

Cholera in the asylum. Reports on the origin and progress of pestilential cholera, in the West-Yorkshire Lunatic Asylum, during the autumn of 1849, and on the previous state of the Institution. A contribution to the statistics of insanity and of cholera / By Thomas Giordani Wright.

Contributors

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London School of Hygiene and Tropical Medicine

Publication/Creation

London : Longman, Brown, Green, and Longmans; Wakefield : Illingworth and Hicks, 1850.

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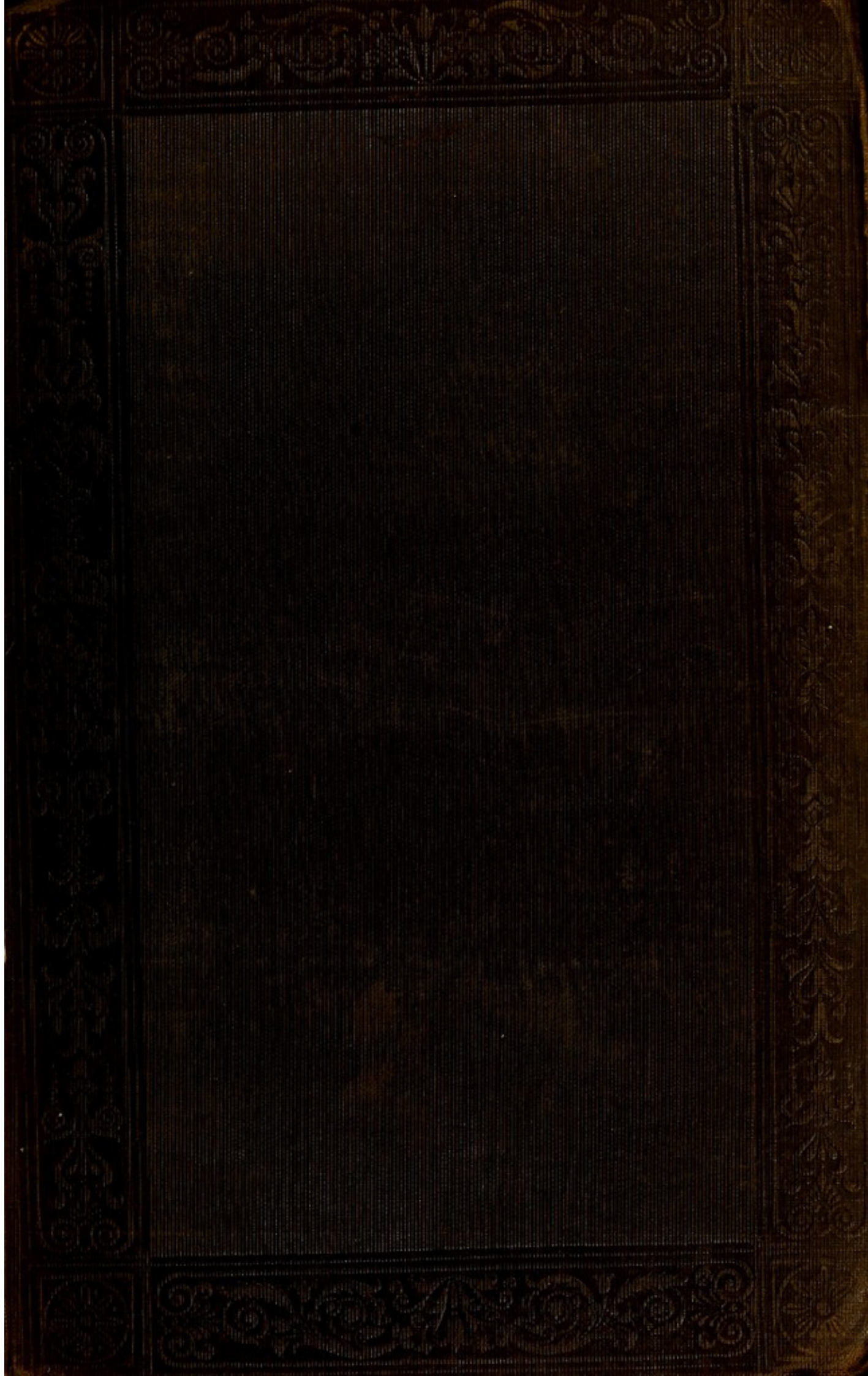
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The Editors of the
Lancet Mercury
with Dr. Wright's kind regards.

REPORTS

ON

PESTILENTIAL CHOLERA.

"Hoc dictum volo, me quidem nihil omnino quoad rerum atque experimentorum
veritatem imposuisse; omnia candide atque ingenue elocutum."

SYDENHAM in Prefatione.

"Through medical statistics lies the most secure path into the philosophy of
medicine."—HOLLAND'S *Medical Notes and Reflections*.

CHOLERA IN THE ASYLUM.

REPORTS

ON

THE ORIGIN AND PROGRESS

OF

PESTILENTIAL CHOLERA,

In the West-Yorkshire Lunatic Asylum,

DURING THE AUTUMN OF 1849,

AND ON

THE PREVIOUS STATE OF THE INSTITUTION.

A CONTRIBUTION TO THE STATISTICS OF INSANITY AND OF CHOLERA.

BY

THOMAS GIORDANI WRIGHT, M.D.,

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MEDICAL VISITOR OF LICENSED HOUSES FOR THE INSANE IN THE WEST-RIDING;

PHYSICIAN TO THE WAKEFIELD HOUSE OF RECOVERY, &c.

LONDON:

LONGMAN, BROWN, GREEN, AND LONGMANS;

AND

ILLINGWORTH AND HICKS, WAKEFIELD.

MDCCCL.

63313

WAKEFIELD:
ILLINGWORTH AND HICKS, PRINTERS, MARKET-PLACE.

INTRODUCTORY ADDRESS.



TO THE REV. JAMES ARMITAGE RHODES, THE CHAIRMAN; AND THE VISITING
MAGISTRATES OF THE WEST-YORKSHIRE LUNATIC ASYLUM.

REVEREND SIR, MY LORDS AND GENTLEMEN,

WHEN, in November of last year, you requested from your medical officers reports on the state of the institution, with reference to the cholera, then prevailing fatally among its inmates, I presented, on behalf of my colleague DR. THOMAS and myself (the Visiting Physicians) a brief statement of the first appearance and progress of the pestilence up to that date: but, in the three days that only intervened, betwixt the communication of your request and the meeting at which the reports were delivered; and amid the harass and anxiety incident to such a visitation; it was impossible to offer more than a mere outline of the subject to be inquired into. It was intimated, however, in our report, that a further investigation would be continued into the valuable mass of facts, then accumulating within the asylum.

The following pages contain the fulfilment of that intimation, so far as my endeavours have been able to accomplish it.

Having, in common with most of my professional brethren, read much, and seen and written something, of Cholera, during its

prevalence in England in 1832-3, it was an object of absorbing interest, to analyse, and if possible rend some fragments from its veil of mystery, when it was my fortune to encounter and struggle with the pestilence, caged as it were, within the walls of an institution, where every circumstance of its advent, and every particular of its progress, and of the habitudes and health and previous history of its victims, could be ascertained with precision.

But, besides this professional inducement, it was most important to the interests of the institution, with which I have the pleasure to be officially connected, that a careful and searching inquiry should be made. An unusual mortality in the asylum had preceded the Cholera. During the previous eighteen months, nearly one hundred patients had died, beyond the average annual amount ;*—a number startling enough by its excess, to demand separate and rigid investigation : and when cholera broke out, it carried off in little more than a month, one hundred more victims. *From these two causes, therefore, a number equal to one third of the patients resident in the Asylum, perished in less than two years, over and above the usual ratio of mortality !*

Now, the profession and the public had a claim to be informed, and especially the Magistrates, to whose chief superintending care the Asylum is entrusted, were bound to inquire, as indeed they

* The mortality of the three years preceding 1848 had been 9·3 *per cent* on the numbers resident : this would give an estimate of 48 deaths in 1848, and about 56 in 1849 ; that is,—

As 100 : 9·3 :: 517 : 48·08 in 1848,
and 100 : 9·3 :: 601 : 55·89 in 1849 :—

Whereas the actual number of those who died in the former year was 79, and in the latter, (exclusive of cholera) 123 : thus proving in the two years an excess of 98 deaths over the average of the previous three years.

have already done, what was the cause of this excessive mortality ; and whence and how the pestilence arose, which far more than decimated its inmates : in order that if any fault or mismanagement existed, it might be discovered and amended ; or if not, that the Medical Officers, and the establishment, might be vindicated from any appearance of unconcern or neglect.

It is in answer to this claim, and for the purpose of rendering my part toward satisfying the obligation that I feel to be due, to the Magistrates, the profession, and the public, that I have devoted what intervals of leisure I could command during the last six months*, to a careful analysis of such data as were available to me : and from these sources is derived the "Further Report," to which I now beg to invite your attention.

Perhaps it is, in some respects, more technical than becomes a document addressed to non-medical readers : but as it is intended for professional, as well as general, perusal ; and the questions discussed are most importantly professional ; it seemed better to include the whole in one publication, than to break the chain of inquiry, by omitting the few technicalities that are indispensable to the argument.

Statistical evidences are necessarily dry and complex, though they form the surest,—perhaps the only sure—basis of medical induction. Their object is to bring under review, and present to the mind's eye as distinctly as possible, the elements of difference, and the points of accordance, in the varied circumstances which

* Interrupted, alas ! by domestic affliction, in the illness and death of a very dear child : and by other inevitable causes of delay in completing and printing these reports.

form the subjects of inquiry. Statistical analysis is searching as that of the chemist; and its tests are as clear and indisputable as the demonstrations of physical science. In arithmetical experiments, however, like those of the laboratory, it often happens, that no definite result is obtained; or one which is simply negative. But a distinct negative, is a positive, and often a valuable, fact: and it is in this way that much of the following inquiry derives its only value. Amid a host of contending hypotheses, it is worth something to prove what are not true, even though we should not succeed in establishing that one which is true: and hoping that these researches may be found useful in at least negative evidence, and thus in clearing the ground for more successful efforts, they are respectfully submitted in the present publication.

In order to render the work more complete, our first report to the Magistrates is reprinted by way of preface; and some illustrative matter, including a former paper containing my own sentiments on the pathology of cholera, will be found as an Appendix.

I have the honor to be,

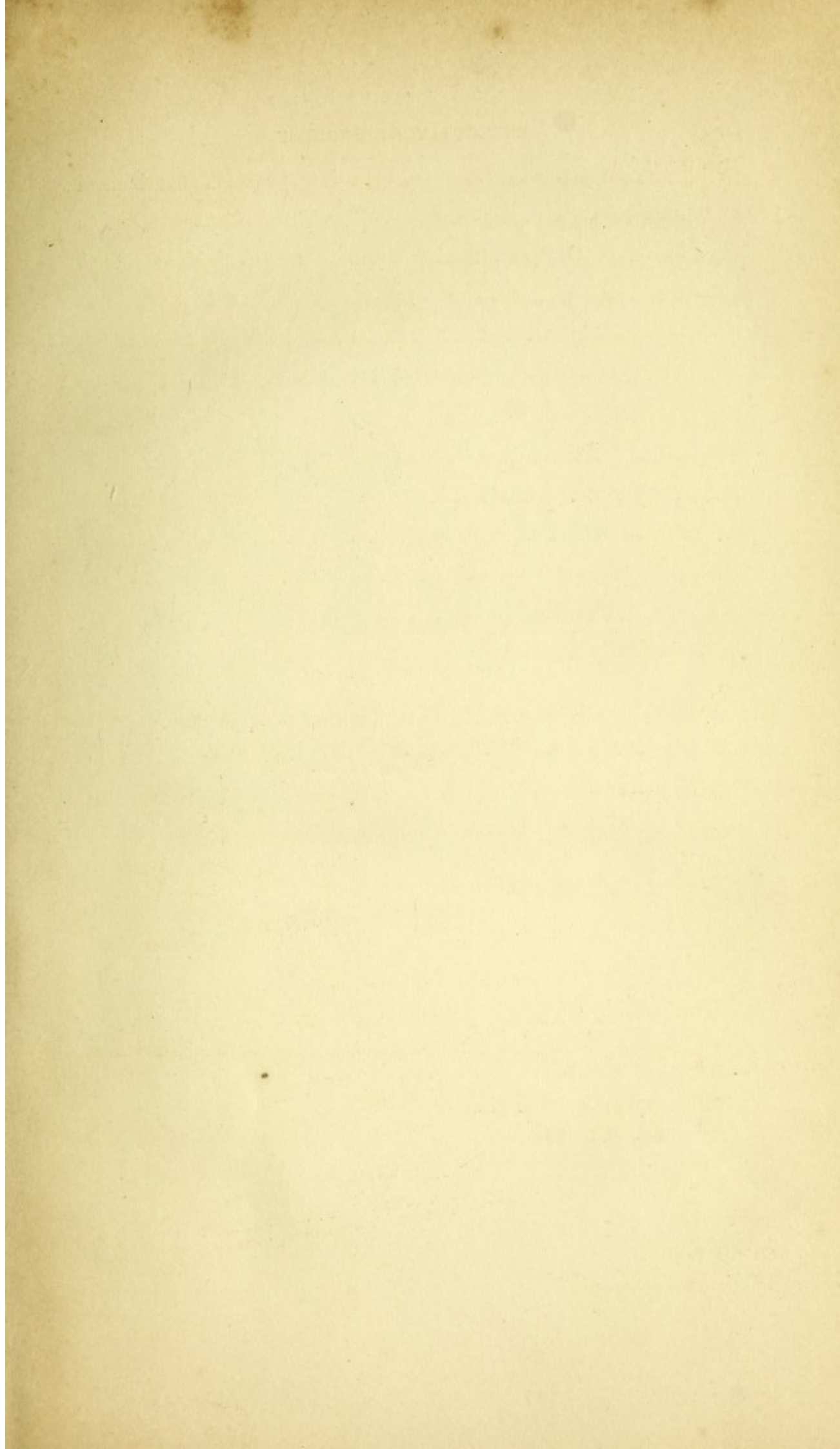
Rev. Sir, my Lords and Gentlemen,

Your most obedient,

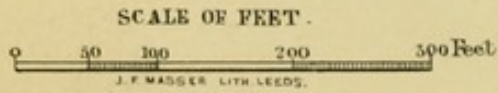
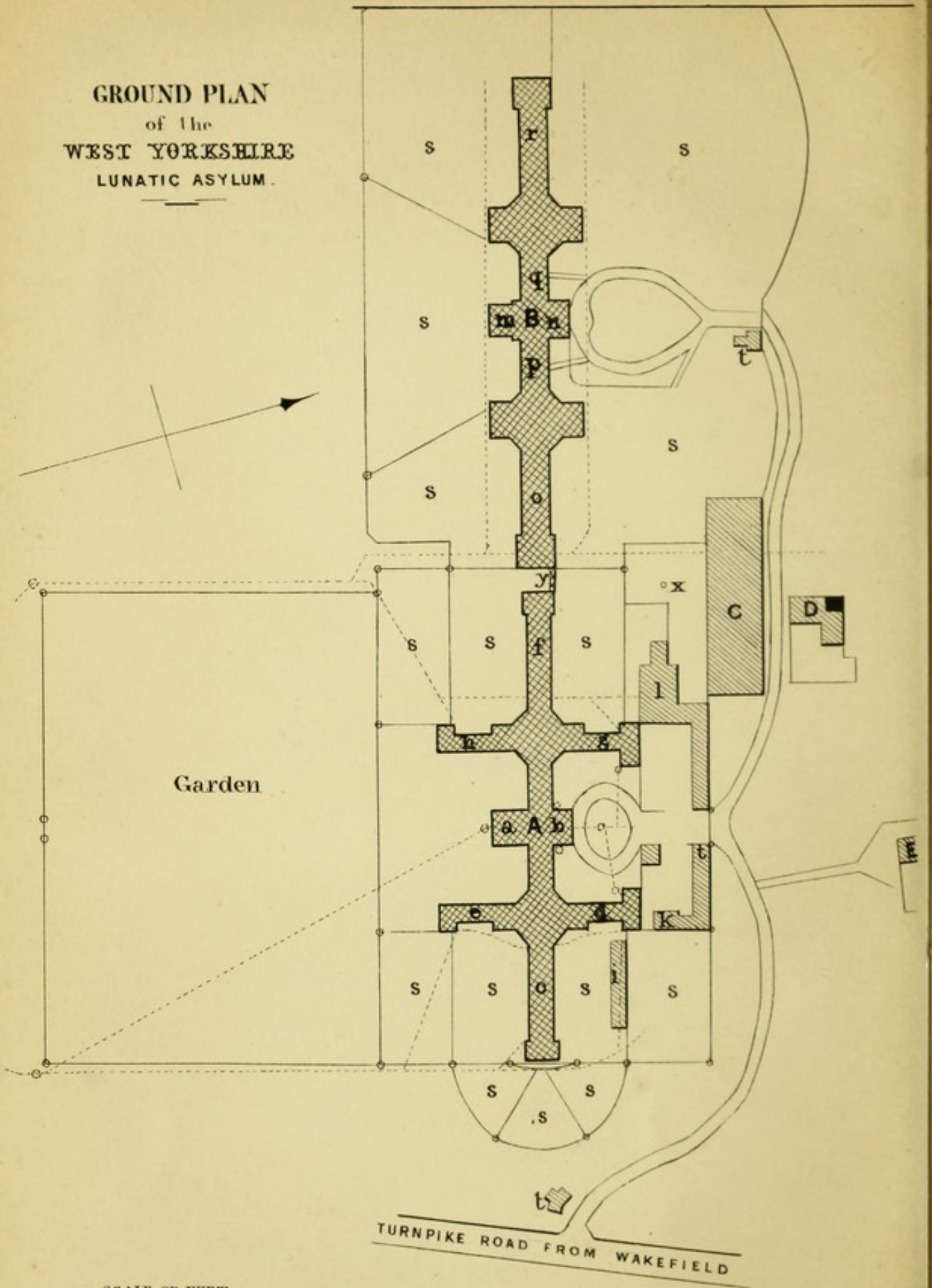
T. G. WRIGHT.

SOUTH PARADE, WAKEFIELD,

July 30, 1850.



GROUND PLAN
of the
WEST YORKSHIRE
LUNATIC ASYLUM.



GROUND PLAN OF THE ASYLUM.

To facilitate reference to the wards and other arrangements alluded to in the ensuing reports, a ground plan is annexed, from the ready and accurate pencil of MR. NAYLOR. In the following explanation, the apartments in each division of the buildings are described from the ground floor upward.

A THE OLD ASYLUM.

- a. The Director's residence.
- b. The office, entrance, and house-keeper's room: the chapel: and dormitories to ward 9.

Men's Wards.

- c. East wing; basement story: wards 1, 4, and 7; over the eastern end of which is the men's hospital.
- d. Wards 3, 6, and 9. In the airing-court of No. 3 are (i) the weaving shops.
- e. Wards 2, the shoemakers': 5, the tailors': and 8, which has occasionally been used as a separate ward, but is now a dormitory to Nos. 2, and 5.

Women's Wards.

- f. West wing; wards 18, 14, and 13; over the western end of which is a hospital.
- g. Kitchens, larder, &c: wards 16, and 12.
- h. No. 17, a dormitory to the wards above, viz: 15 and 11.
- k.l. Stables and out-offices.
- t.t. Porter's lodges.

B. THE NEW ASYLUM.

- m. Apartments of the house-surgeon, and deputy matron.
- n. Entrance, surgery, &c.: chapel: dormitories.

Women's Wards, east wing.

- o. Wards 1, 2, 3, 4; and above them the hospital.
- p. Kitchens: wards 10 and 11.

Men's Wards, west wing.

- q. Offices: wards 9 and 8.
- r. Wards 5, 6, 7; and hospital.

s. s. s. Airing courts.

C. Brew-house, bake-house, engine-house, wash-house and laundry.

D. Gas-house; at the north-west angle of which is a large chimney, 128 feet high: into it pass flues from the adjoining offices; and also, since last autumn, air-flues from some of the chief drains.

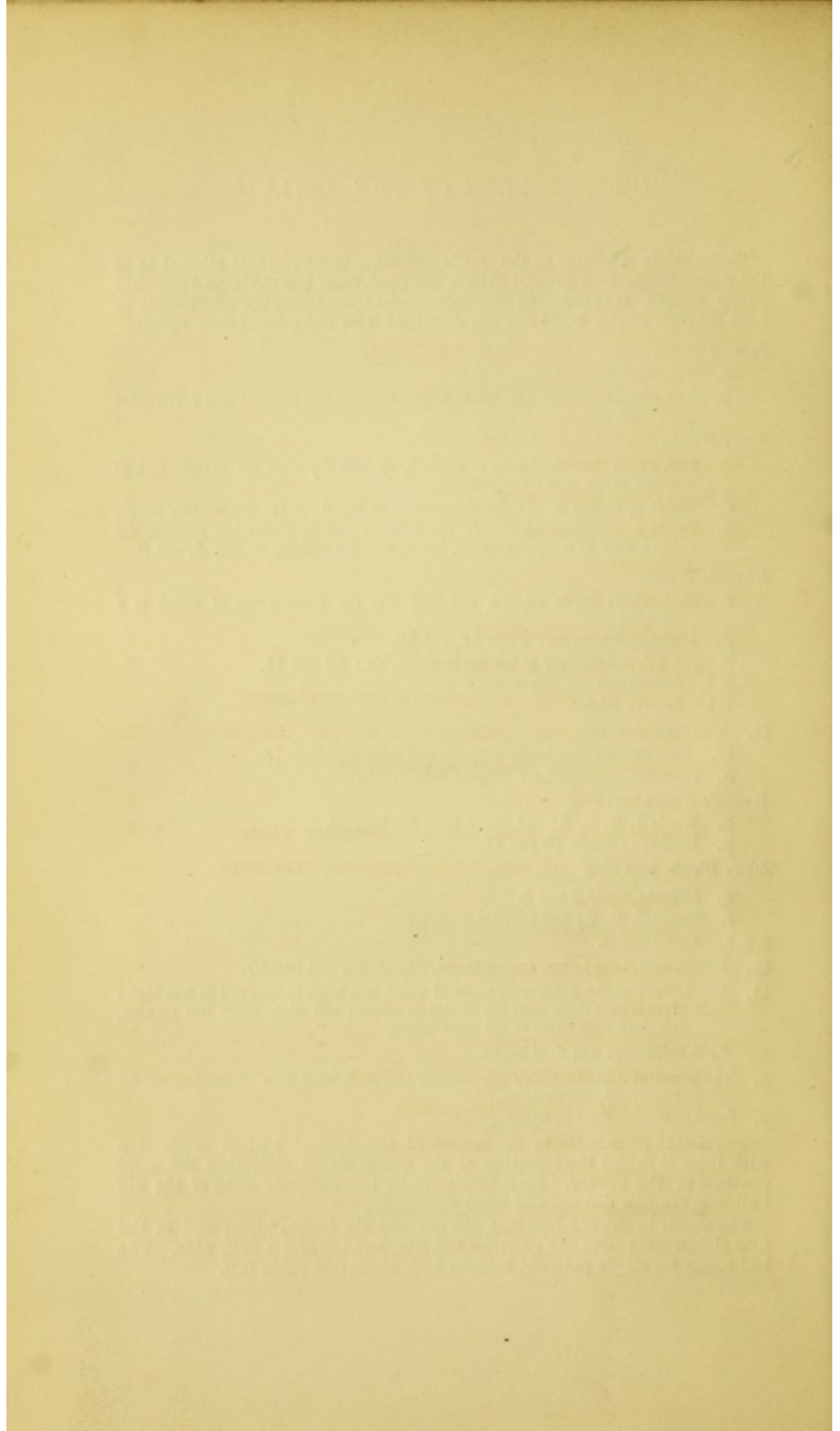
E. Farm buildings: and dead-house.

x. The principal well, in which are forcing-pumps worked by a steam-engine, for supplying both asylums.

y. Passage uniting the two buildings.

The dotted lines indicate the course of the drains: and in connection with them is shewn the situation of the cess-pools for collecting the solid contents of the sewers. Five, that were in the entrance yard of the old building, are now disused and filled up.

The wards in the old building are ten feet six inches high; and in the new eleven feet: and the galleries ten feet, and ten and a half, wide. The bed-rooms for single patients, contain each about 800 cubic feet.



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N.B.—Tables XI to XVIII are inadvertently numbered XII to XIX, both in the heads and context.

FIRST REPORT.

At a SPECIAL MEETING of the Committee of Visitors of the West-Riding Pauper Lunatic Asylum, held at the Court-house in Wakefield, on Saturday, the third day of November 1849, reports were read from the Medical Officers and Director of the Institution ; which were ordered to be printed, and copies transmitted to the Secretary of State, to the Commissioners in Lunacy, and to the Magistrates of the Riding. Subjoined is a reprint of the

REPORT OF THE VISITING PHYSICIANS.

IN compliance with a request of the Rev. Chairman of the Visiting Justices, communicated to them on the 31st *ult*: the Visiting Physicians of the West Yorkshire Lunatic Asylum, have the painful duty of reporting to the Magistrates, what has now become matter of public notoriety, that Malignant or Spasmodic Cholera, has been extensively and very fatally prevalent in the Asylum during the last six weeks.

Throughout the previous eight months of the present year, the general condition of the patients had been nearly as healthy as usual. Diarrhoea had prevailed somewhat beyond the average amount during the summer ; and cases of dysentery had been rather more numerous: the general mortality had also been increased, and in the spring and summer quarters had been two *per cent* of the average number of inmates, beyond the similar quarters of 1848 ; an increase which seemed to arise chiefly among worn out and debilitated patients, and was attributed to the influx of a considerable number of feeble chronic cases, in the autumn and winter of last year, whose admission had been delayed till the opening of the additional wards in the New Asylum.

With these exceptions the institution had presented no remarkable degree of sickness: and while cholera was gradually spreading its ravages over the country, and for several months had been prevailing in the surrounding district, and the immediate neighbourhood of the

asylum, its inmates appeared likely to escape the infliction, with the same remarkable immunity they enjoyed during the visitation of the pestilence in 1832, when not a single patient was attacked by it.

The first alarm as to the presence of CHOLERA within the asylum, was excited by the illness of a female brought on the 17th of September from Gomersal workhouse, where it was stated two persons had died of cholera on the previous night. This woman, *Elizabeth Fenton*, was attacked with vomiting and diarrhœa, soon after her admission; and though her case was not distinctly marked, and happily has not been fatal, the symptoms were considered suspicious: she was kept in bed, isolated from the other patients, and her case carefully watched. The door of her room was locked, and no one but the nurse allowed to enter, except the medical officers, and one assistant in the ward, for occasional aid in washing the floor.

About a week after, an imbecile patient, *Mary Morley*, sleeping in a large room (containing eight beds) on the opposite side of the same gallery, was attacked during the night of the 22nd September, with more unequivocal symptoms of malignant cholera: in the morning she was livid and in a state of collapse; was moved by the nurse at 10 a.m. into one of the side rooms, toward the other end of the gallery, (letter N.) and at 2 p.m. was ordered to the hospital, where she died the following day. *Elizabeth Fenton* was at the same time removed, with her bed and all her clothes and bedding to the hospital; and the room she had occupied, as well as that from which *Morley* had been taken, were thoroughly white-washed and purified with chloride of lime, before any other patients were allowed to enter them.

The next case was that of *Sarah Atkinson*, who, after a lapse of ten days, was sleeping in the side room (letter N.) previously occupied by *Morley*, during four hours before her removal to the hospital. She was also seized during the night, was collapsed and livid next morning, and died during the following night. After her removal to the hospital, the room was again purified and white-washed, and was not used for some weeks.

A fourth case in the same ward was that of a patient, *Mary Marr*, who had just recovered from a severe attack of dysentery, and slept in a room opposite to that of *Atkinson*. She was rapidly carried off on the 7th of October: and a fifth sank with equally fatal rapidity two days afterward, who was an inmate of the large bed-room before mentioned.

This ward No. 3, is in a healthy situation, forming part of the third story in the east wing of the new building: and nothing seemed defective in its cleanliness or ventilation: but as, besides the cases of cholera just mentioned, a number of the patients in the ward were then suffering from sickness and diarrhœa, it was thought desirable to remove the whole of the inmates into fresh apartments. Accordingly on the even-

ing of Tuesday, October 9th, they were all transferred into a hitherto uninhabited range of rooms in the same story, nearer the centre of the building; with the gratifying result, that next day all the invalids were reported well: and it is remarkable, that not one patient has since complained of sickness in that ward.

All the rooms and galleries of No. 3 were cleansed and white-washed; the clothes and bedding of the patients who had died, were removed and stoved; and for eight days it was hoped that the epidemic had ceased.

This hope, however, was extinguished by a re-appearance of the disease in a male patient in No. 4, the second story of the east wing of the old building; a man who could have had no direct communication with the inmates of No. 3, new building, and was far removed from that locality. He was attacked on Monday, October 15th; and almost simultaneously a woman in No. 1 of the new building, a ward two stories below the then un-occupied No. 3. Next day another female was seized with cholera in No. 1; one in No. 12, a distant part of the old building; and three or four cases occurred at the same time, in different wards of the men's part of the institution. The breath of the pestilence had spread itself all over both buildings, and each day added fearfully to the number of its victims and the intensity of its virulence.

Not a single ward escaped; and there seemed no difference in any, as to the deadly nature of the poison or the rapidity of its operation. Almost every one attacked with livid collapse died. The number of deaths during the succeeding twelve days ranged from four to seven a day, with a singular increase of mortality on the two Saturdays, viz: the 20th instant (the day of the Bishop's visit to the asylum), when ten patients expired between noon and midnight—nine from cholera, and one from dysentery; and Saturday, the 27th, when there were nineteen deaths from cholera; and the pestilence appeared then to have reached its acme of destructiveness.

Since Saturday last the cases have been less numerous, and on the whole of a less aggravated character, so that a much larger proportion of those attacked are recovering.

* * * *

[The tables that accompanied this report are here omitted; being superseded by the more elaborate statistics of the present volume.]

* * * *

It may be somewhat consolatory to observe, that, with scarcely an exception, the patients carried off have been subjects of incurable mental derangement; and in a majority of instances so demented as to be unable to describe their symptoms; while many perversely refused alike

food and medicine. A large number of the fatal cases appeared suddenly death-struck, without premonitory symptoms of any observable kind, and sank in from eight to twelve hours: in others the attack was more prolonged, and some survived two or three days. The most rapid case was that of an idiotic girl, *Hannah Sutcliffe*, who had gone to bed in apparently good health on the evening of Friday, the 26th: she was sleeping tranquilly at three a.m.; was attacked with cramp and collapse at half-past three; became immediately cold and livid, and expired at half-past seven; after an illness of only four hours.

With respect to the CAUSES of this terrific outbreak in the asylum, the Visiting Physicians are as yet unable to offer a decided opinion. The first cases seemed attributable to infection brought by the patient from Gomersal; but subsequent attacks occurring, almost simultaneously, in all parts of the institution, remote from and unconnected with previously infected wards, are more difficult of explanation. The medical officers, however, are pursuing their inquiries, by collecting and analysing all the professional details relative to the disease, which the urgency of their several engagements has left them leisure to observe and record, with an endeavour to arrive at a more definite solution of this, and other debated questions, in the history of this awfully interesting disease.

As to the TREATMENT of the disease, it is scarcely necessary to assure the Visiting Magistrates, that everything which the individual and combined skill of the medical officers could suggest (several of them having had considerable experience in the treatment of cholera during its prevalence in England in 1832, as well as during the present visitation of the epidemic) has been had recourse to; but unfortunately with no greater measure of success, than has attended similar exertions in other localities. In the early form of simple diarrhoea and vomiting, the complaint is in general easily subdued; but when it assumes the form of malignant collapse, human efforts seem of comparatively little avail.

To the PRECAUTIONARY and PREVENTIVE MEASURES the Physicians can refer with more satisfaction; and they would advert to these under two heads, viz: *Diet* and *General Hygiene*.

1.—*Diet*. It may be mentioned that so long ago as February last, Asiatic cholera was prevailing in the Wakefield House of Correction; and its vicinity to the asylum suggested the desirableness of placing all the delicate and weakly patients on full diet—that is, with daily meat dinners. The order was accordingly given, and a considerable number were placed on this extra allowance, which was continued throughout the spring and summer, up to the present time. During the whole of the same period* no vegetables have been allowed in the wards; and flour, instead of oatmeal, has been used for the milk porridge,

* See a note in part II., section 13.

and for thickening the soup prepared for dinner, as general diet, on three days of the week. On other three days, the usual patients' dinner consisted of a plentiful allowance of good meat, boiled or baked, with light yeast dumplings and bread each day instead of vegetables. On the remaining day of the week (Saturday), they dined on rice stew with meat: and the Physicians have been satisfied, from frequent personal examination, that the food of the patients has been good in quality and sufficient in quantity.

