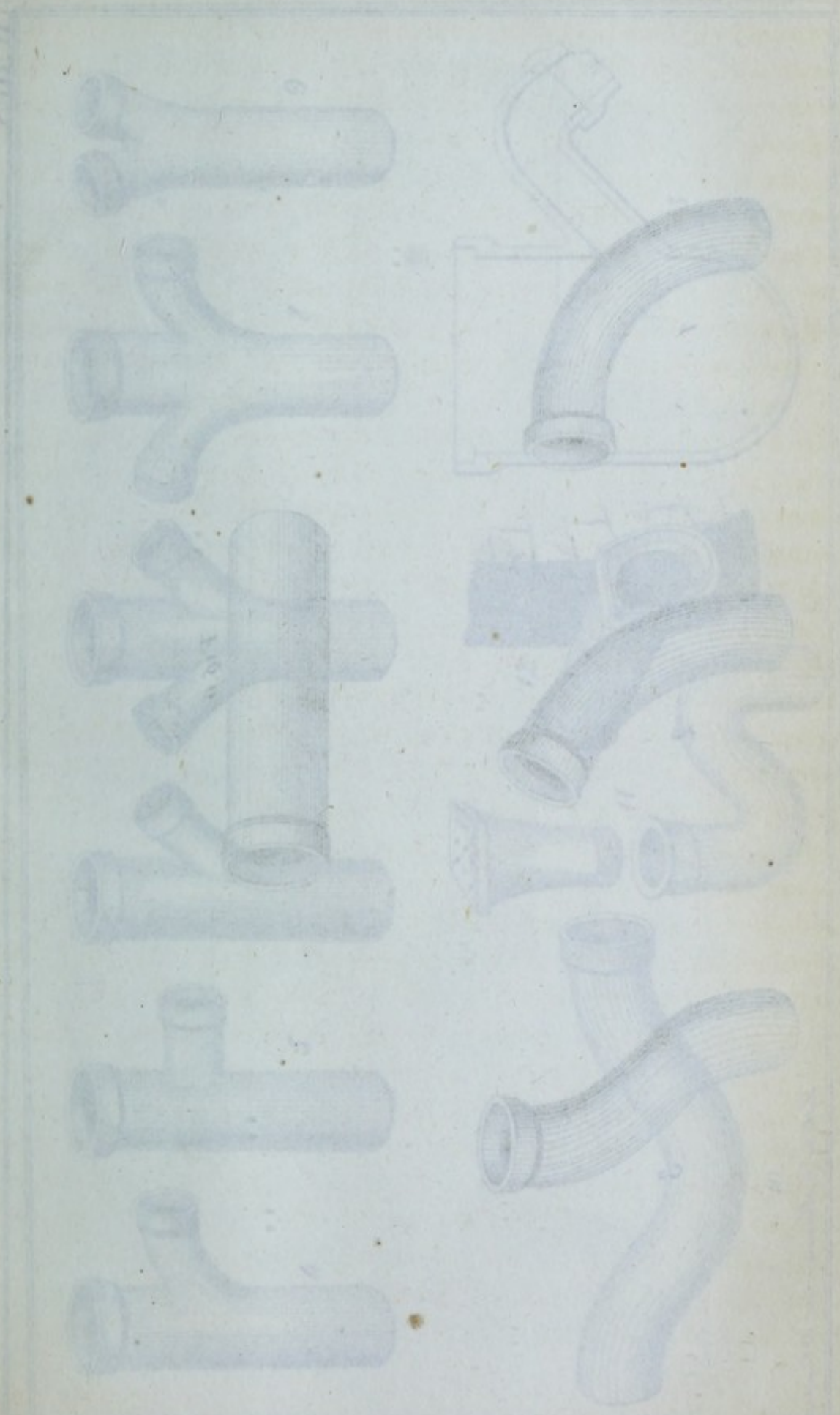
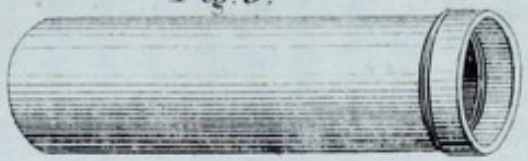
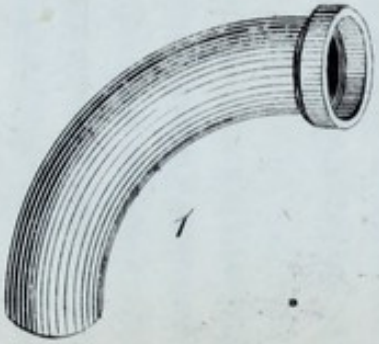
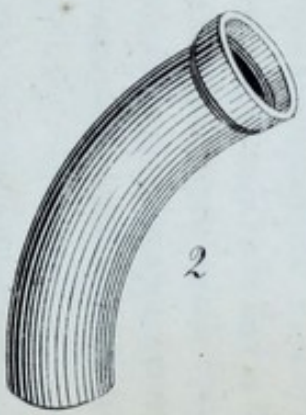


Fig. o.





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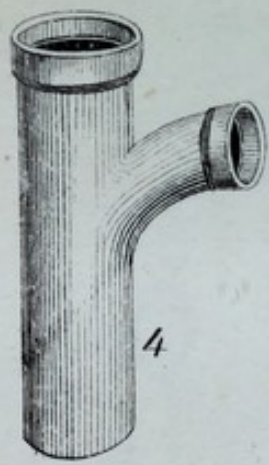


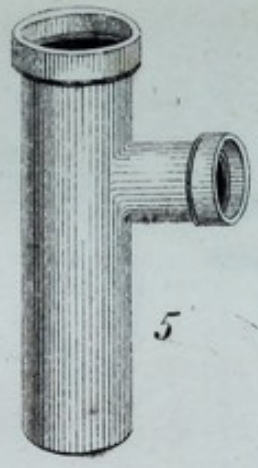
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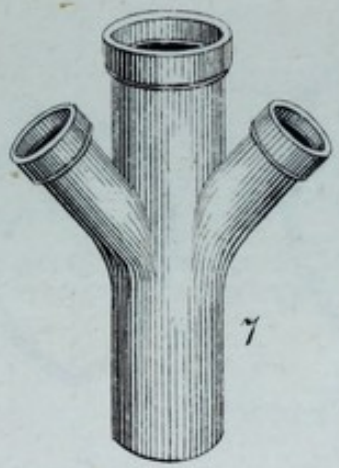
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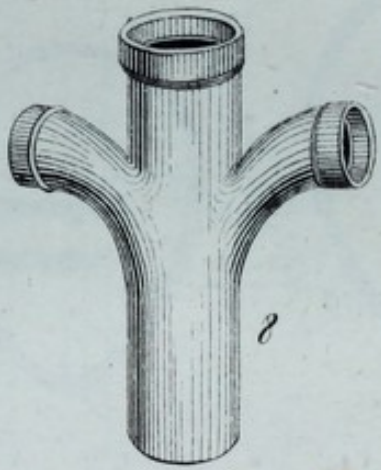
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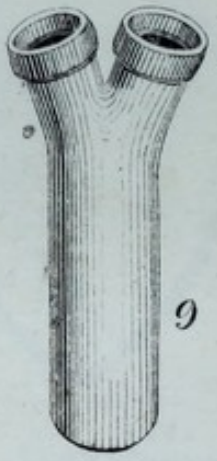

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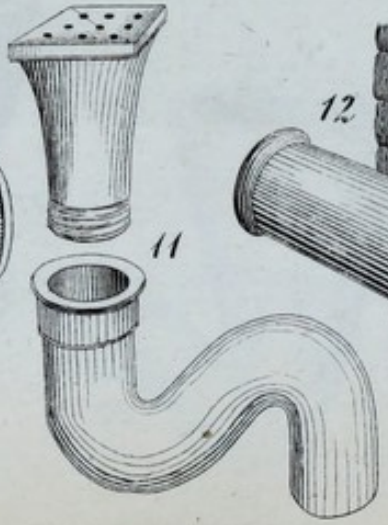

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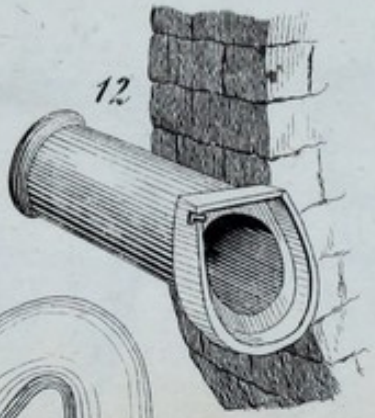

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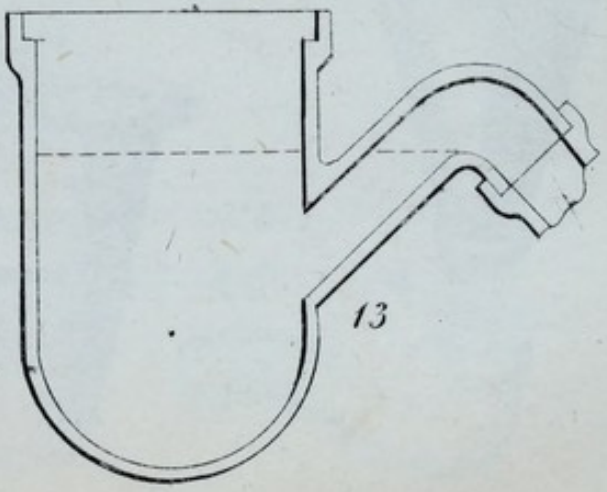

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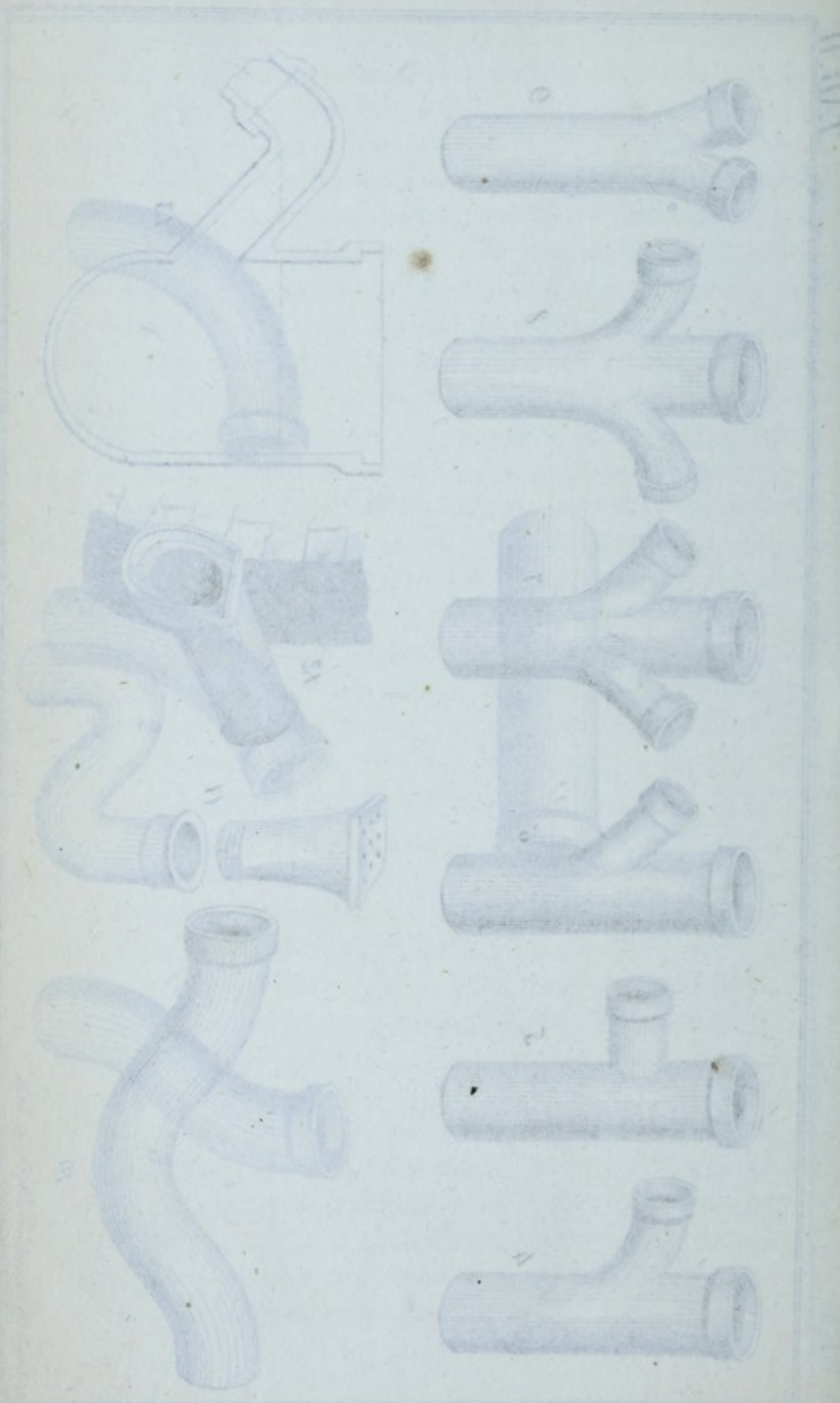

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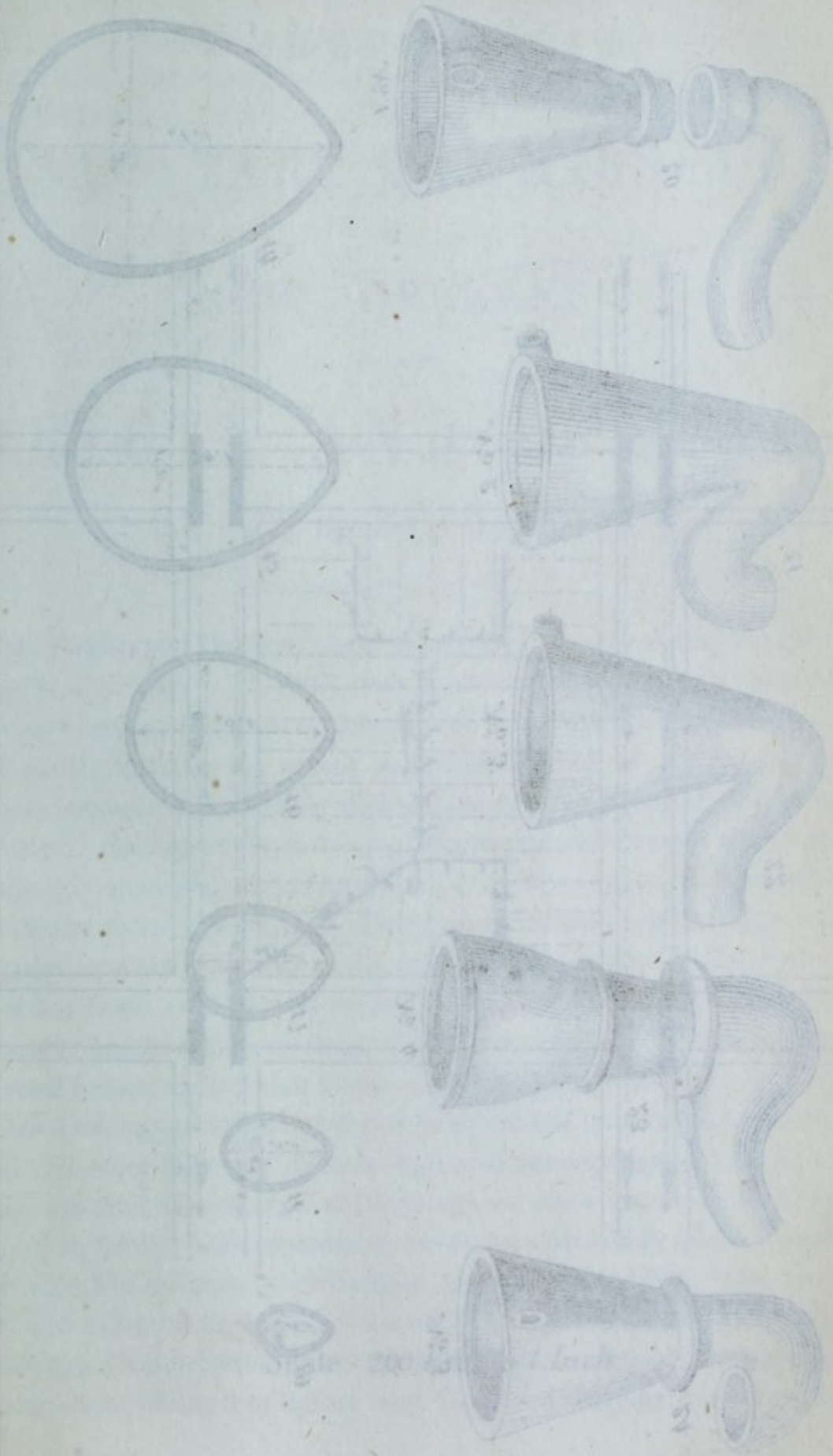

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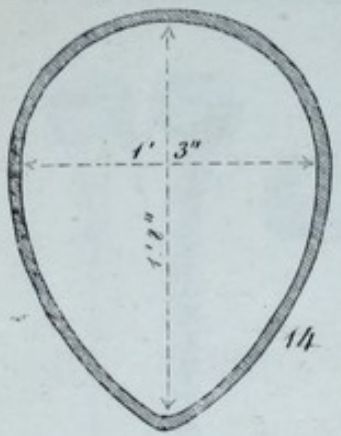

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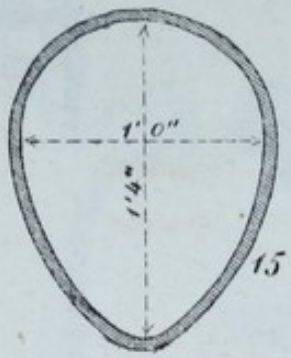

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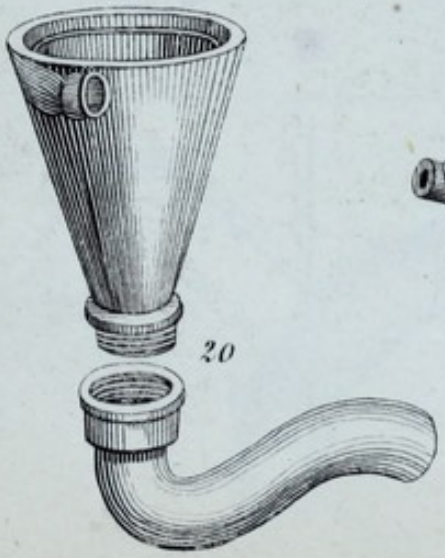


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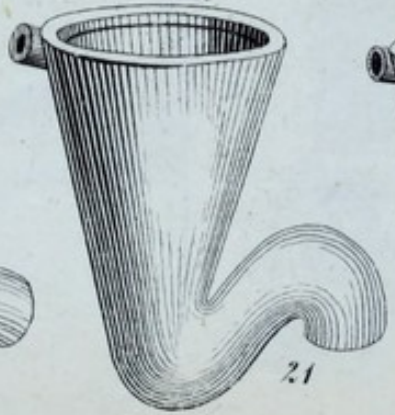