Since the irruption of the present epidemic, meat dinners have been served daily to all the patients in every ward; and tea with an addition of brandy, liberally allowed in lieu of the evening meal of milk porridge.

As the dietary of the asylum has been made a subject of public comment in reference to cholera, the Visiting Physicians have deemed it necessary to enter into the foregoing details; and they would further beg to remind the Magistrates, that the patients in this asylum are necessarily paupers, whose general scale of living is more meagre than the ordinary diet of the institution; and that, therefore, the extra allowances alluded to, must be regarded as much more abundant, than would be the case with individuals accustomed habitually to more nutritious fare.

2.—Of the measures of *general hygiene* the following were considered chiefly important.

The Nurses and Keepers in every ward were furnished with a supply of such medicines as were thought best adapted to relieve the commencing attack of vomiting or diarrhoea, with directions for their use, and strict injunctions to watch carefully the patients under their charge, and on the earliest approach of alvine disorder, to administer immediately the appropriate medicine, and next to report the case in the office to the Director or House-Surgeon.

So soon as patients were observed in a state of approaching or commencing collapse, they were removed, by order of one of the medical officers, to the cholera hospital: a suite of rooms having been set apart in each division of the establishment for that purpose, and competent attendants appointed in them, with all appliances that might be required for instant employment. This separation seemed desirable, both for placing the patients attacked in immediate proximity to the hot bath and other remedial agents, and under the care of the nurses whose special duty it was to apply them; for preventing the alarm and dread, which the presence of such extreme cases might occasion, among other patients in their respective wards; and to relieve the nurses of those wards, from the harass and exclusive occupation which their cholera patients would have required: and also to remove a possible source of infection from among those previously in health.

In the earlier days of the outbreak, the cholera patients were removed to rooms built for, and hitherto used, as hospitals in the several depart-

ments of the institution; but these were soon found to be so inconvenient and unsuitable for the emergency that another arrangement was adopted.

In the new asylum the hospital apartments are placed on a level with the roof of the rest of the building, at an elevation of five stories, and an ascent of one hundred steps, from the ground floor; and the same plan obtains in the old building, only that the erection is one story less in height: an arrangement which answers tolerably well in cases of ordinary illness; but during the present crisis, the defective supply of water (and especially hot water) and the incessantly great labour of carrying the patients, and all needful supplies of coals, food, &c., up to so great an elevation, besides other inconveniences, were insuperable difficulties, which caused these rooms to be abandoned (in the new building at any rate) and other more commodiously accessible wards appropriated for hospital use. In the women's end of the new asylum, the patients from the lowest ward (No. 1) were removed to No. 3, which had been for ten days under purification and unoccupied, and No. 1 was taken for a cholera hospital: similar previously unoccupied rooms being appropriated at the men's end for a like purpose.

Strict directions have been given that every article of bedding and clothing connected with the infected patients, should be kept apart from all others, until they have undergone a thorough process of cleansing and been passed through the stove; heat being probably the most powerful disinfecting agent which can be employed: and orders have more recently been given, that every patient who may be suffering from diarrhœa or vomiting, as well as the more severe forms of cholera or dysentery, shall be removed from the room in which they became ill, into a fresh unoccupied room, and one that had just previously been fumigated by the vapour of chlorine.

The chlorides of lime and of zinc are habitually and freely employed in all the cleansing processes in the asylum, and have been distributed in more abundant quantities since the invasion of cholera: but in order still more effectually to destroy any noxious vapours or pestiferous exhalations that might be floating in the wards, it was ordered, that every part of the establishment should be separately fumigated by an atmosphere of chlorine gas. This was efficiently done under the superintendence of Mr. John Dawson (chemist), a large pot of the ingredients for evolving chlorine having been placed in each room and gallery, during the temporary absence of the patients in successive wards. Four of the wards were thus fumigated on Friday the 26th, eleven on Saturday, six on Sunday, and the remaining five on Monday last: and it is a fact worthy of remark, that, whether from this process as a cause, or whether from changes in the condition and temperature of the atmosphere, which were also conspicuous at the same period, or from the virulence of the poison having then passed its acme,—or whether probably from these several causes combined,—the cases of cholera, as before stated, have been since last Saturday, both less

numerous, and generally less severe ; though aggravated and fatal cases are still daily occurring.

Solutions of chloride of lime and of zinc have also been freely poured down the water-closets during the whole course of the epidemic, and constant attention has been directed to insure those offices being kept as clean and pure as possible.

In thus concluding their report, the Physicians beg to express their acknowledgements to the Visiting Magistrates for the ready confidence with which every available resource has been placed at their disposal ; and to Dr. Corsellis both for his valuable aid, and for the prompt diligence with which their wishes and suggestions have been carried into effect. They desire also to record their testimony to the unwearying and kind assiduity of Mr. Naylor (the House-Surgeon) and Miss Roseden (one of the Deputy-Matrons), in their respective arduous duties ; and, generally, to the faithful and unshrinking exertions of every Servant, Nurse, and Keeper in the institution.

WILLIAM THOMAS, M.D.

T. G. WRIGHT, M.D.

Wakefield Nov. 3rd, 1849.

[*The report of the DIRECTOR and that of MESSRS. WEST AND DAWSON
will be found in the APPENDIX.*]

Faint, illegible text, likely bleed-through from the reverse side of the page.

WILLIAM PHOENIX, M.D.

100 N. 10th St., St. Paul, Minn.

1890

[The Board of the University of Minnesota, St. Paul, Minn.]

FURTHER REPORT.

In the former report two subjects of inquiry are prominently indicated, viz :

I.—*What have been the causes, and what the extent, of the unusual mortality in the Asylum, during twelve months preceding the occurrence of Cholera in its wards : and*

II.—*Whence was the origin of Asiatic Cholera in the Asylum, what its progress, and what the causes of its fatal virulence ; under what circumstances or peculiarities were those whom it selected as its victims ; and what means seemed most effectual in modifying or quelling the pestilence.*

These two subjects, or rather groups of subjects, may, or may not, be perfectly distinct from each other ; and are separate problems, to the attempted solution of which this essay is devoted. The further inquiry, whether and to what extent they are connected, will form an important corollary of the investigation.

We will therefore consider these questions in the order in which they have been stated—first inquiring as to the amount and character of the increased mortality during the last two years ; and secondly, gathering what information it is possible to glean, from such statistical facts as have been recorded, relative to the visitation of Cholera in the Asylum.

I.—ANNUAL MORTALITY.

1.—*Gradual enlargement of the Asylum.*

As in all similar institutions, the number of patients who have died annually in the Asylum has varied considerably at different periods since its establishment; and in order to arrive at a standard of comparison, by which to estimate the mortality of any particular period, it is necessary to glance over the history of the institution from its commencement, and notice some of the more apparent causes of annual fluctuation.

Since the WEST RIDING ASYLUM was opened in November 1818, the number of its inmates has gradually increased, and the building, which was originally erected for one hundred and fifty patients, has been enlarged, by extensive additions to meet the increased applications for admission, until three times the anticipated numbers were lodged within its walls: and of late, another building, larger than that at first projected, has been added to the establishment;—as is well known to the Magistrates, and more fully detailed in the annual reports of the Director, to which it is unnecessary more expressly to allude.

The rate of increase in the number of patients resident in the asylum, has varied as considerably as the rate of mortality, chiefly from causes connected with the successive enlargements of the building, and partly from less obvious circumstances.

On comparing the numbers annually admitted with those discharged and dead, as given in the first four columns of Table I. we observe, that after 29 patients had become resident in 1818, 67 more were added by the close of 1819; and the accumulations in the succeeding four years were 29, 24, 41, and again 41 in 1823. From that date till 1831, the numbers resident were nearly stationary; sometimes increased by 8 or 9, while in other years the discharged and dead exceeded the numbers of the admitted; as in 1828 by 4, and in 1830 there was a decrease of 8. The average number resident was about 250, which were all that could be conveniently accommodated in the asylum, as it then stood.

The plan of the original building was that of the letter **H**, a form well adapted for progressive enlargement, without interfering with the general arrangement of the wards. In 1831 the first addition was made, by the erection of an east wing, which was opened in the spring of that year, almost contemporaneously with a change of Directorship, by the retirement of DR. and MRS. ELLIS, and the appointment of DR. and MRS. CORSELLIS as resident superintendents of the institution. The new wing was rapidly filled with inmates, by an influx of admissions during that and the following year, a large proportion of whom were stated to be incurable: and the numbers resident were increased in the two years by 52. They were again stationary during five succeeding years, the asylum remaining full, with an average of about 300 patients; and the applicants for admission gradually accumulating for want of further accommodation. This was afforded by building a new residence for the Director and Matron in the centre of the garden front of the asylum, in 1837, and adding their former apartments to the wards; giving room for thirty additional beds: and by a west wing, adjoining the female wards; which was opened in July 1841, and completed the enlargement of the old building to the limits of which it was capable. The former of these alterations augmented the numbers resident in 1838 by 49; and in consequence of the latter, there was an increase of 55, in the years 1842-3.

The applications for admission, however, were becoming annually more numerous, and in greater proportion than the asylum, notwithstanding its several enlargements, could receive; owing partly, no doubt, to the increasing population of the Riding, and in a great measure also to the increased attention paid to the insane poor, and the more diligent carrying out of the laws for their treatment and protection; while the accumulation of incurables was as constantly diminishing the capability of receiving fresh cases. It thus became evident, that either another asylum must be founded, or the old one receive some further important addition. The Magistrates decided upon the former alternative: and a second Asylum has been erected, contiguous and supplementary to the original one, which was commenced in 1844, and partly opened in July 1846. During 1844, 52 patients had been applied for, more than could be admitted: and though some of the passages and galleries

had been converted into dormitories and the wards were inconveniently crowded, of 268 applicants in 1845, only 111 could be received; leaving 157 to be added to the 52 of the previous year, who were unable to obtain admission, and who were therefore either removed to other asylums, or, in the majority of cases, were kept at home or in workhouses, without the benefit of appropriate care and treatment.

In July 1846 a portion of the new building was completed, and 54 patients removed into it; chiefly chronic cases from among the inmates of the older wards.* One or two more wards were occupied in 1847, increasing the numbers resident in the now double institution, by 20 in the former year, and 17 in the latter: but it was not till the summer of 1848 that the new asylum was fully opened, and accommodation afforded sufficient for receiving all the outstanding cases, that had been for so many months awaiting their removal. They then began to flock into the asylum, and during the latter eight or nine months of 1848, and the first three quarters of 1849, the admissions were doubly more numerous than at any previous period of its history. In those eighteen months 457 patients were admitted; and the average number resident rose from about 480, to more than 630, an increase of no less than 150 at the date immediately preceding the irruption of cholera, and when the establishment contained the largest number of patients that have hitherto been congregated in its wards.

Of the patients admitted in 1846, it was remarked by the Director in his report, that a large proportion were removed from other institutions, not exclusively appropriated to paupers; and among them "an influx of hopeless cases," which "presented the unfavourable symptoms consequent on previous mismanagement and long continued disease:" and this remark was even still more applicable to the hundreds of feeble and exhausted patients who

* It was at first intended that the new building should be devoted to incurables and idiots, according to the plan recommended by the Commissioners in Lunacy in one of their Reports; leaving the old building as a hospital for curable and convalescent cases. But, when the new building was fitted up, its light, airy, cheerful wards were so desirable, even beyond some of those in the older erection, and the structure so equally well suited to all classes, (except refractory cases) that the idea of exclusion was abandoned; and its inmates were mingled, like those in all other parts of the institution. The new asylum contains chiefly clean and orderly patients, most of them incurable; but also many who are hopeful and convalescent.

TABLE I.—ANNUAL SUMMARIES OF THE WEST YORKSHIRE ASYLUM.

YEARS.	GRADUAL INCREASE.				RECOVERIES.			: TO ADMITTED.		MORTALITY.			QUINQUENNIAL PERIODS.		REMARKS.	DIED.
	Numbers Admitted.	Discharged and Dead.	Increase.	Decrease.	Total Discharged.	Not Cured.	Cured.	Per Cent Discharged.	Per Cent Cured.	Average Resident.	Died.	Per Cent of Resident.	Average Resident.	Died per Cent of Res.			Per cent of Admitted.
1818	29	...	29	...	...	...	...	...	...	...	...	...			Asylum opened Nov. 23, 1818.	...
1819	109	42	67	...	28			25.6		67	14	20.8				12.8
1820	76	47	29	...	35			46.0		111	12	10.8				15.7
1821	89	65	24	...	46			51.6		144	19	13.1				21.3
1822	109	68	41	...	49			44.9		166	19	11.4	174	11.6		17.4
1823	118	77	41	...	54			45.7		208	23	11.0				19.4
1824	122	119	3	...	89	88	511	72.9	44.4	243	30	12.3				24.5
1825	143	138	5	...	85			59.4		240	53	22.0				37.0
1826	122	113	9	...	68			55.7		246	45	18.2			Period of endemic dysentery.	36.8
1827	114	106	8	...	64			56.1		250	42	16.8	248	18.6		36.8
1828	119	123	...	4	81			68.0		254	42	16.5			(1828.—Drs. Gilby and Thomas appointed Visiting Physicians, vice Drs. Crowther and Alexander resigned.)	35.2
1829	123	120	3	...	70	15	55	56.9	44.7	253	50	19.7				48.7
1830	113	121	...	8	74	14	60	65.4	53.0	249	47	18.8				41.5
1831	143	121	22	...	72	10	62	50.3	43.3	254	49	19.2			(1831.—Dr. and Mrs. Ellis resigned Superintendency. Dr. and Mrs. Corseilis appointed. East wing opened with 70 additional beds.)	34.2
1832	149	119	30	...	66	8	58	44.2	32.2	286	53	18.5	278	17.5		35.5
1833	143	145	...	2	93	26	67	65.0	46.8	302	52	17.2			(1833.—Dr. Wright appointed Visiting Physician, vice Dr. Gilby resigned.)	36.3
1834	127	123	4	...	80	17	63	62.9	49.6	303	43	14.1				33.8
1835	147	141	6	...	81	28	53	55.1	36.0	303	60	19.8				40.8
1836	147	145	2	...	89	27	62	60.5	42.1	309	56	18.1				38.0
1837	155	147	8	...	85	21	64	54.8	41.2	322	62	19.2	329	16.6	(1837.—New residence built for the Director and Matron, and their apartments added to the wards; with 30 additional beds)	40.0
1838	183	134	49	...	97	28	69	53.0	37.1	346	37	10.6				20.2
1839	159	154	5	...	94	15	79	59.1	49.6	368	60	16.3				37.7
1840	140	132	8	...	91	22	69	65.0	49.2	379	41	10.8				29.2
1841	127	128	...	1	71	13	58	55.9	45.6	378	57	15.0	402	12.9	(1841.—West wing of the old building opened in July; with 70 beds.)	44.8
1842	171	149	22	...	96	34	62	56.1	36.2	401	53	13.2				30.9
1843	162	129	33	...	76	11	65	46.9	40.1	412	53	12.8				32.7
1844	146	146	...	...	89	13	76	60.9	52.0	438	57	13.6				39.0
1845	111	119	...	8	75	25	50	67.5	45.0	438	44	10.0				39.6
1846	93	73	20	...	36	7	29	38.7	31.1	429	37	8.6	440	9.3	(1846.—Part of the east wing of the new building fitted up for 54 patients.)	39.7
1847	108	91	17	...	48	7	41	44.4	37.9	455	43	9.4				39.8
1848	257	134	123	...	55	6	49	21.4	19.0	517	79	15.2				30.7
1849	268	361	...	93	135	10	125	50.3	46.6	601	226	37.6			(1847-8-9.—New building gradually occupied)	84.3
ex-Cholera	268	258	10	...	...	...	...	...	...	...	123	20.4				45.8
Cholera	268	103	...	103	...	...	...	...	...	601	103	17.1				38.4

were admitted during the three following years, as the sequel of too many of their cases unfortunately proves.

Such is a brief sketch of the history of the Asylum: and the object of thus reviewing the progressive augmentation in the number of its inmates, is for the purpose of inquiring, whether the rate of annual mortality has borne any definite proportion to the rate of increase, or been in any way affected by the rate of admission: whether in short, the large mortality of 1848-9 (exclusive of cholera,) was correctly ascribed in our former report, to causes unconnected with its sanatory condition.

2.—*Annual Rate of Mortality.*

The first Table of the accompanying series exhibits a statement of the number of patients who were admitted, discharged, and who died, with the average numbers resident, annually, since the opening of the Asylum; and to these are added the per centages which indicate their relative proportions in each year: the numbers discharged being calculated *per cent* on the numbers admitted, and the deaths *per cent* on the average numbers resident; an arrangement which is obviously the most correct and philosophical, and which is doubly proved to be so by Dr. Thurnham, in his excellent treatise on the Statistics of Insanity.* But for sake of occasional reference, a column is appended to the table, which gives the proportion of deaths *per cent* to the numbers admitted: though its only value appears to be, to shew that generally, (previous to 1848) there was little connection between them.

Passing over the first year 1819, when the number as yet resident was small, and the rate of mortality high;—from the large proportion, no doubt, of old worn-out cases then assembled for the first time within a public pauper asylum in the West Riding;—we remark, that the number of deaths was uniformly moderate during the next five years, amounting only to 11·6 *per cent*: but the year after, viz: 1825, the mortality was double the previous average, or 22 *per cent*. There is no allusion to this remarkable fatality in the Director's report for that year: and, as the registers of the period contain no definite statement of causes of death, it is now impossible to do more than guess at them, and that without

* "Observations on the Statistics of Insanity," p. 6, &c.

very distinct grounds for conjecture.* There is little doubt, however, that about that time, Dysentery began to be fatally prevalent in the institution; and that a large proportion of those who died, were carried off by it. Out of nearly one hundred post-mortem examinations in the asylum between the years 1825 and 1829, I have ascertained,† that a considerable number were of patients who had died from dysentery: no less than 15 out of 19 cases so examined from March to July in 1829, being from that disease. How many in previous years,—and how many of the remaining 31, the causes of whose deaths in 1829 are unrecorded,—perished from the same malady, I have no means of computing; but it is evident, that dysentery continued fatally endemic in the institution, for several succeeding years. On looking over the journals (of cases) during that period, it seems the prevailing form of illness; and, even up to recent years, it is one of the diseases most commonly met with among the inmates of the asylum; though the cases are generally slight, and are now happily seldom fatal.

In 1830 and the four subsequent years, Dysentery was reported to be much mitigated in its virulence; yet the annual proportion of deaths remained little less than during the previous quinquennial epoch, dysentery included, viz: *17.5 per cent.* In some of those years it was as high as *19 per cent*: but from that period, it steadily declined for two quinquennial terms; being in 1835-9, *16.6 per cent*, and in 1840-4 about *13 per cent*, per annum. In 1844 to 1845 the mortality had declined from 13 to *10 per cent*; and in 1846 it reached a minimum of *8½ per cent*; only 37, out of 429 inmates, having died within the year.

It would be difficult now to ascertain, and is foreign to our present purpose to inquire, what combination of causes occasioned the fluctuations of mortality in each individual year: but two facts are evident from the table before us, which bear immediately on our subject. The first is, that the annual ratio of mortality has varied considerably, from causes that may be regarded as purely accidental,

* It was then the rule that a Coroner's inquest should be held on every patient who died in the Asylum, and the form of their verdict is the only record of the cause of death; unless a post-mortem examination was made, when a few brief remarks were appended to the case in the journal. The verdicts were generally "Died by the visitation of God:" a form of register obviously of no value in a professional inquiry.

† From my friend and neighbour Mr. STATTER, who assisted at all the examinations, and has obligingly placed his notes of the cases in my hands.

and irrespective of any changes in the numbers or management of the asylum. The increase of its inmates has not uniformly been marked by a corresponding increase of mortality, either in proportion to the numbers admitted, or the numbers resident. For, if we look to the chief epochs of increase prior to 1848, viz: the years 1831-2, 1838, and 1842-3, we may observe, that in the first of these three terms, the number of deaths was larger relative to the number resident, and smaller in proportion to those admitted, than in previous and succeeding years: the mortality of 1838 was little more than one half that of the contiguous years, in both forms of per centage: and in 1842-3 it was rather less, than before and after that period. Prior to 1848, therefore, it is evident, that the fluctuations can be assigned to no fixed law; but were dependent on changes of season and other accidental causes: such for instance as occurred in 1837, when 16 deaths were reported from consumption; and 15 patients said to have "been admitted in a dying state, who expired within a few days after admission;" these 31 cases constituting one-half of the deaths during the year, and thus explaining its unusually high mortality.

But, though we can arrive at no law which will indicate the probable amount of annual fluctuation, we may notice, secondly, the more important fact, that from the year 1825 to 1847 the average mortality of quinquennial periods has been gradually diminishing:—a fact that can be accounted for only in two ways; either by supposing some amelioration in the general condition of the patients when admitted, or some improvement in the treatment, diet, and sanatory state of the institution. In the five years 1825-30, the mortality *per cent* was 18.6; and in the three years previous to 1848, it had decreased to exactly one half, or 9.3 *per cent* of the numbers resident.

To some it may appear that these data are dwelt on with too great minuteness: but it is essential to ascertain the average standard of mortality in the asylum, in order to weigh, with any approach to accuracy, the causes of the unusual numbers we have next to consider.

The year 1848 exhibits a considerable increase both of admissions, residents, and deaths, beyond those of previous years. The mortality was at the rate of 15 *per cent*; and in last year, 1849, it rose to upward of 20 *per cent*, exclusive of cholera:—including

the victims of the pestilence, the deaths amounted to the excessive ratio of 37 *per cent*, or more than one third of the average number resident.

Now, the condition of the asylum was in all respects the same, as to diet, ventilation, and management, as in previous years; the same under which the mortality had for so many years been diminishing; the same as in the preceding three years, when only 9 *per cent* per annum of its inmates had died: and the only element of difference was, the influx of new patients during the latter nine months of 1848, and the three quarters of 1849; a large proportion of whom had been waiting for a protracted period, were worn out by delay and disease, and came into the asylum only to peacefully end their days.

3.—*Quarterly Rate of Admission and Mortality.*

To ascertain what effect the new admissions had on the mortality, we must refer, in the next place, to Tables II. III. and IV; where the numbers admitted, discharged, and died, are given in quarterly returns, and compared with each other, and with the average resident.

It was stated, that the new building was partially opened in 1846; but at that time only one or two wards for females were fitted up, adjoining the women's wards of the old asylum: and though 54 patients were lodged in them, the immediate effect was merely to relieve the inconveniently crowded state of the older wards, without augmenting the total number of residents. For it may be observed, that the daily number of inmates in 1846 was below that of 1845; and that the admissions in 1846 and 1847 were less numerous, than for twenty-four years previously; while the increase of patients at the close of each year had only been 20 and 17.

Though the new building was erected, therefore, and one of the wings partially occupied in 1846 and 1847, it was not so far completed till the spring of 1848, that its doors could be thrown open to the crowd of miserable objects that were waiting for admission. On referring to Tables III. and IV. it may be noticed, that admissions in the second quarter of 1848 were one half more numerous than in previous quarters, being 12 *per cent*, instead of from 4 to 8 *per cent*, of the residents: and in the third quarter 18

per cent, or nearly one hundred patients were admitted. Comparing these data with Table II, in which the quarterly mortality is detailed for the last five years, there appears a marked increase in the amount of deaths during the corresponding quarters of 1848 and 1849; the average of fourteen quarters before midsummer 1848, being at the rate of 2.5 *per cent*; and of the five quarters after the same date, 4.7 *per cent*: a result that clearly establishes a coincidence between the increase of deaths and of admissions, during the period referred to.

TABLE II.—QUARTERLY RATE OF MORTALITY.

YEARS.	AVERAGE RESIDENT.			DIED.			PER CENT.		
	Men.	Women	Total.	Men.	Women	Total.	Men.	Women	Total.
1845, 1st Quarter.	227	208	435	3	5	8	1.3	2.4	1.8
2nd.	227	212	439	9	7	16	3.9	3.3	3.6
3rd.	225	214	439	8	3	11	3.5	1.4	2.5
4th.	221	211	432	6	3	9	2.7	1.4	2.0
1846, 1st Quarter.	219	208	427	5	5	10	2.2	2.4	2.3
2nd.	220	209	429	1	8	9	.4	3.8	2.0
3rd.	216	205	421	3	9	12	1.3	4.3	2.8
4th.	211	219	430	3	3	6	1.4	1.3	1.3
1847, 1st Quarter.	207	241	448	10	4	14	4.8	1.6	3.1
2nd.	206	247	453	7	2	9	3.3	.8	1.9
3rd.	207	254	461	5	8	13	2.4	3.1	2.8
4th.	208	257	465	4	3	7	1.9	1.1	1.5
1848, 1st Quarter.	208	262	470	7	6	13	3.3	2.2	2.7
2nd.	209	280	489	15	10	25	7.1	3.5	5.1
3rd.	232	303	535	10	8	18	4.3	2.6	3.3
4th.	262	315	577	11	12	23	4.1	3.8	3.9
1849, 1st Quarter.	278	320	598	20	14	34	7.1	4.3	5.6
2nd.	290	331	621	18	17	35	6.2	5.1	5.6
3rd.	302	330	632	16	16	32	5.2	4.8	5.0
4th.	251	294	545	67	58	125	26.6	19.7	22.9
14 Quarters before Midsummer, 1848.	3011	3227	6238	86	76	162	2.8	2.3	2.5
5 Quarters after...	1364	1599	2963	75	67	142	5.4	4.1	4.7

TABLE III.—QUARTERLY ADMISSION AND DISCHARGES.

QUARTERS.	ADMITTED.			DISCHARGED.			PER CENT.		
	Men.	Women	Total.	Men.	Women	Total.	Men.	Women.	Total.
1847, 1st Quarter.	8	20	28	1	6	7	12.5	30.0	25.0
2nd.	10	15	25	3	10	13	30.0	66.6	52.0
3rd.	9	31	40	2	12	14	22.2	38.7	35.0
4th.	8	11	19	1	13	14	12.5	118.1	73.6
1848, 1st Quarter.	8	31	39	2	9	11	25.0	29.0	28.2
2nd.	21	40	61	2	10	12	9.5	25.0	19.6
3rd.	55	43	98	3	8	11	5.4	18.6	11.2
4th.	34	25	59	5	16	21	14.7	64.0	35.5
1849, 1st Quarter.	44	40	84	9	14	23	20.4	35.0	27.3
2nd.	45	43	88	13	21	34	28.8	48.8	38.6
3rd.	35	32	67	23	23	46	65.7	71.8	68.6
4th.	11	18	29	15	17	32	136.3	94.4	110.3

TABLE IV.—QUARTERLY RATE OF ADMISSION.

QUARTERS.	ADMITTED.			AVERAGE RESIDENT.			PER CENT.		
	Men.	Women	Total.	Men.	Women	Total.	Men.	Women	Total.
1847, 1st Quarter.	8	20	28	207	241	448	3.8	8.2	6.2
2nd.	10	15	25	206	247	453	4.8	6.0	5.5
3rd.	9	31	40	207	254	461	4.3	12.2	8.6
4th.	8	11	19	208	257	465	3.8	4.2	4.0
1848, 1st Quarter.	8	31	39	208	262	470	3.8	11.8	8.2
2nd.	21	40	61	209	280	489	10.0	14.2	12.4
3rd.	55	43	98	232	303	535	23.7	14.1	18.3
4th.	34	25	59	262	315	577	13.0	7.9	10.2
1849, 1st Quarter.	44	40	84	278	320	598	15.8	12.5	14.0
2nd.	45	43	88	290	331	621	15.5	12.9	14.1
3rd.	35	32	67	302	330	632	11.5	9.6	10.6
4th.	11	18	29	251	294	545	4.3	6.1	5.3

4.—*Mortality with reference to Age and Residence.*

Having now ascertained distinctly at what periods the mortality of the asylum was great, the next point of inquiry is into the circumstances of the patients who died: to observe whether any particular class of patients suffered in unusual proportion; and whether the deaths were more numerous at one period than another, in any one portion of the building.

For this purpose the Tables of the next series are constructed, exhibiting a summary of the condition of the patients who died from 1842 to 1849, both inclusive: these eight years being divided particularly with reference to the periods of average mortality prior to the middle of 1848, and of excessive mortality during the remaining eighteen months. My reason for selecting these periods and dividing 1848 between them is, that we have found the influx of new patients to have commenced a short time previous to the summer of that year; and if aught defective or unhealthy in the sanatory condition of the asylum were the cause of the increased mortality, we should find deaths among the older residents at least equally numerous with those of the recently admitted, the prejudicial cause beginning to operate with fatal effect after they had been a few weeks in the institution: and as the present part of our inquiries are irrespective of cholera, the deaths from that disease are excluded from the statistics of the latter period.

AGES.—Tables V and VI contain a summary of the ages of patients who have died during the periods in question—arranged so as to show the maximum and minimum, as well as the average age, for each year and each period: but with no remarkable result; the average of each period being nearly alike, 44·6 in the former and 45·1 in the latter. In every year there is evidence of an advanced age being attained by several of those whose deaths are recorded: the maximum in no year being under 70; while one old woman, who had been five years and a half in the asylum, reached the extreme age of 97.

TABLE V.—SUMMARY OF THE AGES OF PATIENTS WHO DIED DURING 1842-9.

	MEN.				WOMEN.				TOTAL.			
	No.	Max	Min	Average	No.	Max	Min	Average	No.	Max	Min	Average
1842	29	74	14	46.3	24	74	24	44.7	53	74	14	45.6
1843	28*	74	21	37.8	24	80	22	49.1	52	80	21	43.0
1844	32	65	19	45.5	25	82	24	47.0	57	82	19	46.1
1845	26	69	20	42.1	18	70	21	38.6	44	70	20	40.7
1846	12	67	32	46.4	25	67	23	45.1	37	67	23	45.5
1847	26	83	24	48.1	17	97	18	45.4	43	97	18	47.0
1st Half 1848	22	67	16	43.7	16	68	23	45.3	38	68	16	44.4
2nd Half 1848	21	78	16	42.0	20	63	14	42.5	41	78	14	42.2
1848	43	78	16	42.9	36	68	14	43.7	79	78	14	43.3
1849	121	75	17	45.3	105	75	9	48.6	226	75	9	46.8
ex-cholera	67	74	17	43.4	56	75	9	49.3	123	75	9	46.
Cholera	54	75	23	47.7	49	75	22	47.9	103	75	22	47.8

* Age of one man unknown.

TABLE VI.—COMPARISON OF PERIODS.

	No.	Max	Min	Average	No.	Max	Min	Average	No.	Max	Min	Average
Total of 6½ yrs., 1842 to 1st half of 1848, inclusive.	175	83	14	44.1	149	97	18	45.3	324	97	14	44.6
1½ yrs., 2d half 1848, and 1849, ex-cholera.	88	78	16	43.0	76	75	9	47.5	164	78	9	45.1

THE DURATION OF RESIDENCE affords a more satisfactory test of the problem we are attempting to solve; because it will reveal the proportionate amount of old and recent patients, who are included in the annual lists of mortality: and this test is furnished in the Seventh and following tables.

TABLE VII.—SUMMARY OF *RESIDENCE* OF PATIENTS WHO DIED IN 1842-9.*—IN YEARS AND WEEKS.

	MEN.						WOMEN.						TOTAL.					
	No	Max		Min	Average		No	Max		Min	Average		No	Max		Min	Average	
		Y.	W.		Y.	W.		Y.	W.		Y.	W.		Y.	W.		Y.	W.
1842	29	9	46	1	2	31	24	21	43	1	4	11	53	21	43	1	3	17
1843	29	22	24	2	4	34	24	15	44	2	3	47	53	22	24	2	4	16
1844	32	21	51	3	3	47	25	15	26	1	3	15	57	21	51	1	3	33
1845	26	24	48	4	4	3	18	12	47	1	1	31	44	24	48	1	3	2
1846	12	25	11	3	4	19	25	25	27	9	5	19	37	25	27	3	5	2
1847	26	23	45	2	5	27	17	8	29	1	3	8	43	23	45	1	4	30
1st Half 1848	22	29	12	17	6	19	16	23	37	3	5	2	38	29	12	3	5	42
2nd Half 1848	21	9	4	1	1	37	20	17	28	1	3	33	41	17	28	1	2	34
1848	43	29	12	1	4	5	36	23	37	1	4	14	79	29	12	1	4	9
1849	121	24	40	1	4	45	105	29	16	1	4	39	226	29	16	1	4	42
ex-cholera	67	21	11	1	2	6	56	19	32	1	2	50	123	21	11	1	2	26
Cholera	54	24	40	9	8	14	49	29	16	1	6	41	103	29	16	1	7	30

TABLE VIII.—COMPARISON OF PERIODS.