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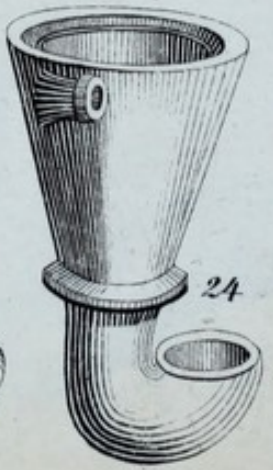
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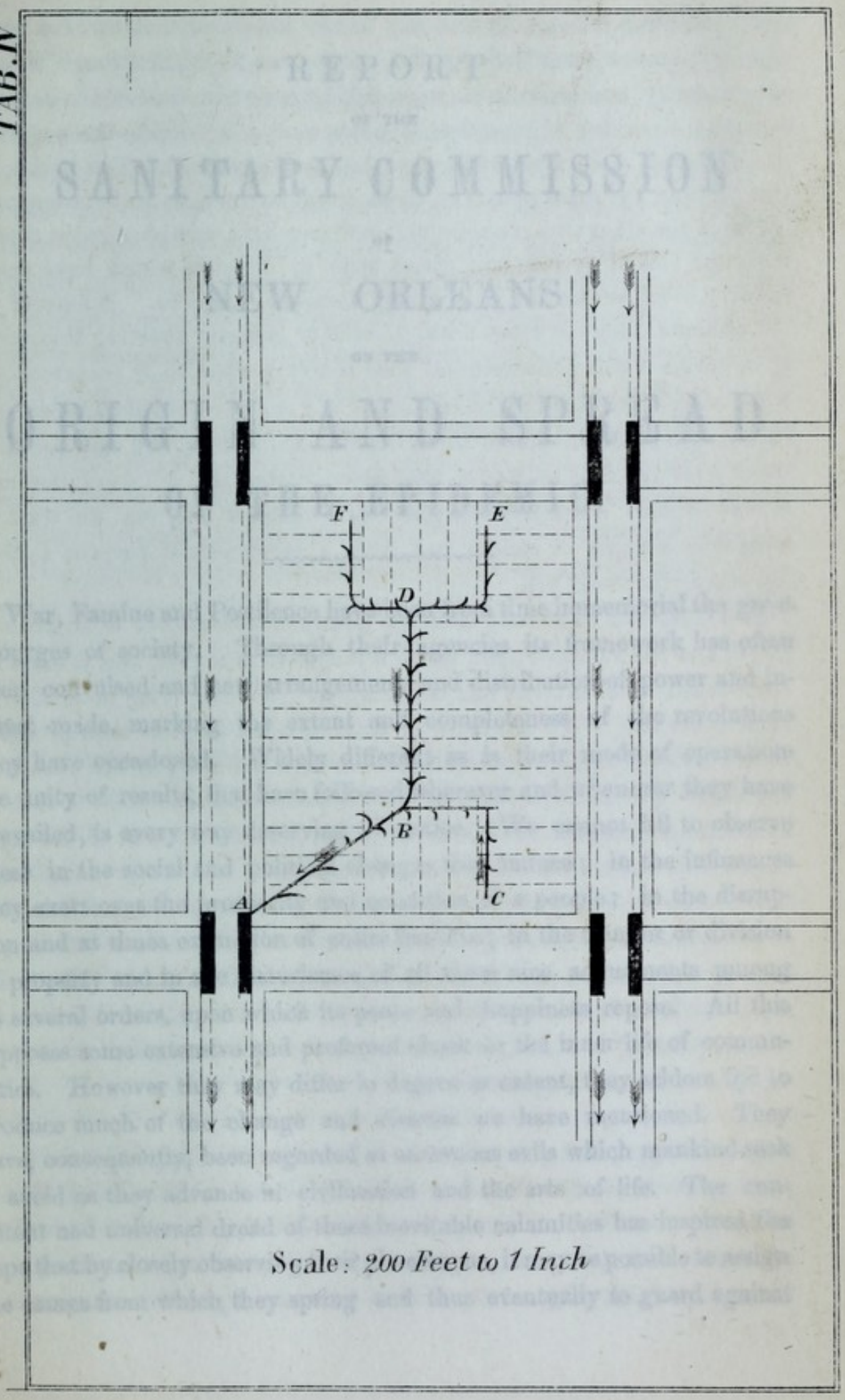
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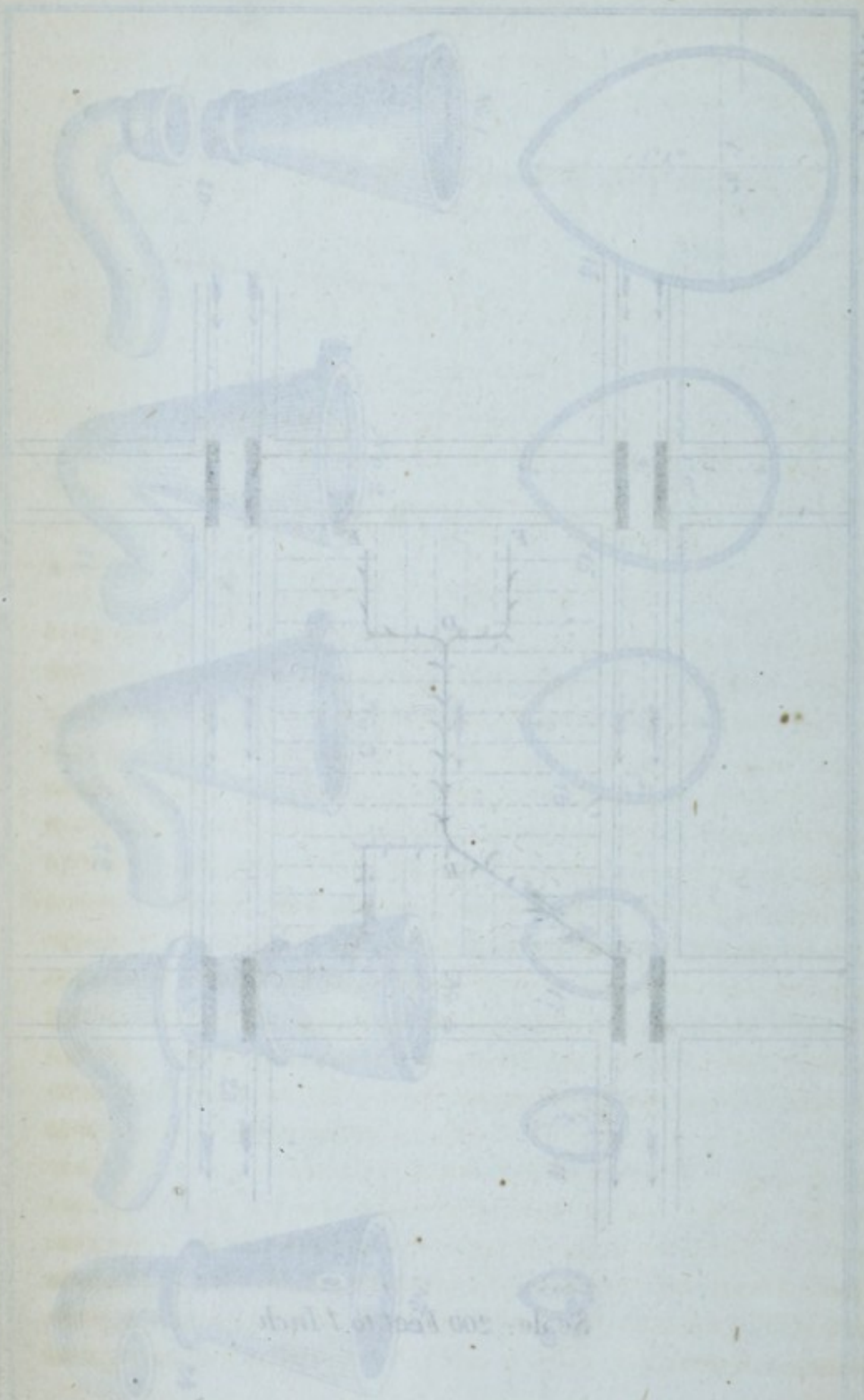
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TAB. IV



Scale: *200 Feet to 1 Inch*



REPORT

OF THE

SANITARY COMMISSION

OF

NEW ORLEANS

ON THE

ORIGIN AND SPREAD

OF THE EPIDEMIC.

War, Famine and Pestilence have been from time immemorial the great scourges of society. Through their agencies its framework has often been convulsed and new arrangements and distribution of power and interest made, marking the extent and completeness of the revolutions they have occasioned. Widely different as is their mode of operation, the unity of results, that have followed wherever and whenever they have prevailed, is every way deserving of notice. We cannot fail to observe these in the social and political changes they induce; in the influences they exert over the prosperity and condition of a people; in the disruption and at times extinction of entire families; in the transfer or division of property and in the disturbance of all those nice adjustments among its several orders, upon which its peace and happiness repose. All this supposes some extensive and profound shock to the inner life of communities. However they may differ in degree or extent, they seldom fail to produce much of the change and distress we have mentioned. They have, consequently, been regarded as enormous evils which mankind seek to avoid as they advance in civilization and the arts of life. The consistent and universal dread of these inevitable calamities has inspired the hope that by closely observing their phenomena, it may be possible to assign the causes from which they spring and thus eventually to guard against

their desolating action. In this way has it happened that war has been dignified by the magnitude of the revolutions wrought through its instrumentality and come to be regarded, by a certain fashionable dogma, as one of a number of providential contrivances by which the progress of the world in art and civilization has been advanced. But if this be true of war, the most potent of these mischievous agents, it is scarcely less so of the other two. Famine and pestilence have each changed at divers times the face of society and given birth to disasters which have occasioned a re-adjustment of its civil and domestic relations. Whatever be the ultimate design of these dreadful evils or however cheering this spirit of optimism which finds eventual good to follow upon their occurrence it is not our present business to inquire. We are to record the history and explore the causes of one of these frightful scourges, which has recently swept over the face of six of our sister States and left desolation and sorrow behind. The task is a grave and difficult one, but we trust to meet it in a spirit of candor and with a singleness of purpose to find out where the truth lies.

It will not fail to be seen from the nature of the subject to be investigated, and the evidence upon which a judgment is to rest, that it must be approached with caution and deliberation. We can bring no artifice of logic to our aid. We can hope for nothing more tangible than probable truth; nothing more satisfactory than such a summary as will reconcile the largest number of facts, and be the least opposed to those it fails to assimilate or generalize. If, therefore, we miss the solution of the mystery, which has so often perplexed others; which, too, has provoked animosities the more to be deplored, as they have arisen in the most laudable of researches; those, namely, which concern only the welfare and happiness of our race, we should not despair of its final solution. The principle which, to-day, is obscure, to-morrow may arise out of the circumstances pointing to it and become the germ of measures which shall swell the tide of human happiness.

ORIGIN OF THE FEVER.

It is alledged, and generally believed, that our recent pestilential fever was imported from Rio Janeiro. So firmly rooted was this belief, that it instigated several of our City papers either directly, through their leading editorial columns, or indirectly, through correspondents, to arouse public feeling upon this subject with a view to obtain legislative sanction to a

system of quarantine measures, as a means of future protection. The fact of transportability as a property belonging to this disease, no one now disputes. If it were ever doubtful, the current events of the past summer (1853) must be admitted as finally settling it. Rio, for reasons not very satisfactory, was fixed upon as the source of our pestilence. Our commercial relations with that port, it is true, had become so intimate, and our means of intercourse so frequent, that the idea of importation naturally enough grew out of these relations; and the more especially so as for the last three years that place, and its shipping particularly, had been severely scourged by it. The most diligent inquiries, however, and the whole tenor of the evidence we have been able to collect, unite in acquitting it of all agency in the origination of our yellow fever. We cannot trace to any vessel from its harbor, a single one of the many early cases of fever, which have definitively been proved to have occurred here in May or June. We have examined the time of arrival of every vessel from that port, the locality moored at while in New Orleans, and the time of departure therefrom; and in no solitary instance has a case of fever been traceable to any such vessel, far less to have been originated by any such means. Rio, although severely scourged, towards us has been no plague-centre.

We might, pertinently enough, retort upon the advocates of this opinion, the impression prevalent in Rio Janeiro, that from the United States was derived the fatal scourge which devastated that unhappy city in 1850. In our minutes from Rio, will be found evidence distinctly ascribing to two sources, and those as far removed from each other in latitude, and as unlike in geographical resemblances as Philadelphia and New Orleans, the first and early cases of yellow fever, which, beginning in 1850 in that city, has gradually completed its circle by finding its way back in 1853, to both New Orleans and Philadelphia. The facility with which assumed and unproved facts are currently believed, in reference to phenomena, that shock the moral sense of mankind or greatly excite its fear and wonder, is truly enough illustrated in these vague impressions which have grown to something like the importance of settled public opinion, in both Rio Janeiro and New Orleans. But while we allude to this, we attach to it no more importance than we would to any assertion made under those illusive feelings, that find their gratification in

believing that every social or physical evil is the growth of foreign soils, and which, by some sad mischance, has come to be naturalized in their midst. Was our pestilence, then, a self-originating one, indigenous to our soil, climate and population, or was it imported? We shall proceed to give the facts we have been able to collect, that bear upon these questions, and leave it to the candid reader to strike the balance between them. We have no opinions but what have grown out of this investigation—none but what accord with our statement of what we believe to be the facts.

The first death from yellow fever happened, as will be seen by reference to our minutes of evidence, on the 28th May, at the Charity Hospital. The subject was one J. McGuigan,* an Irish emigrant, who arrived here on the 9th May, on the ship Northampton, from Liverpool direct. This man was sick four days before entering the Hospital, which was on the 27th; he died on the 28th. He fell sick, consequently, according to this reckoning, on the 23d inst. The Northampton sailed from Liverpool about the latter part of March, with three hundred and odd passengers, was forty-five days on her passage, passed fifty miles to the North of Cuba, stopped nowhere between Liverpool and this place until she was moored, on the 9th May, at the foot of Josephine street, in the Fourth District. Came up the river alone. On the 10th, a gang of hands was sent on board by a Mr. Pashley,† to clean out and unload her. They worked a day or two and abandoned her, on account of alledged impurities and filth. Of this first gang one sickened with what Pashley says was yellow fever. He recovered. Five days after, that is on the 17th, a second gang was employed to clean and discharge her; several of this gang also sickened with fever. The hold was filthy, according to Pashley; the water-casks below contained putrid water, which discharged a ropy black slime. The hospital of the ship, a partitioned space in front of the passengers' bunks, showed signs of blood or black vomit. Pashley cleaned and discharged her at or about the 28th May, the time of McGuigan's death with black vomit. This McGuigan was hired by Pashley and slept on board; in fact, he never left her until he was taken to the Charity Hospital, on the 27th. Between the time of McGuigan's sickening and the 14th June, when she sailed for Liverpool,

*See testimony from Charity Hospital. †See Pashley's testimony in the Appendix, and map of the city.

—our records do not say more definitely—a boy on board, named Richardson, also fell ill and was treated by Dr. Thorpe, who expressed the opinion that his was a case of yellow fever, or rather, so much like it that, at a later period of the year, he would unhesitatingly call it such. So much for Mr. Pashley's testimony.

According to this summary of evidence, which may be referred to in our minutes for fuller details,* it would appear that the first case and death from yellow fever originated in the unclean state of the hold of an immigrant ship from Liverpool. It is true that every particular circumstance of this statement, referring to her uncleanliness and the putrid state of her water, has been pointedly denied by the captain † of the Northampton. His testimony may be found in our minutes. He does not deny, however, that McGuigan never left her until he was sent to the Charity Hospital, nor that he was one of Pashley's men employed in cleaning her, nor that he sickened while on board; nor does he deny the facts of the boy Richardson falling sick and being considered by Doctor Thorpe a case of yellow fever. His denials only rebut Pashley's averment as to the uncleanliness of his vessel and the appearance of the hospital, which, he says, was not used by the sick on the voyage for any such purpose, and was filled with old rigging.

We will now proceed with other evidence relating to the Northampton. About the 28th or 29th, the ship was placed in the hands of a Mr. Clark, a stevedore, to be loaded. Clark reports her hold as being at that time clean and inoffensive. Two days, however, after he began to load her, Thomas Hart, one of his hired laborers, fell sick and died on the 10th June, at the Charity Hospital. His body was examined by some of the attending physicians of that institution, and gave rise to some controversy as to the cause of death. Some of the visceral lesions, as well as the color of the skin, were those of yellow fever. There was, however, no black vomit found in the stomach, and the absence of this, together with a recent hepatization of one of his lungs, led some to assert that his death was caused by a bilious pneumonia. If Hart's was a case of yellow fever, he lay sick with it four days, near the Mint, before going to the Hospital, and in a house next that in which the first death from yellow fever occurred in this portion of the city. His is the connecting

* See Pashley's testimony in Appendix † See Capt. Read's testimony.

link, if we determine it to be yellow fever, between the cases now increasing daily in the Fourth District and its outbreak in the Third District. We state this fact thus supposititiously so as to give full force and expression to any tittle of evidence going to show communicability as a feature of this fever. We do not intend by this, however, to intimate that Rahaze,* Dr. Browning's earliest patient of yellow fever, who fell sick on the 18th, and died on the 24th June, and who lived next door to the house in which Hart lay sick four days, had any connection or communication with Hart. We revert to the incident simply to show that before Rahaze sickened, the disease was carried to his neighborhood in the person of one believed to be sick with it. Hart was buried from the Hospital with a certificate of yellow fever. As we intend to follow out all the cases directly traceable to this presumed source of the disease, the ship Northampton, we offer the evidence of Dr. Lindsay, who informs us that his first case of sickness with fever was one Donnell, the foreman of a stevedore who had been engaged in discharging this ship. He lives in St. John the Baptist, near St. James street, and fell sick on the 13th June. A few days afterwards there fell sick five other persons, living in the same house with Donnell; the locality rather clean but crowded. It must be borne in mind that Donnell, as one of the discharging crew, for only in that capacity is he spoken of by the Doctor, ceased to work on the Northampton about the 28th or 30th May. Clark, who loaded her, commenced doing so about this date, and he nowhere mentions Donnell as one of his men. Fifteen days afterwards he falls sick, and his sickness, at a residence not particularly unclean, but crowded, is followed in a few days with five other cases. Donnell's residence now becomes a focus of disease. Pashley, in continuation of his testimony, states that Coleman, another of the men engaged in discharging this ship, went to Conroy's to board, subsequently to his having had the fever. Now, this Conroy's † is a boarding-house on Race, near Tchoupitoulas street. It was an intensely infected spot, several of the earliest malignant cases occurring in its immediate neighborhood. It was here that Murray died on the 10th June with black vomit, and in an adjoining house or two that Margaret Russell sickened and died with black vomit. The entire neighborhood was filled with yellow fever.

* See Dr. Browning's testimony. † See Drs. Sunderland and Henderson's testimony.

We have thus completed the history of all the cases traceable to the ship Northampton. We have shown that one of the earliest cases of fever and the first death came from her; that the earliest case of yellow fever known to be in or near the Third District was carried there by the man Hart, who helped to load her; that, either directly or indirectly, but in some way connected with her, two men are presumed to have carried into two distinct localities the disease; the one Donnell, while actually sick of it—the other, Coleman, after convalescing from it. This much is absolutely deducible from our records.

The question now presents itself for the first time, did this fever originate on the Northampton? Pashley, from the tenor of his evidence, believes such to have been its origin, and, in fact, there is nothing in the circumstances of the ship, as he has presented them, unreasonable in his opinion or unwarranted by precedent. The outbreak of yellow fever on shipboard, from foul holds or from ballast in a decaying state, or holding organic matter in a process of decay, is a fact too well attested to require any argument. It is enough merely to refer to such instances. Among others we shall mention that of the General Greene, United States frigate. This ship sailed from Newport, (R. I.) on the 3d June, 1799, for the Island of Cuba. On her voyage the yellow fever broke out and extended rapidly among her crew. The principle of the disease, observes Dr. Kollock, her surgeon, seemed to have been generated on board, and to have gradually acquired virulence as she approached her place of destination; in other words, as she approached the region of intertropical heats. The General Greene was newly built, and from this fact it is inferred she must have been clean; but unhappily "her ballast consisted of old iron and earth, taken from a clay shore, intermixed with soft slate stone, shells and marine vegetables." The weather was hot, during which some of her stores, consisting of codfish, became putrid.

Another example, and specially applicable from the analogy she offers in the putrid state of the water in her casks to that of the Northampton, is the frigate Macedonia, which had the yellow fever to break out among her crew while lying in a port free from the fever at the time. It proved most malignant in character, causing the death of one hundred out of a complement of three hundred and seventy-six persons, officers and men

inclusive. The severity of the loss led to an inquiry into the causes of its origin, and the evidence adduced on the occasion was both abundant and conclusive in proof of a foul hold. "A quantity of mud or dirt was found in her; the water pumped out of her casks was black and slimy, and her bilge water was filthy and offensive."

The last example we shall produce is that of the U. S. ship Hornet. This ship, while lying at the island of Sacrificios, three miles from Vera Cruz, had yellow fever to break out among her men in September of the year 1828. She had undergone extensive repairs the winter previous, and was "salted," and consequently very damp, the moisture collecting in drops on her beams whenever the atmosphere was charged with vapor. The weather during the time she lay at the island was hot and oppressive, the thermometer averaging F. 87° at noon, and at no time above 90° or under 79°. She sailed for Pensacola during which time she had but two new cases, but after leaving the latter place for New York, and whilst in the latitude of the Florida capes, during a rise in the temperature from F. 78° to 82°, the disease revived. On reaching New York she was broken open, and her hold was found foul with mud and shavings in a state of decay, mixed with offensive bilge water. These facts are a few of many parallel ones most ably and elaborately analyzed in an invaluable article by Dr. La Roche,* on the local sources of infection in yellow fever, and which might have been indefinitely extended were it all necessary to do so. They have all been purposely taken from our naval service, as it is presumable that if anywhere, it is among this class of vessels we should expect proper diligence in the outfitting; where discipline and regimen are scrupulously observed, and cleanliness in person and quarters made an essential part of the duties of the men. If, under all these favorable circumstances, yellow fever has happened from local sources of infection, is it a forced presumption of Pashley, that it so occurred in a passenger ship or an improbable event that the hold of such was unclean, filthy and so offensive as to cause a gang of men, after two days trial, to refuse to work on her? A question very naturally arises here as to the credibility of Pashley as a witness, and the value of his testimony. As to the former, that is, his credibility as a witness, his testimony proves him veracious on all points but one, and on that one he has not been convicted of error or

* See American Journal of Medical Sciences, April, 1853.

misstatement—we mean his evidence as to the condition of the ship. Capt. Read, admitting all the other points to be true, denies the statement of the uncleanliness of his vessel. He adduces the log-book in evidence of her being in a wholesome condition, which certainly shows as far as the absence of sickness and mortality can show, that she was wholesome and cleanly. This record shows only six deaths out of three hundred and odd individuals, and four of these were children who were teething. But all this might happen and still the hold of the ship be unclean, and the water in her casks putrid. The captain would be less apt to know this than the stevedore, whose business it is to unload and clean her. In the absence of any adequate motive to pervert the truth or to misstate it, we are bound to regard Pashley's statement as quite probable, if not more so, than the captain's. As to the value of the testimony, this is altogether another question. Its value here is quite a different thing from its truth, for it may all be true and yet, so far as it is a solution of a doubtful phenomenon, a questionable fact, it may be worthless. Its value therefore, can only be determined by its being the real adequate answer to the question: Did the ship with her foul hold originate the yellow fever? If we could trace step by step in regular and progressive succession all the early cases of yellow fever from this ship, as we are supposed to have done in Hart's and Donnell's cases, and probably in Coleman's, we would make a presumption in favor of this opinion with something of the aspect of truth. But, unfortunately, we cannot; for we shall presently show that almost co-incident in time, but quite distant in place with the death of McGuigan, other cases of genuine yellow fever were seen by competent observers, who recognized them as such, and that they had no communication with the Northampton or other shipping.

But before citing the details of these cases, let us return to the Northampton, and see if there be any facts warranting the opinion, that, despite her foul hold and putrid water, she may have caught the infection from a neighboring vessel, which began about the same time (the 23d May) to lose her crew with all the malignant symptoms of this pestilential fever. On the 17th May, the ship Augusta, direct from Bremen, with over two hundred passengers, sixty-six days on her voyage out, passing as far South of Cuba as the Northampton to the North, a distance of fifty miles, takes her position near this latter ship. Unlike, however, the Northampton, she

takes a tow at the mouth of the river, in company with the Camboden Castle—a vessel direct from Kingston, Jamaica. This latter vessel, while in that port, lost her captain and seven of her crew—all of the latter dying of yellow fever. She recruited there, and underwent a lustration and was sprinkled with lime before sailing for New Orleans. During the voyage up the river, there was free intercommunication between her decks and the passengers on the Augusta—the crew of the one and the passengers and crew of the other freely intermingling. It does not appear in evidence, that any of the Augusta's crew went below decks on the Camboden Castle, nor that she had fruit or any other freight, in fact, beside her ballast. On the 17th of May, the Camboden Castle was dropped at Post 27, directly opposite the Water-Works, and in company with the Niagara, the Saxon and Harvest Queen, while the Augusta was carried some thirteen wharves higher up, and dropped near the ship Northampton. On the 23d May, the same day, it will be observed, on which we have determined from the dates of our minutes, McGuigan, on the Northampton, to have sickened, one of her crew becomes ill, and Dr. Schuppert,* a German physician, attends, who pronounces the case to be one of gastro-duodenitis. After fifteen days' illness the man recovers, and during his convalescence becomes quite yellow. Between this and the 27th, another of the crew, named John Haar, sickens and dies with black vomit on the 30th. On the 27th, three other of the crew fall sick, two of whom went to the Hospital and died, the one on the 30th May, the other on the 7th June.

Regarding the singular co-incidence as to time of the first sickness on both these neighboring vessels, an interesting question offers itself as to the source whence was derived the same disease on both these ships. We have just stated that we shall presently introduce evidence going to prove that the Northampton, although from analogy competent to originate in her foul hold and putrescent atmosphere, the disease among those on board, yet cannot be fairly deemed by any rule of inductive reasoning the salient point for the fever which spread like a rain-cloud over our city. Can she be deemed the cause of its outbreak on the Augusta? Hardly, we should think, for if our dates are correct, and we cannot otherwise make them from our record, it was a concurrent phenomenon on both

* See Dr. Schuppert's testimony in Appendix.

these ships and we should rather suppose indicated some common influence in operation in their common locality. For parity of reason we are disinclined to the converse of the proposition that the Augusta may have infected the Northampton. If this conjecture be urged as a means of explanation, let us follow it out in all its consequences. We must then assume the Augusta to have taken the infection from the Camboden Castle; but to do this, we must prove first, that two ships separated by the breadth of a towboat, but with free intermingling of the crews, can communicate an infectious disease, although neither of them are known to have any such; and secondly, that the air of the Camboden Castle must have contained such infection, although she was thoroughly cleansed and limed before sailing—was twelve days at sea before coming in contact with the Augusta, and had neither during her voyage hither, nor her stay in our port, sickness of any kind among her crew—all which appears to be true of the Camboden Castle,* as will be seen by reference to our minutes. But again, supposing her cleansing to have been imperfect and her liming ineffectual, it does not appear in evidence that her decks were penetrated by the crew of the Augusta, nor have we any tittle of evidence that this same vessel, which, during a twelve hours' run up the river, has power to infect from her decks the crew and passengers of a neighboring ship, has given rise to a single case of disease, among the laborers who cleared or those who loaded her. Of all the early cases derived from the shipping, not one is traceable to her. Between the 17th May and the 8th June, she completed her cargo, and on the evening of the latter day, sailed for England. In all this time, while the Augusta was almost decimated of her crew, the Camboden Castle not only did not lose any, but we are utterly unable to trace to her even a single case of sickness or death among the men who unloaded or loaded her.

So much for the hypothesis of the Camboden Castle being the source of sickness on board the Augusta.

Did she communicate the fever to the ships "Niagara," "Harvest† Queen," or "Saxon," in the midst of which she lay; if she did not, as we think will be apparent on a bare statement of facts, then the assumption fails on a second ground, of her being a source of infection to the Augusta. It is true that the fever broke out among these ships; in the

* See Dr. Fenner's testimony. † See ditto.

former, however, not until the 8th June, and after she had put to sea, which was twenty-three days after the Camboden Castle came to her moorings; in the second, or Harvest Queen, on the twenty-ninth day, or twelve days after the arrival of the Camboden Castle, and on the third ship, or Saxon, on June 3d, an interval of eighteen days subsequent to exposure by the vicinage of the same ship. It is hardly correct to say the disease broke out on these vessels. This is literally true of only the Niagara, which lost, after going to sea, as we have just stated, her captain and several of her crew. As respects the other two ships, cases of fever occurred among the laborers engaged at work on board, and one case only for each ship. Beyond these we hear or know of no others among the early cases derived from this source. The relative position of these ships was as follows:* at post 26 lay the Niagara and Harvest Queen, and one wharf higher up, viz: at post 27, were the Saxon and Camboden Castle. With the position of these ships just given, and their relation to the Camboden Castle, as the assumed source of infection, we cannot fail to mark incongruities at variance with the opinion that she acted as the cause of the fever which appeared, either among the neighboring ships or among the crew of the Augusta. If she were the source of infection, upon what principle or law of propagation of disease shall we explain the fact that while she is competent to infect the Augusta during a twelve hours' run up the river, the same infection should require an interval of eighteen days to contaminate the Saxon, which lay immediately alongside of her; or that other fact, that the Niagara required an exposure of twenty-three days to her vicinage before she showed signs of the infection, while the Harvest Queen, her consort at wharf twenty-six with equal liability from position, has a case of fever on the twelfth day from the arrival in the neighborhood of the Camboden Castle. Do we not see in the naked statement of these facts insuperable difficulties to the opinion which would establish any connection between the Camboden Castle as the cause and the occurrence of fever on board any of the ships that had connection with her. The laws determining the latent period of infectious disease are too well established for loose and indefinite statements of this nature. They operate within a given time or they do not operate at all. It is needless to recite facts well known to those who are conversant with the habits

* See map of the city.

and nature of that class of diseases that propagate themselves by specific contagions or by infectious miasms. It is likewise a law equally constant and universal that when these disorders acquire that intensity or that diffusion, as to entitle their prevalence to be regarded of epidemic character, the period is the minimum of time necessary for its effects to be felt. Thus we see small pox or scarlet fever striking down in malignant types of these affections, those exposed to them, after intervals of a few hours or days, and so in typhus fever, the minimum interval of time after such exposure, is but little in advance of those diseases that have a recognized contagious principle as its means of spread. The plague more justly furnishes the proper parallel to our epidemic yellow fever in this particular as well as in the other incidents of its history. And here we find whenever the conditions existing, produce a malignant epidemic, the interval between exposure and the attack is as brief as in that of the most malignant contagious disease. A few hours exposure often proves sufficient to originate the disease. The same is equally true of yellow fever. Among our minutes, cases of this kind are to be found, where exposure for a few hours to an infected atmosphere has been availing to the occurrence of the fever. We put in no plea of this character to make stronger the naked statement of the facts connected with the ships which had the admitted relations with the Camboden Castle. These facts are too explicit for farther statement, for surely no one will contend that the Augusta presented susceptibilities for infection which the Saxon did not. The one was but twelve hours in connection with her, the other eighteen days. They were both passenger ships; but it was the crew, who remained on board in the one, that was attacked, and a boy, who slept, while laboring on the other, that first showed the infection. There was nothing in the condition of the ships that can rationally account for this difference in the results. This very difference in fact constitutes the highest presumption against the conjecture that the Camboden Castle communicated any infection. As we intend, however, to sift all the facts we are in possession of relative to the importation of the fever by our shipping, we will now inquire if there be any circumstances calculated to show the possible contamination of the Saxon by any other vessel. It might be urged with equal justness that she got the fever from the barque Siri, from Rio, for her

relations had been just as intimate with her as they had been with the Camboden Castle. She came up in the same towage on the 10th May, with the Siri, which lost both her captain and several of her crew by fever while in the harbor of Rio. The Siri too, on her voyage out continues the parallel to the Camboden Castle, having no sickness at sea, and none after getting into port. To her also, as in the case of the Camboden Castle, we have been able to trace no case of sickness or death among those occurring in May or June. In reality, it would appear reasonable from this double exposure to two distinct sources of infection if they were such, that the Saxon should have been the proper *fons mali* of our fever. She was a passenger ship with immigrants from Liverpool, after a long passage, when she fell in with the Siri on the same tow up the river; she was twelve hours in her company; seven days after parting company with her the Camboden Castle arrives at the same wharf with her, yet it is not until the 3d June, eighteen days after the arrival of the latter ship, and twenty-three after parting company with the Siri, that we learn of any sickness on board, and that the solitary one of the Irish boy Mahoney, who was one of her passengers, and like McGuigan, on the Northampton, slept on deck at night, while employed as a laborer to load her. So much for the shipping, and the grounds on which the hypothesis of importation rests. We have proved, if our minutes are correct or trustworthy, and we have no moral hesitancy whatever on this point:

First, That the first case of fever which died came from the Northampton.

Secondly, That other early cases, coincident as to the time of sickening with McGuigan, occurred on the ship Augusta, lying in the same locality.

Thirdly, That the earliest cases traceable to three distinct localities where the fever shortly afterwards prevailed, had connection with the Northampton, viz: Hart's case, opposite the Mint, and near the Third District, Donnell's case, on St. John, near St. James street, and Coleman, on Race, near Tchoupitoulas street; and

Lastly, That from none of the vessels either from Rio or Jamaica have we been able to find a case of fever or death of all those occurring in May, or up to the period when it commenced to prevail as an epi-

demic, either among the crew or among those who worked on these vessels.

If then, the fever originated from other than local causes, it must have done so on the Northampton, an immigrant ship from Liverpool direct, a conclusion rendered the more inevitable by all the antecedent facts.

We will pause here for a moment to examine farther our record of evidence to determine on what grounds, if any, the Northampton may be considered the salient point of our epidemic. We have before remarked that the concurrent outbreak of fatal cases on the ship Augusta could on no legitimate process of reasoning be attributable to the Northampton. They were so exact in point of time as to be explicable only on the assumption of some influence common to the locality operating with equal intensity on the crews of both ships. There is no other reasonable mode of accounting for their occurrence just there and at that particular time. The boldest advocate for importation will hardly dare assert the opinion that the fever was brought by the immigrants from Liverpool. She must have either originated it in her foul holds or derived it from her locality. The latter source is rendered all the more probable by the following facts which we gather from our minutes of evidence. These will show the presence of some general and wide-spread agencies operating in that locality and repeating at different and distant places similar phenomena to those transpiring on the ships Northampton and Augusta. On the 22d of May, one day earlier than either McGuigan's case or those in the Augusta, Dr. Zehender * visits a man living a few squares higher up with all the well defined symptoms of yellow fever; and on the 24th, one day later than the same cases, Dr. Schuppert † visits the butcher Keltering, who after throwing up black vomit recovers. These cases are believed not to have visited the shipping. This is literally true of Dr. Zehender's cases. Again, on the 3d June, the second case is seen by this latter gentleman in a locality still more remote from the position of these ships. On the 2d June, more than a mile in the rear of the shipping, Kein and his wife come under the charge of Dr. M. M. Dowler. They both died with black vomit. A few days later, in a locality still more remote, and contiguous to the swamps, Dr. Campbell

* See Sanitary Map of the city, and Dr. Zehender's testimony. † See ditto and Appendix—Dr. Schuppert's testimony.

attends a case which died with black vomit. In all these latter instances there was positively no communication with the river or shipping. *Having thus shown several localities, where cases of fever originated and each remote in their position from the ship Northampton, coincidently in point of time with those on this ship and the Augusta, or in consequence of connection with these ships, we will rest the matter here. It will be seen that we have not exhausted all our evidence proving other localities of early cases. Enough, however, has been established to render untenable the notion of importation for our pestilence. If any facts exist at variance with our statement, they neither appear on our minutes, nor is their truth attested by our mortuary records. There can be no going behind these. This is testimony from which there can be no appeal, without wilfully and unreasonably denying its validity. The two are in perfect harmony with each other, the record of deaths thus vouching the living testimony as to the occurrence of yellow fever and the time and place of its appearance. These were clearly spontaneous cases owing their origin to something besides and beyond infection from the sick or an infected locality. To what then shall we ascribe their appearance? certainly not to an infection derivable from any particular place or person. All that we definitively know of the laws of contagion or infection lead us to expect the gradual and progressive diffusion of a disease depending on such means within ascertained limits as to space and time. It forbids the idea of spontaneousness in several remote and distinct localities and of exactness as to time. There must be precedence in a given place, progressive spread therefrom after proper interval of time and within a limited space. But such were not the phenomena we have just recited. There was neither progression nor succession, but spontaneousness of outbreak in distant places and exact coincidence in the moment of their occurrence. There was in fact, broad-cast over that particular district, some obscure but pervading influence co-operating with local conditions in originating the fever. What this was, and how it operated in generating one common product—that of fever—has been elaborately investigated in another division of this report. They conjointly produced, in fact, what we call an epidemic influence, the nature of which and the laws governing and directing the same, it has been one

* See Map for other early cases, viz: Drs. Henderson's, Wedderburn's and Sunderland s.

main object of the Commission to explore. There was in these phenomena nothing in common or kindred to the action of a principle of contagion. They were quite independent on it. The witty Radcliffe who saw even in his day, clearly enough the differences between things closely resembling each other, quaintly remarked to one, who inquired if epidemics did not spread by contagious influences; "If you and I are walking together and a rain overtakes us, we will both get wet, but does it necessarily follow that I wet you or you wet me." So was it here in this district. The general diffusion of the same influence struck down simultaneously divers persons in separate and distant localities—in some its operation was intensified by certain unknown conditions—in others it was mitigated by the same—like a rain-cloud pouring in torrents here, gently sprinkling there or passing harmlessly by elsewhere. We have thus shown, we trust—

That there is no just or tenable ground for the opinion that our fever was imported:

That to none of the sources to which general impression ascribed its origin, have we been able to trace even a colorable presumption of truth and

That from analogous phenomena happening at the same moment of time and over an unlimited space in the city, and from what we certainly know of contagion and its mode of action, the inference is made inevitable, that the fever was one of indigenous origin, resulting from local influences developed and intensified by peculiar atmospheric states.