	No	Max		Min	Average		No	Max		Min	Average		No	Max		Min	Average	
		Y.	W.		Y.	W.	Y.	W.	Y.		W.	Y.	W.	Y.	W.		Y.	W.
Total of 6½ yrs. 1842 to 1st half, 1848.	176	29	12	1	4	21	149	25	27	1	3	45	325	29	12	1	4	8
1½ yrs., 2d half 1848, and 1849, ex-cholera	88	21	11	1	2	1	76	19	32	1	3	7	164	21	11	1	2	28

* Calculating the term of residence of each patient is a tedious process, where many hundreds have to be thus registered, in order to obtain an average result: but the labour is expedited, if we employ a scale by which the terms may be *measured*, instead of computed. I constructed one many years ago for a similar purpose; and that I have used for the present calculations is a slip of card-board, nearly two feet long, on which is drawn a scale for two years, minutely divided into the months and days of the calendar: and, accurately corresponding with this, are two other slips of 365 days each—one graduated in weeks, and the other in decimal sections. So that, on applying the zero of one of the shorter scales, to any given day on the calendar, the term to any other day (within twelve months) may be read off with rapid facility and precision, either in weekly or decimal periods. Or a sliding rule may be constructed for the same purpose.

TABLE IX—DURATION OF RESIDENCE—*MEN*.

YEARS.	WEEKS.					YEARS.										Total Men.
	Less than 1	1 to 4	4 to 13	13 to 26	26 to 52	Less than 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	
1842	1	2	6	2	4	15	4	1	-	3	6	-	-	-	-	29
1843	-	1	4	2	3	10	1	5	3	3	4	-	1	2	-	29
1844	-	2	2	7	4	15	3	3	1	1	5	2	-	2	-	32
1845	-	1	2	2	4	9	5	2	2	4	1	1	-	2	-	26
1846	-	1	-	-	2	3	3	3	-	1	1	-	-	-	1	12
1847	-	2	-	1	1	4	4	4	1	1	8	2	1	1	-	26
1st Half 1848	-	-	-	2	4	6	2	4	2	1	3	-	2	1	1	22
2d Half 1848	2	3	1	4	3	13	3	-	2	-	3	-	-	-	-	21
1848	2	3	1	6	7	19	5	4	4	1	6	-	2	1	1	43
1849	1	7	11	16	22	57	13	3	3	4	20	9	6	6	-	121
ex-Cholera	1	7	9	10	26	47	7	1	-	2	6	3	-	1	-	67
Cholera	-	-	2	6	2	10	6	2	3	2	14	6	6	5	-	54

TABLE X.—DURATION OF RESIDENCE—*WOMEN*.

YEARS.	WEEKS.					YEARS.										Total Women
	Less than 1	1 to 4	4 to 13	13 to 26	26 to 52	Less than 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	
1842	1	-	5	4	-	10	4	3	-	-	4	-	2	1	-	24
1843	-	1	4	-	1	6	6	1	3	2	3	2	1	-	-	24
1844	-	4	2	2	3	11	4	-	4	1	2	2	1	-	-	25
1845	-	2	3	3	2	10	4	3	-	-	-	1	-	-	-	18
1846	-	-	2	1	2	5	5	4	1	1	5	1	1	1	1	25
1847	1	-	-	2	1	4	3	4	-	-	6	-	-	-	-	17
1st Half 1848	-	3	2	1	1	7	2	-	-	2	1	3	-	1	-	16
2d Half 1848	-	2	4	2	1	9	3	1	-	2	2	2	1	-	-	20
1848	-	5	6	3	2	16	5	1	-	4	3	5	1	1	-	36
1849	3	7	11	10	14	45	14	9	3	2	10	12	7	1	2	105
ex-Cholera	3	5	6	9	5	28	9	5	1	2	5	4	2	-	-	56
Cholera	-	2	5	1	9	17	5	4	2	-	5	8	5	1	2	49

Tables VII and VIII exhibit the aggregate duration of residence of patients who died in each year, similar in plan to that of their ages, and divided, like it, into the two periods which are the subjects of experiment. In each year, as might be expected, some have died within a few days after admission ; and in each some of the old inmates—the patriarchs of the institution—have dropped off : the relative proportion of these extremes, and of their intermediate periods, of course determining the average. Thus, of the 29 men who died in 1842, the longest resident had been nearly ten years in the Asylum, while the most recent had been less than a week ; the average of the 29 being two years and thirty-one weeks : of the 24 women, the extremes were twenty-one years and forty-three weeks, and one week ; and the average four years and eleven weeks : making a total average of the residence of the 53 patients, three years and seventeen weeks.

This table shews a wide difference between the patients who died in the two halves of the year 1848, the total average of the former half being nearly five years and three quarters, and that of the latter less than two years and three quarters : and the contrast is even still wider among the men, taken separately, than in the total of both sexes. Of the 22 men who died during the earlier part of 1848, the average duration of residence was more than six years ; the 21 who died during the latter part of the same year, had only been on an average about one year and three quarters resident. A similar difference is shewn in Table VIII to exist in the two periods we are examining, viz : four years in the former, and two and a half in the latter period, of both sexes. Among the women the difference is less marked : but of the men it is, as two years to nearly four and a half.

Tables IX to XII have been compiled to ascertain the relative numbers who died during successive terms of residence : how many, for instance, of the patients dead in each year, had expired within a week after admission ; how many between a week and a month (four weeks) ; between one and three months (four to thirteen weeks) ; from three to six months (thirteen to twenty-six weeks ; and from six to twelve months. After twelve months the terms are in annual rotation up to five years ; and in quinquennial periods from five years to thirty. But, in order to have the annual amounts more readily in contrast, the aggregate of the divisions of the first year, is given as the first annual column ; that

is, the total number within the first year of residence: and this column is the most important relative to our inquiry. The successive years, thus analysed, are again classed in periods as before, in Table XII, and the result may be summed up in a few words, as follows:—

Of 325 patients who died during the former period (1842 to June 30, 1848) 115 had been less than one year resident in the asylum; and of 164 in the second period (the latter half of 1848, and 1849 exclusive of cholera) 97 had died within a year after admission.

TABLE XII.—SUMMARY OF DURATION OF RESIDENCE, IN TWO PERIODS.

	WEEKS.					YEARS.										Total.	
	Less					Less											
	1	4	13	26	52	1	2	3	4	5	10	15	20	25	30		
6½ yrs.	Men	1	9	14	16	22	62	22	22	9	14	28	5	4	8	2	176
	Women	2	10	18	13	10	53	28	15	8	6	21	9	5	3	1	149
	Total	3	19	32	29	32	115	50	37	17	20	49	14	9	11	3	325
1½ yrs.	Men	3	10	10	14	23	60	10	1	2	2	9	3	-	1	-	88
	Women	3	7	10	11	6	37	12	6	1	4	7	6	3	-	-	76
	Total	6	17	20	25	29	97	22	7	3	6	16	9	3	1	-	164

TABLE XIII.—PROPORTION PER CENT OF DEATHS TO TOTAL NUMBER OF DEATHS IN TWO PERIODS.

	WEEKS.					YEARS.										Total Died.	
	Less					Less											
	1	4	13	26	52	1	2	3	4	5	10	15	20	25	30		
1842 to ½ 1848																	
6½ years	Men	.5	5.1	7.9	9.0	12.5	35.2	12.5	12.5	5.1	7.9	15.9	2.8	2.2	4.5	1.1	176
	Women	1.3	6.7	12.0	8.7	6.7	35.5	18.7	10.0	5.3	4.0	14.0	6.0	3.3	2.0	.6	149
	Total	.9	5.8	9.8	8.9	9.8	35.3	15.3	11.3	5.2	6.1	15.0	4.3	2.7	3.3	.9	325
½ 1848 & 1849 ex Cholera.																	
1½ years.	Men	3.4	11.3	11.3	15.9	26.1	68.1	11.3	1.1	2.2	2.2	10.2	3.4	-	1.1	-	88
	Women	3.9	9.2	13.1	14.4	7.8	48.6	15.7	7.8	1.3	5.2	9.2	7.8	3.9	-	-	76
	Total	3.6	10.3	12.1	15.2	17.6	59.1	13.4	4.2	1.8	3.6	9.7	5.4	1.8	.6	-	164

The mere enumeration of these, however, is little available for comparison and contrast, till they have passed the crucible of percentage: we must therefore refer to Table XIII, which gives the results thus reduced: and there we find the ratios to be relatively 35 and 59 *per cent*, a contrast sufficiently striking to attract further investigation.

TABLE XIV.—PROPORTION PER CENT DIED, TO TOTAL NUMBER ADMITTED IN EACH PERIOD.

	Total Adm.	WEEKS.					YEARS.											
		Less					Less											
		1	4	13	26	52	1	2	3	4	5	10	15	20	25	30		
1st Period																		
6½ yrs.	Men	359	.2	2.5	3.8	4.4	6.1	17.2	3.1	6.1	2.5	3.8	7.7	1.3	1.1	2.2	.5	
	Women	532	.3	1.8	3.3	2.4	1.8	9.9	5.2	2.8	1.5	1.1	3.9	1.6	.9	.5	.1	
	Total	891	.3	2.1	3.5	3.2	3.5	12.9	5.6	4.1	1.9	2.2	5.4	1.5	1.	1.2	.3	
2nd Period																		
1½ yrs.	Men	224	1.3	4.4	4.4	6.2	10.2	26.7	4.4	.4	.8	.8	4	1.3	-	.4	-	
	Women	201	1.4	3.4	4.9	5.4	2.9	18.4	5.9	2.9	.4	1.9	3.4	2.9	1.4	-	-	
	Total	425	1.4	4.	4.7	5.8	6.8	22.8	5.1	1.6	.7	1.4	3.7	2.1	.7	.2	-	

5.—*Proportion of Deaths to Admissions.*

What proportion do the foregoing numbers bear to the number of patients admitted within the respective periods? This question is important: and it is easily solved by a reference to Table XIV, which shews the difference to be 12.9 *per cent*, on the total admissions of the former period, and 22.8 *per cent*, on those of the latter. With this further discrepance, that the men have been carried off in much greater proportion than the women: for, while less than 10 *per cent* of the females, in proportion to the number admitted, died within twelve months, more than 17 *per cent* of the males, died in a like period; and the excess was chiefly among those who had been from six to twelve months in the asylum.

The tables last examined were derived from the total number of patients who died in each year, compared with the total numbers admitted in the same year: but it is obvious, that these elements

TABLE XV.—NUMBER OF THE PATIENTS ADMITTED IN EACH YEAR SINCE 1842, WHO HAVE DIED, UP TO JULY 31, 1850, WITH THE DURATION OF THEIR RESIDENCE.

	Total Admit.	WEEKS.					YEARS.						Total Died.
		Less 1	1 to 4	4 to 13	13 to 26	26 to 52	Less 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 10	
		1842	171	2	2	15	7	4	30	9	3	1	
1843	162	-	3	7	4	7	21	8	10	2	2	3	46
1844	146	-	5	1	8	5	19	6	4	3	5	1	38
1845	111	-	3	5	3	5	16	11	9	2	3		41
1846	93	-	1	2	2	2	7	8	4	1			20
1847	108	1	2	2	3	7	15	12	5	1			33
1848 1st $\frac{1}{2}$	100	-	3	1	5	5	14	8					22
TOTAL	891	3	19	33	32	35	122	62	35	10	11	17	257
1848 2d $\frac{1}{2}$	157	2	5	6	9	15	37	2					39
1849	268	3	13	13	13	7	49	4					53
ex-cholera													
TOTAL	425	5	18	19	22	22	86	6					92

TABLE XVI.—PROPORTION *PER CENT* DEAD; OF THE NUMBERS ADMITTED IN TWO PERIODS.—TO JULY 31, 1850.

	Total Admit.	WEEKS.					YEARS.						Total Dead per cent.
		Less 1	1 to 4	4 to 13	13 to 26	26 to 52	Less 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 10	
		1st Period											
6 $\frac{1}{2}$ Years													
Men.	359	.2	2.5	3.8	4.7	6.1	17.5	7.7	4.4	1.6	1.1	3.	35.6
Women.	532	.3	1.8	3.5	2.8	2.4	11.	6.3	3.5	.7	1.3	1.1	24.2
Total.	891	.3	2.1	3.7	3.5	3.9	13.6	6.9	3.9	1.1	1.2	1.9	28.8
2d Period													
1 $\frac{1}{2}$ Years													
Men.	224	1.3	4.4	4.4	5.8	8.4	24.5	1.7					26.3
Women.	201	.9	3.9	4.4	4.4	1.4	15.4	.9					16.4
Total.	425	1.1	4.2	4.4	5.1	5.1	20.2	1.4					21.6

do not afford a perfectly accurate exposition of the proportion of those admitted who died within a given period, say twelve months; because the entry of deaths at the commencement of the term, is that of patients who were admitted in a previous year; and many of those received toward the close of the year may have died within short terms, without entering into the record. If the mortality were evenly progressive, this would make little or no difference in the result; but, when the rate is found to vary greatly in successive quarters of the same year, it is important to experiment by a test that shall be free from uncertainty. To obtain, therefore, a more accurate scale of comparison, Tables XV and XVI are arranged, in which the numbers admitted in each year are alone analysed; and those individual cases who have died up to the present time, are traced through successive periods, as in the former tables. This, within the limits of the term required for comparison, is a more perfect arrangement; but it, of course, is only perfect up to those limits: that is, taking twelve months residence as the test, it must imperfectly designate the proportionate mortality of persons admitted within the last twelvemonth, which cannot be fully ascertained till a year has elapsed from the date of the last admission.

The results, however, with this allowance are valuable, as corroborating the preponderance of deaths among the recent over the older cases. From them it appears, that of every 100 patients admitted in the six and a half years of the 1842-8 period, 13·6 died within a year; and that in 1848-9, 20·2 *per cent* of those admitted, have died within a like term; although the returns are only completed to July 31st, 1850, and five months must further elapse before the tables of this later period can be closed.

And lastly; if we examine the foregoing tables, with reference to the number of patients who died *within* one year, and in *more than* one year, after admission, we shall find a still more conclusive exposition of the same fact: for, on analysing the proportion of deaths to numbers resident, under each of these terms, it is remarkable, that of the older cases, who had been more than a year in the asylum, almost exactly the same relative number died during, and after 1848, as in the six previous years, viz: 7·4 *per cent* in the former period, and 7·6 *per cent* in the latter half of 1848 and 1849: while the recent cases, which died within twelve months after admission, were only 4 *per cent* of the resident in the six and

a half years ; but 11 *per cent* in the last eighteen months. It is even singular how accurately the mortality of the older cases, might have been predicated by this proportion ; for, if the same equation which obtained in 1842-8, be applied to the numbers resident in the latter half of 1848, it would estimate the probable deaths of patients who had been more than a year, at 20 ;—they were actually 19. And in 1849, the same mode of calculation would give an estimate of 44 deaths, when the actual number was 48.

Of recent cases, according to a similar computation, the number who would have probably died in the latter half of 1848 is 11 ; whereas it was just double that amount, 22 : and in 1849, instead of the estimate 24, there were no less than 75 deaths, of patients admitted within twelve months.*

6.—*Causes of Death.*

The recorded causes of death have been arranged and tabulated for the years comprised in the foregoing periods ; and the results are shewn in Tables XVII, XVIII, and XIX.

It is to be regretted that no very uniform registration of the causes of death has obtained in the asylum, and in many instances the records are somewhat vague ; but after a careful revision of them, through the periods indicated, I have grouped them into the six divisions given in the tables : not, it is scarcely necessary to add, as a nosological classification, but for contrast and comparison in our present inquiry. The first group contains deaths from general asthenia, or gradual failure of vital energy ; along with those ascribed to old age : and the next four divisions embrace different forms of organic disease. The remainder, including typhus fever, rheumatism, erysipelas, scrofulous and cancerous disease, and accidental deaths, are arranged miscellaneously in the sixth class. An aggregate of these in each period forms Table XVII ; and in the two following are given the proportion *per cent* of the total number of deaths, and of the total admitted, during each period.

* The aggregate of average resident in the years of the former period is 2812 ; in the latter 879 : half the average of the latter part of 1848 is 278 ; and the average residents of 1849 were 601. Thus,—

$$\begin{array}{l} \text{In 1st period} \\ \text{In 2d period} \end{array} \left. \begin{array}{l} \frac{2812}{115} = 4\cdot0 \\ \frac{879}{97} = 11\cdot0 \end{array} \right\} \begin{array}{l} \text{of} \\ \text{and} \end{array} \left(\begin{array}{l} \frac{2812}{210} = 7\cdot4 \\ \frac{879}{67} = 7\cdot6 \end{array} \right) \begin{array}{l} \text{of older} \\ \text{cases.} \end{array}$$

Then, to estimate the probable deaths in the latter half of

$$\begin{array}{l} 1848, \text{ as } 100 : 7\cdot4 :: 278 : 20\cdot5 ; -100 : 4\cdot0 :: 278 : 11\cdot1 ; \text{ and in} \\ 1849, \text{ as } 100 : 7\cdot4 :: 601 : 44\cdot4 ; -100 : 4\cdot0 :: 601 : 24\cdot0. \end{array}$$

TABLE XVII.—SUMMARY OF CAUSES OF DEATH.

DISEASES.	1842 to 1st half, 1848. 6½ years,			2d half, 1848 and 1849, (ex-Cholera) 1½ years.		
	Men.	Wom.	Total.	Men.	Wom.	Total.
I.—Exhaustion, General Paralysis, and Old Age... ..	70	63	133	35	40	75
II.—Epilepsy, Apoplexy, and Dis- eases of the Brain	53	32	85	18	7	25
III.—Phthisis, and other Diseases of the Lungs	23	24	47	9	13	22
IV.—Diseases of the Heart ...	—	3	3	1	4	5
V.—Diarrhœa, Dysentery, Cholera	14	13	27	18	1	19
VI.—Remaining Causes	16	14	30	7	11	18

TABLE XVIII.—PER CENT TO TOTAL NUMBER *DIED*.

DISEASES.	6½ YEARS.			1½ YEARS.		
	Men.	Wom.	Total.	Men.	Wom.	Total.
I.—Exhaustion, General Paralysis, and Old Age... ..	39·7	42·2	40·9	39·7	52·6	45·7
II.—Epilepsy, Apoplexy, and Dis- eases of the Brain	30·1	21·4	26·1	20·4	9·2	15·2
III.—Phthisis and Diseases of the Lungs	13·0	16·1	14·4	10·2	17·0	13·4
IV.—Diseases of the Heart ...	-	2·0	·9	1·1	5·2	3·0
V.—Diarrhœa, Dysentery, Cholera	7·9	8·7	8·3	20·4	1·3	11·5
VI.—Remaining Causes	9·0	9·3	9·2	7·9	14·4	10·9

TABLE XIX.—PER CENT TO TOTAL NUMBER *ADMITTED*.

DISEASES.	6½ YEARS.			1½ YEARS.		
	Men.	Wom.	Total.	Men.	Wom.	Total.
I.—Exhaustion, General Paralysis, and Old Age	19·4	11·8	14·9	15·6	19·9	17·6
II.—Epilepsy, Apoplexy, and Dis- eases of the Brain	14·7	6·0	9·5	8·0	3·4	5·8
III.—Phthisis, and Dis. of Lungs	6·4	4·5	5·2	4·0	6·4	5·1
IV.—Diseases of the Heart ...	—	·5	·3	·4	1·9	1·1
V.—Diarrhœa, Dysentery, Cholera	3·8	2·4	3·0	8·0	·4	4·4
VI.—Remaining Causes	4·4	2·6	3·3	3·1	5·4	4·2

From these we learn, that diseases of general exhaustion were the prevailing cause of death in nearly 46 *per cent*, of the total number in the latter period, and about 41 *per cent* in the former ; or as 17 to 14 *per cent* on the admissions : that epilepsy and other forms of cerebral disease were proportionally more fatal in the earlier than the recent period, as 26 to 15 : that diseases of the lungs prevailed equally in each : affections of the heart were unfrequent, amounting only to eight fatal cases in eight years, and presenting no remarkable difference : but the deaths from diarrhœa and dysentery had increased in 1848-9 from 8 to 11 *per cent* ; although two cases entered as cholera appear in the total of the earlier period, while those from pestilential cholera are excluded from the latter.

These tables prove, that, except in the somewhat greater fatality from diarrhœa among the men, the causes of death prevailed in about equal proportions in both the periods examined : for, though deaths from exhaustion appear in the total to bear a higher ratio in the latter term, it will be observed, that among the men it was greater, in proportion to admissions, in the former period : and thus we may fairly conclude, that no extraordinary source of mortality was peculiar to the asylum during these years, or was operating more prejudicially at one time than another.

7.—*Proportionate Mortality in different Wards.*

One more test remains to be applied to the records of mortality, which it is important to regard, and which is involved in the following queries ;—in which of the buildings, or in what wards, were the deaths most numerous ? was either the old asylum deteriorated in its general healthiness by the appendage of the new ; or was the new building faulty in its construction, drainage, or ventilation ? or again, were any of the wards less healthy than others ?—in short, what the number belonging each ward, who died within the periods before adopted ?

To such questions we have a solution in Tables XIX and XX, which are similar in plan to the others, only that the periods are arranged with especial reference to the mortality of 1849, instead of half 1848 and 1849 ; in order to compare the general mortality of the wards in that year, with the mortality from Cholera, as well as with the average numbers in each ward, in several previous years.

TABLE XIX.—SUMMARY OF ANNUAL MORTALITY IN WARDS—FROM 1845 TO 1849, INCLUSIVE.

YEARS.	MEN.													WOMEN.																		
	OLD BUILDING.						NEW BUILDING.			TOTAL.				OLD BUILDING.						NEW BUILDING.			TOTAL.									
	1	2	3	4	5	6	7	8	9	5	6	7	8	OB	NB	MEN	11	12	13	14	15	16	17	18	1	2	3	4	10	OB	NB	WOM
1845	6	-	2	1	-	4	6	1	6	-	-	-	-	26	26	26	4	4	1	-	-	8	-	1	-	-	-	-	-	18	-	18
1846	4	-	-	-	1	1	4	-	2	-	-	-	-	12	12	12	2	9	4	1	1	5	3	-	-	-	-	-	-	25	-	25
1847	9	3	2	1	1	2	1	3	4	-	-	-	-	26	26	26	1	3	5	2	1	2	-	1	-	2	-	-	-	15	2	17
1848	11	3	6	2	-	2	3	1	12	2	1	-	-	40	3	43	2	10	4	2	2	5	-	1	5	2	3	-	-	26	10	36
1849	22	4	23	3	1	11	10	-	16	9	11	9	2	90	31	121	6	9	19	7	5	16	-	7	11	8	9	4	4	69	36	105
ex-cholera	15	3	10	-	-	6	8	-	14	2	3	5	1	56	11	67	3	5	13	1	2	10	-	5	5	5	3	1	3	39	17	56
{ with Hospital Cholera	7	1	6	3	1	2	1	-	1	5	3	2	1	22	11	54	1	-	1	1	-	1	-	-	1	-	3	-	-	4	4	49
{ in Wards	7	1	13	3	1	5	2	-	2	7	8	4	1	34	20	54	3	4	6	6	3	6	-	2	6	3	6	3	1	30	19	49
1842-8	288	57	96	38	19	86	134	48	23	-	-	-	-	107	309	166	59	47	238	35	35	-	-	-	-	-	-	-	-	-	-	
1849 ex-cholera.	267	53	178	-	-	107	142	-	25	-	-	-	-	76	128	333	25	51	256	-	-	-	-	128	-	-	-	-	-	-	-	-

TABLE XX.
PER CENT TO
TOTAL IN OLD
BUILDING.

In attempting to deduce an inference from these tables, however, it must be taken into account, that many of those recorded as having *died* in a particular ward, had not for any long period *lived* in it. Certain wards are appropriated to dirty patients, where the beds and bedding and general system of nursing, as well as the character of the keepers and nurses, are best suited for the comforts and attentions needed by the feeble, the fatuous, and the paralytic; and into such wards are received or removed, the unfortunate patients who are sinking into hopeless exhaustion, epileptic fatuity, and general paralysis. Such are Wards 1, 3, and 9, for the men; and 12, 16, and 13, for the women. In these we shall, of course, expect to find the greatest ratio of mortality: not only because the patients in them are least likely to live; but also, it is important to remark, because there is in them a more constant change of inmates; each death making room, not as in other wards, for a probably hopeful case to succeed; but for another patient, who will too probably in a short time be removed by death, and again leave his place vacant for another, no more likely to survive.

The New Asylum has so recently become inhabited, that no standard of comparison can be obtained from the mortality of its separate wards; but the ratio of deaths in the entire building may be easily computed: and, taking the numbers resident October 1st, 1849, when the wards were all fully occupied, as the basis of calculation, it is found, that the mortality in the new asylum during last year (ex-cholera) was, of men, 9·7 *per cent*; and of women, 12·4 *per cent*; total, 11·2 *per cent*—nearly the proportion of former years; among a community chiefly of older chronic cases, with a moderate sprinkling of fresh patients. The great majority of recent cases were received and treated in the old building, and hence its great preponderance of deaths (on a similar computation, men, 30·6; women, 20·7; total, 25·6 *per cent*) is readily explained, after the results elicited from previous tables: while it is satisfactory to prove, that the mortality in the new institution was in no degree aggravated beyond an average amount.

On comparing the deaths in each ward of the Old Building during 1845-8, with those of 1849, we obtain the following results:—On the *Men's* side by far the greatest amount of mortality is in Ward 1, for reasons above stated, viz. 28 *per cent*, of the total

deaths in the old asylum, in four previous years; and 26 *per cent* in 1849, *ex-Cholera*. In ward 9, the ratio was as 23 to 25 *per cent*: in ward 7, as 13 to 14 *per cent*: and in the other wards no great difference occurred; except in No. 3. In it the proportion before 1849 was 9·6 *per cent*; and during 1849 it was 17·8 *per cent*; a contrast that requires further explanation: for in other words it shews, that according to the average of previous years the death of five persons might be expected in that ward, whereas there were ten, besides the victims of cholera.

Now it chances that Ward 3 is a chief recipient for new cases of men, especially those who are maniacal, feeble, and dirty; and on that account we need not be much surprised, if amid the continued influx of patients, of whom persons of that description formed a considerable proportion, in 1849, this ward received five hopeless and fatal cases, in addition to its ordinary average. Still the excess is important, and will not be lost sight of, when examining the proportion of deaths from Asiatic cholera.

Among the *Female* patients, the only wards in which the number of deaths exceeded about one per annum, and where any material difference existed, were Nos. 12, 16, 13, and 18: the first two of which are devoted to dirty and enfeebled patients, and 13 to fatuous and epileptic. Ward 13, too, is a frequent receptacle for cases newly admitted, whose character is doubtful, and who if they survive and improve, are draughted off to better wards, to make room for new and less hopeful ones.

In No. 16, one of the wards for dirty patients, the mortality bore nearly the same proportion as in former years; a fact we shall have to revert to when analysing the mortality of cholera in that ward. But in 12 and 13, the ratio was two-fold, only with this difference; that in the more dirty class of No. 12, it was doubly more numerous in other years, than in 1849; and in No. 13, it was double the usual average in the latter year. From the ratio of the previous years, and assuming the actual mortality of 1849 in the old asylum, twelve deaths might have been expected to occur in ward 12, but there were (exclusive of cholera) only five: and in ward 13 the proportions were reversed; instead of six, which might have been estimated, there were thirteen.* The excess in the one, however, may be well allowed to counterbalance that of the other, and both may be considered to result from an acci-

* Of these, seven had been recently admitted.

dental arrangement of the newly admitted patients: because it would be as fallacious, in the absence of other evidence, to ascribe the larger mortality of the one to neglect or bad management, as it would be to suppose the diminution by one half in the other, to be due to improved diet or nursing, when no alteration from the usual fare and attention was perceptible in either.

Of a similar nature is the difference in No. 18, from the former average of 3·5 *per cent*, to 12·8 *per cent* in 1849; or from an average of one patient annually to five. Out of these five, one only had been resident less than a year; the other four had been on an average more than five years each in the asylum; and the death of these four individuals during the same year, can only be considered an accidental occurrence, for they were all cases of advanced bodily and mental disease, and had all extra allowances of food.*

8.—*Number of patients under Medicinal Treatment.*

In my former report it is stated, that the amount of sickness in the wards, preceding cholera, had been "somewhat beyond" its usual average; an assertion founded on the concurrent impression of the medical officers, which subsequent statistical inquiry has confirmed: for, on referring to Table XXI, it shows the weekly average number under medicinal treatment, in each quarter of the last four years; and Table XXII records the proportion of these to the residents. From these it may be noticed, that the total number thus under treatment in 1848, was even less than in 1846 or 1847. During the three quarters of 1849, previous to cholera, the increase was not more than a fraction *per cent*, till the *summer* quarter, when the average of 10 or 12 patients was increased to 20 per week: an addition which, as doubling the former proportion, was remarkable; though not being more than about one *per cent*, of the numbers resident (and had it been evenly spread over the three months,) would not have attracted especial notice, except for the epidemic that succeeded it. The increase occurred chiefly, however, during the month of September, which it must be recollected is included in this third

* The galleries numbered 8 and 17 old building, were occasionally used as separate wards, when the asylum was crowded: but they are now, and have generally been, dormitories for adjoining wards. Hence the scanty column they present in the foregoing table.

TABLE XXI.—PATIENTS UNDER MEDICINAL TREATMENT.—WEEKLY AVERAGE IN EACH QUARTER
OF THE FOLLOWING YEARS.

YEARS.	1st QUARTER.			2d QUARTER.			3rd QUARTER.			4th QUARTER.			TOTAL.		
	Men.	Women.	Total.	Men.	Women.	Total.	Men.	Women.	Total.	Men.	Women.	Total.	Men.	Women.	Total.
1845	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1846	5.6	10.0	15.6	4.8	10.2	15.0	3.9	7.3	11.3	4.6	10.1	14.8	4.6	9.1	13.8
1847	4.1	8.6	12.7	4.3	8.2	12.6	4.4	7.9	12.3	4.0	9.0	13.0	4.2	8.1	12.3
1848	2.1	6.0	8.1	4.7	6.6	11.3	2.8	7.1	10.0	5.3	7.0	12.3	3.7	6.6	10.4
1849	5.6	6.8	12.4	7.0	9.4	16.5	10.2	11.5	21.7	...	...	...	...	...	...

TABLE XXII.—WEEKLY AVERAGE PER CENT ON NUMBERS RESIDENT.

YEARS.	1st QUARTER.			2d QUARTER.			3rd QUARTER.			4th QUARTER.			TOTAL.		
	Men.	Women.	Total.	Men.	Women.	Total.	Men.	Women.	Total.	Men.	Women.	Total.	Men.	Women.	Total.
1845	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1846	2.5	4.8	3.6	2.1	4.8	3.4	1.8	3.5	2.6	2.0	4.7	3.4	2.1	4.3	3.2
1847	1.9	3.5	2.8	2.0	3.3	2.7	2.1	3.1	2.6	1.9	2.9	2.4	2.0	3.2	2.6
1848	1.0	2.2	1.7	2.2	2.3	2.3	1.2	2.3	1.8	2.0	2.2	2.1	1.6	2.2	2.0
1849	2.0	2.1	2.0	2.4	2.8	2.6	3.3	3.4	3.4	...	...	...	...	...	...

quarter; and after the cholera had unquestionably appeared in the asylum on the 22nd of that month, and had probably been introduced on the 17th: and it was occasioned chiefly by additional cases of diarrhœa and dysentery, for which five males and an equal number of females were under treatment at the date immediately preceding the 17th; and the number of these was augmented to ten or twelve of each, toward the end of the month.*

It may be a matter of surprise to some, especially of those who are accustomed to fall into the too common professional error, of considering and treating every case of insanity as a species of phrenitis, that in so large an asylum, out of about ninety probably curable patients, not more than half a dozen, and often less, should be at one time under *medicinal* treatment. But the fact simply denotes, how much more extensively reliance is placed by the medical officers, on moral and dietetic means, than on medicaments, in the cure of mental disease. And that, not from indifference; for they are willing and anxious to adopt, and give a fair trial to, every method recommended on good authority, in the management of the insane: but because their experience has led them to use pharmaceutical remedies rather as occasional, and often valuable adjuncts, than as primary agents: and to regard, the removal of patients from their homes and from causes of excitement; temporary seclusion when, though seldom, necessary; moral control; systematic employment of the mental and bodily energies that are unaffected by disease; judicious diet, and subjection to sanatory discipline; orderly management; a free indulgence in such innocent and cheerful amusements as they are capable of enjoying; and uniform, firm, kindness pervading the whole;—to depend on these as chief means, for the improvement and comfort of the unfortunate patients committed to their care.

* Among other accidental causes of increase in the patients who were on the medicine list during last summer, it may be noted, that several females suffering from epilepsy, were at that time taking the *Cotyledon*, a remedy that had been highly extolled, and which the writer had prescribed for them experimentally; but which, he is sorry to add, like many other remedies, proved a total failure.