These local influences, it would seem, were more concentrated in one particular section than in others and by their action induced a condition or state which might be properly called one of morbific atmospheric saturation. So apparent was this that for a period of near two weeks all the cases of fever happened either among those who lived in this section or who labored and were much exposed in it. It retained this bad pre-eminence throughout the whole period of the existence of the fever and even after its malign influence was felt by other districts. It cannot fail to be noticed, however, that while this district first felt the impression of these morbific causes, the fever seemed to spread thence to other sections of the city. How this happens or upon what principle its diffusion depends, becomes to us a most important inquiry. Does it extend like most epidemic diseases by the migration of certain atmospheric in-

fluences or through the agency of the sick who are affected with it? Upon this point our evidence is most conflicting. If we look at the history of the epidemic in its totality; at the wide spread surface of country over which it was diffused; and at the time it required to effectuate this, the mind cannot fail to discover a conformity in each of these particulars to the well known habits of epidemic diseases. General causes, over which the art of man is powerless, seem mainly concerned in its diffusion. Nothing that we positively know of the most virulent contagions will favor the opinion that they can in so short a space of time, commence, progress, culminate and decline over an extent of country and among a population as diverse and separate as that which fell subject to the dominion of our late pestilence by virtue of any property of contagion merely. Even those affections confessedly propagating themselves by a palpable virus, require the aid of external conditions—of atmospheric predispositions—to attain to any degree of general prevalence.

Atmospheric infection, derived from places abounding in organic remains in a state of transformation and decay, has been doubtless an efficient medium through which the late epidemic has diffused itself. It is no objection to this view that the product of such decay is a gas, and like all such fluid bodies subject to the law of the diffusion of gases, and thereby becoming harmless in proportion to its dilution in the atmosphere. All this is a naked assumption and unworthy of serious refutation. The advocates of the doctrine that putrid and putrefying organic matter develop miasms, which, under certain meteorological states, are capable of producing fever are content to rest this simple proposition on universal experience without attempting to give material form to those miasms. It need not of necessity involve the idea of a gas—for we can conceive it to be something held in solution in the atmosphere like vesicular water. If we cannot precisely define what it is or the condition on which it depends, it is no reason that it does not exist. It would be quite as philosophical for the chemist because he cannot detect by any art of analysis the material odor of the rose to deny that any such exists.

But this subject will be more thoroughly investigated in another part of this report. The probable nature of the cause competent to produce such wide spread calamities is always an interesting subject for investigation. If we admit it to have a local habitation and capa-

ble of being stimulated into activity by our habits and customs, the knowledge of this cause becomes a matter of the highest public duty. It suggests at once a line of conduct the neglect of which is little less criminal than would be that to protect life and property from the hands of the assassin or of him who would apply the midnight torch to our confiding city.

Unfortunately for science, it has hitherto been unable to isolate this principle, and to give it so much of the form and properties of an active agent as to satisfy the demands of the credulous multitude. Strictly speaking there is no such thing as individuality proper to the agents, regarded by the standard medical doctrines of the day, as etiological in their operation on the organism. They are rather conditions than agents, and we incline to look to the peculiarities of the organism, to its various powers of resistance—its vital states, for those changes which suppose the operation of any traceable cause. Even in those instances of specific morbid poisoning where it is possible to transmit and preserve the sameness of type and action of certain forms of disease, we deal rather with conditions than beings, with matter in a state of change or transformation, than matter that is living and conforming to a certain definite type. Now it is just this point of view which is so difficult to be understood by those who are unaccustomed to observe the operations of nature on an enlarged scale. The great natural forces, whose more constant operation is to preserve the harmony and order of the world; to bid the seasons follow in regular progression, and to diversify at the same time that they blend the influences which clothe the earth with verdure and temper the air with mildness, are subject to modifications at times which become destructive in their action on living organisms. These are, it is true, exceptional manifestations of power and seem rather to contradict our uniform experience. Like the tornado or hurricane, they depend on the exertion of a force beyond the usual and customary one, engaged in the preservation of the harmony of the external world. But no one doubts that in the former the same physical agents which occasion the gentle zephyr are involved in the prodigious displays of power which impart terror and dread to the tempest. Human experience is always fallacious in its estimate of means with ends, when it

essays to compare results so unlike in the tremendous energies invoked. We are so constituted that, while uninformed as to the diversity of modes in which natural forces may be exerted, we refer phenomena differing from our common experience to novel and unknown agencies. We yield to sensuous impressions and seek for palpable forms by which the mind is to be satisfied in its inquiries after the origin of these startling changes. Hence it is that instead of pursuing a system of observation which might tend to conform to one universal principle phenomena the most seemingly unconformable, we seek their solution by imposing ideas and theories, that directly defy all the processes of a rational induction.

If then it be possible under certain atmospheric aptitudes for an infectious miasm to be developed from decaying animal and vegetable matters, it is no more impossible, nor more repugnant to reason and common experience that such atmosphere should move about in currents like clouds in the heavens, always of course subject to the conditions from which they at first originated and on which they depend for their existence. It must be obvious to reflection that any change, however slight in the meteorological states favorable to such miasms must modify them in a correspondent manner and thus occasion differences which are explicable only when we know all the essential elements involved in these meteorological conditions. It is only upon some such principle we can rationally interpret the rapid diffusion of the recent epidemic through the Fourth and the adjoining part of the First District, in the brief period of two weeks—for by the middle of June the disease was rife in all that section of the city. There was evidently centred there influences highly favorable to the spontaneous outbreak of the disease. Hence we see that all the early cases occurred within a few days of each other and over a surface too wide to admit of the possibility of contamination by contact. These influences continuing to operate and intensifying in their progress spread rapidly through the whole city so that in about four weeks from the appearance of the first case an area of seven miles comprising the whole city is brought under their dominion. While we cannot forbear the conclusion that general causes like those we have alluded to are competent to produce and intensify an epidemic disorder, and even to diffuse it, it may not be uninteresting to inquire what influence, if any, the sick have

had in occasioning its spread. Out of the city and in all the places in the adjoining States where it has appeared for the first time, the conviction is as general as it is conscientious, that it spreads by direct contact with the sick or in other words by means of a contagious principle. It will be contended by no one conversant with the nature of pure contagions which are competent to reproduce themselves irrespective of season or place by virtue of a material virus and through inoculation, that our fever must be classed with these. The experiments of Ffirth* more than half a century since finally settled this point. In every possible mode he introduced the blood and excretions of the sick into his own system—and at all periods of the disease, but with no result. Yellow fever then gives rise to no material product which, like the pus in syphilis or the lymph in cow pox or the blood in scarlatina or variola, is capable of being inoculated so as to reproduce itself. It does not belong to the same class of disorders with these. If then it be contagious it must be so in a sense so restricted as to modify most essentially the meaning of the term. That the body of one sick with yellow fever gives out miasms we have abundant evidence from our minutes. These are so palpable and peculiar that several of our witnesses have declared their capacity to decide on its existence from the smell alone and without any other assistance even in the dark. What then is this miasm and what are its properties? Is this the source of its infectiousness and independent of any extraneous accessories? The solution to these questions can only be furnished by incontestible facts. It is not approachable by any *a priori* reasoning.

Let us see what there is in our evidence favorable to this view. Hart,† it will be remembered, visited and worked in the district in which the Northampton lay, and was taken sick about the 2d June. He slept on the confines of the Second and Third Districts. The runner of the house in which Hart boarded was in the habit, with others from the same section of the city, of making daily visits to the Fourth District. They both had yellow fever, and until the occurrence of fever in these persons, there was no indication or evidence of it in that portion of the city. The first death that occurred there was on the 24th June, in Dr. Browning's patient

* See Rush's works. † See Clarke's testimony.

Rahaze, occupying the next house to the one in which Hart and the boarding-house runner lived. We were not able to establish the fact of any communication between Rahaze or Hart and the other sick person. But from this time forward, the disease spread in that neighborhood. Again Donnell, Doctor Lindsay's patient, on the 13th June, falls sick on St. John street, after working for many days on the Northampton. In quick succession five others, living in the same house, take the fever, and that whole neighborhood becomes a focus of disease. It may be urged by by some who look only to a part, and that the most obvious part of these phenomena, that these examples furnish ample proof of the infectiousness of the fever from the presence of the sick alone. This would be so if we were prepared to disregard entirely the marked and peculiar state of the atmosphere then and for some time previous impending over our city. In another part of this report, the nature of this atmospheric condition, its constitution and influence over organic life have been so well considered, that with a full knowledge of these states we cannot overlook its primordial importance as a cause in any explication we may give of the origin of our pestilence. To do so would be as narrow as illogical in any rational effort to solve the great problems affecting animal life in its relations to external nature. It must be borne in mind, that if our premises are at all reasonable (and that they are so we submit all the facts connected with the outbreak of fever in that district in several and distinct and remote localities,) that we regard that section of our city as the salient point of our epidemic, and that in both these instances we are able to establish communication, not with infected persons, but with infected places. These men went to the spot where were concentrated the immediate influences producing the disease and fell sick in consequence of that communication—thus realizing the emphatic declarations of a close and competent observer, who asserts while describing faithfully similar ravages of the same pestilence in the West Indies, "that places not persons constitute the rule of its existence, places not persons comprehend the whole history; the etiology of the disease." All this satisfactorily accounts for the sickness of Hart and Donnell, but does it do so for Rahaze's sickness and the family of Donnell, who are known not to have visited those places? If the disease be not infectious why should these persons so directly and so succes-

sively fell sick one after the other? It must be admitted that the difficulties to a satisfactory solution of this question are great. It should be borne in mind that about the time of the sickening of Donnell's family, and even a little while before, on the 5th June, in the same neighborhood * Margaret Russell was taken sick and died on the 11th. On the 10th, in the same locality Dr. Sunderland saw a fatal case; and on the 11th, near by, Dr. Mather saw his first fatal case. Neither of these persons had any thing to do with Donnell, nor as far as we know with the shipping. The occurrence of fever in these instances must then be attributed to the same influences, which, on the confines of this District and the Fourth District, were occasioning all the sickness then prevalent. If so why go farther to hunt for a new principle of action in Donnell's family? The same reasoning will apply equally well to Rahaze's case. Dr. Browning evidently regarded him as the first subject in that section of the city; nor was he undeceived until in company with one of the Sanitary Commission, he learned from the boarding-house runner that Hart and himself had been previously sick in the adjoining house. But we were not able to establish any connection between these cases at the time we b gan our inquiries. Rahaze was a German, and followed shoe-making as a trade. His habits, as well as his language form a presumption against his having any intercourse with Hart or the other sick man at the boarding-house. His sickness, then, must be deemed one of spontaneous outbreak, the result evidently, of the spreading atmospheric infection.

It is always a matter of extreme difficulty to separate in epidemic foci the spread of a disease by virtue of any inherent infectiousness of its own from those examples where its occurrence may justly be ascribed to epidemic influence. This difficulty too is greatly enhanced by the multiplicity of facts we have collected going to establish an apparent infectiousness at least in the minds of those who observed them. They, as we have before remarked, were intent only on the most obvious phenomena and as these showed consecutiveness in the order of progression of the fever, it was natural that the other and major proposition, the meteorological states, insensible to sight, feeling or smell should be overlooked and disregarded. Besides it is by

* See Sanitary Map—Dr. Henderson's testimony.

no means an adjudicated point in the etiology of fevers, whether the type may not be so modified by the unusual energy of the causes as to render it to some degree distinctly infectious by virtue of the miasms escaping from the bodies of the sick. Opposite opinions are held by highly respectable authority on this subject. The change of type, or perhaps, more properly the tendency to conversion into one nearly akin or allied to the typhoid forms of fever was universally remarked in the fever of last summer as will be seen every where throughout our minutes. We will quote but one opinion as an example of the others. * Prof. Jones, (than whom there is no more competent witness both by his experience and attainments) "thinks there is a difference in type of the fever of this year; the disease of former years more paroxysmal; more secondary fever this year and more disposition to typhus." This evident disposition to conversion of type and with it the assumption of the habits and susceptibilities of the new or allied form, we think is rendered apparent in the whole history of the disease as well as in the classes and races it attacked. It certainly differed from its predecessors in the indiscriminate manner in which creoles and natives were assailed. Ordinarily the rule is that only new comers and strangers are subject to its invasion, but in the promiscuous numbers of both natives and strangers who fell sick under its influence, a novel feature was seen marking its departure from the general law of its prevalence. This deviation too was farther illustrated in the slight immunity felt this season by the colored races. Here and in the West Indies it is an observation, become almost proverbial, that negroes and their descendants are exempt from it. But in its march throughout our gulf shores and rivers, it seemed scarcely to pause long enough to discriminate between the cabins of the slave and the mansion of the master. Both were swept alike into one common resting place—the grave—and both felt in almost equal degrees its fierce and scorching blight. Another and marked peculiarity showing not only the extreme energy of the influences in operation but their decided result on the vital resistance of the economy, inducing a rapid and fatal prostration of life was the number of children who died and many of them without manifesting any symptom of the dis-

* See Prof. Jones' testimony.

order until it announced itself by the fatal black vomit. The transition was from apparent health into the adynamia of the closing stage. Phenomena like these, not unusual to yellow fever, when it rages in its greatest intensity are generally limited to such subjects as have passed the period of immunity of childhood—to an adult and more susceptible population. But the fever of 1853, sought its victims among the unweaned age of infancy—even as early as five weeks old—occurrences indicating very marked changes impressed on it, altering its tendencies, enlarging its circuit of action and so intensifying its energies that the life-force of those exposed was lowered to a scale of minus vitality, rarely seen except under the combined action of the most depressing causes. How far this change may have operated in imparting a character of infectiousness it is difficult to say. There can be little doubt that away from epidemic foci no such property is ever shown. At Rio Janeiro while the disease was mowing down its victims by the hundreds, it became powerless at Petropolis,* a neighboring village to which fled the affrighted inhabitants. The sick and dying were carried there with it, yet in not a single instance did it extend from these to the many friends who nursed and buried them. Here no closeness of intercourse, no kind of exposure in handling the sick or the dying had power to contaminate with the disease. Yet the same persons descending to the city succumbed quickly to the fatal influence.

Analogies like these were seen in many parts of our own country. We shall mention but one: at Memphis, in the City Hospital, sixty-five cases of fever, carried from this place sick, or taken sick on the river, were treated, and in not one of these instances was there any communication of the disease to either the medical attendants, the nurses, or the other inmates of the hospital. The results were limited to the original subjects, whether these were in recovery or death. How unlike all this is to an infectious or contagious disease, one that is such in consequence of certain inherent and invariable properties, we need not remark. It must be apparent to every mind open to reason and observation. What constitutes the difference between these two sets of observations, these two sets of facts, as we may properly call them, it is impossible, under present circumances, absolutely to say. But in the absence of positive proof, we may show the strongest analogies

* See Doctors Lallement and Pennell's testimony..

for the opinion that general causes existing in certain atmospheric conditions supply the element that is wanting in our last cited examples. Have we not strong confirmation of these views in the occasiona spread of dysentery, puerperal fever and erysipelas, both in camps and contiguous neighborhoods. These diseases are as a general rule, sporadic, and happen casually to the fewest numbers. But whenever they attain to such diffusion as to attack consecutively families and neighborhoods, they acquire just those doubtful properties which, looking only to the disease, and abstractedly from all other considerations, impart to it the evidence of contagiousness. Yet, no one conversant with their nature is bold enough to assert this. The fact of their deviation from the usual law of their existence is sought for in extraneous circumstances, both local and atmospheric, and the remedy is found, not in isolation of individuals, but in change of place and purer air. Even of plague, occupying a far more disputable position between contagious diseases, purely such, and those that are infectious through local and general agencies, the same fact is clearly enough established. * Dr. Coch, chief physician of the Egyptian fleet, records an interesting fact, observed by him during the fatal plague epidemic of 1835, strikingly similar to what we have remarked of Petropolis, near Rio Janeiro, and at Memphis, on the Mississippi. "Ten men" says he, "had gone from Sakkarah, a populous village, to Cairo, when the plague was prevailing. On their return home every one of these men sickened and died; yet, not a single member of their families, who had assiduously waited upon them, took the disease; such, a fact," he adds, "was observed hundreds of times during the course of the great epidemic."† Here then, we have clearly enough demonstrated, by a striking analogy running through several distinct diseases, and inducing close resemblances—nay, identical processes—in their mode of action, all tending to show that what there is of infectiousness or contagiousness in their propagation is derived from extraneous and casual causes, and is not a necessary or essential part of their nature. Proof could hardly be more clear or conclusive by any course of inductive reasoning, so that we may truly say with Fergusson, "Places, not persons, comprehend the whole history, the etiology of the disease."

* See testimony of Drs. Letlement and Pennell. † Prus' report on the Egyptian plague.

There are other features connected with this epidemic and its modes of spreading, that we should have been glad to have discussed, had we not been forewarned of the necessity of hastening to a close by the undue size and bulk to which our materials have grown. Such are questions going to show the possibility of its propagation by goods, clothes, merchandize, &c., in short, by everything capable of acting as fomites. Our evidence, however, is not sufficiently explicit or direct upon this point, to render investigation necessary, and we are guarded against making any issues not contained in our minutes of evidence. Were we to do so, this report might be filled with matters drawn, not from our recent experience, but from the recorded histories of similar pestilences by a past generation, and which were amply and finally adjudicated by the inquiring minds of those days. Looking, then, with singleness of purpose only, at the late epidemic and what we have been able to garner up of its passing history, we feel warranted in stating—

That it has not been derived from abroad, but is of spontaneous origin:

That there existed here, as attested by our records, very peculiar meteorological conditions, known, by general experience, to be capable of producing, in co-operation with local causes, fatal and malignant forms of fever:

That these conditions were present in an exaggerated degree, and impressed upon the prevalent type of disease susceptibilities and habits assimilating it to another and distinct form of fever:

That this showed in all those localities within the range of the meteorological state or influence, an infectiousness not necessary to, or characteristic of the fever, but purely casual and incidental, the result of physical causes, and which it loses as soon as those causes are changed or disappear.

With these views we submit our inquiries in regard to the origin and spread of the fever, to the candid reader, for such a verdict as the facts and the testimony seem to indicate.

REPORT

ON

QUARANTINE.