FROM the foregoing evidence, the following INFERENCES seem deducible:—

1. That within twelve months after the Asylum was opened in 1818, when many cases of old standing disease were first collected within its walls, the mortality was greater than (with one exception) in any subsequent year—20 *per cent*.
2. During the five succeeding years, when recent cases had ready access to the asylum, the mortality was reduced to 11 *per cent*.
3. In the following year, 1825, epidemic dysentery began to prevail fatally in the asylum, increasing its mortality in that year to the highest ratio, 22 *per cent*; and continuing, with other causes, apparently connected with the drainage, ventilation, and diet of the institution, to keep up a high rate of mortality during many succeeding years.
4. That since 1825, by improved drainage and ventilation, and increased care in the management and diet of the patients, the mortality has gradually decreased, through quinquennial periods, till it reached one-half its previous annual amount, viz: from 18 to 9 *per cent*.
5. That in the course of these periods, successive enlargements of the building had been made, to provide for the increasing demands for admission: which had not any perceptible effect on the rate of mortality, prior to the erection of a new asylum.
6. That in the years 1845 to 1848, the applications for admission were more numerous than could be received, the accumulation amounting, when the new asylum was opened, to more than two hundred patients; many of whom had been waiting some years for admission.
7. That during the period when the admissions were least numerous, the rate of mortality was the lowest; being in 1846 not more than 8.6 *per cent* of the numbers resident: and for the six-and-a-half years preceding the midsummer of 1848, 11.4 *per cent*; of whom 4 *per cent* were deaths of recent cases, and 7.4 *per cent* those of patients that had been more than twelve months in the institution.
8. After midsummer 1848, while an unprecedented influx of 435

new patients were received into the asylum, the mortality among the older cases remained nearly the same as in the previous years—7·6 *per cent*: but among the recently admitted the mortality rose from 4 to 11 *per cent*: thus proving, that while of the patients entered during and since the year 1848, a much larger proportion of those newly admitted died, in the ratio of 20 to 13 *per cent*; those who had been above a year in the asylum were unaffected by any change in the like periods.

9. That the circumstances of the asylum as to diet, management, and general hygiene, having remained the same during the latter as in the former periods, it is evident, that *the cause, or causes, of the greater mortality of the last eighteen months, must be EXTRINSIC to the institution.*
10. That the increased mortality did not, therefore, indicate any unhealthy state of the establishment; but arose from the unusually large proportion of enfeebled patients, and advanced and hopeless cases, admitted on the opening of the new asylum.

In deducing these inferences from the duration of life after admission, it may be objected, that some “die of seasoning;” that the change of home and diet operates prejudicially on the new comers; and that, as appears from Table XIV, men bear the seasoning worse than women. This argument seems plausible; and might derive some support from the statements hitherto advanced, were it not for the following, among other, considerations.

It must be borne in mind, not only, as alluded to in our former report, that the ordinary diet and comforts of the asylum are more abundant, than in many of the homes of poverty, and often of destitution, from which the patients are removed; or even than has been their lot in many of the workhouses of which they may have been inmates; but further, that those who come in sickly and feeble in bodily health, are put on full diet, with daily meat rations, and, if necessary, extra allowance of beef-tea, strong beer, wine, &c., suited to good nursing and sick-room diet. These patients, therefore, cannot be disadvantaged by a change to asylum fare; which some, who are more ready to jump to conclusions,

than accurately to weigh premises, have industriously insinuated as the cause of great part of the mortality that has lately prevailed. If it were so, and that the general mortality of the last eighteen months, and the fatal severity of cholera, were from the same cause, the same classes of patients would have suffered from each: but the palpable results of the tables before us, fully contradict such a supposition; showing that the mortality for many years past had been steadily decreasing up to 1848, and that the general mortality of 1848-9 occurred chiefly amid the recent inmates: whereas the cholera, as we shall find in the latter part of this inquiry, was chiefly fatal among the older residents.

Still, I am willing to give this suggestion the full amount of weight that it merits,—not as an accusation of the past (for we had no reason, *a priori*, to calculate on any extraordinary mortality) but as a hint for the future. All experience in treatment of the insane proves, that a full and nutritious diet tends much to the recovery of the patients; in a majority of cases, even under maniacal excitement, as well as other forms of mental disease: an axiom which is corroborated by the fact, that in asylums where the diet is liberal, the proportion of recoveries is generally larger than in those where it is more meagre. And further it is most probable, that an additional allowance and better regulation of the diet, were among the causes of the diminished mortality, we have so satisfactorily noticed in the West Riding Asylum.

Whether *all* the cases that might have been improved by full and generous fare, have been hitherto placed on extra diet; and whether any who have died, might have been thus saved, is at least an open question: but my own experience, and the results of these statistical inquiries, induce me to urge upon my professional colleagues a conviction, that it is highly desirable to place most of the patients recently admitted, on full diet with *daily* rations of animal food; and to continue this extra diet, so long as feebleness of constitution is apparent.

But, it may be said, why not improve the dietary of the whole, and give them all daily meat dinners? To which I would reply, that there are other interests to be thought of, besides those of the poor lunatics: and though their welfare is our immediate and first consideration, yet when that is, as far as possible, secured, we are bound to have regard to the ratepayers, who furnish the means for

their support. The present scale of diet* appears abundant for the healthy sustenance of ordinary and chronic cases, and therefore it is unnecessary to increase the general expenditure, by adding to their already sufficient fare : but for recent and exhausted patients, if a generally more nutritious diet is required, I feel convinced it will not be begrudged, either by those who control, or those who contribute, the funds needful for providing it.

THE PROPORTION OF RECOVERIES has not been previously adverted to, because not immediately within the limits of our prescribed subject ; but when discussing the diet of the asylum, it is a witness too important to be altogether passed over.

In estimating the proportion of recoveries, the proper standard of comparison is to calculate the *per cent* on the numbers *admitted* : and it is scarcely necessary to add, that the *cured* should be carefully distinguished from the *discharged*—a distinction that has not always been sufficiently marked ; because in all asylums, many patients are sent out at the desire of friends, who are at best but partially recovered (entered as “relieved,”) and are often no better than when admitted : and these swell the amount of “numbers discharged,‒ without increasing the actual proportion of cured.

In Table I will be found a statement of the numbers annually discharged from the Wakefield Asylum, and of those cured ; with the per centage of each to the numbers admitted in the same year : and these show the average for thirty-one years to be about 44 *per cent* ; a proportion which has varied little during the progress of the asylum, and which may be favorably compared with other similar records, where paupers only, the most unpromising and incurable class of patients, are received.†

The object of this report is not to eulogize the Asylum, or to plead in its defence ; but to state candidly and fairly, for the

* DIETARY of the asylum.—See APPENDIX A.

† Proportion of Recoveries to the numbers admitted in English Asylums, in which pauper patients only are received : to December, 1848.

<i>County Asylums.</i>	<i>Years Established.</i>	<i>Present Resident.</i>	<i>Cured per Cent. on admissions.</i>
Lancaster	32	717	40·1
West Riding	30	601	41·9
Suffolk.....	20	262	42·1
Middlesex (Hanwell)	18	967	24·4
Kent	15	370	27·7

purpose of legitimate inference, such data as I could procure, that bear on the subjects discussed: and the language of panygeric would be out of place toward the medical officers from one of their number: I feel, therefore, that the simple record of figures, which is here quoted, is the fittest and best testimony I can offer to the services and management of DR. and MRS. CORSELLIS, to whom, as resident Superintendents of the Asylum, belong the credit and responsibility of its more immediate administration. And without urging any peculiar claims upon public sympathy, or insisting exclusively upon the value of one system of treatment, the Magistrates, and the Medical Officers generally, may rest conscientiously satisfied with the facts, proved by the foregoing statistical analysis; that, although circumstances, over which they had no control, have, during the last two years, inflicted on the West-Riding Asylum an unusual mortality, now happily arrested; it was in no appreciable degree caused, or aggravated, by mismanagement or want of proper attention: and that the proportion of patients who have recovered in the asylum, has been, and continues, at least as great as in any other establishment, in which similar cases only are under care and treatment: while they believe the general health and quiet comforts of their patients, to be in no degree inferior to those of other similar institutions.

IN CONCLUDING this branch of our inquiry, I would beg to direct the attention of the Magistrates to one other consideration, which these inferences suggest; that is, the danger of delay in providing ample accommodation for the constantly increasing demands upon their care. Dr. Corsellis has well shown, in his report for 1841, a table of the comparative expense of an equal number of cases admitted early after being attacked with insanity, and of cases neglected and delayed. Of the former, all were cured, at a cost of about £9 each: while of the latter, those who died cost upward of £30 each, and those who remained about £15 each *per annum*. If then, notwithstanding the generally prompt and judicious enlargements of the asylum, we take into account, that during the inevitable lapse of time in the erection of a new building for this populous Riding, two hundred cases had been delayed admission; and so disastrous had been the effect of the delay, that one hundred of these died soon after they could be received, over and above the average mortality of the establish-

ment; the difference of cost to the Riding may be estimated at many hundreds of pounds, in merely the pecuniary view of the question: and, if we adopt the higher motives of humanity, it is evident that a fearful difference of mental health or misery, and a sad expenditure of human life hang in the balance. How much more aggravated must have been the condition of the insane poor before public asylums were erected for their reception; and how urgent must be the necessity, in those counties which are yet unprovided with hospitals for their especial accommodation!

On the other hand it must not be overlooked, that increased facility of access to the asylum may augment the ratio of its mortality, by admitting many cases on instant application, who would not have survived a process of delay. Patients suffering from acute attacks are thus often hastily sent in, when scarcely fit to be removed; and when the nature of their ailment is not always correctly appreciated. These causes have, no doubt, added to the effect of delay, in augmenting the late mortality; and they have been a chief source of that of the last half-year. In illustration of which it may be stated, that although the total number of deaths from Jan. 1, to July 1, 1850, have not been more than twenty-eight (about 10 *per cent* of the resident per annum) *yet eighteen of these were patients admitted in the present year; twelve of whom died within a month after admission.* Several were brought in an evidently hopeless and sinking condition: and two were not strictly cases of insanity but of inflammation of the membranes of the brain, in which ordinary delirium had been mistaken for mania, and was passing into fatal effusion when the patients were received into the wards.

Only ten, therefore, of the residents of 1849 have died during the last six months. Of the rest, some were from causes the reverse of those we have been discussing, haste instead of delay, but still extrinsic to the asylum. Prompt and ready access to a hospital for the insane, is, however, of such unquestionable advantage, both to the patients and the county; that the instances just alluded to cannot be allowed to have weight: except as abuses to be guarded against, by judicious vigilance on the part of the Magistrates, as to the condition of those whom they commit to its care, and caution in the medical referees to discriminate proper objects for their certificates.

II.—THE CHOLERA.

HAVING arrived at what I trust will be deemed a satisfactory solution of the former subject proposed for inquiry, we proceed next to a demonstration of the second problem, viz: an analysis of the rise and progress of CHOLERA; and of the sanatory conditions under which it appeared, and of those who were its victims.

Before entering on the discussion of this topic, however, let me premise a few words, and define the meaning which the terms are here meant to convey.

1.—*Definition of Terms.*

There is no disease more easily recognised than a fatally developed attack of livid Cholera; and yet, on perusing the statistics published with reference to it, we are struck with the wide dissimilarity of their results. The cause of this is one that too often invalidates medical evidence,—the want of a clear definition of the elements compared: for, when we read, for example, of cholera being fatal in three-fourths of the cases seen or treated by one observer; and of the records of another, in which nine-tenths of the patients were cured; it is clear that some great dissimilarity must obtain in the mode of treatment, or some extreme difference in the data contrasted: and in most instances, the latter constitutes the more important source of disparity.

It is foreign to the purpose of this essay, to give a history or technical description of cholera; but, in order to render these statistical researches of value, the writer will briefly define what he regards as the distinctive character of the disease.

ASIATIC OR PESTILENTIAL CHOLERA, whether it be an affection *sui generis*, or a malignant form of ordinary cholera; whether it be a new disease of the present century, or one of greater antiquity; whether it be the effect of contagion or is epidemic, or only an offspring of bad drainage and ventilation; under whatever circumstances it arises,—has one symptom that distinguishes it from all other kinds of alvine disorder, when it assumes an aggra-

vated form: that is, the sudden *collapse*; which ushers in a livid coldness of the surface, a rapid sinking of the pulse, and an unconsciously rapid exhaustion of vital power. Without this collapse, vomiting may be severe, and diarrhœa may continue for weeks, during the intensity of epidemic influence, yet they are not *per se* even dangerous: with this collapse, there may be neither vomiting nor diarrhœa, and yet the danger becomes instantly extreme. Diarrhœa without collapse, therefore, does not constitute Cholera: livid collapse, with or without diarrhœa, does.

It is true, that collapse accompanies severe cases of ordinary cholera: but it is not then so rapid in its seizure, nor attended with the livid complexion, and the peculiar restlessness, of the pestilential disease: and in our present inquiry, the question is not, how to distinguish between ordinary and pestilent cholera; but to fix upon some distinctive symptom, or symptoms, during the prevalence of an evidently pestilential epidemic, that may form a standard of diagnosis for statistical arrangement.

It is no less universally admitted, that when the pestilential influence is prevailing, it assumes many subordinate varieties, and affects the type and progress of many other disorders: that an epidemic diarrhœa precedes or accompanies epidemic cholera, generally attended by more or less sickness and vomiting: and that these symptoms are marked characteristics of most cases of livid cholera. Some have even designated the diarrhœa as the (curable) period of *disease*; and the stage of livid collapse, as the period of *death*. Too often, it is so. Yet even from the state of blue collapse, patients occasionally recover: and inasmuch as vomiting and purging are not uniformly present in every case, it appears to me more clear, to designate the period of collapse, as essentially implied in the term cholera. According to the nosology of many writers, the whole, or nearly the whole, of the cases recorded in the following tables, would be classified, and perhaps correctly, as varieties of cholera: but the distinction I have adopted is more convenient for statistical analysis; and the results may easily be translated into any other formula.*

* Two or three cases that occurred in the Asylum, would lead to a suspicion, that this state of collapse has minor degrees of development. A poor blind woman, aged 38, in Ward 1, whom fear can scarcely be supposed to have influenced, as she is quite demented, but not epileptic, fell on the floor of the day room, in the forenoon of the 18th of October, in a fainting fit. She was sick, and vomited a little when taken up: but the nurse

Hence, in the subsequent pages, whenever the word cholera is expressed, it is meant to indicate a state of collapse, whether preceded or not by concomitant diarrhœa. No case of diarrhœa or dysentery, however aggravated, is classed as cholera, unless collapse were observed: and in every case named as cholera, livid collapse was apparent in a greater or less degree.

Amid the cases of simple DIARRHŒA, a distinction might be manifestly drawn, between those which were the result of epidemic influence, and chronic cases that were connected with other states of organic disease, and which are generally to be met with, especially in autumn, among the aged and feeble inmates of an asylum. But it chanced that of the patients under my own care (the females) only two were suffering from chronic diarrhœa connected with other disease, during the period of the epidemic;* and as neither of them were attacked by cholera, their cases are omitted from all the following calculations in which their condition would interfere with an estimate of epidemic disorder.

It is necessary also to premise that the ensuing analysis of cholera, is deduced chiefly from its occurrence and progress in the *Female Wards*, of the asylum. The arrangement of the visiting Physicians being for one to attend the men and the other the women in annual rotation,—it chanced, that last year the women were under my care: and, as the cholera commenced and ended in observed she was cold and livid, as if she was suffering from cholera. Her bowels were not at all affected. She would take nothing; but was got to bed immediately, and wrapped in hot blankets: and in an hour or two, she was warm, eat her supper, and appeared well as usual.

Another instance, was that of an imbecile female in Ward 11, who was attacked, on the 6th of October, with a peculiar kind of syncope, and painful oppression in the præcordia, sickliness and coldness of surface; but without vomiting or purging. She, also, was put to bed without delay; and after drinking a glass of hot brandy-and-water, she soon rallied. But on the 30th of the same month, this patient was seized during the night with more unquestionable symptoms of cholera, vomiting diarrhœa, and deeply livid collapse, and she was one of the worst cases that recovered.

And a third example might be adduced, from the case of *Martha Emmett*, hereafter to be noticed.

Were not these patients, though threatened rather than attacked, genuine cases of cholera;—gently brushed by the wing of the Destroyer, from which, for a time, they escaped? They are of too doubtful a character to be included in the statistical tables about to be quoted, but seem worth this passing notice.

* Both are since dead. One from extensive cancerous disease of the uterus, and bowels: and the other from long continued marasmus and general decay.

the women's wards, it is in them the chief interest lies, to trace the origin and decline of the pestilence. And my personal experience lies amid them alone. The tables which have been my pleasant, but laborious, occupation for some months past, are therefore derived from records of the female patients only: but by the obliging assistance of MR. NAYLOR, who has, at my request, collated some data relative to the sickness among the men, during the same periods, I am enabled to give comparative results, in many important particulars, relating to both sexes in the establishment.

Having, by the reprint of our former report, prefaced a sort of index to the rise and spread of Cholera in the Asylum, it appears the most lucid arrangement, in now pursuing the subject, to present first a general sketch of the condition of the patients at the period in question; and then to state a summary of the amount of illness recorded; before proceeding with a more critical examination of its history and nature.

2.—*General condition of the Asylum.*

The first fatal case of cholera happened on the 23d of September: but it was not till the 2nd of October that another was reported; and not till the middle of the latter month, that the pestilence became general in the wards. With only one exception, therefore, all the patients who had been, or subsequently became, subject to epidemic illness, were resident in the asylum on the first of October, the commencement of the fourth quarter of 1849; or were admitted, during the first week of that month, before an order was enforced prohibiting the reception of any fresh cases. These last, nine in number, are not included in the census of October 1st, but they, as well as the patient who died in September, are, of course, taken into account in such tables as they belong to, in subsequent statistical computations.

On October 1st, 1849, the following were the aggregate numbers of patients in the combined asylums.

In the <i>Old Building</i> , MEN 183 ; WOMEN 188 ; TOTAL 371.			
<i>New Building</i> ,	113 ;	136 ;	249.
<i>General Total</i> ,	296	324	620.

Of the relative condition of the three hundred and twenty-four female patients, a summary is given in Tables XXIII and XXIV, which are compiled from a list of the individuals in every ward; respecting each of whom the several particulars have been carefully registered. Table XXIII exhibits the physical circumstances appertaining to them, and XXIV contains an aggregate of their mental state: and together they present a more accurate exposition of the peculiarities of each ward, than any general description would convey.

Prior to the opening of the new asylum, several of the wards had been inconveniently crowded: and in case it might prove useful to ascertain which had most exceeded its average, the greatest number that each ward had received is stated, as well as the number of beds, and the present number of inmates.

In all other particulars the details of the census are self-evident, and seem scarcely to require further explication. The parallel columns contain first the total numbers, under each division; then the details of separate wards, and the two columns on the right of the tables, exhibit in juxta-position the numbers in the old, and in the new building. The succession of the wards is arranged, not in arithmetical progression, but for bringing into contiguous columns those that are likely to present features of similarity or contrast;—such as wards 11 and 15 which are the most cleanly and generally convalescent wards of the old building; and wards 12 and 16, which are devoted to the dirty and refractory.

Respecting their PHYSICAL CONDITION it may briefly be observed, that, on the first of October, the number of beds in the institution was 313;—185 in the old building, and 128 in the new: they had formerly accommodated 352 patients, though the number was then but 324. The wards vary in capacity, the largest, Nos. 13 and 1 containing thirty patients each, and the smallest, No. 10, but 22. The greatest number of beds is in ward 13, and the least in 16. Most of the wards have had from one to seven inmates more than their present complement: the greatest increase viz: seven, being in ward 14.

The total average age of the females resident is about 42 years. Ward 11 contains the largest proportion of old patients, and their average age is 48.3 years: but not of the longest resident; their average term of residence being about four years, while the

TABLE XXIII.—GENERAL CONDITION OF THE FEMALE PATIENTS.—IN WARDS

	Total.	11	12	13	14	15	16	17	18	1	2	3	4	10	O. B. N. B.	
OCTOBER 1st, 1849.																
Number of Beds.....	313	24	29	24	21	33	28	26	27	26	26	26	26	23	185	
Greatest Number of Patients.....	352	27	30	27	27	33	34	28	32	34	34	31	27	22	206	
Present Number.....	324	25	29	25	27	30	27	25	30	29	29	28	27	22	188	
AGES.—maximum	75	73	70	75	68	62	72	57	60	71	64	64	61	70	75	
“ minimum	13	32	24	19	21	17	21	18	21	18	25	25	13	21	18	
“ average.....	42.0	48.3	50.5	39.4	39.4	38.4	44.8	41.7	37.3	38.9	41.7	41.0	44.3	43.2	40.4	
DIET.—common.....	218	21	14	18	16	26	18	17	21	24	13	13	19	11	130	
“ meat (daily)	106	4	15	7	11	4	9	8	9	5	15	8	8	11	58	
EMPLOYED in the ward	87	6	11	10	6	5	5	6	10	12	8	4	4	4	49	
“ knitting and sewing ...	25	3	5	—	1	—	5	2	—	—	3	2	2	4	16	
“ laundry, wash-house, } and bakehouse }	40	4	1	—	2	9	2	9	1	5	3	2	2	2	27	
“ kitchen and house.....	13	3	3	—	—	—	1	2	1	2	—	—	1	—	9	
UNEMPLOYED	159	9	9	15	18	16	14	6	18	10	14	14	18	12	87	
HABITS.—clean	265	24	28	7	13	19	26	23	23	29	27	27	25	21	140	
“ dirty	59	1	1	18	14	11	1	2	7	—	1	1	2	1	48	
HEALTH.—generally good	216	16	15	14	19	23	19	20	20	23	17	17	22	8	126	
“ feeble.....	108	9	14	11	8	7	8	5	10	6	11	11	5	14	62	
Term of Residence } maximum IN } Years and Months. } average	Y. M. 29 4 25	0 23 8	10 20 5	27 24 5	5 27 6	0 22 24	3 24 130	10 15 50	15 0 4	17 5 4	23 6 10	9 13 5	14 2 4	11 15 3	6 29 7	4 29 9

TABLE XXIV.—MENTAL CONDITION OF FEMALE PATIENTS.

OCTOBER 1, 1849.	Total.	11	15	12	16	13	14	18	1	2	3	4	10	O	B	N. B.
I.—MORAL INSANITY	1												1			1
II.—MONOMANIA																
III.—DELUSIONS	35	6	7	-	1	1	2	5	2	2	3	5	1	22		13
IV.—MANIA, acute	15	1	-	1	2	3		1	3	1	-	3	-	8		7
„ chronic	58	6	5	5	5	7	5	-	5	4	7	4	5	33		25
„ recurrent	19	-	2	2	4	1	1	2	1	2	-	1	3	12		7
V.—MELANCHOLIA,																
„ acute	34	6	5	1	3	2	3	4	1	4	2	2	1	24		10
„ chronic	8	1	3	-	-	-	1	-	-	-	-	1	2	5		3
„ recurrent	3	-	1	-	-	1	-	1	-	-	-	-	-	3		-
VI.—DEMENTIA,																
„ partial	45	-	-	4	2	6	7	7	4	5	4	3	3	26		19
„ complete	56	3	1	6	4	2	6	2	7	6	9	5	5	24		32
VII.—AMENTIA,																
„ partial	38	2	5	3	5	4	2	3	3	5	3	1	1	25		13
„ complete	12	-	-	3	1	3	-	-	4	-	-	2	-	6		6
TOTAL	324	25	29	25	27	30	27	25	30	29	28	27	22	188		136
Possibly CURABLE.	89	9	9	4	7	9	4	8	7	12	7	6	7	50		39
Convalescent and Discharged at } ... Christmas	18	2	6	-	2	3	1	-	1	2	-	1	-	14		4
Probably INCURABLE	235	16	20	21	20	21	23	17	23	17	21	21	15	138		97
Suffering from EPILEPSY	25	1	-	3	2	4	3	3	6	1	2	-	-	16		9
HYSTERIA	10	-	2	1	-	1	2	-	-	3	-	1	-	6		4
GEN. PARALYSIS	12	1	-	4	-	2	-	-	3	-	1	-	1	7		5
SUICIDAL	43	8	4	-	4	3	2	5	5	3	5	5	2	26		17

inmates of wards 12 and 10 have been on an average more than six years in the asylum: and the average of the whole is exactly five years.

The patients occupied in sewing and knitting belonged chiefly to wards 15 and 14; while those employed in the laundry, wash-house and other domestic offices were scattered over many of the wards, and were most numerous in 13 and 18. The greatest numbers on extra diet were to be found in wards 15, 3, and 10: the chief proportion of feeble patients in 15 and 10: and the majority of those dirty in their habits and propensities in wards 12 and 16, as has been before stated.

A similar glance over Table XXIV. shews the distribution of *Mental disease* in the several wards: for it may be observed that none are devoted exclusively to any particular class of cases. All are commingled to such an extent as appears suitable to the peculiarities of the individual, the character of the nurse, and the habitudes of the other inmates in the ward: an arrangement that is decidedly more convenient and conducive to the comfort of the patients, than an adherence to any specific or theoretical classification, according to the forms of disease they may be suffering from. The only special distinction is between the cleanly and the dirty, who have a different kind of bed provided for them: but the latter are to be found more or less numerous in almost every ward.

As to the nosological arrangement adopted in the classification of mental disease, an explanatory note will be found in the appendix.*

The mental state of the patients appeared to have little or no connection with their liability to alvine disorder, neither as to its form or duration, nor as to that of their cerebral derangement: but our analysis would be incomplete without an inquiry into this point; and apart from their connection with cholera, it is useful to tabulate the proportion in which the several classes of mental disease exist in the asylum, for sake of comparison with other districts and other institutions.

With this object, and to render our census somewhat more complete, a statement is given in the following tables of the aggregate of both sexes in each class: and of the ratios they bear to the total residents in the two buildings, separately and conjointly.

* See APPENDIX B.

TABLE XXV.—MENTAL STATE OF PATIENTS IN THE ASYLUM.

OCTOBER 1, 1849.	OLD BUILDING.			NEW BUILDING.			TOTAL.		
	Men.	Wom.	Total.	Men.	Wom.	Total.	Men.	Wom.	Total.
I.—Moral Insanity...	...	...	...	...	1	1	...	1	1
II.—Monomania.....	...	...	...	...	...	...	...	...	...
III.—Delusions	25	22	47	26	13	39	51	35	86
IV.—Mania	68	53	121	15	39	54	83	92	175
V.—Melancholia.....	21	32	53	19	13	32	40	45	85
VI.—Dementia	34	50	84	28	51	79	62	101	163
VII.—Amentia	35	31	66	25	19	44	60	50	110

TABLE XXVI.—PER CENT TO TOTAL RESIDENT IN EACH DIVISION.

OCTOBER 1, 1849.	OLD BUILDING.			NEW BUILDING.			TOTAL.		
	Men.	Wom.	Total.	Men.	Wom.	Total.	Men.	Wom.	Total.
I. Moral Insanity ...	...	...	...	...	.7	.4	...	.3	.1
II. Monomania .....	...	...	...	...	...	...	...	...	...
III. Delusions	13.6	11.7	12.6	23.0	9.5	15.6	17.2	10.8	13.8
IV. Mania	37.1	28.1	32.6	13.2	28.6	21.6	28.0	28.3	28.2
V. Melancholia	11.4	17.0	14.2	16.7	9.5	12.8	13.5	13.8	13.7
VI. Dementia	18.5	26.5	22.6	24.7	37.5	31.7	20.9	31.1	26.2
VII. Amentia	19.1	16.4	17.7	22.1	13.9	17.6	20.2	15.4	17.7

3.—*Aggregate amount of Illness.*

The extent and amount of epidemic illness during September, October and November, the three months in which the pestilence prevailed, is shewn in Tables XXVII, XXVIII, and XXIX, as follows:—

TABLE XXVII.—SUMMARY OF DIARRHŒA.

CASES DURING SEPT., OCT., AND NOV.	OLD BUILDING.			NEW BUILDING			TOTAL.			
	Men.	Wom.	Total	Men	Wom.	Total	Men.	Wom	Total	
Number of persons attacked	35	57	92	31	51	82	66	108	174	
Attacked more than once ...	8	3	11	3	8	11	11	11	22	
Number of Cases	45	60	105	35	60	95	80	120	200	
Simple DIARRHŒA	Cases	35	50	85	34	51	85	69	101	170
	Recovered ...	35	50	85	34	51	85	69	101	170
	Av. dur. in days	7·8	2·8		6·1	2·9			2·8	
	Died .....	...	...	...	...	...	...	...	...	...
	Av. duration..	...	...	...	...	...	...	...	...	...
DIARRHŒA ending in <i>Cholera.</i>	Cases	10	10	20	1	9	10	11	19	30
	Recovered ...	3	3	6	...	3	3	3	6	9
	Av. duration		2·6			4·0		7·7	3·3	
	Died	7	7	14	1	6	7	8	13	21
	Av. duration	13	5·7		3	5·9		11·3	5·7	

TABLE XXVIII.—SUMMARY OF DYSENTERY.

CASES DURING SEPT., OCT., AND NOV.	OLD BUILDING			NEW BUILDING.			TOTAL.			
	Men.	Wom.	Total.	Men.	Wom.	Total	Men.	Wom.	Total	
Persons attacked	10	3	13	3	9	12	13	12	25	
Number of Cases	10	4	14	3	10	13	13	14	27	
Simple DYSENTERY	Cases.....	7	3	10	3	8	11	10	11	21
	Recovered ...	3	3	6	3	7	10	6	10	16
	Av. dur. in days	11	14	...	9	12·2	...	...	13·1	...
	Died.....	4	...	4	...	...	...	4	...	4
	Av. duration	43	...	...	...	...	...	43	...	...
DYSENTERY ending in <i>Cholera.</i>	Cases	3	1	4	...	2	2	3	3	6
	Recovered ...	-	...	...	...	...	...	...	...	...
	Died	3	1	4	...	2	2	3	3	6
	Av. duration	11·3	32	...	...	15·5	...	11·3	21	...

TABLE XXIX.—SUMMARY OF CHOLERA.

CASES DURING SEP., OCT., AND NOV.	OLD BUILDING			NEW BUILDING			TOTAL			
	Men.	Wom.	Total	Men.	Wom.	Total	Men.	Wom.	Total	
Number of cases	47	39	86	21	25	46	68	64	132	
Recovered.....	10	9	19	1	6	7	11	15	26	
Died	37	30	67	20	19	39	57	49	106	
CHOLERA preceded by <i>Diarrhœa.</i>	Cases	10	10	20	1	9	10	11	19	30
	Recovered ...	3	3	6	-	3	3	3	6	9
	Av. dur. in days..	-	7·0	-	-	5·5	-	12	6·4	-
	Died	7	7	14	1	6	7	8	13	21
	Av. dur. in hours	20	45·6	-	196	36·	-	-	27·3	-
CHOLERA preceded by <i>Dysentery.</i>	Cases	3	1	4	-	2	2	3	3	6
	Recovered ...	-	-	-	-	-	-	-	-	-
	Av. dur. in days..	-	-	-	-	-	-	-	-	-
	Died	3	1	4	-	2	2	3	3	6
	Av. dur. in hours	-	6	-	-	17	-	85·6	13·3	-
CHOLERA without premonitory symptoms.	Cases	34	28	62	20	14	34	54	42	96
	Recovered ...	7	6	13	1	3	4	8	9	17
	Av. dur. in days..	-	14·6	-	-	7·3	-	-	10·9	-
	Died	27	22	49	19	11	30	46	33	79
	Av. dur. in hours	45	32·8	-	40·	39·3	-	-	34·5	-
Total fatal cases	37	30	67	20	19	39	57	49	106	
Duration in hours.	maximum	276	147	276	196	142	196	276	147	276
	average	44·	35·9	-	48	34·3	-	46	35·3	-
	minimum	5	4	-	9	7	7	5	4	4

These record the several varieties of diarrhœa, dysentery, and cholera, and the average duration in the cases of each: and instead of the division of wards which pertains to our more elaborate tables, the amount in each sex of the two buildings is stated, and the total in the whole institution. As in all the registers connected with this inquiry, however, a simple enumeration does not suffice for statistical contrast: it is therefore translated into the language of per centage in Tables XXX to XXXII, in which the ratios are given under different forms of combination.

TABLE XXX.—CASES OF DIARRHŒA PER CENT.

SEP. OCT. NOV. 1849. A : : TO NUMBERS RESIDENT.	OLD BUILDING.			NEW BUILDING.			TOTAL.		
	Men.	Wom.	Total.	Men.	Wom.	Total.	Men.	Wom.	Total.
Persons attacked ...	19·1	30·3	24·7	27·4	37·5	32·9	22·2	33·3	28·
Total cases	24·5	31·9	28·3	30·9	44·1	38·1	27·0	37·0	32·2
I.—Simple Diarrhœa	19·1	26·5	22·9	30·0	37·5	34·1	23·3	31·1	27·4
II.—Diarrhœa ending in cholera.....	5·4	5·3	5·3	0·8	6·6	4·0	3·7	5·8	4·8
B : : TO TOTAL CASES OF DIARRHŒA.									
I.—Simple diarrhœa	77·7	83·3	80·9	97·1	85·	89·4	86·2	84·1	85·
II.—Ending in chol.	22·2	16·6	19·0	2·8	15·	10·5	13·7	15·8	15·
Recovered	84·4	88·3	86·6	97·1	90·	92·6	90·	89·1	89·5
Died	15·5	11·6	13·3	2·8	10·	7·3	10·	10·8	10·5
C : : TO CASES ENDING IN CHOLERA.									
Recovered	30·	30·	30·	—	33·3	30·	27·2	31·5	30·
Died	70·	70·	70·	100	66·6	70·	72·7	68·4	70

TABLE XXXI.—CASES OF DYSENTERY PER CENT.

SEP. OCT. & NOV. A : : TO NUMBERS RESIDENT.	OLD BUILDING.			NEW BUILDING.			TOTAL.		
	Men.	Wom.	Total.	Men.	Wom.	Total.	Men.	Wom.	Total.
Persons attacked ...	5·4	1·5	3·5	2·6	6·6	4·8	4·3	3·7	4·
Total cases	5·4	2·1	3·7	2·6	7·3	5·2	4·3	4·3	4·3
III.—Simple Dys....	3·8	1·5	2·6	2·6	5·8	4·0	3·3	3·3	3·3
IV.—Dys. ending in cholera	1·6	0·5	1·0	—	1·4	0·8	1·0	0·9	0·9
B : : TO TOTAL CASES OF DYSENTERY.									
III.—Simple Dys....	70·	75·	71·4	100	80·	84·6	76·9	78·5	77·7
IV.—Dys. ending in cholera	30·	25·	28·5	—	20·	15·3	23·0	21·4	22·2

TABLE XXXII.—CASES OF CHOLERA PER CENT.

SEP., OCT., NOV. A : : TO NUMBERS RESIDENT.	OLD BUILDING.			NEW BUILDING.			TOTAL.		
	Men.	Wom.	Total.	Men.	Wom.	Total.	Men.	Wom.	Total.
Total cases.....	25.6	20.7	23.1	18.5	18.3	18.4	22.9	19.7	21.2
Recovered	5.4	4.7	5.1	0.8	4.5	2.8	3.7	4.6	4.1
Died	20.2	15.9	18.0	17.6	13.9	15.6	19.2	15.1	17.0
II.—Preceded by diarrhœa	5.4	5.3	5.3	0.8	6.6	4.0	3.7	5.8	4.8
IV.—Do. by dys.....	1.6	0.5	1.0	—	1.4	0.8	1.0	0.9	0.9
V.—No premonitory symptoms	18.5	14.8	16.7	17.6	10.2	13.6	18.2	12.9	15.4
B : : TO TOTAL CASES OF CHOLERA.									
II.—Preceded by diarrhœa	21.2	25.6	23.2	4.7	36.0	21.7	16.1	29.6	22.7
IV.—Do. by dys.....	6.3	2.5	4.6	—	8.0	4.3	4.4	4.6	4.5
V.—No premonitory symptoms	72.3	71.1	72.0	95.2	56.0	73.9	79.4	65.6	72.7
Recovered	21.2	23.0	22.0	4.7	24.0	15.2	16.1	23.4	19.6
Died	78.7	76.9	77.9	95.2	76.0	84.7	83.8	76.5	80.3
C : : TO TOTAL CASES IN EACH DIVISION.									
Recovered.—II	30.0	30.0	30.0	—	33.3	30.0	27.2	31.5	30.0
“ IV	—	—	—	—	—	—	—	—	—
“ V	20.5	21.4	20.9	5.0	21.4	11.7	14.8	21.4	17.7
Died.—II	70.0	70.0	70.0	100	66.6	70.0	72.7	68.4	70.0
“ IV	100	100	100	—	100	100	100	100	100
“ V	79.4	78.5	79.0	95.0	78.5	88.2	85.0	78.5	82.2

As a slight abstract it may be noted, that of the 620 patients in the asylum on the first of October, 331 or more than one-half, suffered during the succeeding three months, from disorder in the bowels, in a more or less severe degree. Twenty-four were attacked

more than once. And 200 cases of diarrhœa are recorded; 27 of dysentery; and 132 of cholera.*

* In stating the aggregate number of patients who were ill and who died, relative to cholera, a discrepancy may be noticed between the tables contained in this volume, and other published statements, which requires a word of explanation.

No Director's report and official annual records, were published at the close of last year; and the only account for the year, or printed return of the cases of cholera, is contained in the report of the Visiting Magistrates of the asylum. According to it, the total deaths from cholera are stated to be 98, whereas in the present report they are assumed to be 103; and according to the most recent computation 106. This difference arises, not from any error in the record of the whole number of deaths, but from the line defining the limits of cholera, being drawn by different hands. My tables include five fatal cases, as cholera, which were registered in the official returns under other appellations, viz: those of four women and one man.

The latter died of effusion in the brain, consequent on an attack of cholera: and as he certainly could not be reported to have recovered from cholera, I could not but add his name to its fatal list.

Two of the females alluded to had been suffering from dysentery; and their deaths having occurred in the intervals between my visits to the wards, without any remarkable alteration being recorded in the medical journal, were ascribed to the complaint under which they had been labouring: but on subsequent careful inquiry, I became satisfied, that both had been attacked with sudden livid collapse and vomiting, some hours before death; and that, in fact, they died at last of blue cholera.

Another case was that of an old woman, aged seventy-one, who had unquestionably an attack of cholera, from which it was for some days hoped she would recover. She lingered eleven days, after livid collapse, and removal to hospital; but would take neither medicine nor food, except a little tea and wine; and she gradually sank and died. Her death was returned "Old Age, subsequent to Cholera;" but as she had suffered from cholera so immediately preceding it, she could not properly be entered among the recoveries, nor the fatal event be ascribed to any other complaint.

The fifth was a more doubtful case, and may admit of question. It was that of *Martha Emmett*, a married female, aged thirty, who had been about three years insane, and more than two years an inmate of the asylum. She was silent and fatuous, but had never been reported epileptic. On Monday, November 19, she was found to have been purged in the night, and had cramp and vomiting during the following day; with hot skin and feverish pulse. From this state she partially recovered, under medicinal treatment: her bowels became quiet, and the fever abated; but she remained in bed, and was exceedingly dirty and offensive in her person. The following Sunday afternoon (the 25th,) the nurse was suddenly called to her bed-side, and found her livid, cold, and apparently moribund. She spoke indistinctly once; had not been vomiting or purged; and continued in this state only

A majority of the records of diarrhœa is among the women, in the proportion of 33·3 *per cent* to 22·2 *per cent*, of the respective numbers resident: 4·3 *per cent* of the men had dysentery, and 3·7 *per cent* of the women.

The ratio of cholera was highest amid the men, 22·9 *per cent*; to 19·7 *per cent* of the women.

Of the cases of DIARRHŒA, 85 *per cent* were simple, and 15 *per cent* passed into cholera; the proportion of the latter being greater in the women than the men, as 15 to 13 *per cent*. The whole of the patients who suffered from epidemic diarrhœa only, recovered: of those ending in cholera, not more than 30 *per cent*; the fatal cases being rather more numerous among the men.

The sufferers from DYSENTERY were nearly equal in both sexes;

for five or ten minutes when she expired. DR. CORSELLIS was not within call at the moment, and before the house-surgeon, who was instantly summoned, arrived in all haste, the patient was dead: but before she expired the deputy-matron had reached the ward, who assures me that her dying aspect, as to lividity and coldness, certainly resembled the cases of cholera, with which we were at that time too extensively familiar. On my visit next morning, my first impression, derived from an imperfect statement of one of the nurses, was that death had resulted from an epileptic fit; and so the case was officially returned: but further inquiry having made me acquainted with the above circumstances, it appears more probable that the poor woman died from a sudden seizure of cholera, or livid collapse after preliminary diarrhœa, and as such she is recorded in these tables. The cause of her death is doubtful; yet under the view I have adopted, she was more appropriately included than omitted in a statistical enumeration.

These complete the 103 cases stated in the majority of our returns. But on receiving from MR. NAVLOR the unexpected addition, while preparing these remarks for the press, of a summary of cases in the men's wards, and combining them with my records of the women, I find three cases included in his list, beyond the total before arrived at; for reasons precisely similar to those advanced above: and, being satisfied by inquiry, that they necessarily belong to a like classification, I have not hesitated to give them place, and thus increase the aggregate of deaths from cholera to 106: my motive in thus deviating from the official return being, as I beg may be understood, not from any wish to question the correctness in designating the cause of death, made and signed by my colleagues; but merely because the line of definition I have adopted, places them, *to me*, under a rather different aspect, to that from which they had regarded them; and compels me to embrace those additional cases within its limits.

and all who were attacked by dysentery only, got well: whereas every case that lapsed into cholera died. Dysentery was most prevalent among the women in the new building, and among the men in the old: diarrhœa rather more frequent amid the inmates of the new building: and cholera prevailed most extensively in the old.

Of the 132 persons stricken by CHOLERA, 65 *per cent* were in the old building; 34·8 *per cent* in the new: rather more than one half (51·5 *per cent*) were men; and 48·4 *per cent* women. About one-fifth of the whole recovered; and four-fifths died. The recoveries were more numerous in the old building than the new: and were to the total cases, 23 *per cent* of the women, and 16 *per cent* of the men. By far the highest ratio of recoveries were among cases preceded by diarrhœa; 30 *per cent* of this class having escaped, and only 17 *per cent* of those in whom cholera was the primary attack. The most uniformly fatal were the cases preceded by dysentery, of whom not one recovered: and 82 *per cent* died in whom no premonitory symptoms had been observed.

Such is a cursory glance over the tables presented in the context; to which the reader who is sufficiently interested in the subject to desire more minute details, may readily refer.

In a further series of records, which now lie before me, the details are continued and contrasted through each of the (female) wards: and amid each combination of particulars, as to physical and mental state, given in the census of tables XXIII and XXIV.

They are too voluminous to be printed with this report, and are in a great measure superseded by the contents of a succeeding section; but several of their results, as regards the total inmates of the women's wards may be briefly here stated.

The total numbers ill were 45·8 *per cent* of those on common diet, and 54·7 of those who had full diet: 47·5 *per cent* of the patients of cleanly habits, and 54·2 of the dirty: 47·9 of those in good health, and 50·4 of the feeble: 47·2 of the employed, and 50·2 of the unemployed. The cholera cases included 19·2 *per cent* of patients on common, and 20·7 *per cent* on meat diet: 16·6 *per cent* of the clean, and 33·8 *per cent* of the dirty: 18·9 *per cent* of the healthy, and 21·2 *per cent* of the feeble: 13·9 *per cent* of the employed; and 25·7 *per cent* of the unemployed.

Respecting the mental state of the patients affected by the epidemic, we may summarily note, that of those suffering from

<i>Delusions</i>	...34·2	<i>per cent</i>	were ill,	14·2	<i>per cent</i>	had cholera.
<i>Mania</i>	.....47·8	....	....	22·7	....	....
<i>Melancholia</i>	55·5	....	....	11·1	....	....
<i>Dementia</i>	...55·4	....	....	22·7	....	....
<i>Amentia</i>	42·0	....	....	20·0	....	....

The proportion that recovered and died, of cases of cholera, in each class, were

<i>Delusions</i>	...20·0	<i>per cent</i>	recovered,	80·0	<i>per cent</i>	died.
<i>Mania</i>	.....28·5	....	....	71·4	....	....
<i>Melancholia</i>		....	....			(all died.)
<i>Dementia</i>	...17·3	....	....	82·6	....	....
<i>Amentia</i>	40·0	....	....	60·0	....	....

The greatest proportion of illness, and the least of cholera, were thus among patients suffering from mental depression: but when attacked with cholera, they were the most unfavorable cases: and next to the melancholic may be reckoned the demented.

About 46 *per cent* of the curable were ill, and 48 *per cent* of the incurable; diarrhœa preponderating amid the former: while of cholera cases 6·8 *per cent* only were among the mentally curable, and 24·1 amid the mentally incurable. Forty-six females of the latter class died, and only three whose mental state left hope of recovery.

Out of forty-three patients addicted to suicide, eight were attacked with cholera, and only one recovered.*

4.—Ages and Terms of Residence.

Those who had diarrhœa were to be found among patients of all AGES in nearly equal proportion; for their average age is forty-two years,—exactly the same as the average age of the total patients in the house. The few cases of dysentery were rather more aged; their average being 43·7 years: and cholera prevailed chiefly amid

* The extent to which the officers and servants of the asylum suffered from the epidemic, and their general numbers and efficiency, form the subject of the Director's report, addressed to the Magistrates, and printed last November, along with that which is the preface to the present volume. It will be found in Appendix C.

a still older class, viz. 45·2 years. Of the latter (the sufferers from cholera) the more aged, as might be expected, sunk in larger proportion than the others: for the average age of those who recovered is but 36·2; while of the fatal cases the average is nearly 48 (47·9) years.

In duration of their RESIDENCE in the asylum, a similar uniformity obtains, between those who escaped and those who were attacked by diarrhœa: the average term of residence in both being precisely the same,—five years. The dysentery cases had an average of six years and three months: and the total of cholera nearly six years (5 years and 11 months.) In this particular, too, as might be anticipated, the patients who recovered, and who were generally younger, had been a shorter term in the asylum, than those who died: the average as to the former being three years and a quarter; of the latter six years and three quarters. In this we have a corroboration of the fact adverted to in the former division of this report (see page 39) that cholera was most fatal among the older residents in the asylum; several having been from fifteen to twenty years, and three between twenty and thirty years in the institution.

5.—*Employment.*

Neither had the EMPLOYMENT or non-employment of the patients, or the nature of their occupations, any perceptible effect on their liability to attack. A series of tables is before me, in which this question is analysed throughout the different classes in the several (female) wards; from which it is enough to note, that a nearly equal proportion, from 27 to 32 *per cent*, of those employed in the wards, in knitting and sewing, and in the domestic offices, suffered from diarrhœa; the highest ratio being 32·5, among the workers in the wash-house and laundry: and only 23·8 *per cent* of the unemployed. One of the latter had dysentery: about five *per cent* of the helpers in the wards and laundry: and none others.

Cholera attacked 16 *per cent* of the employed in the wards: the same proportion of knitters and sewers: 23 *per cent* of those in the house and kitchen: only 5 *per cent* of the patients in the wash-house, bake-house, and laundry: and nearly 26 *per cent* of the unemployed. The latter result may be accounted for, if we recollect, that the class contains most of the demented and infirm, the dirty and the idiotic.

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

REPORT ON THE PROGRESS OF THE WORK

BY

ALBERT EINSTEIN

1905

TABLE XXXIII.—PROGRESS OF DIARRHŒA, DYSENTERY, AND CHOLERA, COMPARED WITH DAILY DIET AND METEOROLOGICAL REGISTER.

SEPTEMBER.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			
DAILY DIET.—Dinner.		R.	M	S	M	S	M	S	R	M	S	M	S	M	S	R	M	S	M	S	M	S	R	M	S	M	S	M	S	R	M			
Number Daily Attacked	DIARRHŒA {			1		2	1		1	1	2		1	3	1				1	1	1	3		4						1				
	Men. ...																																	
	Women. ...																																	
Numbers Ill, each Day	DIARRHŒA {			1	1	1	2	1	1	2	2	2	1	4	4	4	4	4	3	3	6	6	6	10	7	7	7	7	8	4	4	4	4	
	Men. ...																																	
	Women. ...																																	
No. Died, each Day.	DIARRHŒA {			1	1	3	3	1	2	2	2	2	2	4	5	5	4	5	5	6	7	7	8	13	10	9	11	13	9	10	10	10	10	
	Men. ...																																	
	Women. ...																																	
METEOROLOGICAL REGISTER.	BAROMETER, daily mean ...	29.2	29.7	29.5	30.1	30.2	30.2	30.2	30.0	30.1	30.3	30.3	30.4	30.1	30.0	30.0	29.6	29.5	29.1	29.4	29.8	30.1	30.1	29.9	29.6	29.8	29.9	29.8	29.7	29.5	29.2	29.2		
	THERMOMETER. {																																	
	Max. ...	67	77	79	74	74	70	66½	68	73½	67	67	57½	61	61	63½	62	64	58	71	60½	63	65	63	63	67½	65	65½	62	56½	56	56		
Min. ...	52½	52	55	56	51	47	43	33	51	49	36	45	49	48	47	35½	36	34½	44	45	53	44	49	49	50	47	55½	45½	50	42½	42½			
THERMOMETERS, daily mean.	Dry bulb	61.6	65.8	65.0	62.8	61.3	54.6	53.3	49.7	58.2	57.1	52.3	51.7	55.1	54.5	56.8	51.6	50.7	46.7	54.5	53.8	57.5	54.7	58.6	56.6	56.3	55.5	58.5	54.6	53.7	49.8			
	Wet do.	59.0	59.5	59.6	59.1	56.8	51.5	48.6	45.7	55.1	54.0	48.1	49.7	49.8	51.0	51.2	49.1	45.3	42.7	50.5	50.0	54.0	50.7	52.8	53.5	52.2	51.5	53.7	52.5	52.7	48.5			
RAIN in inches		.45		.04					.08	.67	.005	.76	.003		.11				.008	.01	.07	.001					.60	.19	.83	.25				
WIND	3 A.M.		NNE	E	ENE	NNNE	NE	N	W	W	S	NW	WNW	NW	W	WSW	SE	NW	NW	WNW	N	NNE	E	NE	NNNE	NE	E	E	E	SSW	NE			
	9 "		E	SSW	E	NNNE	NNNE	NNNE	NNNE	ENE	ESSE	ESSE	SW	NE	W	W	SSW	SE	N	N	W	NNW	NE	ENE	ENE	NE	NNNE	ENE	E	E	E	SSW	NE	
	3 P.M.		ENE	S	SE	NE	E	NNNE	N	WSW	SW	S	SW	N	WNW	WSW	SSE	W	N	N	WNW	NNNE	ENE	ENE	ENE	ENE	ENE	ENE	E	E	E	WNW	NE	
9 "		E	E	ENE	NE	NE	NE	N	NW	S	SW	W	N	NW	SW	SSW	W	NW	WNW	WNW	N	NE	NE	NE	NE	NE	NE	E	W	NE	N	N		

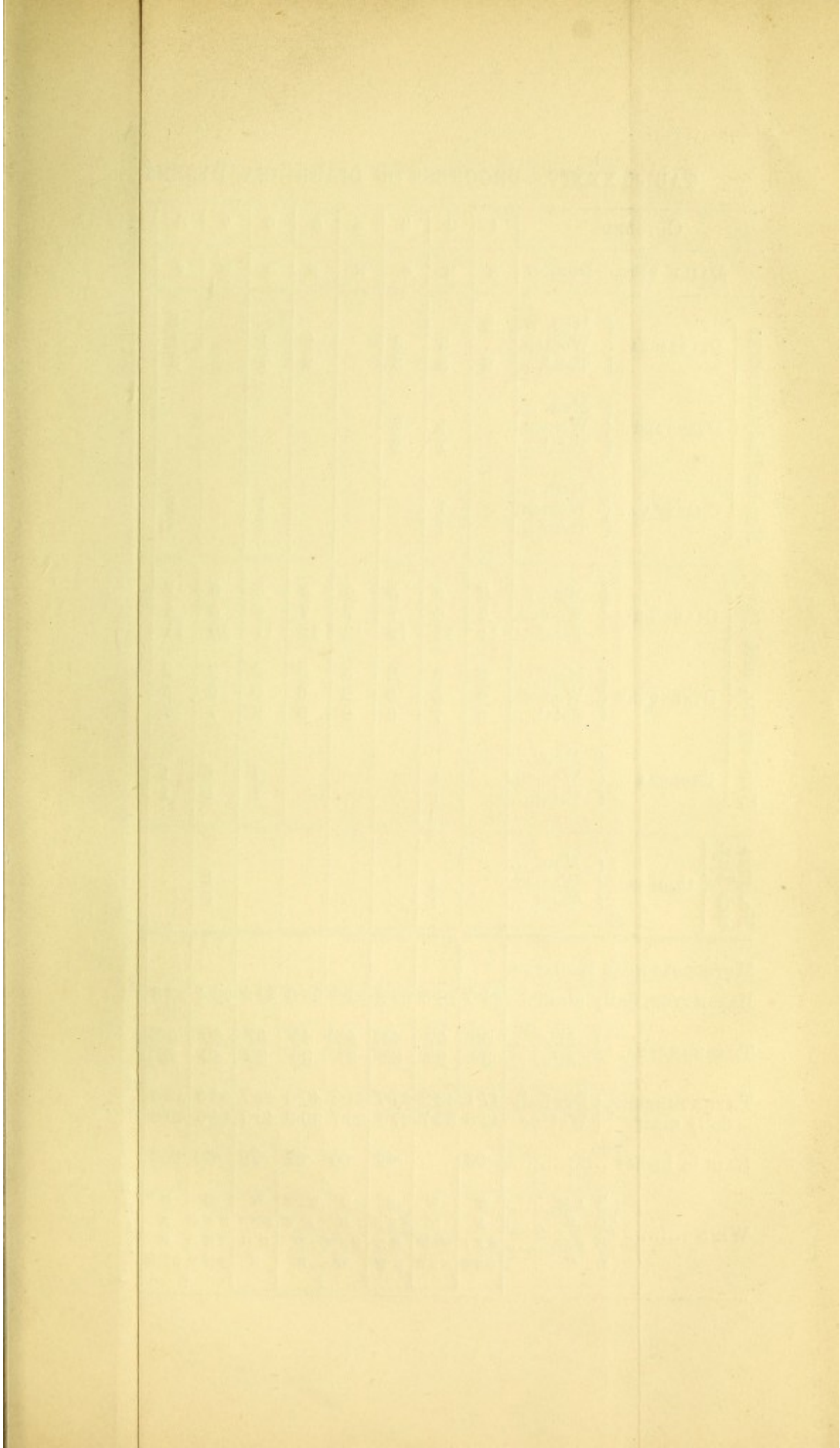


TABLE XXXIV.—PROGRESS OF DIARRHŒA, DYSENTERY, AND CHOLERA, COMPARED WITH DAILY DIET AND METEOROLOGICAL REGISTER.

OCTOBER.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
DAILY DIET.—Dinner.		s	m	s	m	s	r	m	s	m	s	m	s	r	m	s	m	s	m	s	r	m	s	m	s	m	m	m	m	m	m	m		
Number Daily ATTACKED	DIARRHŒA {	Men. ...	2						2				1		1						2	1		2	1	1	1			1	2		4	
	Women.		3	3					1				2		1						2	8	4	6	3	8	3	3	4	1	3	4	4	
	Total....	2	3	3			2	1		3			1		2		1				2	9	4	8	7	4	9	3	4	2	5	4	4	
DYSENTERY {	Men. ...																				1		1					1						
	Women.		1	2								2									1	1						1						
	Total....		1	2								2									1	1						1						
CHOLERA ... {	Men. ...						1									1					1		4	5	7	2	6	1	2	2			2	
	Women.		1						1							1			1		3	1	4	4	5	1	3	5	4	6	6	2	1	6
	Total....		1					1		1						1			1		4	5	9	11	7	7	4	7	8	8	2	1	8	
Numbers ILL, each Day	DIARRHŒA {	Men. ...	6	5	5	5	5	5	7	4	4	4	5	5	5	6	5	5	4	5	4	4	6	6	13	17	18	17	20	22	22	25		
	Women.	5	6	7	7	7	6	5	4	2	3	2	4	3	5	4	4	7	9	4	11	13	15	17	17	19	16	16	14	13	12	9		
	Total....	11	11	12	12	12	11	10	11	6	7	6	9	8	10	10	9	12	13	9	15	17	21	23	30	36	34	33	34	35	34	34		
DYSENTERY {	Men. ...	2	2	2	3	3	2	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	2	3	3	3	4	4	4	3	2	2		
	Women.	4	5	6	6	6	6	5	5	5	7	7	7	7	7	7	7	6	6	5	6	7	7	7	5	4	3	3	3	2	2	2		
	Total....	6	7	8	9	9	8	7	7	7	9	9	9	9	9	8	8	7	7	7	8	9	9	10	8	7	7	7	7	5	4	4		
CHOLERA ... {	Men. ...						1	1	1	1	1					1				6	11	15	13	17	17	16	20	21	20	11	11	10		
	Women.		1													1			1	4	7	9	10	8	8	12	14	16	19	11	7	13	9	
	Total....		1				1	1	1	1	1	1				1			2	5	10	18	24	23	25	25	28	34	37	39	22	18	19	
No. DIED each Day.	CHOLERA {	Men. ...															1			3	4	5	4	2	6	2	4	3	9	2	3	1		
	Women.																1		1	1	2	4	3	3	1	2	2	1	10	4				
	Total....		1					1				1					1		1	4	6	9	7	5	7	4	6	4	19	6	3	1	1	
METEOROLOGICAL REGISTER.																																		
BAROMETER, daily mean		29.6	29.6	29.2	29.3	29.6	29.9	29.4	29.8	29.9	29.7	29.6	29.7	30.0	30.1	30.1	29.9	29.8	30.0	29.8	29.8	29.8	29.9	29.9	29.9	29.7	29.7	29.9	30.4	30.4	29.9	29.5		
THERMOMETER.	{ Max.	56	57	43½	45½	45	57	50	53½	55	53	53	53½	52	51½	51½	53	60½	62	67½	60	56½	56½	55	60½	61	58	59	62	54	55	53		
	{ Min.	38	29	33	31	30	39	40	29½	28½	30	30½	33	32½	36	37½	34½	51	48	47	36	34	42	49	52	49	44	48	33	39	40	41		
THERMOMETERS, daily mean.	{ Dry bulb	47.1	43.3	37.7	41.3	40.6	42.7	46.5	42.5	43.2	46.6	45.0	43.5	42.7	42.1	44.6	44.0	55.1	55.8	58.1	50.0	48.0	53.2	53.2	58.7	58.8	56.2	56.1	49.1	44.6	51.1	44.6		
	{ Wet do.	43.8	39.7	37.1	39.7	39.0	40.3	44.6	39.0	40.3	38.5	41.8	39.7	39.5	39.2	40.8	41.1	51.0	52.2	54.0	45.2	45.1	49.8	51.1	55.7	55.5	53.2	53.6	44.1	42.1	47.2	42.1		
RAIN in inches .....		.03		.67	.09	.32	.70	.66	.003		.04	.03	.004	.005	.005			.001		.001	.07	.004	.02	.39	.06	.14	.05	.01	.005		.19	
WIND	{ 3 A.M.	W	W	S	N	WSW	W	E	N	W	WNW	NN	NN	N	N	NNE	E	SE	SSW	SSW	SSW	WSW	SW	S	S	SW	W	W	WSW	SE	SW	ESE		
	{ 9 "	N	W	SSE	N	SW	WSW	NNE	N	W	W	NE	NE	NNE	N	ENE	S	S	SW	WSW	SW	S	W	SSW	SSE	W	SE	W	SE	W	SE	SSE		
	{ 3 P.M.	NNE	WSW	NE	NNW	W	SE	NNE	N	WSW	SSE	E	NE	NNE	NNE	ENE	SSE	S	SSE	SW	W	SSE	W	SSW	SSW	WSW	WNW	WNW	SSSE	SSW	SE	SE		
{ 9 "	NNW	WNW	NW	W	W	E	NNE	WNW	W	NN	NN	N	N	N	ENE	S	SSW	SE	S	NW	SSW	E	SW	SSW	SW	W	W	S	SSW	SE	SE			

THE UNIVERSITY OF CHICAGO

NO.	NAME	RESIDENCE	DATE	REMARKS
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TABLE XXXV.—PROGRESS OF DIARRHŒA, DYSENTERY, AND CHOLERA, COMPARED WITH DAILY DIET AND METEOROLOGICAL REGISTER.

NOVEMBER.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
DAILY DIET.—Dinner.		M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	
Number Daily Attacked	DIARRHŒA.	Men. ...	2	1	2		1					2	3			1	1		3	1	1			1	4	2	1		1	2			
		Women.		3	4		2		1					3				1		3	1	1			5	2	1		1	1	2		
		Total...	2	4	6		2	1					2	3			1	1		3	1	1			5	2	1		1	2			
	DYSENTERY.	Men. ...			1																									1			
		Women.				1					1																			1			
		Total...			1	1					1																			1			
	CHOLERA...	Men. ...		2					1					1		1											1	1		1			
		Women.													1												1	1		1			
		Total...	2	2	1		1		1					1	1	1										1	1		1				
	Numbers ill, each Day	DIARRHŒA.	Men. ...	23	22	18	15	15	9	9	9	6	6	7	6	7	7	4	4	4	4	4	3	3	3	3	3	2	2	2	2	2	2
			Women.	7	7	11	8	6	5	5	4	2	2	2	5	5	4	4	3	2	5	5	4	3	3	7	4	3	3	3	4	1	1
			Total...	30	29	29	23	21	14	14	13	8	8	9	11	12	11	8	7	6	9	9	7	6	6	10	7	7	5	5	5	6	3	2
DYSENTERY.		Men. ...	2	2	3	3	3	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
		Women.	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	
		Total...	3	3	4	4	4	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	2	1	1	1	1	2	2	2	2	2	
CHOLERA...		Men. ...	7	9	7	6	6	6	6	6	6	4	4	5	4	2	2	1	1	1	1	1	1	1	1	1	2	2		1			
		Women.	11	9	8	8	8	7	6	6	6	5	4	4	5	3	2	2	2	2	1	1	1	1	1	1	2	2		1			
		Total...	18	18	15	14	14	13	12	12	12	9	8	9	9	5	4	3	3	3	2	2	2	2	2	2	2	2	2	1	1		
No. Died each Day.		CHOLERA	Men. ...	1	1	1		1								1	1	1										2		1			
			Women.	2	1		1	1									1	1	1														
			Total...	3	2	1	1	1	1								1	1	1										2		1		
METEOROLOGICAL REGISTER.																																	
BAROMETER, daily mean ...		29.5	29.6	29.4	29.0	29.0	29.5	29.9	30.1	30.1	30.1	29.9	29.6	29.4	29.7	30.0	30.1	29.9	30.0	30.0	30.0	29.7	29.3	29.3	29.5	29.9	30.1	29.9	29.7	29.8			
THERMOMETER.	Max. ...	51	52½	48	48	47	42	55½	59	57	59	60½	56½	55	45½	46	47	50	54	50	47	46	44	46½	43	41½	37	36½	32	41½	46		
	Min. ...	45	35	35	38	36	31	35	52	49	46	46	45	41	37	38	29½	33	47	43	42	40	40½	32	31	31	30	22	21	33	33		
THERMOMETERS, daily mean.	Dry bulb	47.2	43.9	39.9	44.5	41.1	36.6	44.9	54.7	53.9	53.4	52.6	50.6	46.2	40.4	41.7	37.6	40.7	51.2	45.6	44.0	42.6	42.5	44.4	35.1	33.2	33.5	28.6	27.2	36.4	39.9		
	Wet do.	45.0	43.0	38.9	42.4	39.0	35.2	43.0	51.6	50.5	49.5	48.1	47.0	43.5	39.0	38.5	35.5	39.2	49.5	44.2	42.5	41.0	41.1	44.0	34.2	32.5	32.4	28.0	26.4	34.9	38.9		
RAIN in inches .....			.01	.007	.08	.24	.14	.40					.01	.009	.06				.07	.01			.03	.19						.52	.01	
WIND	3 A.M.	SSW	ESE	SW	S	S	NW	W	SW	SW	S	SW	SW	SW	SW	W	WNW	WNW	SW	NW	S	ESE	ESE	S	S	S	WNW	WNW	W	ESE	SE		
	9 "	ESE	ESE	S	S	SW	WSW	S	SW	SSW	SW	ESE	SW	WSW	SE	W	W	W	SW	N	SE	SE	ESE	SE	SW	W	SE	NW	NW	SE	S		
	3 P.M.	E	ESE	E	SE	SW	WSW	SE	SW	SSW	S	SW	SW	WSW	SW	WNW	WNW	W	W	ENE	SE	ESE	ESE	SE	SW	NW	SE	E	E	SE	WNW		
	9 "	E	W	ESE	SSW	W	W	WSW	SW	SW	SSW	SW	SW	WSW	WSW	WNW	WNW	WSW	W	SSE	ESE	ESE	ESE	S	S	W	WNW	WNW	WNW	SE	S	W	

6.—*Diurnal Registers.*

In tables XXXIII to XXXV, a daily record is given of the numbers attacked and the numbers ill, throughout the three months of the epidemic, distinguished into cases of diarrhœa, of dysentery, and of cholera: so that on any given day a reference to the tables will shew, how many patients of each sex were suffering from each form of disease. At the head of each column is indicated the general dinner for the day, by initial letters for Meat, Soup, and Rice-stew;—breakfast and supper consisting of oatmeal-and-milk porridge up to the 25th of October; after that date of flour porridge and tea. And to afford a ready comparison with the state of the weather during the same period, an accurate meteorological register is appended, in similar daily columns. The latter has been kindly supplied to me by my scientific friend MR. MILNER, from his records at the House of Correction, of which he is a resident medical officer; and the locality of which, a mile distant from the asylum, is sufficiently contiguous for the purpose of our illustrations. The height of the barometer is given in mean terms, from four daily observations: the maximum and minimum heat of the day recorded by the self-registering thermometers: and the height of the wet and dry-bulb thermometers stated in a mean of daily observations. The amount of rain each day is also given: and the direction of the wind, at quarterly periods of the twenty-four hours. With respect to the latter it may be well to add, that it has been collated and corroborated by slight daily memoranda, as to the wind and weather, entered by myself in the journal book, at my daily visits to the asylum.