Every disease must originate primarily in some peculiar combination of external circumstances conjoined with their relations to the persons first attacked. Having once been developed some diseases (and by far the greater portion) become extinct with the individual attacked, other diseases produce a *material* virus which re-develops itself in other persons exposed to direct contact therewith; others give rise to an inappreciable virus a bare exposure to the atmosphere of which will re-develop a similar disease; others again require apparently a concentration of this atmospheric poison.

The first case includes only sporadic diseases. The second condition gives rise to diseases eminently and truly contagious. The third to those that possess mixed character, either contagious or infectious, and the fourth to those that are conditionally infectious or contagious.

For example, in the first category must be placed intermittent fever, in the second small pox, in the third scarlet fever, and in the fourth typhus fever.

Diseases may again be designated according to the extent of their prevalence as epidemic. An epidemic in its fullest acceptation would require that the disease should prevail universally regardless of climatic or meteorological condition or the geological character of the country. The term is however used in a more restricted sense as applying to any very extensive mortality in any particular locality.

Endemic diseases are those which are peculiarly prevalent in certain places at certain seasons of the year, and year after year.

Sporadic diseases are those inherent in the constitution, either directly from hereditary descent or indirectly from peculiarities of constitution derived from ones progenitory, causing a peculiar susceptibility to the influence of certain external causes.

The term sporadic is used in two distinct senses. As an antithesis of epidemic and endemic, it signifies few and scattered.* As an antithesis of zymotic and external causes of disease it refers to those peculiarities of the constitution which renders one person more liable than another to a certain disease or class of diseases, or by which the same cause will excite different diseases in different persons. A disease may therefore be either zymotic or Sporadic—a zymotic disease may be either epidemic, endemic or sporadic, and a sporadic disease may be either zymotic or constitutional, epidemic or endemic, contagious, infectious, or neither.

The best example that can be adduced of an epidemic disease is the cholera, which has prevailed under every possible circumstances of external influence, in the heat of the Torrid, and the cold of the Frigid zone—mountains and valleys, primary diluvial and alluvial countries, sandstone, limestone and granitic regions, have all felt the influence of this fell destroyer.

As an example of a limited epidemic we may cite the plague and yellow fever, which though generally restricted to certain localities, yet have under some peculiar and as yet unknown circumstances extended themselves into other climatic and geological regions; the first having devastated all Europe in former times, and in later dates the second has prevailed most extensively on the American continent and at a few places in Europe.

The peculiar existence of an epidemic disease should be found developed to a greater or less extent in almost every locality, diseases and the circumstances on which they depend have not been distinctly marked out. The most familiar examples that can be cited are our autumnal fevers, and among them some localities will be generally found to be specially afflicted with intermittent fevers, while others will suffer in as great a degree from remittents.

The term sporadic being once understood would not require a specifi-

* This was the original acceptation of the term as derived from the Islands in the Agean Sea called Sporades in contradistinction to the Cyclades, which was a *cluster* of Islands more remote and scattered though to some extent intermingled.

cation of an example thereof. It refers to any disease from which a person may suffer not specially referable to contagious, infectious or epidemic influences. Their existence, though modified by, and to some extent dependant on, external causes, are chiefly referable to the peculiar susceptibility of the individual. What is usually called a change in the weather may and often does produce catarrhs, pneumonias, diarrhœa, dysenteries, and also affections of the kidneys and brain.

The definition of these terms, epidemic and endemic and sporadic, contagious and infectious, being combined, the following conclusions with regard to the origination, propogation and perpetuation of diseases are clearly deduc ble—

1st. That a disease may, under circumstances as yet not entirely known, originate spontaneously in any locality, and necessarily become extinct with those subject to the influence of these circumstances.

2d. That a disease may originate in a certain locality and become either partially or fully—either locally, generally or universally—epidemic, without being either infectious or contagious.

3d. That a disease having originated, may thence be propagated from the atmosphere of one room to that of another, and thus ultimately pervading every part and portion of a city or village become epidemic therein.

4th. That in another combination of events a disease will be produced which will, *under certain conditions*, reproduce itself in another person or subject, and that may, therefore, become *epidemic* to a greater or less extent.

In which of these categories must yellow fever be placed? Is it contagious or infectious? Is it of foreign or domestic origin? Is it in any case transmissible from place to place?

These questions suggest others, anterior to all of them, viz: Is yellow fever always one and the same disease, or may there not be varieties which, though presenting symptoms sufficiently similar to be called by but one name, yet are in reality radically distinct or different? Is it always attributable to identically the same cause, or may not several different causes be confounded in its production?

This latter is the view taken by the writer, not only with regard

to yellow fever, but also as to diseases deemed specific, viz: scarlatina, and even small pox. The history of the prevalence of these diseases clearly indicates a difference, which, though usually attempted to be accounted for on other principles, are more satisfactorily understood by reference to a radical diversity of cause. There can be no greater impropriety in believing that there are different varieties of small pox virus or scarlatinous infections in existence than that the same combinations of heat, moisture and filth, or decomposing animal and vegetable matter, will give rise to intermittent, remittent, continued and yellow fever.

The rapidity with which deleterious gases spread, may serve as an examplification of the progress of a poisonous agent.

The friction applied to a match has hardly ceased the wood thereo has not become inflamed ere the odor of the phosphorous or of the sulphur has penetrated and filled the whole room. Who can say that the opening of the hold of a foul vessel may not be attended with a siuuilar diffusion, though it be not as in the former case, perceptible to the senses. In Mobile, a deputation or committee of the commission was informed, on what it considered a satisfactory and sufficient authority, that those first attacked at Citronelle, were the persons engaged in unloading the baggage cars which had been kept closed from Mobile at the distance of thirty miles. None can tell to what extent it might have spread in that direction, had similar conditions existed.

In view of the preceding facts and principles, what course is proper to be adopted with regard to the question of quarantine? The conclusion must be, that in spite of the most efficient and rigid quarantine, cases of yellow fever may occur spontaneously in New Orleans; but it would appear to be equally certain that the malignant forms of this disease, and also other diseases, such as cholera, small pox, scarlet fever, typhus fever, &c., may be almost entirely excluded.

The mention of cholera, as one of the diseases that may be excluded, will at once suggest that the despotic governments of Europe, with all their sanitary cordons, were unable to restrain its progress. The fact is admitted, but while we can only plead ignorance of the cause of its progress in Europe, we can point to the fact that in 1832, and again in 1848, it was kept out of Northern cities, as we believe,

in consequence of quarantine. The commercial intercourse between the ports of Western Europe and those cities, say New York, was, even in 1832, more direct and more extensive then between the same ports and Quebec and Montreal, but the cholera, abandoning its usual uniform law of following the regular course of traffic, was introduced into the United States by way of Canada. So, in 1848, although cases of cholera were received at Staten Island before any arrived in New Orleans, it was only after traversing the interior line of travel and intercommunication, that it was introduced into New York and other Northern cities. The quarantine enforced in these cities, including the cleansing of vessels as well as isolating the sick, conjoined with a voyage across the Atlantic, appears to have been efficient in preventing its direct introduction on these two occasions, and renders it possible, if not probable, that a quarantine against the interior was equally needed. That these cities were quite susceptible to the development of cholera subsequent events clearly proved. When once introduced, it rages with equal severity in the filth of New York and the cleanliness of the city of Brotherly Love.

Whatever may be thought of the contagiousness or of the transportability of yellow fever in general, or as it has prevailed here in other years and in other places at various times, it would appear to admit of no doubt that the epidemic of 1853 was carried by the regular course of travel to the interior. Its progress was steadily directed to the points of most direct commercial intercourse throughout the Southwest; and it appears, moreover, that having once obtained a foothold in any locality, this served as a new focus from which it was still further diffused. It does not appear to have followed any of the known laws of the diffusion of gases, nor to have exhibited any other law of diffusion than that above indicated. Like a skillful general in the invasion of the territory of an enemy it took possession, *seriatem*, of the most important and prominent points which should serve as a basis for future operations.

Admitting the perfect accuracy of these several statements, (and they doubtless might be greatly multiplied, *) who can undertake to

* *Vide* evidence of Drs. Rushton, Picton, and Wedderburn, as well as that of several others in other parts of this volume, where the transmissibility of this disease is fully maintained.

prove that the earliest recorded cases had no communication with any of these which may be designated suspicious or doubtful cases?

In this city it is most particular to be remarked, that being specially dependant on commerce for its very existence, and being very greatly indebted to the expenditures of transient persons, strangers, visitors, and those who, though engaged in business pursuits, like birds of passage, fly away at the least intimation of danger or disease; there is particular reluctance on the part of all who may or can remotely be benefited by their stay to make any announcement which would induce their departure. This influence, commencing with the hotels and boarding-houses, and those connected therewith and dependant thereon, runs through the several classes of wholesale and retail merchants, mechanics, laborers, restaurant keepers, and employees, etc. The press takes the alarm, for it and the news-boys are interested in decrying any who will dare announce a case of yellow fever, cholera, or any malignant disease which may possibly become epidemic. In this state of things it is not surprising that physicians should hesitate whether to record a case as yellow fever or call it bilious remittent fever; the only wonder is that any can be found daring enough to face all these influences with an honest expression of opinion.

During the past summer yellow fever appears plainly to have been introduced into Philadelphia. True the historian thereof, (Dr. Jewell) contends that it originated there, and attributes it to certain local causes, but he has justly and honestly given so minute an account that we are justified in arriving at a different conclusion. Its outbreak in the vicinity of the shipping, and specially near to a ship recently from an infected port, its propagation in that vicinity only, would go far to prove its importation and transmissibility, even though its absolute contagiousness could not be clearly established.

That cases occurred in individuals who could not be proved to have had direct intercourse with the assumed source of infection only shows difficient information; that it did not extend itself into the city and become epidemic proves either our ignorance of the laws of the development of epidemics or that the necessary constituents were wanting in this particular case.

The causes assigned for the yellow fever of 1853 in Philadelphia, was

the vicinage of the mouth of a sewer, a similar cause, defective sewerage, was assigned for the epidemic of 1828 in Gibraltar. As to the latter, the extent to which this disease prevailed, and the failure to show that the sewers were in worse condition then than in previous and succeeding years forbids the adoption of the idea that the cause assigned was sufficient to produce the results experienced. As to the former, the restricted limits of the disease, conjoined with the arrival and position of the Mandarin, only proves that yellow fever cannot be propagated except in a congenial atmosphere. In both cases we may ask why does this disease not prevail more frequently, for the same condition of the sewers may be presumed to exist for at least several successive years?

Similar causes cannot be assigned here. The yellow fever always makes its first appearance here in the vicinity of the shipping at the Levee, and does not first appear among the hands on steamboats from the up-country, who would be equally exposed to local influences. Moreover there is no sewer in this city, and the drainage is towards the swamp, bayous, canals and lake in its rear. Again, according to Professor Forshey's report on the hydrography of the Mississippi river, on an average of thirty years, the river is at its highest point about the 1st of May, and at its lowest about the 1st of October, (Fenner's Medical Reports.) No definite information has been obtained with regard to the height of the river last year, but we have no reason to believe that so early as the 28th of May or the 15th of July, the river had fallen so much as to expose to any great extent the batture of its banks, and consequently there could be no specific cause of disease in that vicinity.

The ablest writers, the best informed medical men, and those who have had, from the extent of and opportunities for observations, the best chance of forming correct views, have differed among themselves, and at different periods a different opinion has been prevalent among them. For a long time it was generally believed to be contagious. The recantation of Rush, and the researches of Chervin, and the experiments of, ———, produced a change of opinions, and for the last forty years but few have been found to advocate doctrines once almost universally received. A change is again taking place. The Boa Vista fever and our late epidemic have changed the views of many. It would require only the occurrence of a few

more similar cases to convert nearly all to old and long-abandoned doctrines.

The admmitted fact that all who are exposed to the cause of yellow fever do not become its victims is equally difficult of explanation according to either theory, and is certainly not without a parallel among diseases avowedly contagious. The majority of adults who have never had scarlatina may be exposed to its infection with impunity though the same cannot be said of children. Many persons exposed and liable to small pox withstand its influence, and numerous cases of those even who have sought exposure to measles, with a desire to contract it during youth, but whose constitution resists its invasion, might easily be found. Mumps, a specific, a contagious, and once a prevalent disease appears to have almost died out.

To those who have endeavored to apply the *experimentum crusis* by the production of the disease by inoculation, &c., we may reply:

1st. That the cases experimented on may have been acclimated and not subject thereto, as those who have had small pox in which case similar experiments would also fail.

2d. That these experiments have been made by medical men upon themselves and their insusceptibility to disease is almost proverbial, and their familiarity with all diseases removes one of the most efficient causes of every disease, viz: the fear thereof.

The same reasoning is applicable in all instances and to every particular case of the possible importation of any and every disease. As to yellow fever, as it occurred here during the summer of 1853, we are compelled to say that during May and June, its very *existence was ignored* by most of the faculty and the whole press, but after a devastating epidemic when all doubt had been dispelled numerous cases are found to have occurred long anterior to its first announcement. The minutes of evidence, the public prints and private information, show the existence of cases of this kind. To only an instance of each of which will reference be made. A physician who had never seen a case of yellow fever was called early in the season to attend cases which, now that he has become familiar with the disease (having last year had it himself,) he has no hesitation in pronouncing were cases of yellow fever. Another physician in the public prints announces cases and deaths long before any recorded and

assigns as a reason for attaching a different name to them, the fear of creating a panic and being called an alarmist. A third physician claims to have had cases a month before any previously reported and assigns the same reason for not putting them on record.

The most Northern point on the Western side of the Atlantic at which it has prevailed is Portland, Maine, in latitude 43°, and the most Southern Rio Janeiro, in South latitude 23°; on the Eastern shore of the Atlantic it has prevailed as far North as Marseilles, in latitude 43¼°; its Southern limit on the coast of Africa is not well known, the whole coast being almost unoccupied at least by the white race. These limits are included within the isothermal lines of 50° on the North, and 60° on the South, according to Humboldt, but it must not be forgotten that these isothermal lines are calculated from the average temperature of an entire year and though dependent to some extent on both latitude and elevation above the sea do not, and are utterly insufficient to, define the points of special interest with regard to yellow fever. This must and does involve many other considerations, viz:

The length of days, the length of summers, the average temperature of days and nights especially in summer.

Whether it was originally imported from Siam cannot now be determined, as chroniclers differ so greatly concerning its history, but in more recent times since India has been one of the British possessions, and has had a corps of able medical observers, in that region no similar disease has been described as existing there. We, therefore, do not know that yellow fever has prevailed in any other localities than the Eastern and Western shores of the Atlantic ocean, and the contiguous seas and gulfs, and it has almost uniformly been restricted to sea port towns. A few instances of disease somewhat similar have undoubtedly been recorded, such as at Rondont, N. Y., Memphis, Tenn., and Woodville, La.; but that these were instances of a genuine yellow fever and dependant on the same causes as those producing this disease in sea port towns may well be doubted.

The general Board of Health of England in its very valuable publications, has argued most strenuously against the utility of quarantine, but this question, its utility in England, differs widely from these two in which we are interested—the necessity and the practicability of a quarantine

for New Orleans and thence for the whole Southwest. That yellow fever, (even admitting it to be eminently contagious,) could ever prevail to the extent of an epidemic in England may be doubted on these grounds—1st. That it never has so prevailed, and—2d. That it is a disease peculiarly incident to hot climates. Its prevalence in New York and other Northern cities, does not and cannot prove that it may prevail in a much higher latitude, even though the average annual temperature be nearly the same, in as much as the summers are necessarily much shorter, and the intensity of heat, though sometimes greater, continues but for a very short period of time.

Again with regard to the utility of quarantine as to cholera, against which the same Board adduces strong arguments, we must admit that while the whole history of the disease—a complete view of its general dissemination over the world, would indicate the inutility, because of the inability and inefficiency of quarantine to arrest or even retard its progress. It is nevertheless certain that it follows the course of traffic.

This Board, (the general Board of Health of England,) also enters into disquisitions as to the influences of the general sanitary condition of particular places in localising diseases with reference to the propagation and dissemination of disease. The proposition itself, the very term localising clearly implies and really admits that diseases may be imported; but that even when introduced they require local conditions for their development into an epidemic or for any general degree of prevalence in the community. As to the mode of introduction the Board declaims against the opinions heretofore prevalent, viz: the arrival of cases from which it may spread by a virus unrecognizable to the senses and only recognized by its effects, and also against the possibility of the importation of disease by fomites. It does not show however any other plausible or possible mode of introduction. It denies the most obvious and rational mode, and begs the question on all other modes by pleading ignorance. Not only does it desist from the attempt to prove, but it does not even suggest the possibility of diseases by ærial, magnetic, electrical or other currents. It does not suggest or attempt to prove the influence of the lower orders of the animal or vegetable creation in the production of epidemics. It has not dared to cite the concomitant occurrence of earthquakes, comets *et id omne genus*. It simply denies the possibility of the

propagation of disease by the introduction of fomites, either in the form of persons diseased, or goods impregnated with an infected air.

Although it may be difficult, and even impossible in most instances, to trace the early cases of disease to any defined source of infection, and although it is still more difficult to explain the apparently spontaneous origin of diseases of this character at particular times in certain localities, there are salient points which cannot fail to strike the attention of all. No epidemic disease has ever been known to follow any meteorological lines. All have generally followed the lines of intercourse by travel or traffic, commercial lines always have more accurately defined the course of epidemics than any others. These diseases, if disseminated, are certain to pursue some one or other of these routes. They never travel in any other fixed direction. True, occasional outbreaks (still however on the line of regular commercial intercourse) sometimes take place in advance of its apparently regular progress. But this at least only proves that the quarantine was inefficient, either as to persons or goods, some infection having evaded the quarantine. If it be allowed that these diseases are transmissible, and if it be denied, we ask a better explanation on the other view of the question. On what other theory can such anomalous outbreaks be explained. More has been attempted, and the first, unsatisfactory as it may be, is the best that can in the present state of our knowledge of these questions be propounded.

As regards the propriety of quarantine, the Commission are unanimously of the opinion that a quarantine should be established. Even if of no use as to yellow fever, it will serve to keep out other diseases equally, if not more, deleterious to our city and its inhabitants. It may prevent the introduction of diseases known and acknowledged by all to be contagious or infectious. It will prevent the introduction of moribund emigrants, and thus by diminishing the number of interments in our city, enable us to ascertain more certainly its degree of salubrity—which cannot be done at present on account of the disturbing influence thereof. It will require all vessels to arrive in a cleanly condition, and consequently, by compelling the officers to keep their vessels clean during the whole voyage, extend its beneficial effects for weeks anterior to their arrival, and therefore, conduce to the comfort and salubrity of those passengers whose circum-

stances are such that they cannot protect themselves nor enforce those requirements which are necessary.

It has been suggested that the adoption of quarantine here would justify its adoption against us. To this it may be replied: 1st. That the failure to establish a quarantine for the protection of New Orleans has not heretofore prevented quarantine against us in nearly, or quite, every commercial port in the civilized world, nor can it be shown that its neglect now would induce a repeal of their existing laws. 2d. That the establishment of quarantine would argue that yellow fever was an imported disease, that New Orleans was naturally very healthy and only suffered from the importation of cholera, yellow fever and typhus fever. This view must certainly claim the consideration of, and secure as advocates of a quarantine, all those who so strenuously maintain the high dregree of salubrity of New Orleans.