A brief review of the data afforded by these tables will be found in sections 12 and 13, which describe the progress and decline of the pestilence.*

* A comparison of the development of cholera with contemporaneous meteorological changes, is most distinctly exhibited in some diagrams, in which I have expressed all the particulars in the adjoining tables, by rising and falling lines in parallel series. But these would be much less easily adapted to the requirements of the printing-press, than numerical annotation.

For a similar reason, a diagram which shews a bird's-eye view of the womens' wards, with the date and duration of every attack of illness, through the three months, by varied and continuous lines, is also omitted from the present volume.

7.—Proportion of disease in Wards.

Table XXXVI shews the amount of epidemic illness in each ward during the months included in our inquiry ; with the numbers resident in each on the first of October, and the total affected : also the per centages which bring them all to a common standard.

The proportions vary so widely in many similar and contiguous wards ; and contradict so much of previous expectation, in their results ; that no very obvious inferences seem deducible from them,—with one fatal exception.

Among the WOMEN'S WARDS that which had the greatest number of invalids was No. 2, the story immediately below 3, in which cholera first appeared. In No. 2, 75 *per cent* of the inmates were ill during the epidemic : and the next in order were wards 3 and 10, both also in the new building. With regard to the latter it may be observed, that all the cases of bowel complaint were simple diarrhœa, except one fatal attack of cholera : in most the disorder was slight ; and the seeming large number of them is owing rather to the extra vigilance of the nurse, in reporting every slight ailment, than to an actually greater amount of diarrhœa in this, than in adjoining wards. At least, if they were more numerous, they were more evanescent.

It may be remarked, that cholera was not so destructive either in 12 or 16, the chief recipients of dirty patients, as in several more cleanly wards : and that the ratio of deaths to cases of cholera was nearly equal, or rather greater in 16 than 12 ; a result at variance with the proportionate mortality in previous years, adverted to at page 33.

More than one half the cases of dysentery were in No. 2 ; a fact that is not accounted for by any peculiarity in the ward or its inmates. The greatest proportion of victims to cholera were in Nos. 1, 14, and 13, the two former very clean and orderly wards, and the last not particularly the reverse, as may be estimated by reference to table XXIII. The least were in 10 and 18 : the latter the passage ward, leading to the new building, through which all the unfortunates who were being conveyed to the hospital, from the old asylum, had to pass, and which would appear most exposed to contagion, if it existed.

TABLE XXXVI.—SUMMARY OF ILLNESS IN WARDS DURING SEPTEMBER, OCTOBER, AND NOVEMBER, 1849.

MENS' WARDS.	Numbers Resident.	Cases of DIARRHŒA.			Cases of DYSENTERY			CHOLERA.			RATIO PER CENT : :: TO RESIDENTS.				PER CENT :: TO CASES OF CHOL.	
		Cases of DIARRHŒA.	Cases of DYSENTERY		Cases.	Recovered.	Died.	Total ill.	DIARRH.	DYSENT.	CHOLERA.	Recovered.	Died.			
			Died.													
O B —1	15	...	...	...	7	...	7	46·6	...	...	46·6	..	100		
2	16	...	...	...	2	1	1	12·5	...	...	12·5	50·0	50·0		
3	31	9	2	2	16	3	13	87·0	29·0	6·4	51·6	18·7	81·2			
4	18	4	...	...	4	1	3	44·4	22·2	...	22·2	25·0	75·0		
5	15	6	...	...	1	...	1	46·6	40·0	...	6·6	...	100		
6	25	7	2	1	6	1	5	60·0	28·0	8·0	24·0	16·6	83·3			
7	30	8	1	...	5	...	5	46·6	26·6	3·3	16·6	...	100			
9	33	1	2	1	6	4	2	27·2	3·0	6·0	18·1	66·6	33·3			
N B —5	26	9	1	...	6	...	6	61·5	34·6	3·8	23·0	...	100			
6	33	10	1	...	9	...	9	60·6	30·3	3·0	27·2	...	100			
7	27	12	...	...	4	...	4	59·2	44·4	...	14·8	...	100		
8	27	3	1	...	2	1	1	22·2	11·1	3·7	7·4	50·0	50·0			
TOTAL ...	296	69	10	4	68	11	57	49·6	23·3	3·3	22·9	16·1	83·8			
WOMENS' WARDS.																
O B —11	25	3	2	...	5	2	3	40·0	12·0	8·0	20·0	40·0	60·0			
12	25	6	...	...	6	2	4	48·0	24·0	...	24·0	33·3	66·6		
13	30	5	1	...	8	2	6	46·6	16·6	3·3	26·6	25·0	75·0			
14	27	7	...	...	8	2	6	55·5	25·9	...	29·6	25·0	75·0		
15	29	9	...	...	3	...	3	41·3	31·0	...	10·3	...	100		
16	27	9	...	...	7	1	6	59·2	33·3	...	25·9	14·2	85·7		
18	25	11	...	...	2	...	2	52·0	44·0	...	8·0	...	100		
N B —1	30	6	1	...	9	1	8	53·3	20·0	3·3	30·0	11·1	88·8			
2	29	11	6	...	5	2	3	75·8	37·9	20·6	17·2	40·0	60·0			
3	28	11	1	...	5	1	4	60·7	39·2	3·5	17·8	20·0	80·0			
4	27	8	...	...	5	2	3	48·1	29·6	...	18·5	40·0	60·0		
10	22	15	...	...	1	...	1	72·7	68·1	...	4·5	...	100		
TOTAL ...	324	101	11	...	64	15	49	54·3	31·1	3·3	19·7	23·4	76·5			
TOTAL BOTH SEXES.	620	170	21	4	132	26	106	52·0	27·4	3·3	21·2	19·6	80·3			

At the MEN'S end wards 2 and 5 O.B., (the shoe-makers' and tailors' wards) and 8 N.B. enjoyed a similar fortunate exemption, only one case of cholera having occurred in 5, and two in each of the others: and only one patient died from each. The greatest relative number of diarrhœa was also in 5, and in 7; but by far the highest proportion of cholera was in Nos. 1 and 3.

Number 3 is connected with the weaving shops, and is one of the receiving wards for dirty and refractory patients, of which class its inmates chiefly consist. It is on the ground floor of the north wing, at the eastern end of the old building, and contains sleeping rooms for twelve patients: but for several years past, it has had a basement story, below No. 1, attached to it as a dormitory; and thus accommodated thirty-one inmates, beside two attendants, at the period of the irruption of cholera. The basement story is in the eastern wing, the only part of the old building which, from the undulation of the slope on which the asylum is built, admits of a story below the ground floor of the rest. It is more nearly level with the airing court on the south, but has a rising bank behind it on the north; and being more cheerless and gloomy than any other ward, has only been inhabited since the asylum was filled to overflowing. It was in No. 3 and its dormitory, it may be remembered, that the mortality of 1848-9 was so great, as to attract notice in the first part of our inquiry.*

This unfortunate ward was the most aggravated nidus of the pestilence in the asylum. No less than 87 *per cent* of its inmates were affected with epidemic disease;—29 *per cent* with diarrhœa; 6 *per cent* with dysentery; and more than one half (51 *per cent*) with cholera; of whom eight-tenths died!

Of sixteen cases of cholera in No. 3, ten were individuals that had, about that period, been sleeping in the basement story: only one of these recovered. Six were found collapsed, on opening their room door in the mornings; and all died. Two of them

* Possibly it may be noticed, that the number of deaths in two or three wards does not correspond in Tables XIX and XXXVI. This arises from a trifling difference in the arrangement of the cases, during the progress of the work; as for instance, an omission of three patients in ward 7 of Table XIX, who are entered as cholera in Table XXXVI, for reasons explained in page 57; and a difference in the entry of two women, who belonged ward 1, and died in 3, after the removal of the patients from the one ward into the other.

had suffered from diarrhœa: the rest had no premonitory ailment.

Of the six who slept in the ward, two also had previous diarrhœa: four died and two recovered. Those belonging to the basement story were the worst and most fatal; and one half of its inmates died of cholera.

Immediately after the fumigation of the wards, this dormitory was closed; and the numbers in ward 3 were reduced to so many as can be accommodated in its eleven beds: and it is due to its active and intelligent attendants to add, that since the cessation of the epidemic (during the last six months of which I can speak from personal experience, having had charge of the men) No. 3 has been one of the most healthy wards in the asylum.*

Another disparagement to No. 3 is the cheerless aspect and limited extent of its airing court, darkened on the south and west by the tall fabric of the asylum, and curtailed on the north by a range of weaving shops and stoving house. The allotment of a small airing court, with high partition walls, is a disadvantage common to most of the men's wards in the old building, which it is highly desirable should be remedied, as has been done some years ago at the women's end, by knocking down the divisions and throwing two or three of the courts into one, common to several wards; rendering them thus more roomy and airy, while they are quite as convenient, and admit of being laid out with more ornamental effect:—the last a point of great consequence, where cheerful appearance is so important, and every association of imprisonment to be avoided.

The numbers who died in HOSPITAL, and in their respective wards, are given in Table XIX, (page 31); where the total deaths from cholera are stated, both with reference to the wards which they belonged, and where they died,—including the hospitals.

It will be observed that a much larger proportion of women died in hospital, than of men,—21 of the latter, and 41 of the former: and a correspondingly greater number of men died in the wards in which they were taken ill. Whether any, and what effect, the removal had on the issue of the cases, there is not sufficient evidence to determine. There was not much difference in liability of the two sexes to attack,—as 19 to 22 *per cent* of the residents:

* The mortality from cholera in wards 1 and 3, is further adverted to in section 13.

the recoveries were in greater proportion among the women, as 23 to 16 *per cent* of cases: and the deaths of the men were more numerous as 83 to 76 *per cent*. The difference, however, cannot be ascribed with certainty to any system of treatment, but may depend on peculiarities of sex or several other causes.

8.—*Aspect of the Wards.*

The aspect of the wards has been considered in reference to the sickness and mortality: and a table lies beside me, similar in arrangement to the last quoted, in which the wards, including both sexes, are classed according to their position toward the north, south, east and west. The greatest proportion of illness was in the northern wards, (3 & 6 of the men, and 12 & 16 of the women), and the least in the southern, (2, 5, 11 & 15,) as 58 to 36 *per cent*. This result might be expected independent of anything in the situation of the wards: for those toward the north all contain dirty and refractory patients; to the south all clean and convalescent. The western (women's) wards were more sickly than the eastern (men's) as 51 to 45 *per cent*. Cholera attacked 29.5 *per cent* to the north: 25 *per cent* to the east: 21.9 *per cent* west: and only 12.9 *per cent* south:—the cases belonging the basement being separated from those in ward 3, and included in their respective aspects. In the east wards 95 *per cent* of those attacked, died: 77 *per cent* in the west: 72 *per cent* in the south: and only 69 *per cent* in the north.

The situation and form of the new building precludes any consideration of its aspects, because the erection stands east and west, and the sleeping rooms in every gallery are toward the north and south: and as the whole of the eastern half is allotted to females, and of the western to men, no comparison of difference apart from that of sex can be instituted. It may be noticed, however, that the first case in No. 3 occupied a room to the north; the second was taken ill in one to the south; the third to the north; and the fourth to the south. Thus no uniformity of aspect attended the earliest cases.*

* Mr. Naylor has a series of plans of every ward, with the situation of each bed, and an enumeration of those in which any case of illness occurred, but I am not aware of the result of his investigation.

9.—*Sanatory condition of the patients.*

It is, as has been before remarked, to the physical rather than the mental state of those attacked, that we must look for elucidating the nature of cholera, and of the circumstances which favor, or are preservative against, its approaches. Accordingly I submitted to statistical analysis the number of patients affected with diarrhœa, dysentery, and cholera, under each division among the foregoing tables: and in order to arrive at a due estimate of their results, the whole are reduced, throughout every combination, in every ward, to per centages. And further to illustrate, and being under the eye more distinctly, the proportions of those attacked in each ward, and thus to test their separate conditions, many of the results are depicted in the form of diagrams, drawn to a given scale; whereon lines variously characterising the different forms of disease, represent in rising and falling ratios, on parallel columns for the several wards, the particulars meant to be indicated.

These tables (to the number of about sixteen, and eighteen diagrams) afford a complete analysis of the proportionate number of patients who suffered in each particular class. But their results, though they seemed indispensable to the progress of the inquiry, are unsatisfactory, for this reason;—the patients grouped together under each head, differ in other important particulars which affect the value of the comparison. For instance, of patients classified according to their state of health, many of the feeble were on extra diet, while some had ordinary fare; some were dirty in their habits, and others cleanly: and, as it is chiefly important to ascertain the relative influence which these three specialities had on the growth and progress of the epidemic, none of the tables which classified them separately, and irrespective of the other, can afford an accurate solution.

It was necessary, then, to push the analysis further, and so to contrive a classification, that the particulars required may be compared in such patients, as were alike in all other important respects, *except* those to be contrasted. A re-arrangement was therefore made, that I trust is free from objection, and is shewn in Tables XXXVII to XLI.

TABLE XXXVII.—SANATORY STATE OF FEMALE PATIENTS IN WARDS.

OCTOBER—1849.			OLD BUILDING.										NEW BUILDING.				TOTALS.	
HABITS.	HEALTH.	DIET.	TOTAL.	11	15	12	16	13	14	18	1	2	3	4	10	O. B.	N. B.	
Clean	Good	Meat ...	47	4	9	2	2	3	5	4	3	4	6	4	1	29	18	
		Common	143	13	8	2	9	13	14	14	14	20	13	16	7	73	70	
	Feeble	Meat ...	46	2	7	2	2	2	3	4	2	1	9	3	9	22	24	
		Common	37	7	6	1	...	3	4	1	4	5	...	2	4	22	15	
Dirty	Good	Meat ...	6	...	...	1	2	...	...	...	2	...	...	1	...	3	3
		Common	31	1	...	9	6	9	...	2	2	...	1	1	...	27	4	
	Feeble	Meat ...	15	...	1	2	6	1	1	...	3	...	...	...	1	11	4
		Common	9	...	...	6	1	1	...	...	1	...	...	...	...	8	1

TABLE XXXVIII.—SANATORY STATE PER CENT.

			A :: TO NUMBERS RESIDENT IN EACH.														
HABITS.	HEALTH.	DIET.	TOTAL.	11	15	12	16	13	14	18	1	2	3	4	10	O. B.	N. B.
Clean	Good	Meat ...	14.0	14.8	29.0	8.0	7.1	9.3	18.5	16.0	9.6	13.3	20.6	14.8	4.5	14.8	12.9
		Common	42.8	48.1	25.8	8.0	32.1	40.6	51.8	56.0	45.1	66.6	44.8	59.2	31.8	37.4	50.3
	Feeble	Meat ...	13.7	7.4	22.5	8.0	7.1	6.2	11.1	16.0	6.4	3.3	31.0	11.1	40.9	11.2	17.2
		Common	11.0	25.9	19.3	4.0	...	9.3	14.8	4.0	12.9	16.6	...	7.4	18.1	11.2	10.7
Dirty	Good	Meat ...	1.7	...	...	4.0	7.1	...	...	...	6.4	...	...	3.7	...	1.5	2.1
		Common	9.2	3.7	...	36.0	21.4	28.1	...	8.0	6.4	...	3.4	3.7	...	13.8	2.8
	Feeble	Meat ...	4.4	...	3.2	8.0	21.4	3.1	3.7	...	9.6	...	...	...	4.5	5.6	2.8
		Common	2.6	...	...	24.0	3.5	3.1	...	...	3.2	...	...	...	...	4.1	0.7

TABLE XXXIX.—SANATORY STATE OF FEMALE PATIENTS WHO WERE ILL.

SEP., OCT., & NOV., 1849.		CASES OF				CASES OF CHOLERA				Total.				
		HABITS.	HEALTH.	DIET.	Dysentery	Diarrhoea	Dysentery	Diarrhoea	Dysentery			Diarrhoea	Dysentery	
Clean	Good	Meat ... Common	19	1	2	1	2	...	...	2	...	3	4	
			39	6	7	...	3	...	6	...	9	4	10	14
Dirty	Feeble	Meat ... Common	15	2	2	...	1	...	...	1	1	...	5	6
			15	2	3	2	...	1	...	1	3	1	3	7
Total number of Cases ...	Good	Meat ... Common	2	...	...	...	...	...	...	...	...	...	3	3
			7	...	4	...	...	1	...	1	4	...	3	7
Total number of Cases ...	Feeble	Meat ... Common	3	...	...	...	...	...	...	...	...	...	5	6
			1	...	1	...	...	1	...	1	1	...	1	2
			101	11	19	3	42	...	9	15	...	33	49	

TABLE XL.—PROPORTION PER CENT TO PATIENTS IN EACH DIVISION.

SEP., OCT., & NOV., 1849.		CASES OF				CASES OF CHOLERA.				Total.				
		HABITS.	HEALTH.	DIET.	Dysentery	Diarrhoea	Dysentery	Diarrhoea	Dysentery			Diarrhoea	Dysentery	
Clean	Good	Meat ... Common	40.4	2.1	4.2	2.1	4.2	...	...	4.2	...	2.1	6.3	8.5
			27.2	4.1	4.8	...	2.0	...	4.1	...	6.2	2.7	...	6.9	9.7
Dirty	Feeble	Meat ... Common	32.6	4.3	4.3	...	2.1	...	...	2.1	2.1	...	10.8	13.0
			40.5	5.4	8.1	2.7	...	2.7	...	...	8.1	2.7	...	8.1	18.9
Total number of Cases ...	Good	Meat ... Common	33.3	...	...	...	...	...	...	...	...	...	50.0	50.0
			22.5	...	12.9	...	...	...	3.2	...	12.9	...	...	9.6	22.5
Total number of Cases ...	Feeble	Meat ... Common	20.0	...	...	6.6	...	...	...	...	...	6.6	33.3	40.0
			11.1	...	11.1	...	...	...	11.1	...	11.1	...	...	11.1	22.2
			30.2	3.2	5.6	0.8	12.5	...	2.6	4.4	...	9.8	14.6	

TABLE XLI.—AVERAGE DURATION OF CASES OF DIARRHŒA, DYSENTERY, AND CHOLERA IN EACH SANATORY DIVISION.

SEPTEMBER, OCTOBER, AND NOVEMBER, 1849.		IN CASES OF CHOLERA.														
HABITS.	HEALTH	DIET.	DURATION IN CASES OF		PREMONITORY ATTACK.			DURATION AFTER COLLAPSE.			DIED.—WITH PREVIOUS					
			Diarrhœa	Dysentery	RECOVERED.	DIED.	RECOVERED.—WITH PREVIOUS	DIED.—WITH PREVIOUS	Diarrhœa	Dysentery	No P. S.	Total Rec.	No P. S.	Total died		
Clean	Good	Meat ...	3.5	4.0	2	...	9	...	7.5	...	...	...	16	†64	48.0	
		Common	2.4	16.6	4	...	...	...	5.6	...	12.1	10.0	...	...	37.7	31.5
	Feeble	Meat ...	3.9	16.5	*...	...	4	...	*...	...	...	...	21	...	31.0	29.3
		Common	3.3	12.5	...	...	3	32	...	...	20	20	56.6	6	20.6	34.0
Dirty	Good	Meat	1.5	...	...	...	...	...	...	...	...	...	...	...	62.6	62.6
		Common	2.5	...	...	...	†4.5	...	...	...	15	15	†44.0	...	20	†32.0
	Feeble	Meat ...	3.6	...	...	...	...	22	...	...	...	...	...	18	26.4	25.0
		Common	1.0	...	...	...	5	...	...	...	7	7	147	...	4.0	75.5
Number of Cases			101	11	*5	...	†12	3	*5	...	9	*14	†12	3	†32	†47
Average of Duration....			3	14.7	*3.2	...	†3.5	21	*6.4	...	12.7	10.5	†44.5	13.3	†34.5	†35.7
AVERAGE IN DAYS.												AVERAGE IN HOURS.				

N.B.—In the above Table are not included the cases of *Eli. Fenton**, *Mary King*†, and *Martha Emmett*†.

In these tables the several combinations of habits, health, and diet are specified; and the proportion of females in each division, who suffered from disease is stated. The form of disease, too, is indicated, and the amount of recoveries and deaths under each variety. And in Table XLI the *duration* of disease is given under each separate division; the term of diarrhœa and dysentery, whether simple or premonitory, being recorded in days, and the duration of fatal cholera, after collapse, in hours.

They will thus be found to present a complete epitome of the amount of alvine disease during the period in question; and will enable one to weigh with at any rate a near approach to certainty, the relative influence which habits, diet, and previous state of health of the patients, had on their liability to attack, and their power of resisting its fatal virulence.*

To estimate the influence of DIET, we may observe, from Tables XXXVIII, and XL, that of cleanly patients, in general good bodily health, about 43 *per cent* were (October 1st) on common diet, and 14 *per cent* had daily meat dinner and extras. Of the former, on common diet, 27 *per cent* were affected with diarrhœa; and 40 *per cent* of the latter: or about half as many more of those on extra, as on ordinary fare. But of those attacked with dysentery, the proportion was twice as great on common, as on meat diet. And if we look to the total cases of cholera, we shall find them one-fourth more numerous among those on common, than of those on full, or meat diet; the chief difference being among cases without premonitory symptoms; of whom there were 6 *per cent* on meat diet, but 11 *per cent* on common fare. The recoveries from cholera were larger in proportion amid the patients affected who were on common diet: the mortality nearly alike in each.

From these data we may infer, that the difference between the ordinary diet of the asylum (with three days soup and four meat dinners a week) and full diet (without soup, and with daily meat rations and other extra allowances) had this effect on the epidemic:—patients were at least equally susceptible of attack, or those on

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meat diet most so ; but in the majority of patients on full diet, their illness ended in diarrhœa only, while a larger proportion of those on common diet were liable to cholera, and were chiefly attacked without premonitory symptoms.* It cannot be said that the diarrhœa of those on common diet passed into cholera, because the proportion of cases preceded by diarrhœa were alike in each : neither can it be supposed that the larger amount of animal food, in those of full diet, could aggravate the tendency to diarrhœa, while it diminished the liability to cholera : and therefore, unless the above explanation be admitted, and unless we may conjecture the effect of an infectious principle in cholera, superadded to an epidemic influence in diarrhœa, it must be inferred that diet had little effect on the proportionate numbers attacked, or on the degrees of recovery or fatality among patients in previously good health.

Amid feeble patients, on full, and on common diet, the proportions were the reverse of those among the healthy. There was a larger ratio of the latter attacked with diarrhœa, 40·5 to 32 *per cent* ; with dysentery, 5 to 4 *per cent* ; and with cholera, 21 to 15 *per cent*. Only one patient recovered from cholera in each division ; while the deaths were 19 *per cent* of those on common diet, and not more than 13 *per cent* on full rations. From this we may infer, that three cases of diarrhœa might probably have been prevented, among the female patients, if *all* those in feeble health had been on full diet : and that, by the same means, three cases of cholera might perhaps have been averted ; and the deaths been reduced by two or three:† a clear argument in favor of a liberal allowance of extra diet to those patients, whose general health is less than ordinarily robust ; or who are suffering from bodily disease.

The next question is, what bearing had the state of previous general HEALTH on the fate of those exposed to the epidemic ?

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To ascertain this, we again limit ourselves to cleanly patients, and contrast those in opposite states of health, who were all equally on *full* diet: this latter precaution being evidently necessary to avoid the unfavorable tendency of common diet on the feeble, as was shewn in the last paragraph; and to enable us to bring the classes to be compared, as much as possible under similar conditions, except in point of previous health.

Of the cleanly female patients, on full diet, in good health, 40 *per cent* were attacked by diarrhœa; and only 32 *per cent* of the feeble: a result as unexpected as in the former experiment. But two cases of dysentery occurred among the feeble, and only one amid the healthy. Of those attacked with cholera, in these divisions, were 12 *per cent* of patients in good health, and 15 *per cent* of the feeble. The recoveries of the previously healthy were 4 to 2 *per cent*: while 13 *per cent* of the feeble died, and only 8.5 *per cent* of the more healthy class: and again, it may be remarked, that the difference lies chiefly among those cases, that were not preceded by what are termed premonitory symptoms.

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Of 174 patients in good health and on common diet, 16 *per cent* of the cleanly, and about 26 *per cent* of the dirty, were attacked with cholera: or in other terms, out of eight patients of this class who had that disease, three may be estimated to have suffered in consequence of want of cleanliness. And the ratio of deaths is still higher, 9 to 22 *per cent*, for seven out of those eight dirty patients died; while the proportion of cleanly patients who died would have reduced the number to three. Four out of the seven, may be considered, therefore, to have fallen a sacrifice to uncleanly habits.

Only one-tenth of dirty patients recovered from cholera, or 2 out of 20: but of 44 cleanly patients attacked, 13, or nearly one-third, survived. And glancing further, generally, over the table before us, it may be observed, that the largest proportion of diarrhœa occurred among the cleanly, in good health, and on full diet; and among those in feeble health, on common fare: while the smallest proportion is found in the class lowest in sanatory scale, the dirty and feeble, without extra diet. This latter class includes but nine persons, one of whom had diarrhœa, and only for one day: but three of them, or one-third of the whole, were attacked by cholera; and, of these, two died. Three out of six dirty patients, in previous good health, and on full diet, were attacked by cholera, and all died: the highest per centage in any division, though the numbers included were few.

In point of DURATION the cases of diarrhœa present also the unexpected result, that those on full diet were generally longer than on common; though the difference is not great, and the average of the entire aggregate of cases, only three days. Those of dysentery were too few, and too widely dissimilar in duration, to afford a satisfactory comparison. Of the cholera cases that recovered, the premonitory diarrhœa, when present, was twice as long in those on common, as on meat diet: and the latter were more rapid in their recovery as 10 to 7 days: those who died on the other hand, that had ordinary fare sank in 31 hours; while those that had full diet lingered on an average 48 hours.

Generally speaking, the fatal cases of the dirty were more protracted than those of the clean; and most so were those of the lowest class in the sanatory divisions. The most rapid, as a class, being found in the dirty and feeble on full diet.

It seems unnecessary to comment at greater length on these distinctions, however, as the tables afford facility for any who wish, to enter into more prolonged and minute details.

10.—*Origin of the Pestilence.*

Having briefly reviewed the amount and extent of the ravages committed by cholera in the asylum, and the classes of patients who were most affected by it, and by contemporaneous diarrhœa and dysentery, we are in a position to inquire with more satisfac-

tion into its nature, and to attempt some solution of the vexed questions, as to its origin and progress.

The circumstances under which the first case occurred are shortly adverted to in the former report. A female named *Elizabeth Fenton*, was admitted on September 17th, from Gomersal Workhouse. She was said to be epileptic and frequently violent; but nothing was recorded in the warrant to be otherwise amiss with her bodily health. She was brought in about three o'clock p.m.; and at nine the same evening was reported to be suffering from diarrhœa, for which medicine was immediately prescribed and administered: and, as the Relieving Officer who accompanied her, had stated, that two persons died of cholera in the Gomersal workhouse the previous night, the attention of the medical officers was anxiously directed to her case; and the precautions were taken that were before mentioned. Next day the diarrhœa continued, with pale and liquid dejecta; and calomel and opium were freely given with apparent relief: for on the 19th *Fenton* was said to be better; and on the 20th the bowels were less relaxed, though the excretions remained pale and serous. On the 22d the record is "bowels quiet during the night, and not moved this morning: continue the pills three times a day." The patient remained a little better, till the 25th, when her excretions are stated to be "feculent and healthy;" but she was exceedingly feeble, and salivation having commenced, the mercurial medicine was omitted. During the following night she was seized with severe vomiting and purging, and became collapsed and livid: brandy was freely given to her; but no further medicine for a day or two, as she was suffering acutely from ptyalism; and the collapse was then (it may be correctly) ascribed to the combined effect of the mercury and the previous diarrhœa. Next morning *Fenton* was removed to hospital, where she remained for many weeks in a state of extremely perverse, and often violent, mania, with a succession of anomalous ailments, compounded of epilepsy, hæmorrhage from the bowels, hæmorrhoids, and cholera; till her symptoms assumed a more distinct form of chronic dysentery, from which, after some months, she has slowly recovered.

While *Fenton's* case was still a matter of anxious doubt, and before she had the attack on the night of the 26th, which more nearly resembled cholera, the second patient who suffered, fell ill,

and was carried off,—*Mary Morley*: and three others were successively attacked in the same ward, as narrated in the previous report, viz: *Sarah Atkinson*, *Mary Marr*, and *Jane Loukes*.

It would greatly prolong these remarks, were I to quote at length, even the brief records which the journals of the asylum contain, of these important cases; but it may be sufficient to state, that there was nothing in the previous history or habits of any of them, to account for their being victims, rather than others in the ward, to cholera or other similar attack. *Fenton* had full sick-room diet, consisting chiefly of rice-milk, sago, beef-tea, and brandy, after her admission: *Morley's* dinner the day she was attacked, had been the usual Saturday's fare, rice-stew with meat: *Sarah Atkinson* began during a Monday night, after soup dinner: and the other two, *Marr* and *Loukes*, had meat dinners allowed daily. Not one of them had been subject to disordered bowels: all were orderly and clean in their habits, except *Fenton*: and none were employed out of the ward. The only one, indeed, who was capable of any industrious occupation, was *Jane Loukes*. She was liable to occasional paroxysms of mania, and short attacks of simple fever; but when well, as she had been for many months preceding cholera, she was a most industrious knitter, usually completing a pair of stockings each day.

Fenton's age was 37; *Morley's* 35; *Atkinson's* 39; *Marr's* 54; and *Loukes'* 64: and when attacked they had been resident in the asylum respectively, one week; five years; ten months; seven years; and fourteen years. One, *Atkinson*, was labouring under chronic mania; the other four were demented: and *Loukes* and *Fenton* both subject to epilepsy.

The ward in which they resided, as was before observed, was clean and well ventilated, and one of the most airy and healthy in the institution: and there was no peculiarity connected with these five individuals, which appears to explain the irruption of cholera among them, and in that ward, *unless it was connected with the admission of Elizabeth Fenton*. To that source I feel compelled to ascribe it; and in this opinion I express the concurrent sentiments of every medical officer of the asylum.

Our persuasion being contrary to the doctrine of many influential writers on cholera, has not been adopted without careful inquiry and reflection: and before accepting it, it was essential to trace

the history of this poor woman, the unconscious messenger of death, prior to her admission : to ascertain more particulars as to her previous state of health ; and to inquire respecting the alleged prevalence of cholera in the workhouse from whence she came. These details will be found in the appendix :* and they remarkably corroborate the idea, that not only was cholera brought to the asylum by infection, or through the medium of *Fenton* ; but that it was introduced into the workhouse, where she imbibed it, in an almost identical manner.

It is true, that no personal contact can be traced, in either instance. *Fenton*, when in the workhouse, lived in a room apart from the hospital, where the cholera patients had died ; and had no direct communication with them : neither had any of the four patients who were next attacked in the asylum, been in *Fenton's* room, or even seen her, so far as can be known : but they were inmates of the same ward ; and there is no other evident way of accounting for their sudden illness and death.

It is also certain, that cases of diarrhœa and dysentery had begun to be rather more frequent than usual in the asylum, before the admission of *Fenton* ; and there is probable reason to believe this increased frequency may have arisen from epidemic influence. The increase, however, was so slight, that had it not been for the prevalence of cholera in the district, it would scarcely have attracted the notice of the medical officers. During the first seventeen days of September 13 patients (7 men and 6 women), had complained of slight and brief diarrhœa ; and four women and one man (the latter on the 17th), had been attacked by dysentery. This number among 620 patients, and in a month when bowel complaints are very common, cannot be considered excessive. Yet our fatal experience during the succeeding eight weeks, shewed that this peculiar brief diarrhœa *was* the result of epidemic causes, and in fact was connected, or contemporaneous, with the advent of cholera.

Whether, had *Fenton* not been admitted, the asylum would have escaped further or more fatal disease, includes a critical point of our inquiry : the evidence before us tends to a belief that it would. The spread of the pestilence all around the asylum, and the prevalence of diarrhœa among its inmates had been exactly similar in

* See Appendix D.