Any attempt to suppress the truth, or to conceal the existence of disease is extremely culpable in every point of view, and more effectually injures the reputation of this city, as to its salubrity and as to the reliability of statements thereof, than any and every distinct acknowledgment of the existence of disease; whether cholera, yellow fever, &c., be propagated by contagion, or by peculiar and unknown meteorological causes or be developed by local influence, sufficient warning should be given to enable all who can to escape exposure to these influences. The loss of a few dollars that might be expended here, is nothing to the deleterious effects of a devastating epidemic. The late visitation of yellow fever has cost the city an incalculable sum—the public charities, the fifty thousand dollars expended by the Board of Health in the establishment of infirmaries and other relief to the poor—the———thousand dollars expended by the Howard Association; the——— dollars expended by the Charity Hospital during the past year, the extra expenses of the city government—say about————thousand dollars—in all amounting to——hundred and———thousand dollars is nothing to the absolute loss sustained by the city. The expenditures of private individuals cannot be estimated, but must certainly far exceed the aggregate of public expenses. Those who have died (considering them only as

stock laboring for the benefit and improvement of the city independently of the question of humanity,) were worth to the city at least two and a half millions of dollars; remembering that they were our fellow-citizens, identified, or beginning to be identified, with us in feelings and interests—that they were human beings, hurried to an untimely grave; reflecting that such an epidemic must for years injure the reputation and prejudice the interests of New Orleans, all calculations must be set aside, and we must hurry to the conclusion that if it be even remotely possible to prevent the recurrence of similar evils, at any cost to the city and State, or at any inconvenience to commerce, it should forthwith be done.

Although the Commision believe that the law of 1825, repealing the quarantine of 1821, vests in the Common Council of the present consolidated city of New Orleans full power to estabilsh a quarantine, yet it is deemed advisable that these powers should be rendered more full and definite. Further, that a quarantine though intended to protect, in the first instance, the city will, if effectual, protect indirectly and directly the whole State. The expense thereof should not be thrown upon the city alone, but shoud be assumed chiefly by the whole State, and the city would therein and thereby be compelled to bear its proportion of the expense thereof.

The Commission therefore recommend that the Common Council memorialize the Legislature, requesting that full powers to establish, govern, supervise, and direct a quarantine for the port of New Orleans, including therein all the routes, road passes, bayous and railroads in any and every direction, be conferred on the corporate authorities of the city, and that an appropriation of —— hundred and ——— thousand dollars be set apart, subject to the order of the proper authorities under proper restrictions to defray the expenses thereof.

In connection with the foregoing report, the writer would submit the annexed extracts from an article in the Cyclopedia of Practical Medicine on Epidemic diseases, by Dr. Hancock, and from Dr. Hume, on "Origin and Sources of Yellow Fever;" in Charleston Medical Journal for March, 1854.

"An attentive and unbiased observation of facts removes these unphilosophical distinctions. Many epidemic diseases appear under certain circumstances to be communicable by contagion, and some diseases,

avowedly contagious, prevail epidemically. Facts, in all ages, would seem to show that most epidemic diseases have a tendency to spread by intercourse with those exposed to the same causes of disease, and thus predisposed to it. This tendency has been made too much of by systematic writers in some cases, and in other cases too little. No epidemic disease either attacks simultaneously or rages with indiscriminate violence among all classes in any community, and no contagious disease attacks every one who is fully exposed to its influence. Epidemic diseases, whether contagious or not, have their assigned laws. Even when highly pestilential and destructive they observe stated seasons and periods of rise, increase and decline. When their attack is most sudden and general they pass over a large proportion of the community. In the former case the disease loses its malignity, in the latter, some constitutions are proof against the common destroyer, without any apparent immediate intervention of art." * * * * * * * *

"Facts apparently contradictory, or at least to the proper name, and the contagious quality of certain epidemic diseases, such as the Levant plague, the Asiatic cholera, and the yellow fever have been brought forward by men justly eminent in their profession, but wedded to particular opinions. Hence has arisen the extensive difficulty of knowing the truth. Physicians, on the very sight of pestilence, have sometimes, like children at play, taken opposite sides and maintained their grounds with unseemly pertinacity. So that we may look in vain to either party for unprejudiced observations. The records of all modern visitations of pestilential epidemics present us with opinions and statements as much at variance as light and darkness; and hence we must conclude either that one set of observers are right and the other wrong, or both partially informed but blinded by prejudice, so that they cannot see any truth in their antagonists assertions, consequently that many things that they report as facts are only partial observations or vague rumors, or hastily formed conjectures on unconnected and adventitious appearances. Truth is sacred, and error cannot be propagated without some injury. How incumbent then is the duty of medical observers to inquire impartially and to report with fidelity. He that presents us with a physical observation clouded by his prejudices on a subject so deeply important as to the health and welfare of his fellow creatures, is but a degree less culpable than the man who gives false coloring to some moral or religious truth which involves the dearest interests of humanity.

"If this view be correct, where shall we look for the facts, strictly such which may assist our reasonings on this weighty subject. It is not clearly to recorded observations of infection and of non-infection adduced by contagionists and their opponents that we must refer for those unexceptionable datas on which some safe practical conclusions may be built. We may, perhaps admit something from each, but must reasonably doubt their wholesale inferences.

"The subject would be involved in a cloud of darkness, which no diligent and honest inquiry could penetrate, if there were not other

things besides facts of infection and non-infection—in short, other facts connected with the origin, spread and decline of pestilential epidemics, (for to these we shall confine our attention in the present article,) which though too much overlooked, throw a good deal of light upon the whole question, and not only point to something quite independent of this contagious and non-contagious nature, but help us to determine how much importance we should attach to these circumstances in the general estimate. It is fortunate for our science that there is such a class of facts and that the lover of truth has not to range in a wilderness of uncertainty. It is also a source of gratification that many of these facts are admitted by both parties, or at least, with a few exceptions, are not denied by either."

Extracts from Dr. Hume's Article.

"The conclusion seems to be founded on the observation, that when the fever was carried into the country, it extended no further; hence was not contagious, and could not have been brought into Charleston from the West Indies, and subsequently extend itself by contagion; but it did extend itself by contagion; but it did extend itself by some other means, which appears now to be the still further vitiation of our impure atmosphere, by the addition of another unknown element. The doctrine of a contingent contagion, or more properly, a contingent infection, will embrace all of the phenomena observed. It implies that the atmosphere of crowded, filthy cities, necessarily impure, but contains no element capable of producing yellow fever; but if a vessel arrives from a yellow fever port, with or without yellow fever cases on board, another element is added to the atmosphere of the city, which renders it capable of producing the disease. It is as a leaven, which operates a new kind of fermentation, and results in a new production. Its effects are limited to the atmosphere of the city; hence the phenomena observed. Had the atmosphere been originally pure, the disease could not have extended, as is observed in the pure atmosphere of the country.

"This doctrine plainly indicates the objects which a wise government should endeavor to effect, namely, to keep the atmosphere of the city as pure as possible, by removing filth, draining, ventilating and covering the surface of the earth. Secondly, excluding vessels and passengers from infected ports, by a rigid and effectual quarantine, sufficiently comprehensive to embrace all the means of possible entry. Should the restrictions on the commerce of the West Indies, by quarantine, amount to a suspension of the whole trade for six months each year, the evils to the city will be less than it now suffers from the annual apprehension of the fever, and "the pecuniary loss of a hundred years by the quarantine establishment cannot equal the ruin and desolation of a single season of the pestilence." Fortunately, the most effectual quarantine need not do more than interrupt the landing of cargoes for a few days, and as all vessels will be subjected to the same delay, the equality of competition remains undisturbed. If the imposed restrictions should add to the value

of the imported article, it is evident that the consumer suffers this extra expense, and we doubt not but that our citizens are willing to pay the difference, and consume the article in health and happiness. Who can calculate the price of health? And is the health of the city to be placed in competition with a few cargoes of sugar and molasses, introduced without care or caution, so as to afford a luxury to our people, at the least possible expense of money, and at the greatest cost of human life. In modern times, the growth of cities depends on the increase of inhabitants. The value of city property depends upon the same, and the quantity of merchandize imported depends upon the number of consumers; hence the first act of a good government should be to increase its population, and with that comes all the other sources of wealth. To increase a population, we must preserve them in health, by all the sanitary means that wisdom has placed in our hands, and we must defend them against the importation of diseases endemic to other climes, and exotic to our own. That yellow fever is one of this class, we have every reason to believe. Its capability of introduction into other countries is admitted by all who have carefully examined its history with unbiassed minds, but still, commercial interests induce many to believe that the matter is not fully established. The yellow fever, as an epidemic, has never been introduced into England; quarantines there are useless; hence the quarantines of other countries are injurious to British commerce, and the British government denies the necessity of them, and strives to prove their inutility. The last and most memorable case of an attempt to suppress the truth, was the introduction of the yellow fever into the island of Boa Vista, one of the Cape de Verdes, by the British steamer Eclair. The government sent Dr. McWilliam to investigate the matter; on his return, his report was unfavorable to the government views of the subject. Dr. King was then sent, who returned with opposite views. Although he could not disprove the facts of Dr. McW., he gave them a different construction, and thus the government was enabled to maintain the integrity of its original creed. (See Brit. and For. Med. Chir. Review.)

"We trust that enough has been advanced to demonstrate the extreme probability that the germ of epidemic yellow fever is imported more frequently than has been generally suspected. We acknowledge the difficulty of tracing the origin of early cases, and we also regret, that until lately, none of our physicians have sufficiently doubted the accuracy of our forefathers as to make further investigations necessary. It is no honor to Charleston, to be the parent of such a pestilence; it is no credit to her sons to endeavor to prove her to be. There is no positive proof that she is; and there is much positive proof that she is not. There is both damage and danger in the charge, and she has the right to be esteemed innocent until proved to be guilty; and it becomes her sons of the present day, by industrious research, to disprove those assertions which the indolence and negligence of her former sons induced them to make. That Charleston is beyond the northern limit of self-generating epidemic yellow fever, is exceedingly probable, for it is the property of

epidemics never to die in the places of their nativity. Yellow fever does die in our climate, for it is not renewed each successive summer; while at Havana it flourishes in perpetuity. If the fever is not a native of the West Indies, it is at least naturalized; but it cannot be said to be naturalized in Charleston. Our winters extinguish it effectually. Charleston does occasionally produce sporadic cases of fever of domestic origin—but they do not extend, nor infect localities. In 1847, a drummer at the Citadel Academy, went on a drunken frolic to Sullivan's Island, returned to Elliott street, in the city, and when he became a little sober, reported at his quarters at the Citadel. In a few days he was taken with all the symptoms of yellow fever, even unto black vomit; he neither died, nor did he extend his disease to the numerous subjects in his immediate vicinity. Had he obtained his disease from an infected West Indian vessel, the result and consequences would have been very different. We apprehend that it is from such cases as this, that the elder physicians founded their belief of the domestic origin of yellow fever, and inferred if it was seen occasionally, to be of domestic origin, it must necessarily always be so, without distinguishing the remarkable difference which exists between the sporadic and epidemic. Another source of error was the observation, that in the pure country air the epidemic fever was not extended; such is still the observation, but the present conclusion is different. The impure air of the city is necessary for this extension, and so long as the city air is pure, the fever will not even extend in the city. We never hear of yellow fever in winter, and we always notice its decline and destruction as cool weather advances. It is possible that the reduction of temperature impedes the putrefactive fermentation, diminishes the amount of eliminated gases and vapors, and thus destroys the medium of intercommunication, and consequently the foreign element is extinguished by defect of combination and influence of a low temperature. It was a standing order to the French ships cruising in the West Indies, to make sail for the Polar seas as soon as the fever was discovered on board, and the success was generally satisfactory. It is now observed that ice constitutes the best disinfectant that can be used at quarantine grounds, and we all know that a low temperature checks every fermentation; hence the deduction, that our impure city air is the result of the putrefactive fermentations going on by the influence of solar heat in the large mass of vegetable and animal matters distributed within and upon the surface of our soil, giving rise to secondary productions of every variety, is not at all extravagant nor incredible.

"Having assumed an hypothesis adequate to explain all the observed phenomena, connected with the origin and propagation of the yellow fever in Charleston, we are prepared to apply it to the prevention of the evil. We have assumed, on sufficient observation and evidence, that two conditions of the air are necessary to produce epidemicity. First.—A condition of impurity of domestic origin, arising from the fermentations of the earth and its contents, derived from the exuviæ of a dense population. Secondly.—A foreign imported element, which readily combines

with our domestic impure air, and imparts a property to it, identical with what it enjoys in its native clime. Without professing to ascertain what the elements may be, we only identify them by their effects upon the human system, and their only property, at present known, is that of producing disease and death in the human family, wherever the combination is allowed to be consummated. This single observation contains all the principles of human action. Prevent the combination, and security from its ravages must be the result. Exclude the foreign element from our port, or extinguish it in the harbor, but never let it reach our wharves to effect the deadly combination. Can this be done in a commercial city? Can our wells be poisoned for the sake of commerce? Where is the difference between poisoning our air, or poisoning our water? Both are essential to the vitality of our citizens, and merchants have no more right to poison the one, than our enemies have to poison the other. Poisoning is the foulest kind of murder, equally abhorrent to the savage as the saint, and it is only necessary to demonstrate, beyond a doubt, that the poison of yellow fever is introduced among us by commerce, and we will soon find that there is among our merchants a moral principle paramount to the love of gain. However valuable the West India trade may be to the city, it cannot be equivalent to the injury produced in other branches of commerce, by the dread which the disease produces in the minds of country purchasers, and the compulsion it induces to flee to other markets, where the disease is prohibited entrance. Of death and desolation we need not argue, for habit has rendered us callous to such considerations; and the exemption which the native enjoys, may make him careless of the sufferings of others. Far be it from us to attribute a bad motive to the non-believers in the introduction of the disease, but the facts collected appear to be sufficient to produce a re-consideration of the matter, and to induce the performance of an experiment which will settle the matter beyond a doubt. The experiment does not involve the destruction of the West India trade, although it will encumber it with additional expenses, and thus raise the price of commodities beyond their former value; but this increase of price will fall equally upon all the West India merchants, thus producing no change in their relative profits, while the community at large are made to pay the extra charges. It is not observed that the rigor and extra expenses incident to the New York Quarantine increases the price of sugar in that market; and with all the impediments of quarantine, the West India trade is prosperous in that city. We desire to accomplish no more for Charleston than what the Legislature of the State of New York has done for the city of New York. We desire to imitate her example, to profit by her experience, and be rewarded by the same happy results. For, "let it be remembered," says Vaché, (State Commissioner of Health to the Marine Hospital, Staten Island,) "that the malady has not appeared in this city for nearly a quarter of a century, and not since the present health laws have been rigidly enforced, and never will, as long as the statute remains as it is, and its provisions are observed to the letter."

Here we have the fruits of difference of opinion between Drs. Rush and Hosack. So long as Rush prevailed, and domestic origin was advocated, the fever continued its annual ravages. When Hosack prevailed, and foreign importation was admitted, ways and means were found to stay the pestilence, and nature seemed to yield to a correct opinion. Let public opinion change in Charleston, and ways and means will also be found to stay our pestilence. We have been taught how it may be done; we have only to put those principles into practice, and the scourge of Charleston will be as a thing that was."

The preceding extracts so fully coincide with the views entertained by the undersigned, and are so well expressed, that he has deemed it better to use the original language than to attempt to transpose them into his own.

The misfortune of a partial loss of sight having prevented the writer from reading and writing during nearly the whole of the present year, must be his excuse for the imperfections of the preceding Report, and for the want of a more thorough analysis and fuller reference to the evidence contained in this volume, as well as to that which might have been derived from other sources.

J. C. Simonds, M. D.

APPENDIX.

LOUISIANA.

NEW ORLEANS.

SATURDAY, 5, P. M.

The Commission met pursuant to adjournment, Dr. Barton in the Chair; present Drs. Axson, McNeill, Riddell and Simonds; Mr. Pashley appeared before the Commission. The first cases of yellow fever occurred on board the ship Northampton, direct from Liverpool, with between three and four hundred passengers. This vessel arrived here on the 9th May; on the 10th, hands were sent on board for the purpose of cleaning her, they did not finish in consequence of discovering what they considered to be "black vomit" in the hospital of the ship. It was understood that several persons died on the voyage, and one man, a steerage passenger, while the vessel was coming up the river. The ship lay at the first wharf above the steamboat landing in the Fourth District. Charles Lanness, one of the men sent on board to clean, was taken sick with yellow fever two or three days afterwards. Jas. McGuigan, one of the steerage passengers, also took the fever, was sent to the Charity Hospital and died there. The boy of the ship named Richardson was taken sick. The remark of Dr. Thorpe, who attended him, was that the case would be considered undoubted yellow fever had it occurred later in the season.

Of the second gang employed five days afterwards in discharging the vessel several were taken sick, among them Mr. Pashley's confidential man, although he was acclimated. Mr. Clark, foreman of the gang employed in loading the ship mentioned, one of the men under his charge, living in the Third District, sickened and died with black vomit. Mr. Pashley speaks of the water used on board and describes it as smelling badly, and when emptied from the casks as having a black ropy sediment. Mr. Pashley's wife and child were taken sick a few days after this with yellow fever; the child nine months old had black vomit and recovered. Mr. P. can reckon six persons of the hands employed in discharging this vessel who afterwards had the fever. Coleman, one of these laborers boarded subsequently at Conroy's.

The ship "National Eagle" lay in the neighborhood of the Northampton, this vessel was bound to New York. She lost after her de-

parture so many hands from fever that she was compelled to put into the Capes of Delaware, in distress, many of her passengers were also reported sick with fever. No other vessel came up in the same tow with the Northampton, neither was she in company with any other while at the Pass. The Siri, from Rio, lay a quarter of a mile distant from the Northampton.

MONDAY, October 17th, 12, M.

The Commission met pursuant to adjournment, President in the Chair; present Drs. Barton, McNeill, Riddell and Axson; Mr. Clark appeared before the Commission. "The Northampton was loaded by my gang of hands; one of the men named Thomas Hart, was taken sick two days after we commenced loading, he was sent to the Charity Hospital and died of black vomit; doubt if Hart had ever passed a summer in the city; he was temperate in his habits. Thomas Hart lived in the Third District near the Mint, and was sent from there to the Hospital—must have been sick about the first of June, as Clark commenced loading her about the 27th or 28th May, and two days after he says Thos. Hart fell sick. He died on the 8th June according to the records of the Charity Hospital. Did not observe any offensive smell on the ship; she had been discharged and cleaned previous to commencing loading. Resides in the Third District and some of his men were in the habit of riding up in the morning and returning in the evening by the omnibus.

THURSDAY, October 20th, 12, M.

Dr. M. M. Dowler appeared before the Commission, and stated that the case on Gormley's Basin, of the man named Kein was taken sick on the 6th of May and died on the 10th, the woman, his wife, was taken on the 11th and died on the 15th. The doctor derives this information as to dates, from Ebenger, who was Kein's landlord, and Hubert having lost his memorandum book on or about the 15th of August, in which it was noted. The man died with black vomit and his case was clearly and unequivocally one of yellow fever. The doctor gave a certificate in both cases—the man and his wife—not wishing to create alarm, as dying of bilious malignant fever. The woman did not throw up black vomit; the doctor subsequently attended cases in the same square. The children of Kein went to the asylum; thought the case was yellow fever before he saw black vomit. The doctor saw many cases afterwards as late as 3d of August, in the same neighborhood. There are several soap factories in that part of the town; Dr. Dowler has never observed that occupation except in case of laborers in the sun, had any influence in causing the disease. The intemperate however, suffer the most. The doctor thinks crowded rooms have an influence in the disease; has never seen a second case of yellow fever in the same individual; knows many instances of exposure of unacclimated persons who escaped it, infers from this that the

fever did not subside for want of subjects, but thinks it run its course; noticed that in many other cases of sickness this summer a similarity to yellow fever symptoms presented themselves in acclimated subjects. Has seen four cases of black vomit to recover—one boy of five years, one girl of eight, one girl of eighteen, one married woman of twenty-five years. Adjourned.

THURSDAY, November 3d, 12, M.

Dr. Schuppert saw a case of yellow fever on the 23d of May, on ship Augusta, from Bremen. The Augusta came up in the same tow with ship Camboden Castle, which ship stopped at Kingston, Jamaica. The Augusta lay opposite Bull's Head, in Fourth District. The case mentioned was a sailor, who recovered after an illness of fifteen days; he remained on board the ship during the time of illness. On the 24th of May, a butcher named Kittering, residing on Chippewa, between 7th and 8th streets, was taken; did not hear of his having been on board any ships; had black vomit; his premises not very filthy; had been in the city two years; has a wife and two children, neither his wife or children took the fever; this was the second case. The third case was a man named John Haar, this was also a sailor on ship Augusta, he was the cook on board, and died on the third day of illness of black vomit. On the 27th, three more cases occurred on same ship, their names were G. Woolte, Herman Bruntz, and F. Donber. The two first named, went to the Hospital and died; the last remained on board and recovered. The Augusta was very clean, she had no sickness like yellow fever until she arrived here; was sixty-six days on her passage; Dr. Schuppert has seen five cases of recovery from black vomit; practiced in the city nearly two years; Dr. Schuppert thinks his cases the first in the city; the doctor heard that much sickness occurred on board the Camboden Castle.

LETTER OF MR. GIBBS.

Friend Etter:—As we have no churches open and I am too unwell to be about, I have concluded to spend some time in giving you an account of the state of things in our neighborhood as being different from what ever happened to us before. As a great deal has been said of late for and against quarantine, the facts as they have occurred in our town and Washington will be of great interest. Now for the facts: on the last trip of the steamer Opelousas, a Frenchman, who was a passenger, came to our village in the hack with other passengers, and on the way from the landing complained of head and back ache, which Mr. Daniels noticed as very suspicious, and on his arrival at the Eagle Hotel, named it to the landlord and others. This was late in the evening; the Town Council met, called in doctors and examined the man, when Dr. Boghni, who had been familiar with yellow fever in the city, stated if a man with these symptoms was in the hos-

pital he would be treated for yellow fever. On this a hack was ordered and he was conveyed on his journey to his brother's about eighteen miles where he was intending to go, some days after we heard of his death from yellow fever. Many thought it was rather rash at the time, but no one now thinks so. Here I will remind you that our village suffered severely in 1838–'39 and 1842, hence the caution, this was about the 9th of August.

Soon after this, Mr. Follen, at the receiving warehouse in Washington, was taken down with bilious fever as they then considered it, then his clerk in a few days, others at the store of Lepps, then across the street A. Millspaugh, his brother-in-law, James Petrel. About this time Dr. Boghni was sent for from Opelousas, and pronounced a case of yellow fever, whereupon the Washington people called a meeting, declaring that no yellow fever existed there, and only one case resembling it; so said their doctors.

About this time some died, but not the one that had been pronounced yellow fever, which helped to blind them. On Saturday night, James Petrel, who was up and rode out in the sun, and who was supposed to have had bilious fever, relapsed and died early Sunday morning, with black vomit; likewise a child of Mr. Millspaugh, in the same house. Then they were convinced, and we who had suffered from the like, begged them to scatter and not feed the disease in such numbers. But no, only a few could be induced to leave the town, and why? This was their fatal reasoning, in 1837 and '39, cases came from Opelousas to Washington, and did not spread, our town is so healthy, fine rolling hills, no water pools, nor dirty streets, every filth washes off; unfortunate conclusion.

Up to this time full eighty have either died there or away, having contracted the disease there, and of course many of their best men, besides one doctor, Dr. Heard. After it had raged sometime they began to inquire how it came there, and it was discovered that some negro or mulatto clothing and bedding belonging to some one who had died in the city, were brought up on the boat, landed at Follen's and taken to Lepp's. Now see, Follen and clerk, first taken sick and then Lepp and Clark, then across the street opposite. Now if they had known these facts and acted as they did with the cases coming from Opelousas, they more than like would have escaped this great calamity. Now see the similarity between our town now and theirs in 1837 and 1839. The first we moved away, the next case was young Chahany, who was clerking at Washington, came to Opelousas to attend the funeral of a child; was taken sick about September the 8th, and the next day the doctor declared it yellow fever. Our council met and waited on his father, and requested him to send away his family with the exception of one or two to nurse him. The people of our town had declared that if a case came here a large majority would shut up store, suspend business and go to the springs, and various parts of the country, so on this being announced a case, a great

many left, others awaited its termination. In a few days he was declared out of danger, or fast recovering and many doubted its being yellow fever. On the morning of the 16th, he was taken worse, and that evening was a corpse—buried early next day, his clothes and bedding burnt and other precautions taken. You will recollect Mr. Cahenner's house, it stands alone on the Northwest side of the village. Out of about twelve stores, ten closed; four grog shops, three closed; two drug stores one closed, one tavern with one boarder and a man to take care of it, the other two boarders, and one guard placed on the Washington side of the town, ordered to be more strict and allow none from there except doctors or people for medicine.

On the evening of Cahenner's funeral, Dr. Diggs, who had paid some three visits to his brother-in-law, Dr. Heard was taken with fever and pronounced yellow fever, his fever was broken and apparently he was doing well, when on the morning of the fifth day unfavorable symptoms appeared and he died with black vomit the next morning. He lived on the East side of town, near the old church; the same care was taken, his wife removed as soon as he died, no one allowed near but Dr. Little and Boghni with two old negro men to assist to nurse him. He was well attended to, and was very rational until a few minutes before his death, and in fact great hopes were entertained of his recovery. Up to this time it has not spread in our town, which is now over ten days.

Several have passed through our town from Washington and died at Grand Coteau, and elsewhere. It has been severe on mulattos, as many as five or six in a family have died besides some negroes, a great many sick and about half a dozen more were liable to be sick.

Washington people are very angry at Opelousas people, for so strictly prohibiting them from coming to our town, but are they responsible? Did we take it there? By no means, then do not the foregoing facts prove us right in protecting ourselves, without hurt to them, a law all right minded people admit. To describe the appearance of our town and country at the present, would more than fill one sheet of paper. Never was the like seen before, and may we hope never will again. When the fever first broke out my wife was confined to bed just having made me a present of another girl, and in about five days after, I was in bed with bilious fever, and our cook taken away partly sick and in fear of fever, and left with but a little girl to nurse, cook, &c., only for a neighbor or two left, I know not what we should have done, and had we wished to have left we could not. My wife partly by excitement was kept back from recovering; so after I recovered my time was taken up by nursing; business was out of the question. People are now gaining confidence and a few men have visited town the last day or two, but we advise all families to remain away from town until it has gone through in Washington, or a white frost occurs, not that we have any sickness in town, but to carry out our plan of precaution.

It has been bad in Vermillion, brought there by a drover; so you see we are between two fires, and we are kept well on the look out since the first case here, I have kept a daily note of facts as they occurred, knowing how apt we are to forget, and how different things are related, each day I obtained my information from the doctors in attendance, as what few in town meets pretty often.

I must now close my disjointed account of fever, and I hope the worst is over. Yours sincerely, JOSEPH GIBBS.

TESTIMONY OF PROFESSOR CARRIGAN, OF BATON ROUGE.

The name of the locality is Baton Rouge. Its limits and boundaries are one mile square. The surface soil is calcareous. Well water, free from limestone, but strongly impregnated with ferruginous qualities, is used in this neighborhood. There has been no disturbance of the soil.

As regards situation, it has the Mississippi in front, and a bayou and swamp on the North, but the bayou was dry during the epidemic. The drainage is good, the water running off freely.

In respect to the vegetable kingdom, I had about thirty peach trees, the fruit of which was wormy, and rotted on the trees; the potatoes rotted in the ground.

The population of the town in 1850, was four thousand; in 1853, say about four thousand five hundred. There was no distinction in the census of males and females. The population is fused—American, French, German, Irish, Italian, English, and Scotch.

The first case had not been in a locality where yellow fever was prevailing. For cases apparently spontaneous, see those of J. Butner and Miss Burbank. They had no intercouse with any case. It seemed to move in a zig-zag course, but would at times sweep off a whole family. Some seemed to be constitutionally liable to it.

The disease was very impartial in respect to persons, with reference to their personal and social habits, living in crowded houses, &c., both with regard to attacks and mortality.

In at least two-thirds of the cases there was black vomit; yellowness of skin generally; hæmorrhage in about one-third. During the prevalence of the epidemic there were some inflammatory fevers.

I have not noticed particularly what time intervened between exposure, assuming it to be contagious, and the appearance of the premonitory symptoms, or the development of the disease. It generally terminated as true yellow fever. I have seen the disease before, in New Orleans, in 1841, '43, and '47; at Natchez, in 1837, and at Vera Cruz, in 1847. I do not recollect how many cases of black vomit I have seen; was told I had it myself.

Mayor Dufrocq was constantly in attendance upon the sick this year, and in 1847; he told me he never had the yellow fever; there were others in the same category.

TESTIMONY OF JUDGE LOUIS SELBY.

LAKE PROVIDENCE, (La.) December 31, 1854.

PROFESSOR J. L. RIDDELL, NEW ORLEANS:

Sir:—I state first, my understanding of the questions, that you may the better judge of the weight to be given to what I write. Is the yellow fever contagious? Is it infectious? and if infectious, how?

The person of the individual being in a habit or the place in a situation, from local causes to receive the epidemic, will it arise spontaneously and without being communicated to the person or place from some other place where it already exists; or, must the infectious matter be brought from where it already is to the new seat of disease, by travelers, removal of goods, or other conveyances from the former to the latter place? To illustrate, no matter how well the ground may have been prepared the seed of cotton or corn must be put in the earth to produce a crop:—a quantity of combustible matter, dry wood, or even powder, must be ignited by fire to produce a blaze. But combustion *may* take place without any communication of fire, or by friction, or from the state of the combustible substance, by accident, or without any known human agency; and herbs, *may* grow upon ground where man cannot tell at least how the seeds got there.

To *know* that the premises are correct from the kind of evidence to be had, is difficult; and without such knowledge any conclusion *may* be erroneous; for a mistake of one fact, amongst the many, may destroy the most satisfactory theories, logical arguments and decisions or judgments. And to gather a correct statement of facts from the complicated subjects, and conflicting statements of different individuals—and sometimes even by the same person at different times—of one case, appears almost hopeless.

If the past is the only time that the yellow fever has been here, at the town of Lake Providence, as an epidemic, and Mrs. Selby's, the first case, the investigation of her case, might afford some useful information. Such cases, if *all* the facts of them could be *correctly* known, would seem to present the best opportunities of arriving at the desired conclusions.

Since you left, I have satisfied myself that Mrs. Selby had not been out of the village—out of sight of her dwelling, or on any steamboat, for, at least, six months before her sickness; she having been in bad health; and from all the information I can get, I *believe* that, she had not been in the "Sparrow House," or nearer it than on its side walks, in passing it, and very seldom there, for more than a month before her death.

From the information I have been able to get, no freights or merchandize arrived here, till after the death of Mrs. Selby, and her's, was the first death *known* to have been caused by yellow fever here. But, I only discovered the disease about seven or eight o'clock in the morning of the day on which she died, precisely at twelve, M.; and the physician who attended during her sickness doubted till the subsequent day; and then, when he ventured to say that her disease had been the yellow fever, he was ridiculed for it all over the town, and particularly by the other physicians, for several days following: and I have learned that two deaths by *fevers*, took place a day or two before her's, one at the "Sparrow House,"

and one directly opposite it. The physicians who attended them are dead, and those living who saw them, can give no account to be the least relied upon. I consider it not improbable that, they may have died with the yellow fever. Had Mrs. Selby's case passed unnoticed, how much longer the epidemic might have remained concealed, we now cannot tell; for the information to be gleaned here by the greatest industry, and most searching inquiry, I fear, can avail but little; and it glaringly presents the difficulty, if not the impossibility, of getting a correct statement of the facts of such cases; and that theories, and reports of cases, may be made more agreeable by an occasional slight changing, or disregard of some of the facts; but, that to be useful, all must be truly known:—and now, I fear that I deceived myself into the belief before I commenced, that I might write something useful; but the more I try the more I see the difficulties—and I only send this because it can do no harm, and I have *written* it. I have little hopes that it is now, really worth the reading.

About September 14th, after the sickness had been here about twelve days in a lot near my house, I suppose in one night, would spring up, about fifty times as many toad-stools, as ever grew there before in the same time; although the weather was extremely dry. Musquetoes seemed multiplied a hundred-fold, commonly here they are a dirty yellow, but these had gray rings around their bodies, bit quicker and stung much harder than heretofore. During the sickness, and for some time before, and since, nor yet do I recollect of having seen a blue-bird or wood-pecker within the bounds of the disease—the martins were very scarce, and the few that were here left early—while at the same time, in ordinary seasons there have been, perhaps, a hundred mocking birds, this season, during the sickness, I only saw two; and for weeks only heard one sing; horses and cattle were lean and dull, with sores and lumps upon them; the fowls were drooping and looked as if recovering from disease, and found dead in all directions; the combs of the roosters were bloated to twice their natural size, fiery red, and almost transparent; killed a half grown chicken and could not eat it. About the middle of August the rats and mice were very numerous, a month after in the midst of the sickness there was scarcely a rat or mouse to be seen or heard. The furniture in the house, and books in my office, moulded, ten times sooner and worse than heretofore, but the color I did not observe. No one at my house during the disease, ate half as much as usual.

There has been a great deal of filth, and increased from year to year for the last few years for a small village situated as this, which, together with the decomposition of great quantities of sawdust put upon the walks last winter and mixed with the mud, I think aggravated the fever. Had not the disease been worse than ordinarily in New Orleans, and at so many other places for the first time, I would have been disposed to consider those the causes of its originating here. The Mississippi river has been the whole year lower than I have ever seen it before, and all its waters pretty much confined to its channel. Many think that the country is always more healthy after an overflow. The first cases were much the

more fatal, and those who had the least attention, and took the least medicine did best; children, the young, got through much better than the old, and the blacks with still much greater ease than the whites—and the yellow had it easier than the whites, and harder than the blacks.

Gentlemen: not being a physician, or expecting during the disease to be honored with such a call from so highly respectable a source, I have done the best I could and I consider the best apology for the foregoing many imperfections, is to say the least.

MISSISSIPPI.

TESTIMONY OF DR. L. P. BLACKBURN.

NATCHEZ, September 22, 1854.

DR. BARTON, CHAIRMAN OF THE NEW ORLEANS SANITARY COMMITTEE:

Dear Sir:—By request of yourself and Dr. Riddell, I give you my views about yellow fever and its communicability, and in doing this will be as brief as possible. What I write is the opinion formed from my experience of the disease here, last year, and from the most careful inquiry I could make amongst our old residents, about past epidemics. The community (following the profession) is divided into two classes of believers on this subject, one believes that yellow fever, is or may be indigenous, the other that it is of foreign birth; one believes that a person takes the disease from atmospherical causes, that may exist in this latitude; the other believes that the specific malady of yellow fever is communicated either by actual contact with the person, or clothes of a sick man from vessels, or by a morbid miasm arising therefrom. For myself I adhere strongly to the second, of these opinions, we never hear of yellow fever in towns in the Eastern part of this State, remote from all travel to and from places in which yellow fever generally prevails, though these towns may be in the same, or even in a more Southern latitude, whilst these places are free from yellow fever, not because of their smallness, for yellow fever will enter an isolated house in the country. They are not exempt on account of their cleanliness for there never was a cleaner town than Natchez was last July, but as no communication exists between them and places where sickness prevails, they escape disease, and the presumption therefrom is strong that in towns where the yellow fever exists in the same latitude that such diseases is of foreign birth, I affirm that in every case (and they are many) why yellow fever occured in the country, in the neighborhood of Natchez last year, it can be plainly and distinctly traced to contact with the disease. Let me cite a locality with which and with the sickness happening, in which I am familiar. Nearly two miles South of Natchez, a family of the name of Irvine erected a house in the spring of 1853; the situation was on the top of a hill, in a worn out field abandoned by the cultivator, with nothing growing there but sedge grass and no pond or stagnant water near, the river is about a mile distant from the house, and intervening

there is a dense Magnolia wood; the family numbered six; the oldest son was in the habit of attending market, and towards the end of May he sickened and about the first of September died. The second son took his place, came into town, and he too sickened and died in a few days; five out of the six died; Edward Dickson, Irvine's brother-in-law, living a mile from the place, and having no communication with town and having prevented all intercourse, either by goods or persons, visited Irvine's in company with his wife, and remained with them twelve hours; five days afterwards Dickson and wife were attacked, and shortly afterwards, about ten cases occurred in the family. Mr. Dickson died of black vomit, Mathias Gilbert, living three miles from town in the same direction in a house situated in a dense wood, kept up a stricter quarantine than any one with whom I was acquainted; nothing was allowed to come from town, or from any place where a suspicion of yellow fever existed; a negro belonging to Mr. Gilbert, slept at Irvine's, and seven days thereafter was attacked with yellow fever, of which he died, previous to his illness, of the nature of which no suspicion was entertained, Mr. Gilbert and his wife, paid a visit to the Dicksons' who (it was thought) had been sick of a common autumnal fever. In a few days Gilbert and his wife both sickened and died; there were five other cases of unmistakable yellow fever, in this family; these cases made no small talk at the time of occurrence, owing to the mortality that attended them. I select them on account of their notoriety, I would have taken instances much further from town, where a communication or contact with the sick have brought disease, whilst neighboring places had been preserved by their non-intercourse or let us say quarantine. I cannot at present enter into any reasoning, from the above hurriedly detailed facts, I am clearly of opinion that properly stated they strongly fortify the theory I support. I am quite convinced also that we would have had yellow fever in Natchez ere this, but for our quarantine; three have died, and four recovered and left the hospital at the quarantine station; nothing could persuade me that the morbid miasm from these cases, would not, had they been allowed to come to town, killed many of our citizens. To-day we hear of some yellow fever in Vicksburg and have heard of some at Bayou Sara, should these reports be true I may with propriety congratulate my fellow townsmen on our immunity thus far, should yellow fever however make its appearance in Natchez this year, it will be by an evasion of our quarantine.