1832, to what occurred in 1849; *only* that no fresh patients from infected districts were admitted,—and no case of cholera appeared within its walls. These two facts are so peculiarly *coincident*, that one cannot avoid attaching importance to their relation, without positively asserting them to have been *consequent*.

Had the diarrhœa alluded to been incipient cholera, that only required time or favoring circumstances (apart from infection), for its development into fatal collapse, cholera must first have appeared in those wards where diarrhœa or dysentery had been most prevalent, and would probably have there continued most severe and most fatal: but the reverse was rather to be observed. Instead of diarrhœa being increasingly prevalent in the wards which suffered most from cholera, it may be noticed, that diarrhœa was not conspicuous in any one ward more than another, up to the fatal outbreak of cholera: and what is more remarkable, that in ward 3 *not one* case of diarrhœa, or dysentery, or any other bodily ailment is recorded previously to the arrival of *Fenton*; nor subsequently, until three days after the death of *Morley*, and the removal of *Fenton* from that ward into the hospital:—that in wards 12 and 16, amid the dirty patients, in both of which many fatal cases of cholera occurred, only one trifling attack of diarrhœa was noticed in each, and those in September, previous to the irruption of cholera, simultaneously in both wards, on the 17th of October:—while, among the men's wards, No. 6 in the new building, remained free from a single case of diarrhœa or dysentery up to the 20th of October; on which date cholera broke out in that ward, and carried off eleven victims out of thirty-three patients, or one-third of its inmates, before the close of the month!

Neither diarrhœa nor dysentery, then, can be regarded as inevitable precursors of pestilential cholera.

Again:—In the present day of encouragement to sanatory reformation, it is often assumed, that want of cleanliness and defective drainage and ventilation, are among the chief causes of cholera; a doctrine that is well calculated to forward the progress of sanatory improvement and the tendency of which is in all respects salutary and good; and which, on that account, one would not willingly interfere with or gainsay. But if it were strictly accurate, that dirty habits, and defective drainage and ventilation, had a share in *generating* cholera, we should be certain to find these effects

illustrated most palpably in wards inhabited by the dirty and the fatuous; such as 12 and 16 of the women, and 1 of the men, where the majority of inmates are inattentive to the calls of nature, and are generally filthy in their propensities. In spite of all possible care on the part of the attendants, as to personal cleanliness, daily change of bedding, and admitting fresh air into their apartments; after a night passed amid offensive excretions, their condition next morning, as to drainage and ventilation, is in direct contrast to that of patients in cleanly wards, where the bedding is pure and comfortable, and where filthy habits and personal uncleanness are almost unknown. Yet, strange to say, it was in one of the cleanest, most airy, and most healthy wards, that the cholera first appeared: amid patients of whom *none*, till *Fenton* was admitted, were dirty in their habits or persons: it was in two equally cleanly wards, Nos. 1 and 14 (of the women) that the pestilence next appeared: and though, of the wards containing many dirty patients, two or three suffered severely during the progress of cholera, the disease was not uniformly more fatal in them, than in other more generally clean ones.

When, therefore, we remark the first occurrence of cholera to be in a ward particularly clean and well ventilated, spacious, lofty, and the very reverse of crowded, and of which the drainage on being carefully examined was found to be unexceptionable;* instead of in any one of many contiguous wards, less cleanly and less perfectly ventilated: amid patients not one of whom had previously any disorder of the bowels: and selecting as its first victims, four women in that ward, who were in no apparent degree predisposed to alvine or other disease; differing in the forms of their mental malady; in their general characteristics, diet, and previous state of health; dissimilar in age; and similar *only*, in being inmates of the same ward, into which a patient suffering from suspected cholera, had recently been received, from an institution where she had left two persons lying dead of that disease,—I do not see how we can escape from, or resist, the conviction, that *infection* in some way brought into the asylum by that patient, and not epidemic influence alone, nor any cause previously intrinsic to the building, was the active source of the pestilence within its walls, the fatal origin of its devastating ravages.

* See Report of MESSRS. WEST and DAWSON in Appendix E.

TABLE XLI.—AVERAGE DURATION OF CASES OF DIARRHŒA, DYSENTERY, AND CHOLERA IN EACH
SANATORY DIVISION.

SEPTEMBER, OCTOBER, AND NOVEMBER, 1849.		IN CASES OF CHOLERA.														
HABITS.	HEALTH	DIET.	DURATION IN CASES OF		PREMONITORY ATTACK.			DURATION AFTER COLLAPSE.			AVERAGE IN HOURS.					
			Diarrhœa	Dysentery	RECOVERED. Diarrhœa	Dysentery	DIED. Diarrhœa	Dysentery	RECOVERED.—WITH PREVIOUS Diarrhœa	Dysentery		DIED.—WITH PREVIOUS Diarrhœa	Dysentery			
Clean	Good	Meat ...	3.5	4.0	2	...	...	9	7.5	...	7.5	...	16	†64	48.0	
		Common	2.4	16.6	4	...	2.5	...	...	12.1	10.0	...	...	37.7	31.5	
	Feeble	Meat ...	3.9	16.5	*...	...	4	...	...	...	...	...	...	21	31.0	29.3
		Common	3.3	12.5	...	...	3	32	...	20	20	56.6	6	20.6	34.0	
Dirty	Good	Meat ...	1.5	...	...	...	...	...	...	...	...	...	...	...	62.6	62.6
		Common	2.5	...	...	...	†4.5	...	...	15	15	†44.0	...	...	20	†32.0
	Feeble	Meat ...	3.6	...	...	...	...	22	...	...	...	...	...	18	26.4	25.0
		Common	1.0	...	...	...	5	...	...	7	7	147	...	...	4.0	75.5
Number of Cases			101	11	*5	...	†12	3	*5	...	*14	9	†12	3	†32	†47
Average of Duration...			3	14.7	*3.2	...	†3.5	21	*6.4	...	12.7	10.5	†44.5	13.3	†34.5	†35.7
										AVERAGE IN DAYS.			AVERAGE IN HOURS.			

N.B.—In the above Table are not included the cases of *Eliz. Fenton**, *Mary King*†, and *Martha Emmett*†.

In these tables the several combinations of habits, health, and diet are specified ; and the proportion of females in each division, who suffered from disease is stated. The form of disease, too, is indicated, and the amount of recoveries and deaths under each variety. And in Table XLI the *duration* of disease is given under each separate division ; the term of diarrhœa and dysentery, whether simple or premonitory, being recorded in days, and the duration of fatal cholera, after collapse, in hours.

They will thus be found to present a complete epitome of the amount of alvine disease during the period in question ; and will enable one to weigh with at any rate a near approach to certainty, the relative influence which habits, diet, and previous state of health of the patients, had on their liability to attack, and their power of resisting its fatal virulence.*

To estimate the influence of DIET, we may observe, from Tables XXXVIII, and XL, that of cleanly patients, in general good bodily health, about 43 *per cent* were (October 1st) on common diet, and 14 *per cent* had daily meat dinner and extras. Of the former, on common diet, 27 *per cent* were affected with diarrhœa ; and 40 *per cent* of the latter : or about half as many more of those on extra, as on ordinary fare. But of those attacked with dysentery, the proportion was twice as great on common, as on meat diet. And if we look to the total cases of cholera, we shall find them one-fourth more numerous among those on common, than of those on full, or meat diet ; the chief difference being among cases without premonitory symptoms ; of whom there were 6 *per cent* on meat diet, but 11 *per cent* on common fare. The recoveries from cholera were larger in proportion amid the patients affected who were on common diet : the mortality nearly alike in each.

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Having briefly reviewed the amount and extent of the ravages committed by cholera in the asylum, and the classes of patients who were most affected by it, and by contemporaneous diarrhœa and dysentery, we are in a position to inquire with more satisfac-

tion into its nature, and to attempt some solution of the vexed questions, as to its origin and progress.

The circumstances under which the first case occurred are shortly adverted to in the former report. A female named *Elizabeth Fenton*, was admitted on September 17th, from Gomersal Workhouse. She was said to be epileptic and frequently violent; but nothing was recorded in the warrant to be otherwise amiss with her bodily health. She was brought in about three o'clock p.m.; and at nine the same evening was reported to be suffering from diarrhœa, for which medicine was immediately prescribed and administered: and, as the Relieving Officer who accompanied her, had stated, that two persons died of cholera in the Gomersal workhouse the previous night, the attention of the medical officers was anxiously directed to her case; and the precautions were taken that were before mentioned. Next day the diarrhœa continued, with pale and liquid dejecta; and calomel and opium were freely given with apparent relief: for on the 19th *Fenton* was said to be better; and on the 20th the bowels were less relaxed, though the excretions remained pale and serous. On the 22d the record is "bowels quiet during the night, and not moved this morning: continue the pills three times a day." The patient remained a little better, till the 25th, when her excretions are stated to be "feculent and healthy;" but she was exceedingly feeble, and salivation having commenced, the mercurial medicine was omitted. During the following night she was seized with severe vomiting and purging, and became collapsed and livid: brandy was freely given to her; but no further medicine for a day or two, as she was suffering acutely from ptyalism; and the collapse was then (it may be correctly) ascribed to the combined effect of the mercury and the previous diarrhœa. Next morning *Fenton* was removed to hospital, where she remained for many weeks in a state of extremely perverse, and often violent, mania, with a succession of anomalous ailments, compounded of epilepsy, hæmorrhage from the bowels, hæmorrhoids, and cholera; till her symptoms assumed a more distinct form of chronic dysentery, from which, after some months, she has slowly recovered.

While *Fenton's* case was still a matter of anxious doubt, and before she had the attack on the night of the 26th, which more nearly resembled cholera, the second patient who suffered, fell ill,

and was carried off,—*Mary Morley*: and three others were successively attacked in the same ward, as narrated in the previous report, viz: *Sarah Atkinson*, *Mary Marr*, and *Jane Loukes*.

It would greatly prolong these remarks, were I to quote at length, even the brief records which the journals of the asylum contain, of these important cases; but it may be sufficient to state, that there was nothing in the previous history or habits of any of them, to account for their being victims, rather than others in the ward, to cholera or other similar attack. *Fenton* had full sick-room diet, consisting chiefly of rice-milk, sago, beef-tea, and brandy, after her admission: *Morley's* dinner the day she was attacked, had been the usual Saturday's fare, rice-stew with meat: *Sarah Atkinson* began during a Monday night, after soup dinner: and the other two, *Marr* and *Loukes*, had meat dinners allowed daily. Not one of them had been subject to disordered bowels: all were orderly and clean in their habits, except *Fenton*: and none were employed out of the ward. The only one, indeed, who was capable of any industrious occupation, was *Jane Loukes*. She was liable to occasional paroxysms of mania, and short attacks of simple fever; but when well, as she had been for many months preceding cholera, she was a most industrious knitter, usually completing a pair of stockings each day.

Fenton's age was 37; *Morley's* 35; *Atkinson's* 39; *Marr's* 54; and *Loukes'* 64: and when attacked they had been resident in the asylum respectively, one week; five years; ten months; seven years; and fourteen years. One, *Atkinson*, was labouring under chronic mania; the other four were demented: and *Loukes* and *Fenton* both subject to epilepsy.

The ward in which they resided, as was before observed, was clean and well ventilated, and one of the most airy and healthy in the institution: and there was no peculiarity connected with these five individuals, which appears to explain the irruption of cholera among them, and in that ward, *unless it was connected with the admission of Elizabeth Fenton*. To that source I feel compelled to ascribe it; and in this opinion I express the concurrent sentiments of every medical officer of the asylum.

Our persuasion being contrary to the doctrine of many influential writers on cholera, has not been adopted without careful inquiry and reflection: and before accepting it, it was essential to trace

the history of this poor woman, the unconscious messenger of death, prior to her admission : to ascertain more particulars as to her previous state of health ; and to inquire respecting the alleged prevalence of cholera in the workhouse from whence she came. These details will be found in the appendix :* and they remarkably corroborate the idea, that not only was cholera brought to the asylum by infection, or through the medium of *Fenton* ; but that it was introduced into the workhouse, where she imbibed it, in an almost identical manner.

It is true, that no personal contact can be traced, in either instance. *Fenton*, when in the workhouse, lived in a room apart from the hospital, where the cholera patients had died ; and had no direct communication with them : neither had any of the four patients who were next attacked in the asylum, been in *Fenton's* room, or even seen her, so far as can be known : but they were inmates of the same ward ; and there is no other evident way of accounting for their sudden illness and death.

It is also certain, that cases of diarrhœa and dysentery had begun to be rather more frequent than usual in the asylum, before the admission of *Fenton* ; and there is probable reason to believe this increased frequency may have arisen from epidemic influence. The increase, however, was so slight, that had it not been for the prevalence of cholera in the district, it would scarcely have attracted the notice of the medical officers. During the first seventeen days of September 13 patients (7 men and 6 women), had complained of slight and brief diarrhœa ; and four women and one man (the latter on the 17th), had been attacked by dysentery. This number among 620 patients, and in a month when bowel complaints are very common, cannot be considered excessive. Yet our fatal experience during the succeeding eight weeks, shewed that this peculiar brief diarrhœa *was* the result of epidemic causes, and in fact was connected, or contemporaneous, with the advent of cholera.

Whether, had *Fenton* not been admitted, the asylum would have escaped further or more fatal disease, includes a critical point of our inquiry : the evidence before us tends to a belief that it would. The spread of the pestilence all around the asylum, and the prevalence of diarrhœa among its inmates had been exactly similar in

* See Appendix D.

1832, to what occurred in 1849; *only* that no fresh patients from infected districts were admitted,—and no case of cholera appeared within its walls. These two facts are so peculiarly *coincident*, that one cannot avoid attaching importance to their relation, without positively asserting them to have been *consequent*.

Had the diarrhœa alluded to been incipient cholera, that only required time or favoring circumstances (apart from infection), for its development into fatal collapse, cholera must first have appeared in those wards where diarrhœa or dysentery had been most prevalent, and would probably have there continued most severe and most fatal: but the reverse was rather to be observed. Instead of diarrhœa being increasingly prevalent in the wards which suffered most from cholera, it may be noticed, that diarrhœa was not conspicuous in any one ward more than another, up to the fatal outbreak of cholera: and what is more remarkable, that in ward 3 *not one* case of diarrhœa, or dysentery, or any other bodily ailment is recorded previously to the arrival of *Fenton*; nor subsequently, until three days after the death of *Morley*, and the removal of *Fenton* from that ward into the hospital:—that in wards 12 and 16, amid the dirty patients, in both of which many fatal cases of cholera occurred, only one trifling attack of diarrhœa was noticed in each, and those in September, previous to the irruption of cholera, simultaneously in both wards, on the 17th of October:—while, among the men's wards, No. 6 in the new building, remained free from a single case of diarrhœa or dysentery up to the 20th of October; on which date cholera broke out in that ward, and carried off eleven victims out of thirty-three patients, or one-third of its inmates, before the close of the month!

Neither diarrhœa nor dysentery, then, can be regarded as inevitable precursors of pestilential cholera.

Again:—In the present day of encouragement to sanatory reformation, it is often assumed, that want of cleanliness and defective drainage and ventilation, are among the chief causes of cholera; a doctrine that is well calculated to forward the progress of sanatory improvement and the tendency of which is in all respects salutary and good; and which, on that account, one would not willingly interfere with or gainsay. But if it were strictly accurate, that dirty habits, and defective drainage and ventilation, had a share in *generating* cholera, we should be certain to find these effects

illustrated most palpably in wards inhabited by the dirty and the fatuous; such as 12 and 16 of the women, and 1 of the men, where the majority of inmates are inattentive to the calls of nature, and are generally filthy in their propensities. In spite of all possible care on the part of the attendants, as to personal cleanliness, daily change of bedding, and admitting fresh air into their apartments; after a night passed amid offensive excretions, their condition next morning, as to drainage and ventilation, is in direct contrast to that of patients in cleanly wards, where the bedding is pure and comfortable, and where filthy habits and personal uncleanness are almost unknown. Yet, strange to say, it was in one of the cleanest, most airy, and most healthy wards, that the cholera first appeared: amid patients of whom *none*, till *Fenton* was admitted, were dirty in their habits or persons: it was in two equally cleanly wards, Nos. 1 and 14 (of the women) that the pestilence next appeared: and though, of the wards containing many dirty patients, two or three suffered severely during the progress of cholera, the disease was not uniformly more fatal in them, than in other more generally clean ones.

When, therefore, we remark the first occurrence of cholera to be in a ward particularly clean and well ventilated, spacious, lofty, and the very reverse of crowded, and of which the drainage on being carefully examined was found to be unexceptionable;* instead of in any one of many contiguous wards, less cleanly and less perfectly ventilated: amid patients not one of whom had previously any disorder of the bowels: and selecting as its first victims, four women in that ward, who were in no apparent degree predisposed to alvine or other disease; differing in the forms of their mental malady; in their general characteristics, diet, and previous state of health; dissimilar in age; and similar *only*, in being inmates of the same ward, into which a patient suffering from suspected cholera, had recently been received, from an institution where she had left two persons lying dead of that disease,—I do not see how we can escape from, or resist, the conviction, that *infection* in some way brought into the asylum by that patient, and not epidemic influence alone, nor any cause previously intrinsic to the building, was the active source of the pestilence within its walls, the fatal origin of its devastating ravages.

* See Report of MESSRS. WEST and DAWSON in Appendix E.

11.—*What is Infection ?*

What is the nature and *modus operandi* of the infection,* which (if we admit its existence) produces such fearful results,—is a question of still more subtle difficulty, the solution of which probably cannot be distinctly comprehended in the present state of medical science. The laws of contamination are, in fact, little understood: yet not more imperfectly of cholera, than of measles, small-pox, scarlatina, and other indisputably infectious diseases. A progressive intensity in the development of infectious poison, in proportion as sanitary rules are neglected or observed, has been carefully and successfully estimated; and the conditions most favorable to its propagation, shewn to be evidently those most prejudicial to general health. But what the elementary nature of the poison, and how, or by what agency, it is communicated, in each or all of these diseases, is still involved in mystery.

The most probable explication, as the modern designation of this class, *zymotic* diseases, implies, is that which seeks a solution in humoral pathology, and ascribes the results of infection, to a process similar to fermentation: but though chemistry has made vast advances in elucidating the *effects* of fermentation, as well as of secretion, and the processes of organic life, the explanation as applied to infection, seems to carry us little further, than to describe our ignorance in other terms. The chemist understands as little of the operating cause of fermentation, as the pathologist of the mode of transmission of infectious distempers: only we know that the same conditions favor or arrest both.

One peculiarity in all infectious complaints is that a certain (or uncertain) period elapses betwixt the moment of exposure to infectious influence, and the obvious development of its effects; or, in other words, before the poison has become potent enough to palpably disturb the functions of health. This has been called “the period of incubation.” The duration of this period appears to vary in different diseases; and also according to the malignity

* The word *infection* is used in preference to *contagion*, because the latter implies, if not actual contact, at least the idea of more personal approximation, than is conveyed by the former; and this distinction precisely limits the meaning I wish to express.

of the infectious miasm, the degree of health of the recipient, and the favorable or unfavorable sanitary conditions under which it is propagated: and it has been further suggested, that the form or type of the disease may be importantly modified, by the degree of potency of the poison, and the duration of its latency in the system.*

Now, if we assume the infectiousness of cholera, it becomes an important query, whether such period of incubation exists, and what its duration in that disease: and whether the concomitant diarrhœa and dysentery, are but varied types resulting from the same miasmatic agency.

Both these questions may derive some elucidation from the statistical data before us: and it will be convenient to consider the latter inquiry first. Its solution has been partly anticipated, when discussing the origin of cholera in the asylum; where it was stated that if diarrhœa were only a milder form of cholera, we should expect the latter in those wards where diarrhœa had been chiefly prevalent; but that such was not the case. On the contrary no diarrhœa had been observed in the wards first visited by cholera: and it is remarkable almost throughout each of the wards, that where diarrhœa was most frequent, cholera cases were least numerous: while dysentery was unaffected by either proportion; and, in fact, only occurred in four wards, out of twelve among the female patients. In the wards most obnoxious to cholera, a majority of the cases (in No. 16 all) commenced without premonitory diarrhœa: as is recorded of 65 *per cent* of the total cases among the women. Simple diarrhœa, and diarrhœa preceding cholera, were more prevalent in the new building in the proportion of 44 to 32 *per cent*: while cholera was rather more destructive in the old asylum, in the ratio of 21 to 18 *per cent* of its female inmates. If both were more or less aggravated varieties of the same cause, we should expect to find both fluctuating in like gradations. How is it, then, that we observe diarrhœa alternating in excess with cholera?

A ready and obvious solution of the difficulty occurs, if we regard cholera and diarrhœa as different stages of one complaint, and either discard the idea of infection, *or consider both forms*

* The professional reader will scarcely need a reference on this subject, to the essays "on Medical Evidence," and on the "Method of Inquiry as to contagion" in DR. HOLLAND'S admirable *Notes and Reflections*.

equally liable to it: for then it would appear, that in each ward, a given number of patients, whose constitutions were prone to attack, were ill in one way or other; and that in some wards the illness took a preponderating form of diarrhœa, in others, where the conditions were less favorable, that of cholera. This would account for diarrhœa cases appearing most numerous in the better class of patients, because the less favored were seized with cholera instead. Thus the epidemic miasm, during its incubation in the system, might be supposed to break forth in varying types, according to the different circumstances of the patients, or of the wards.

That this explanation is true to a great extent, I have no doubt: but it does not account for many of the anomalies in the distribution of illness, we have noted: and, if we rely on the evidence already adduced, we must admit the probability of *infection* playing some important part, in modifying the transmission of cholera. The total amount of illness including diarrhœa, dysentery, and cholera, was greatest in wards 2, 16, and 10, the first and last of which were decidedly cleanly wards; while the greatest number of cholera cases belonged to wards 1, 13, and 14, two of which were also clean and orderly wards. We can scarcely, then, conceive the miasm to have been fostered in the latter, into a more aggravated stage, than in 12 and 16, if disadvantageous sanitary conditions *alone*, had changed the type, during the incubation of epidemic poison.

But, if we admit the disturbing influence of infection, to disarrange, by accidental though unconscious communications, and interfere with, the laws of simple epidemic propagation; then we may be less surprised at the anomalous distribution we have had to comment on: though we shall arrive no nearer to a demonstration of the agency by which infection is evolved or conveyed. It has, no doubt, its period of incubation or latency in the constitution; and may develop itself, like epidemic miasm, under different types, varying according as the pestilential influence affects more intensely, one or other of the great functions of the animal system:—a point to be further discussed when we come to consider the pathology of cholera.

Is there, then, a *substratum* of epidemic disorder of the bowels, allied to, but not necessarily accompanied by cholera: which is a concomitant of the pestilence, though not essential to its growth;

from which cholera sometimes, and under certain conditions, takes an independent (or sporadic) origin, and amid which its infectious principle takes root, and spreads with fatal virulence? and is it, that when thus conjointly existing, cholera strikes down, without inevitable disorder of bowels, many who, but for its infectious interposition, would have suffered only from diarrhœa? The foregoing argument would seem to point toward such a conclusion; though the facts adduced, are not sufficiently numerous to warrant more positive assertion.

That cholera appears frequently as an epidemic is unquestionable: and that it is not always (nay, possibly not in general) communicated by infection, I am not inclined to deny. And further, I believe it to be indisputable, that sporadic, or isolated cases are often met with, which so closely resemble pestilent cholera, as not to be distinguishable from it.* But the question

* Such cases have been observed in the practice of most medical men: and the experience of the asylum is not without instances of the same fact.

In the year 1835, two or three years after cholera had disappeared as an epidemic, in the surrounding country, a case occurred in No. 15, one of the cleanly and convalescent wards, which, though not strictly one of *blue* cholera, occasioned alarm among the medical officers of the institution. An aged, imbecile patient, *Nancy Shaw*, who had been in the asylum almost from its commencement, was attacked on the 16th of September with vomiting, diarrhœa, collapse, and serous evacuations. The case was considered so severe and suspicious, that a consultation was held; all the inmates of the ward were placed on full diet; and several of them removed into other wards. The old woman lay for several days in extreme danger, but recovered. She had another, less severe, attack in 1842: and soon after cholera became general in the asylum last autumn, she again fell ill; had diarrhœa for some days; became collapsed and livid; and died in 21 hours. She was then the oldest resident, having been *twenty-nine years and a quarter* in the establishment: and she was the only patient in the ward of which she was then an inmate, No. 10, N. B., who died, or was attacked by cholera.

A more unequivocal example of livid cholera, was met with in 1841, in the person of a married woman, *Sarah Askwyth*, then aged 37, suffering from chronic mania, with frequent paroxysms of dangerous excitement, who had been in the asylum about eight years. She was attacked during the night of Feb. 24, (1841), with "severe vomiting, followed by extreme collapse, and lividity of features:" the bowels were twice moved, but not amounting to diarrhœa; but her stomach continued obstinately to reject all food or medicine; she was pulseless, her tongue livid, and she had that peculiar shrunk expression of features, which is recognised in cholera. The patient

in debate is the *total non-infectiousness* of cholera, as opposed to the doctrine of *contingent infection* : and if the latter be distinctly proved, it is an important step toward ascertaining the conditions that promote or avert its infectious capabilities ; and under which its latent infectious influence may become manifestly destructive. What they are, I profess not to have indicated : but having collated what materials of elucidation I can, and placed them carefully before the reader, I willingly leave it to others more able, to extract from them such further inferences as they may bear.

As to the other question adverted to, the *term* of incubation, our evidence is more clear. If pestilent cholera was brought into the asylum by the patient *Fenton*, a period of five days elapsed before another person (*Morley*) was attacked ; and eight days before *Fenton* herself had questionable symptoms of choleraic collapse. Both these women were removed from the ward on the 22d of September, and it was not till the 2d of October, ten days afterward, that *Sarah Atkinson* began, without premonitory symptoms was treated by creosote and blister, with brandy and soda-water : and gradually recovered in four days. She was subject afterward to diarrhœa : and in May, 1836, she suffered a relapse of vomiting, with livid collapse, that came on suddenly, with coldness of surface, and shrunk appearance of hands and countenance ; her bowels then being undisturbed. After some hot brandy-and-water, and an aperient enema, the collapse gradually subsided ; and next day she appeared in her usual state of health. But she, too, was one of the early victims to the pestilence in 1849. On the 18th of October, when the door was opened, of the room where she slept, she was found cold, livid, and collapsed ; having been vomiting and purged during the night, but too idiotic to make any complaint. She suffered severely from cramps ; became gradually worse ; refused every sort of food or medicine ; and died in the afternoon of the following day.

And a fatal case of cholera, in which the symptoms identically resembled those of the pestilent epidemic, is recorded in 1843. The patient, a man named *Broadbent*, had been twenty-two years in the asylum ; was formerly subject to diarrhœa ; and had dysentery in 1833, of four week's duration : but after that, he remained in ordinary health till August 23, 1843, when he was suddenly attacked with vomiting, diarrhœa, cramps, serous evacuations, and livid collapse : his skin and tongue were cold ; countenance anxious ; thirst excessive ; pulse imperceptible ; hands shrunk and livid. He sank rapidly, and died in 44 hours.

Other cases may probably be found in the journals, but these are what occur to my cognizance ; and each of these, had it been met with during October 1849, would unhesitatingly have been ascribed to pestilential cholera.

toms, and without any previously observed ill health in the interval. *Mary Marr* was attacked with diarrhœa on the same day, though cholera did not manifest itself in her case till suddenly on the evening of the 6th. And after the removal of *Jane Loukes* to hospital, and the fortunate migration of all the inmates from the infected ward, No. 3, eight days of repose elapsed before another case of cholera presented itself: and at that time, only four females in both buildings were suffering from diarrhœa.

These examples would determine the period of incubation to be from five to ten days:* but it does not appear that the longer term increased the intensity of the pestilential virus; for equally fatal cases followed both.

Whether the morbidic poison be epidemic or infectious, or both, however, the question alike arises, as to the mode of its development, and of its imbibition into the system. Is it inhaled by the lungs; or absorbed by the skin; or swallowed with the food; or drunk in the water? Is it gaseous, or solid; material or immaterial: vegetable or animal; magnetic or electrical; telluric or atmospheric?—for to each of these sources has its influence been ascribed.

On these difficult points I have no fragments of solution to offer, except such as may be deduced from a comparison of the meteorological register, with the progress of disease, discussed in a succeeding section. But, even if any atmospheric changes be observed, which appear parallel to other changes in the pathological record, the doubt remains, which attends all speculations on meteorological phenomena, that have of late years been advanced to account for pestilential cholera, viz: the want of proof that similar conditions do not often occur, during the long series of years when the pestilence is almost unknown in this country.

To myself, I confess, the arguments have most weight, which look to an effluvium from the excretions of cholera patients, as a source of contamination: though I do not accord with an able advocate of this hypothesis, Dr. SNOW, in thinking the water used

* The interval is often much more brief: an assertion which, not being proved by asylum statistics, may afford me an opportunity of adducing one or two cases, not strictly within the letter of our inquiry; but so interesting as indisputable evidence of the occasionally infectious character of cholera, that I am induced to place them among my illustrations in the appendix. See Appendix F.

as food, to be necessarily, or generally, the medium of communication. The water used at the asylum was tested in the ordinary mode, at the time of cholera, without anything remarkable being observed. It contained the proportions of sulphate and muriate of lime, usual in good spring water in this neighbourhood: and was clear, limpid, and free from smell or taste, or any appearance of impurity. The supply is very abundant, and is derived chiefly from a well thirty yards deep, that was sunk at the time of erecting the new asylum; aided by drifts from other springs in the grounds to the north, one of which is one hundred and fifty yards distant from the buildings. None of these springs are near the sewers, and the drifts are far below their level. The drain nearest to the chief well, as may be seen by reference to the plan, is a culvert from the gas-house, laundry, and wash-house; but thirty feet of solid sandstone rock intervene laterally betwixt them: and the sewers from both asylums are at a much greater distance, and flow in the opposite direction.*

The contiguity of the gas-house drain, will be thought by some a very suspicious circumstance. This opinion, however, is not shared in by the medical staff of the asylum; and it may suffice to add, that the same water has been continuously, and is still, used by all the inmates of the establishment, without any evil consequences. It is pumped by steam power into tanks in the

* The main sewers from both buildings run southward, along-side the walls forming the east and west boundaries of the garden, (see ground plan) at the lower corners of which they pass over two sump-holes; and uniting in the field below, proceed through a skirting of plantation, under a carriage road, and out of the asylum grounds.

Much has been said and written on the course of this drain, and on an outbreak of cholera in a row of cottages, crowded with poor inmates, named *Ripley's Row*, contiguous to it. Some sanitary zeal, too, has been wasted in indignant denunciations of the said drain, and in advocating a proposal to turn its course into altogether an opposite direction, up or through or over the high ground to the north and east of the asylum, and into the river more than a mile off! But if the advocates of this scheme were not so anxious to decry the asylum, they might ascertain, that though this drain is uncovered during great part of its course, between leaving the road and joining the main sewers of the town, yet its contents are freed from solid matter by several large reservoirs, that are emptied at stated periods as depots of rich manure, within the asylum grounds; and that the drainage chiefly observable, is a stream of from twenty to thirty thousand gallons

roof, and the water pipes *may* be in contiguity with the drains : but if there were any leakage in them, the pressure from within is so great, that we cannot conceive any percolation from the drain into the water pipe, but forcefully the reverse.

But it is not essential, that effluvium from excretions should pass into water, to be imbibed into the system. It might be inhaled with the breath, and either enter the lungs, or, impregnating the saliva, be swallowed into the stomach. We know how impalpable, even beyond microscopic cognizance, odours suspended in the atmosphere are : and we know that the fecundating germs of plants and animals are conveyed by it without possibility of detection. Our olfactory sense is more delicate, often, than the tests of chemistry, and can perceive material fragrance that is too sublimated for the reach of experiment. I do not pursue this conjecture into its current of probabilities, because I can offer no statistical data to support it ; and therefore it is not within the legitimate range of this report : but I venture to express the hint, as the most probable supposition, remaining on my mind, after the experience detailed in the foregoing pages.

of water per day, running briskly down this conduit ; which is covered in for a hundred and fifty yards where it passes the row of cottages in question. While, surrounding these houses on all sides, and in all directions, are surface drains, that when I saw them during the cholera period, were filled to overflowing with stagnant dirty water, mingled with ash and manure heaps, pigsties, decaying garden-stuff, privy-soil, and other ordure. The "abomination," therefore, appeared to me much more in the local want of drainage, than in the asylum drain : and a portion of the efforts made to force the Magistrates to alter its course, would have sufficed to improve the local sewerage ; and by carrying the surface drains into the lower level and ample dimensions of that from the asylum, would have rendered it a great benefit, instead of a disadvantage to the district alluded to.