Quarantine may be better enforced in New Orleans than any where on the Mississippi river, and without an efficient quarantine *there*, our quarantines on the river, unless on a most expensive and inquisitorial character (guarding every road and approach to town) cannot be considered perfect, therefore it is that I am exceedingly anxious, for an efficient quarantine in New Orleans, as New Orleans exists, lives, and thrives by the Mississippi valley, the whole valley will indirectly contribute to the expense of a quarantine in New Orleans. The expense, what a trifle compared with the lives of thousands, the happiness of tens of thousands and the substantial prosperity that would certainly attend New Orleans, when her immunity from yellow fever, by quarantine had been demon-

strated. In conclusion, I would respectfully present to the gentlemen of the Sanitary Committee, with some of whom I am personally acquainted, my best assurances of personal regard, with a full sense of their philanthropic and scientific vocation. To such intellects, so open to the omnipotence of facts, I am persuaded that the conviction cannot long be wanting that a rigid system of quarantine even in localities heretofore considered as originators of epidemic yellow fever, will prove a complete safe-guard. Indeed I feel confident that whenever the New Orleans and Nashville Railroad shall have been completed, that the yellow fever, occurring in New Orleans, the last of June, or the early part of July would by such transmission become epidemic in Nashville, every year it was epidemic in New Orleans, unless a system of rigid quarantine interposed. It has been said that a majority of the merchants of New Orleans were opposed to quarantine, fearing a loss of the West India, the Mexican and Brazil trade, I pronounce the imputation a villanous scandal. The noble and world renowned charities they have established, their care of the sick and dying, and indeed their vital interests require a different conclusion. To put trade against human life would call down the indignation of the humane and civilized world; and it would be best rebuked by a visit to the populous cemeteries of your own city, where hecatombs from every region of our country, as well as your native town, sleep the sleep that knows no waking; victims to the unobstructed admission of yellow fever from its home in the tropics.

TESTIMONY OF DR. DAVIS.

NATCHEZ, (Miss.) December 21, 1853.

The name of the locality is Natchez, on the Mississippi river, in Adams county, Miss. It is about one mile square, or thereabouts, situated upon a bluff more than one hundred feet above the ordinary level of the river. The surface soil is chiefly yellow clay, mixed with sand. Cistern water almost exclusively used, from underground cisterns, made of cement, or cement and brick together. There was little or no disturbance of the soil, only as much as was required for the proper working of the streets. Natchez is situated on high land, upon a bluff on the bank of the Mississippi; there are many dry bayous or ravines within and near to the corporate limits, but no marshes or lagoons It is well and swiftly drained.

I cannot furnish any very accurate information in regard to the meteorology of this locality. The weather was very wet, but not very hot, for some time before the epidemic. In the animal kingdom, I noticed that musquetoes were very numerous and annoying; and a kind of epidemic prevailed among poultry, particularly among hens and chickens.

The population of the city before the epidemic was supposed to be between six or seven thousand; during the epidemic a census was

taken, showing a population of nearly three thousand five hundred, of whom a little more than one-half were colored. I cannot answer correctly as to the nativity of the population. The number of natives was small, compared to foreigners, and few blacks died compared with whites.

I cannot answer correctly as to the relative ages of those who died. The whole number of deaths from yellow fever was between three and four hundred.

I cannot answer correctly as to the cases of yellow fever. It spared neither sex nor age, and was somewhat peculiarly severe with *pregnant* women.

The first case occurred on the 17th of July, being a Mr. Pearsall, from New Orleans, who died at the hotel; he was sick when he arrived. I cannot give details. The next case or two happened in the same hotel where Pearsall died. Shortly afterwards, one or two, who had also come from New Orleans, and "dodged" the quarantine here, were taken sick and died. These cases, as previously stated, had been exposed in a locality where yellow fever was prevailing. The Post Master here was supposed to have contracted it from opening a very heavy New Orleans mail. I do not know of any case which appeared to have originated spontaneously, and without the suspicion of intercourse with other cases of the disease, although such cases may have existed. The disease spread by degrees through the city to its extremities, and along the lines of travel into the country. I cannot trace the spread of the early cases of the disease, or its relation to any local cause.

All classes almost indiscriminately were attacked, but the mortality was greatest among the poor and ignorant; very many, however, of those who had means and friends died. The Jews, Germans and Irish suffered most.

The symptoms of the disease were pain in the back, head and limbs, injection of the eyes, sometimes accompanied with chill, great weakness, nausea of the stomach, commonly constipation of bowels—duration, about three days or thereabouts, of active sickness, generally; then a change, decidedly for better or worse.

I cannot tell in what proportion of cases black vomit occurred; it was common, but many died without it. Little or no fever of any other kind prevailed, and it almost invariably ran into the prevailing fever; even a cold with fever was apt to run into the yellow fever.

I cannot answer with any exactness, as to the length of time intervening between exposure, assuming the disease to be contagious, and the appearance of premonitory symptoms, or the development of the disease. In some instances the disease developed itself almost immediately; in one case, where a man's family went into the country, into a healthy vicinity, nineteen days elapsed before the disease broke out.

I regard the epidemic as true yellow fever, of a peculiar type. I have seen the disease before, in Natchez, in 1837, when I had it my-

self. I do not remember how many cases of black vomit I have seen. Many recovered from "black vomit," so called, but no instance within my observation after genuine black vomit. There are said to have been, however, a few cases of the latter kind. I heard two or three persons say that they had had it before; I do not know of my own knowledge.

I cannot answer with exactness, as to the number of persons attendant on the sick, or otherwise exposed and liable, who entirely escaped. Those who were most active and attentive seemed to fare better than others. Death usually occurred from the fourth day, or thereabouts, to the seventh, eighth, and even to the tenth and eleventh. A few died in thirty-six hours. Some in fifty hours. These, however, were not frequent. Several lingered between two and three weeks.

TESTIMONY OF PROFESSOR WAILES.

WASHINGTON, November 4th, 1853.

The name of the locality is Washington, Adams county, Mississippi. Its limits and boundaries are embraced in the corporate limits about one square mile, and is situated six miles East from Natchez. The surface soil is undulating and broken; soil calcarious loam. The kind of drinking water used in this neighborhood is chiefly cistern water; the springs and wells are strongly impregnated with lime. There has been no extensive clearing of lands or disturbance of the soil; the adjacent country has been cleared for a long period, and the timber is rather sparse. There are no swamps or stagnant water in this vicinity; a clear stream with a clean gravelly and sandy bed flows unfailingly about half a mile from the town. No accumulation of water, drainage is excellent.

From the 3d to the 25th of June was very dry and hot; first half of July heavy *daily* rains; from 26th to 29th cold—65° F., sunrise. From 3d to 13th August much heavy rain; *much electricity;* mercury frequently 92° to 96° in the shade.

Have observed nothing remarkable in the animal or vegetable kingdoms prior to, or during the epidemic, unless it be an epidemic among poultry, (turkeys only) which has prevailed *this year and last*, which has taken off *entire* flocks—liver greatly enlarged and diseased.

The population of the town of Washington, previous to the commencement of the epidemic, was: whites, over ten years, males, 44; females, 67; under ten years of age, male and female, 38; total whites, 149. Of whom are natives of the place, 57; natives of the United States, 82; natives of foreign countries, 10—of these, one from Scotland, one from England, eight from Germany; number of colored 132; total, 290.

Only two deaths of whites, over ten years of age, pronounced by the physicians to be yellow fever, occurred—one a resident citizen, the other a foreign Jew, (Oct. 14,) and one other German, recently removed to to the place (Oct. 11.) A colored boy over ten years, (Sept. 24,) a

native and resident of the town; supposed to be yellow fever, but disputed.

The number of deaths of residents during the last six months, was: Sept. 13th, one white male, consumption; Sept. 26th, one white male child, bilious fever; Sept. 23d, aged white lady, chronic disease; one infant (white female) convulsions; two colored persons, fever; three cases of yellow fever, as above; total number of deaths of resident citizens, was nine. Five deaths of yellow fever occurred among fugitives from Natchez, who had contracted the disease in that place.

The first case of yellow fever occurred September 4th, in a white male, over ten years, from Natchez, and visiting that place daily. September 15th, child of the above died of cholera infantum. September 11th, white female, two weeks from Natchez. September 18th, Irish woman, who came from Natchez, and nursed the man who died on the 4th September, died in the same house. October 4th, a traveling horse trader October 9th, a young man from Natchez.

Sept. 24th, yellow boy died; Sept. 26th, Thos. Affleck; Oct. 11th, Bogue (German); Sept. 23d, Mrs. Wilson, old lady, chronic; Oct. 14th, Levi, the Jew; Sept 13th, a case of consumption.

All these cases had been in localities where yellow fever was prevailing, as before stated.

Two cases, in 1825, in this town, and one or more this year from the country, *unquestionably* originated from the handling of goods or clothing or from direct intercourse with other cases.

I do not know of any case which orignated spontaneously, without intercourse with other cases of the disease.

All the cases of fever occurring among servants (only *two* cases of which resulted fatally,) were thought to be traceable to contact or communication with goods or the sick, or to the house in which they died.

The prominent symptoms of the disease was a pain in the spine and head, with suffused eye. Three out of four servants of mine so affected, were relieved of fever so far in twelve hours, by hot mustard foot-baths, hot tea and sweating; the fourth had a physician and *calomel and quinine abundant*, survived after a fever of six or seven days. In a large proportion of cases, immediate resort to foot-baths and sweating produced relief in six to twelve hours.

Most of the cases of fever were mild, but were evidently epidemic, and assumed more or less the yellow fever type.

Fourteen days intervened in one case between exposure and the first premonitory symptoms of the disease, and two weeks in another, has been asserted had taken place, but in both cases the contact or communication with the creating cause was doubtless less.

I regard the epidemic as the true yellow fever of a mild and modified form. I had a severe attack of yellow fever in Washington, in 1825. It was introduced from Natchez.

Do not know of a case of recovery from black vomit on record.

There was no cases of a second or third attack the same season.

TESTIMONY OF DR. WHARTON.

PORT GIBSON, (Miss.) November 12, 1853.

The name of the locality is Port Gibson and vicinity. The surface soil is clayey. The water used is cistern and well water, (limestone.) The town is situated about one-fourth of a mile from the Bayou Pierre, a small creek; is elevated thirty or forty feet above the water, and is considered a very healthy town. The water runs off freely into the bayou.

I made no observation at the time, and can state nothing definite in relation to the meteorology.

I observed nothing remarkable in the animal or vegetable kingdoms.

The total population of Port Gibson is estimated to be about ten or eleven hundred, of which perhaps three to four hundred are blacks. During the epidemic it was estimated that not more than six hundred were in town.

About forty-five white persons died from yellow fever, and about six or eight colored.

The whole number of cases was between fifty and sixty; perhaps the other physicians have made more accurate investigations, as my answer is not more than a rather bare approximation to the facts.

The first case that occurred was a patient of mine, who returned from New Orleans on the 15th of August, where he spent thirty-six hours. He was a German named Imlee, a shoemaker; went to New Orleans to procure leather; was taken sick in sixty hours after leaving the city; walked in the sun eight miles to get here; died on the fourth day. The next ten cases occurred in the same house where Imlee died, and an adjoining one, the first of them on the 26th, the second and third on the 27th of Aug., and so on three or four every day. Imlee was diagnozed yellow fever by me, and so were all the other cases, though seven of the Faculty, all but one, pronounced them bilious fever. All these ten recovered. In a few days other cases occurred in the same neighborhood, and on the 2d September, one died of black vomit, which at once served to explain to all the true nature of the disease. A lady who had not been in the infected part of town, or seen any case, came to my house on the 3d of September, and was taken with the fever in a few hours; my wife nursed her, and was taken thirty-six hours afterwards. I cannot trace to any local cause, but the circumstances above detailed show that in some cases it was clearly traceable to intercourse with the sick, and in other and fewer cases, it seemed to be developed without any such intercourse. All classes alike were attacked, even children one month old, and blacks. The intemperate nearly all died.

The prominent symptoms of the disease were chill, fever, pain in the head and limbs, eyes red or suffused, nausea, intense thirst, very frequent pulse the first day, tongue white, with red edges; duration of fever from thirty-six hours to five, six or seven days; forty-eight hours about the average duration I treated about ninety cases; saw five

cases of black vomit. Slight yellowness in about one-tenth of the cases; about one case of hæmorrhage in twenty. All fevers assumed the type of the epidemic.

I saw one case where the fever was developed in four days after exposure, assuming the disease to be contagious, but most usually from nine to fifteen days elapsed after exposure before the disease developed itself. Imlee was attacked on the fourth day after exposure, and a lady at my house on the fifth day.

I regard the epidemic as true yellow fever. I have seen the disease before, at Grand Gulf, in 1843 and '45, cases which were brought there from New Orleans and Vicksburg. I had five cases of black vomit in my practice, of whom two recovered. I treated one gentleman who told me he had had the fever in New Orleans.

We had a population during the epidemic of perhaps six hundred; of whom I do not believe that more than thirty escaped.

Death usually occurred on the fourth day; nearly every one that died had black vomit; I should suppose, from what I heard, that nine-tenths at least, died with black vomit.

TESTIMONY OF DR. A. BYRENHEIDT, M. D.

BILOXI, (Miss.) November 20, 1853.

The name of the locality is Biloxi, on the Gulf of Mexico, half way between New Orleans and Mobile; its limits and boundaries are from Point Cadet, the extreme point of the peninsula to Presg Isle, two miles West of the village of Biloxi.

The surface soil is white sand.

Principally well water used, also rain, and in a few places spring water, and freestone.

There has not been extensive clearing of lands in the vicinity, or disturbance of the soil from digging of wells or canals, making levees, improving roads, draining or paving of streets or any other upturning of the soil to the best of my knowledge.

There are no river, bayous, swamps, marshes, stagnant lakes or pools of water except the Back Bay of Biloxi, three-quarters of a mile from Biloxi village, which is one mile wide.

Its location is high and dry; water runs off with rapidity or soaks in the sand.

There has been considerable rain in the fore part of the summer; dry and oppressive during August, September and October; highest stand of thermometer Fahrenheit 94°; weather sultry and oppressive, producing great heat.

Fruits rotted on the trees; fowls died during the fore part of the summer in abundance; musquetoes and fleas were very abundant; wood in places inaccessible to the sun covered with gray and reddish moss.

Population.

Whites, over 10 years males, 2,000; whites, over 10 years, females, 3,000; whites, over 10 years both, 5,000; whites under 10 years, 500; total whites, 5,500; of whom are natives of the place, 1,800; of whom are natives of the United States, 5,000; of whom are natives of foreign countries, 500; France, England, Ireland, Spain, Italy, Germany and United States; number of colored, 20.

Deaths from Yellow Fever.

Whites over 10 years, males, 63; females, 34; both, 97; whites under 10 years, 14; total whites, 111; of whom are natives of the place, 10; of whom are natives of the United States, 52; of whom are of foreign countries, 57; England, Ireland, Germany, Spain, Italy, France and United States.

Cases of Yellow Fever.

Whites over 10 years, males, 277; females, 256; both, 533; whites under 10 years, 133; total whites, 533; of whom are natives of the place, 127; of whom are natives of the United States, 306; of whom are natives of foreign countries, 100; England, France, Germany, Spain, Ireland, Italy and United States; number of colored, 20.

The first case of yellow fever occurred on the 29th June, a patient came sick with yellow fever from New Orleans, and died five days afterwards. Fifteen cases occurred in July, and the next five cases occurred in the adjoining lot a few days afterwards. The attendants mostly taken down a few days afterwards; most of them died.

A considerable number of these cases were in a locality where yellow fever was prevailing.

From direct intercourse with other cases I believe to have arisen many.

I know of several cases who had no personal intercourse with other cases of the disease.

I could not perceive any difference between the temperate or intemperate, occupying isolated dwellings or crowded lodgings, they were all affected alike.

The prominent symptoms were augmentation of pulse, gastric irritability, pain in limbs and spinal apparatus, congestion to the head, injected conjunctiva, membranous formation on the gums, nausea and vomiting of blood and bile, &c.

In what proportion of the cases was there black vomit, 1 in 80; yellowness of skin, 1 in 70; Hæmorrhage, 1 in 6.

Almost all of the same type, some more inclined to a low typhoid.

The time that intervened between exposure and the appearance of premonitory symptoms, and developement of the disease, was from one to fifteen days.

I regard the epidemic as true yellow fever, the generality of cases of a typhoid type.

I have never before seen the disease so malignant and infectious, the ordinary yellow fever I have seen in New Orleans, Havana, Vera Cruz, Acapulco, Mexico, and Kingston, Jamaica.

I have never seen but one recovery from black vomit.

There were fourteen who escaped, that were attendants on the disease, who had never had it.

TESTIMONY OF MR. JOHN W. DANA.

LEGATION OF THE UNITED STATES, IN BOLIVIA,
LUCRE, August 20, 1854

Sir:—I have the honor to acknowledge the reception, through the Secretary of State, of the circular, and note of the Sanitary Commission of New Orleans; and as requested in the note, address the reply to you.

I am informed that the yellow fever has never visited Bolivia, unless it may have done so recently at Cobija, on the Pacific coast, its only seaport. The disease prevailed at Guayaquil, in December last; in March (I think) it made its appearance in Lima, and extended Southward, visiting most of the towns *on the coast;* how far South, I am not certain.

With the exception of its seaport, Cobija, Bolivia is separated from the Pacific coast by the Western range of the Andes, which, high and cold, operates as a barrier against the disease; while on the East, it has no communication with the Atlantic.

The country on the borders of its great river, low, flat, and near the equator, would seem to be adapted to the prevalence of the disease, if it would originate spontaneously. I have passed through a region, not on those rivers, but a small stream, about 19° South, so exceedingly rich and productive, that a very dense population had been induced there; but it is so hot, low, marshy, and badly drained, that the terciana, or fever and ague, has almost caused its depopulation by death and flight. In one of the towns in the valley, I observed the entire drainage of the houses moving sluggishly through the streets, and standing at frequent intervals in pools, all green and slimy; and that slugglish movement, and frequent stagnancy, is characteristic of all the water in the valley.

Under the ordinary theory of the circumstances favorable to the propagation of the yellow fever, this region would seem to be, peculiarly, its home, if it could originate spontaneously; and I allude to it as possibly having a bearing upon the query relative to that point, which your circular suggests.

The African race is scattered all through this country, existing to a great extent pure, but often mixed with the Indian, and the Spanish. They are in greater numbers in the low, hot regions, but are found in those comparatively high and cold.

I can add nothing which can possibly tend to throw light upon the important subject of your investigation.

With high respect, I am sir, yours truly,

JOHN W. DANA.

To Hon. A. D. CROSSMAN, Sanitary Commission, New Orleans.