I am not inclined to deny that the irruption of cholera in Ripley's Row, *may* have been communicated by the asylum drain ; occurring, as it did, soon after the epidemic appeared in the asylum : but the grounds for such a supposition are very questionable, while the neighbourhood around those cottages was in such a filthy sanitary condition. At least there was abundant nidus for the pestilence, from whatever source it was derived.

It is also admitted, that the drain would be better covered in through its whole extent, if practicable : but the Visiting Magistrates of the Asylum, not having any jurisdiction over it after it leaves their grounds, nor the power to dictate to the several owners of fields through which it afterward passes, are not the authorities responsible for its condition, so long as it has a good fall and unimpeded course.

12.—*Retrospect of the Progress of the Disease.*

We have examined the particulars of the first victims of the pestilence, and traced its course up to the death of *Marr*, and the attack of *Jane Loukes* on the 8th of October: and I proceed to add some details of its further progress, to the few sentences contained in the former report.

Five cases of malignant cholera had now occurred, three of whom were dead, and the patient last attacked was in the hospital, in a hopeless condition: and it was evident to the medical officers, that though hitherto confined to one ward, the cases were not sporadic, or accidental, but that the dreaded pestilence had got a footing within the establishment, and that every ward was liable to its irruption. Still there was hope that it might be quelled: and the effort before alluded to was made, to check its further progress, by removing all the inmates from the infected ward. Some portions of the new building were still unoccupied: of these was the gallery adjoining No. 3; and into this the patients migrated. Before doing so, it is important to notice, every individual was washed, and supplied with an entire change of garments; those they had previously worn being left in No. 3, and subjected, as well as all else the ward contained, to thorough cleansing and purification.

The result was so remarkable as to bear repetition, that though several were previously suffering from diarrhœa, the next day after they were removed, every patient (with one trifling exception), was reported well: and not a single case of cholera, or epidemic diarrhœa, or dysentery, has since occurred in that ward.

In connection with this removal, it will be appropriate here to record, that the experiment having been so happily successful, a similar plan was attempted two weeks later, when the pestilence had become general: and, the hospital at the top of the new building being found inconvenient, it was resolved to devote one of the wards, two stories below No. 3, into a cholera hospital. No other unoccupied galleries were available, like that in which the previous inmates of No. 3 had fortunately found refuge: but as No. 3 had been purified, and for some weeks empty, it was hoped that a removal to it of the patients in No. 1 might procure them a

like immunity. Unluckily, amid the anxiety and excitement then inevitable in the asylum, the precaution to change the clothes, as well as the abode of the patients, was omitted in their migration, which was effected in haste: and, whether from that cause or not, may admit of question, but it is certain that little or no mitigation of sickness followed this, as in the other removal. Four cases of cholera, and three of diarrhœa, are recorded among them from the 15th to the 21st of October, when they migrated to No. 3: and four of the patients were attacked with diarrhœa, and three with cholera during the following week; besides two who died of cholera a few days later. After that date, no case of diarrhœa or cholera is recorded among this group of patients, from the 1st to the end of November.

To return, however, to the earlier spread of the epidemic, and its first appearance out of No. 3. In my former account it was stated, that the next case, beyond the limits of this ward, was that of a man, *William Hodgson*, at the opposite end of the old building. He had been a resident in South America, was very deaf and subject to delusions, but quiet and inoffensive, and had been in the asylum seventeen years. He seldom or never went out of doors to work, but was often employed in his ward, and in cleaning windows about the house; and on Saturdays always assisted to scour the passages adjoining the entrance, and offices on the ground floor of the old building. He had not been in the new building; and no direct communication can be traced, between him and the ward to which cholera had previously been confined. He occasionally suffered from diarrhœa, but his bowels had been regular, and he was in his usual health up to the evening of Monday, October 15th, when he was seen to bed and left to rest, about seven o'clock. The keeper on returning to his ward, after supper and prayers, a little past ten, heard *Hodgson* calling out, and found him vomiting, purged, and collapsed, with severe cramps, which continued through the night; and in spite of treatment, and every attention from Dr. Corsellis, who had been immediately summoned, he sank rapidly, and died next day.*

But *Hodgson* was not the only victim of that Monday night:

* In our first report, the date of *Hodgson's* attack was inadvertently stated to be October 16th, instead of the 15th: the 16th was the day on which he died.

for on opening the bed-room doors next morning, a woman in No. 1, (two stories below No. 3,) who had gone to bed apparently well, and whom the night-nurse had not heard during the night, was found in a state of collapse, with vomiting and diarrhœa. She was immediately taken to hospital; where, after passing through the worst form of cold shrunk lividity, she appeared to improve for a day or two. Her bowels became regular, her excretions natural, urine free, and a slight feeble pulse was perceptible; but she never quite recovered from livid chilness of surface, and died on the 20th, four days after the attack.

Next morning, Wednesday, another woman in the same ward, No. 1, was found blue, cold, and collapsed. She was demented, and had an attack of dysentery a month before, which had partially subsided, under mercurial treatment and acute ptyalism, into a mild chronic stage; with evacuations generally natural, but occasionally mucoid: she was still confined to bed when attacked with cholera; and therefore could have had no direct communication with the other cases. She died in 18 hours.

On the same day two other women were attacked, one in each of the dirty female wards of the old building, Nos. 12 and 16: and a man in No. 3 also of the old building, a ward that afterward suffered severely from the pestilence: he died early the following morning, and both the others were fatal cases. On Thursday, the 18th, the cholera carried off two more men in No. 3; another woman in No. 1; and broke out also in wards 1 and 7 of the men. On the 19th there were two fresh cases of men in No. 3; another woman in No. 1; and other victims in Nos. 2, 6, 9, and 7, old building, and 5, new building, male wards; and 12, 2, and 18, of the females.

Thus cholera had spread in all directions; and within a day or two, cases were occurring in all parts of the establishment. One or two wards in each building were occupied as hospitals, and these rapidly filled with the dying and the dead. The succeeding ten days, from the 19th to the 29th was a season of anxiety, fatigue, and alarm, that will not readily be forgotten by any who partook of its harassing responsibilities. Those who were attacked being secluded or quickly removed to the hospital, the patients generally did not appear to be much affected by fear; nor were they aware of the extent of the mortality: and a large proportion of the

sufferers were callous to reflection, and unconscious of their danger. But to the officers and attendants, it was a period of awful emergency: and the consternation of all was increased by the fearful mystery of the pestilence; the rapidity of its attack, without previous symptom or warning: and the little more than failure of every effort, to mitigate its course, or avert its progress.

No. 13 was the last ward in which cholera broke out: one case of dysentery, which recovered, during September, and a single entry of diarrhœa for one day, being all the sickness recorded in it prior to the 25th of October. On that day an idiot girl, *Hannah Hunton*, who was sleeping in the hospital,* the uppermost story, over part of the ward, was found livid, cold, and purged. She was one of those who would take nothing of medicine or food, but cold water; and who recovered. Two days after, while the ward was under process of fumigation, another idiot, an old woman named *Slinger*, was attacked while waiting in the same hospital; and though removed quickly to bed, she became livid, would take nothing, never spoke, and died in 17 hours. And in this ward, notwithstanding its purification, the cholera seemed to linger after it had deserted all others: for the last three cases of females were all taken ill in ward 13. This fact is as inexplicable, and probably as accidental, as the extra mortality that was noticed in a previous section (page 33); for there was nothing peculiar in the patients last attacked, more than the first: and the ward in which they resided was neither over-crowded, nor could aught be detected amiss in its aspect, its drainage, cleanliness, or ventilation.

The numbers attacked daily, and the aggregate ill each day are stated in Tables XXXIII to XXXV as well as the daily number of deaths.† From these it may be seen that the number of attacks reached a crisis on the 20th of October, when eleven fresh cases of cholera are recorded, and the daily attacks of diarrhœa amounted to nine: and after continuing with little daily mitigation for a week, till the 27th, there was a sudden diminution to two cases on the 28th; only one on the 29th; a last outburst of eight more on the 30th; and then the pestilence subsided, with a few straggling cases during the succeeding month, in a similar inscrutable mode of disappearance, that had marked the course of its decline in other localities. Epidemic diarrhœa simultaneously

* This hospital, the women's, O. B., was never used for cholera patients.

† See page 61.

became less frequent; and by the end of November the general health of the asylum had resumed its wonted condition, except in the lingering of a few cases of chronic diarrhœa and dysentery, that were too feeble to recover quickly, and who still remained under treatment.

What influences coincided with, or contributed to aid, this welcome consummation, will form the subject of the next section.

13.—*Causes of its Decline.*

To assign a specific cause for the rapid subsidence of so fearful an amount of illness and mortality, as we have been contemplating, would be, at once, to establish a system of treatment, more important and successful, than any which has yet been given to the world: and the evidence I have to offer would be immeasurably more valuable than it is, if it served to demonstrate a certain relation of cause and effect, to the means which were adopted, and the decline of the pestilence. In the histories of all its visitations, the disappearance of malignant cholera has even been more rapid than its approach: a fact that must be borne in mind, with regard to *post* and *propter hoc*, in estimating the apparent effect of any general measures for its extinction.

With this precaution, however, I gladly point to the means adopted in the asylum; because they *appeared* to have a palpable degree of success in mitigating the virulence of the pestilence. They are briefly adverted to in my former narrative; but in detailing them more at length, I would first recur to the atmospheric changes of the period.

The BAROMETER had been high in September, reaching a daily mean of 30·43 inches on the 12th, and remaining above rather than below 29·5 ("changeable") during the rest of the month, and till the latter end of October, without any remarkable fluctuations. During October, the THERMOMETER had a wide range, frequently of 22°, 24°, and even 29°, (Fahr.) in the twenty-four hours; rising to 60° and nearly 70° in the day, and often below freezing point at night. The wet and dry-bulb thermometers shewed a greater amount of MOISTURE in the air during September, than in October: the difference in the former month being frequently 5°; in the latter seldom more than 3°, except on one day, October 28th, when also it reached 5°.

The early part of October was fine and frosty; but toward the middle of the month the weather was muggy and close: the prevailing winds from the south-west, and a little soft rain falling almost every day. The fatal Saturday, the 27th, was particularly oppressive; the air damp, foggy, and sultry: and just such a day as might be expected to aggravate pestilential miasmata. But the weather-glass was beginning to rise. The following day, Sunday, the wind had chopped round to the east; there had been a sharp frosty air with the thermometer down to 33° in the night; the mercury rose in the barometer at least half an inch; the day was bright and cheering: it proved one of comparative quietude and rest; and a welcome hope began to be felt, that the plague was stayed, or at least, that it had passed its acme, and was rapidly abating.

Contemporaneously with these atmospheric changes, two measures had been adopted, which it was also hoped were operating to advantage. The patients had all been placed on full meat diet on the 25th;* with extra allowances of tea and brandy for supper, and every indulgence in wholesome and proper food. And the other means, as formerly named, was the fumigation of every ward in the establishment, a process that was commenced on the 26th, and completed on the 29th of October.

The vigilance of the medical officers, and of all connected with the asylum, had been, throughout the epidemic, keenly directed to purification in the wards and persons of the patients: ventilation was strictly attended to; and chlorides were profusely spread about the wards, and especially in those of dirty patients, and in the water-closets. But in spite of every precaution, it is impossible at any time to prevent the air in these wards being more or less

* In my former report it was stated that meat dinners had been the daily allowance of the establishment "since the irruption of the epidemic;" and that flour had been substituted for oatmeal "during the whole period" of six months preceding cholera. These statements were made on the authority of DR. CORSELLIS, whom I must certainly have misunderstood in the matter: for on inquiry, I find that neither of the changes were put into operation till the date above mentioned, the 25th of October. I regret that the error was not corrected, before my former report went to press: as, to those who attach great importance to such an alteration in diet, it may appear a momentous, and, what it assuredly was not, an intentional misstatement.

charged with ammoniacal and other exhalations. It was, suggested, however, that a thorough fumigation of them might be advantageous; and accordingly it was carried into effect in the manner described, at page 6.

As a test for the presence of pestiferous miasma, the fumigation was partly, though only in part, satisfactory. The chief appearance of ammoniacal vapour,—as shewn by a cloud of muriate of ammonia on the evolution of chlorine gas,—was observed in wards 1 and 4, and the basement story of the men's eastern wing, old building: and here certainly were the chief foci of pestilential malignity: No. 4 being at that time occupied as a cholera hospital; and the largest proportion of cases having occurred in Nos. 1 and 3, of which latter ward the basement was a dormitory.

But in No. 1 we should have anticipated the greatest mortality from cholera, as well as from other causes, independently of any ammoniacal exhalation; because it is especially devoted to cases of fatuity and general paralysis, and those sinking from gradual exhaustion,—as alluded to in page 32: and we find cholera nearly as fatal in ward 3, in the north wing, as in its basement dormitory in the east.

In No. 1, too, every patient attacked with cholera, died: yet the same may be observed of several wards in both buildings. Though the excess therefore corresponds in the one case, the analogy fails in the other: and no proportionate manifestation of noxious exhalation was remarked in any of the other wards fatally visited by cholera: for, though seven fatal cases are recorded as belonging to No. 1 (men's wards) an equal number perished in Nos. 5 and 6 of the new building, where the ventilation was unexceptionable: and in several of the women's wards, where no excess of impurity was remarked.

Moreover it is most probable, that if the same process of fumigation were repeated at any moment, when the institution is in a more than usually healthy state, a similar cloud might be elicited in several of the wards, at certain hours of the day: so that it could not be a *cause* of the pestilence.

Yet I cannot but regard this thorough system of purification, at the critical juncture when it was employed, as a fortunate suggestion; and that, if human means had aught to do with the matter, it was more immediately connected than any other circumstance with the decline of cholera.

Two men were suddenly seized in ward 3 on the 2d and 3rd of November: and two or three women, still later in the month, in No. 13, where the pestilence appeared latest to linger. The cases last attacked were in no degree milder in character or less fatal than during the height of the epidemic: but in a majority of the wards none occurred after the close of October; in several none after the general fumigation: and, like the sudden cessation of a thunder storm, with a few fitful peals and brief gushes of rain, the fury of the pestilence was expended, its gloom and its vehemence were over.

14—*Symptoms.**

In reviewing the symptoms of those who suffered from the pestilent epidemic, it is to be regretted that our records are not so complete as could be wished. To have preserved explicit memoranda of the cases, would have required the efficient services of a clinical clerk solely devoted to that duty; and, in the absence of such an assistant, and, amid the full occupation of every other medical officer, no systematic series of cases has been preserved. The journals of the asylum, therefore, contain little more than the brief notes of the visiting physician in his daily rounds, with the prescriptions for each case: and in those pertaining to the men, the prescriptions alone are recorded. From these memoranda,—which however are to be depended on so far as they go,—and from the additional information I was able to glean in the wards, by diligent inquiry soon after the cessation of the epidemic, as accurate a register as can now be obtained, lies before me: and from it may be quoted the following data.

The DIARRHŒA, which was contemporaneous with, and often preceded, cholera, was peculiar, and differed from more ordinary forms of bowel complaint. It commenced without apparent cause; and was generally brief in duration, lasting from a few hours to a week or ten days, seldom or never longer. It was painless, and free from any sensation of irritant matter within the bowels: but the evacuations produced great languor and exhaustion. They were

* This and the two succeeding sections being purely technical, are addressed to professional readers alone. A concluding summary will be found at the close of section 16.

loose, and more or less serous; and when feculent seemed to pass readily into a state of fermentation.

It was easily subdued or kept in check by medicine; for of 170 cases of simple diarrhœa, all without exception, recovered: or, if we regard them as incipient cholera, and include all cases whether followed or not by collapse, we find that nine-tenths recovered, and about 10 *per cent* died.

The DYSENTERY was not attended by any peculiar features; except that in it, as in all diseases during the period of the epidemic, an unusual amount of general nervous depression prevailed.

It has already been stated, that a majority of the cases of CHOLERA were not preceded by what are termed premonitory symptoms: that is, the collapse came on without, or before, or simultaneously with, vomiting and diarrhœa. Out of sixty-four women who suffered from cholera, in forty-two it was thus the primary attack:—either the patient was observed sinking into collapse before she began to vomit or was purged; or, as soon as attention was drawn to her, by the advent of sickness or diarrhœa, the poor woman was found to be already in a state of collapse. Several were not discovered till the door of their bed-room was opened in the morning: no sound of illness or distress had been heard by the night watcher: but at seven a.m. they were found in livid collapse, having been recently sick and purged. The instances thus commencing were twelve in number, of the females. All of them had gone to bed in apparently good health; and as they were all in a state of more or less advanced collapse when found, and the diarrhœa may be presumed to have come on contemporaneously with collapse, they are registered as without premonitory symptoms in the foregoing tables.*

The probability that the attack of diarrhœa and of collapse were simultaneous, is corroborated by the resemblance of others, whose cases were under immediate observation during later periods of the day. In them, unquestionably, and most probably in the former, there had been no amount of liquid diarrhœa, to drain off the serum from the system, before their illness was discovered.

Whether preceded or not by alvine disturbance the attack of

* In calculating the duration of these cases, the period that had elapsed before some were observed, has been conjectured as nearly as possible, from concomitant circumstances.

collapse was rapid. It did not appear a gradual result of disordered bowels, but a sudden and fatal accession of fresh illness. It came on at all hours ; but more frequently during the night, or in the forenoon. Dividing the twenty-four hours into periods of eight hours each, we find it recorded, that the collapse began in the first period, viz : from

Midnight to 8 A.M. in 27 cases, of whom 4 recovered and 23 died ;
from 8 A.M. to 4 P.M. " 27 " 9 " 18 "
and 4 P.M. to 12 P.M. " 10 " 2 " 8 "

It appears that a larger proportion of those recovered, who were attacked during the day, than night: a circumstance to be accounted for probably, by the vigilance of the attendants being more active during the day, and treatment more promptly had recourse to.

The commencement of collapse, as has been said, was usually, though not uniformly, marked by concomitant *vomiting and diarrhœa*. The proportion in which these symptoms were observed is as follows:—Out of sixty-four cases (females) the collapse, whether preceded or not by premonitory symptoms, was accompanied by simultaneous

Vomiting and diarrhœa in 46, of whom 12 recovered and 34 died :

And, of forty-two cases

without premonitory symptoms, there were simultaneous vomit-

ting and diarrhœa in 25	"	6	"	19	"
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Diarrhœa (no vomiting) " 9	"	2	"	7	"
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Vomiting (no diarrhœa) " 2	"	0	"	2	"
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Diarrhœa very slight " 5	"	1	"	4	"
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<i>Neither vomiting nor diarrhœa</i> " 2	"	0	"	2	"
--	---	---	---	---	---

Diarrhœa and vomiting

in from one to six

hours after livid col-

<i>lapse</i> " 4	"	1	"	3	"
------------------	---	---	---	---	---

The three latter classes are remarkable, because they tend to disprove the theory that livid collapse is *caused* by an abstraction of serum from the blood, in diarrhœa and vomiting. In eleven

cases, or nearly one-sixth of those in the female wards, we must certainly seek for some other solution: even if the hypothesis be not already contradicted, by the simultaneous appearance of collapse and diarrhœa, as already alluded to; and by the occurrence of severe and exhausting diarrhœa for several days in others, without livid collapse, of which many instances are recorded. Similar examples must have occurred to all who have had the misfortune to treat cases of cholera in other districts, as well as the few just quoted: and they are of essential importance in estimating the relation of diarrhœa to cholera, in the pathology of the latter disease.*

The negative is still further supported by the suddenness of the attack in several of the asylum cases. One woman (*Elizabeth Gillam*) stout and active, who said she was in perfect health the moment before, fell down in the kitchen, where she was regularly employed, as if struck by apoplexy. She began suddenly to vomit: and was taken up in a state of syncope and collapse, but quite conscious and without convulsion. Soon afterward she was purged, and cramps were dreadfully severe. The seizure was at seven o'clock p.m. on the 20th of October: in spite of active and persevering treatment, she was blue and cold before eight, and died at seven next morning. Another, more old and demented, aged 71, was on her way to the water-closet, which she had nearly reached, when she fell on the floor; was picked up livid and collapsed; and became rapidly cold. This was about four p.m. of the 3rd of November; and she had neither diarrhœa nor vomiting till the following day. Her case has been before adverted to (at page 56) as having appeared to recover for some days; but she sank from exhaustion, and old age. The sudden commencement and rapid course of the pestilence in *Hannah Sutcliffe*, who was sleeping in apparently good health at three a.m., and was dead in four hours, has also been previously cited (page 4): and several others might be adduced; among them one of the latest victims in the men's wards, *Thomas Annikin*, who is reported to have fallen down in

* This is judiciously made a point of special inquiry in the queries addressed by the London College of Physicians to its members; and doubtless much valuable evidence relative to it will be collated in the promised Report of the Cholera Committee, the publication of which the profession is anxiously awaiting, but which has not appeared before these remarks are committed to press.

the dining-room in a fit of collapse and cholera, which carried him off in little more than five hours.

In other instances the attack was more gradual, and the pestilence stole on its victims unawares. Some of the women were going about their work in the ward, when their altered and stricken appearance attracted the notice of the nurse, or the medical officer in his round: livid collapse had set in, and they were at once ordered off to the hospital, which too often was but a prelude to the grave.

Many, like poor *Gillam*, suffered from *cramps* with excruciating severity; though this symptom was not excessive in more than a fourth of the total number attacked: they were, however, the most unfavorable cases. Of fifteen who are thus recorded, only two recovered, and thirteen died. Cramp was most frequent in the extremities: but in about one-third of the cases, it was more intense in the stomach and bowels.

Two peculiar features of the cramp accompanying cholera, are, that it was not confined to the stage of collapse; and that the spasmodic rigidity was almost exclusively in the flexor muscles; as the following abstracts from the journal of cases will exemplify:

S. H—, of Ward 11, aged 51, had been nine years insane, subject to chronic mania, frequently restless, noisy, and incoherent. She enjoyed moderately good bodily health till Tuesday morning, October 23rd, when she was suddenly seized, soon after breakfast, with vomiting and diarrhoea, and became immediately livid. She was sent directly to hospital; put into a hot bath, and was ordered *Liq. Hydrarg. Bichlor.* ζ iss *secunda quaque hora*.* Next day she continued purged, livid, and unrelieved; and, instead of the mixture, gr. x of *calomel* were prescribed to be taken every hour, most of which it may be presumed she vomited back again. On the 25th she was restless and still distressed with vomiting; cramps severe during the night. No medicine was ordered, but tea and cold water given at frequent intervals. "26th: vomiting abated; bowels not moved since yesterday; pulse returning; skin warm, and of natural colour; frequent hiccup. *Pulv. Opii gr i cum Mistura Effervesc. 4ta quaque hora*. 27th: sick and purged all night, but in small quantities: urinates freely; takes nothing but tea and her medicine. *Mist. Chloroformis* ζ i *2da q.q. hora, vice Pilulae et Mistae Efferv.* 28th: vomits everything she takes, which she says lays like lead on her stomach till it is rejected. Pulse improving; tongue brown and furred; urine free; evacuations dark, but not frequent. \mathcal{R} *Magnesiæ Sulphatis* ζ iss, *Acidi Hydrocyan. dil.* ζ \mathfrak{s} *Aquæ O* \mathfrak{s} *M. Capiat cochleare magnum omni*

* The only case in which this remedy was tried.

hora. 29th: begged piteously last night for some bread and cheese, and a cupful of beer, which were given her for supper, and *she has not vomited since.* Has had some more, at her earnest request, this morning. Bowels once moved; evacuations more natural. *Contr. medic.* 30th: no return of vomiting; tongue cleaner; pulse 80. Bowels not moved since last report. *Contr. Mista 3tia quaque hora.* 31st: no more vomiting; and she is better in all respects. Takes boiled milk, tea, &c. Begs for effervescing medicine, instead of the mixture she is taking, which may be given. Nov. 1: has had one natural evacuation; no vomiting; urine free; has taken beef-tea, and she appears altogether better. 2d: continues improving. 3d: took food (boiled milk) freely yesterday; and appeared going on favourably till nine, p.m., when she was suddenly seized with cramp in both arms; wrists violently bent inward by tonic spasm of the flexor muscles of the arm and forearm; in which state they have been all night and still continue. Her arms have been bathed with hot water frequently, and rubbed with stimulant embrocations, without relief. She has been feverish since the attack, and is now flushed, loquacious, and maniacal; and notwithstanding the tense distortion of her arms, she does not seem to suffer much pain. Bowels not moved since yesterday; urine still free; has taken some meat and pudding, and begged for her dinner, which she enjoyed. \mathcal{R} *Liq. Ammon. Acet.* \mathcal{Z} ij *Liq. Ant. Pot. tart.* \mathcal{Z} ij \mathcal{f} *Sp. Ether. Nitr.* \mathcal{Z} \mathcal{f} *Mista. Camph.* \mathcal{Z} v \mathcal{f} *M. C.* \mathcal{Z} j *4ta q. q. hora.* \mathcal{R} *Extracti Belladonnæ* \mathcal{Z} ij *Linimen. Saponis* \mathcal{Z} i \mathcal{f} *Tinct. Opii* \mathcal{Z} ij *M. nuchæ et brachiis applicandum.* Nov. 4: is less excited; spasm much abated, and she is free from pain; tongue clean and moist. *Omitte Misturam. Cont. Linim.* 5th; feels sore all over; spasmodic rigidity nearly, but not entirely, relaxed; eats well; bowels regular. 6th: wrists slightly swollen, and still a little contracted; has pain in the joints; in other respects better; mind more excited. 7th: very loquacious and maniacal: the muscles of her wrists still feel rigid, but she is, in other respects, convalescent. To be removed into a side-room." * * "Dec. 15: bodily health good; mental state as before the attack of cholera. 17th: returned to her former ward, No. 11, on the breaking up of the cholera hospital."

L. P—, aged 42, also an inmate of Ward 11, who had been for some years demented and epileptic, was attacked with cholera in the night preceding Tuesday, October 30; and was taken to hospital in a state of livid collapse about noon, with pulse imperceptible and scarcely able to speak, in a voice weak and husky. She was treated by hot-bath; calomel and opium pills, and effervescent mixture, every hour; sinapism to the stomach; and brandy and water; but she would take very little of her medicine, under the fear that it was intended to poison her. Next day, the diarrhoea, vomiting, and collapse, had abated; but she passed no urine till Nov. 1, when she made water freely: her pulse rallied; and she appeared altogether better. The following day the patient was worse, and gin and milk were ordered for her. "3d, 4 p.m.: pulse improving; sleeps much; makes water

freely, which is pale and turbid, without urinous smell ; takes little food. Beef-tea." * * "8th : continues better, but very weak ; pulse feeble ; bowels regular ; urine natural in quantity and appearance ; tongue moist and clammy. Takes tea, bread, and boiled milk ; refuses broth and beef-tea. \mathcal{R} *Ferri Citratis* \mathfrak{z} ij *Sodæ Sesquicarbon* \mathfrak{z} ij *Aquæ* \mathfrak{z} viiij *M capiat* \mathfrak{z} i *4tis horis*. Nov. 9 : tongue rather dry ; pulse 86 ; heat in throat, with thirst ; is comfortably warm ; no vomiting ; bowels regular ; urine free and natural. Ammoniacal saline mixture every four hours. 10th : much better. *Contr. Mist. ter die*. 14th : improving ; convalescent. 15th : tonic spasm of the muscles of the fingers, in both hands, came on at 6 a.m. : it has gradually abated, and now (10 a.m) has almost ceased. No discoloration of the hands or arms during the spasm : feet much discolored and livid, but without rigidity. Had a natural evacuation in bed at six a.m. ; but has not passed urine all day. Feet warm ; tongue warm, clean, and moist. 3 p.m. : has passed a pint of clear limpid urine, and another healthy evacuation. *Contr. Medic.* 16th : Feeble, and looks ill, but makes no complaint. Takes little food. *Omitte Misturam*. Brandy, two glasses daily." From this date she gradually, but slowly, recovered, without further interruption.

The state of the *pulse* is seldom recorded in my notes, because in fact it was generally imperceptible soon after the seizure, and continued so during collapse. And along with the sinking pulse came on the distressing restlessness peculiar to cholera ; the dreadful and indescrivable oppression about the chest (*cingulum præcordiale*), when the heart may be heard labouring languidly, amid a load of congested blood in the great venous receptacles around it, which it has not the power to receive or propel, and which becomes every moment more stagnant, till it ceases to beat. These, and the chill sodden skin ; the ghastly features ; the hoarse whisper of the voice ; the cold livid tongue ; the burning sense of suffocation in the fauces and stomach ; the intolerable thirst ; and the clammy death-like perspiration,—are symptoms too painfully familiar to all who have witnessed them, to need description here, further than to add, that they were met with in the asylum in their usual amount of intensity.

The *urine* was not suppressed so invariably as it is often said to be in cholera : for we find that nearly one-third of the patients passed urine during the period of collapse ; that is, in twenty cases, of whom three recovered and seventeen died. Some made water copiously while livid and almost pulseless, as in the following example.

S. H.—, a single woman, æt. 33, who had been subject to melancholia about nine months, and had been five months in the asylum: feeble in bodily vigor; with habitually regular bowels; but a voracious appetite;—went to bed as well as usual, and was singing when the nurse locked her room door on the evening of Friday, October 26th. On opening it at half-past seven next morning, she was stretched on the bed cold, blue, and apparently dead. Her bowels had been moved in the night,—a stiff feculent evacuation: and she had made water; but not vomited. She was instantly wrapped up warm, and had a dose of medicine; after which she revived a little. Being ordered to the hospital, she walked with assistance from the ward No. 11, as far as the passage to the new building; and there being faint, she was carried the rest of the way, *during which she made water, with a strong offensive smell.* She died at six in the evening.

Another woman, who had a severe attack of cholera, (*J. B.* in ward 13) made water freely, as she became collapsed and purged; and was very livid. She was much relieved by the hot-bath, and passed a quantity of urine on coming out of it; after which the lividity abated, and the patient gradually recovered.

Several other exceptional cases might be cited equally illustrative; though in the majority the secretion of urine ceased, as the diarrhœa became serous, and the collapse increased. When the urine began to be restored, as collapse subsided, it was pale, and had no urinous smell, as in the case related at page 101. A few specimens that were tested yielded no unusual results: the specific gravities were 1005, 1007, 1012, 1012, and 1015.

Of the state and appearance of the *evacuations* no satisfactory records are to be found in the journals: and it is in this particular that our case-books are chiefly defective. But it may be stated generally that the excretions did not differ from what has been usually observed in cholera; being first feculent and watery, and gradually becoming serous with flocculent shreds, such as are commonly termed rice-water evacuations.

Of *consecutive fever* we had very few examples. Only one or two of the females who recovered had any feverish symptoms: none indeed more distinct than are related in the case of *S. H.* at page 99, before alluded to. In all the rest the general disturbance of cholera abated gradually, and the patients became convalescent without any intermediate stage.

Mode of death.—None of the female patients died comatose: though I believe effusion in the brain was the proximate cause of death in one or two of the men. In general the women expired

tranquilly; but some struggled much, and a few were convulsed in articulo mortis. With several it was difficult to ascertain the moment of their decease. The body of one poor woman was washed and laid out as dead about six o'clock p.m.; and when about to be fastened up in the mort-cloth, she was observed to breathe. She was laid in a fresh bed, where she remained speechless and motionless, with no other sign of life than faint respiration, and without suffering, till near midnight; when after a slight struggle, she expired.

In those who had been very cold and livid before death, a degree of natural warmth returned; and the corpse, after an hour or two, resumed a more life-like aspect. More than one in this condition were placed by the nurses in a side-room, till they could be assured by the medical officers, that life was actually extinct.*

The cases hitherto quoted have been solely those of *patients* in the asylum: but there was one other victim in the women's wards, whose sufferings deserve especial consideration; inasmuch as she was the chief nurse of the cholera ward during its extreme virulence; and her heroic and unremitting devotion to her duties, cost the sacrifice of her life.† *Mrs. Reynolds'* illness was not otherwise

* See an interesting Paper "On the condition of the body after death from Cholera," by Mr. W. F. BARLOW, in the *Medical Gazette*, July 5 and 12, 1850.

† In this tribute of approval I by no means overlook the devoted exertions of other nurses, who were equally tried, and equally exposed to danger, especially those attached to the cholera hospitals. Among them may be mentioned Mrs. Robson, who had the care of the upper hospital, that was abandoned when the cases became too numerous to be carried up to it (and who was matron of a large cholera hospital in Liverpool in 1832); and Mrs. Hall, who was conjoined with Mrs. Reynolds in her arduous duties. Nor do I forget, that another meritorious officer, the clerk of the asylum, Mr. Robinson, also fell a victim to the pestilence. But Mrs. Reynolds' exertions were particularly onerous, among the suffering, the dying, and the dead: she held up faithfully to the last; only suffered herself to be removed from her post when the fatal attack had rendered her powerless and in extremity; and her kindness and humanity to the miserable objects of her care, were more than ordinarily praiseworthy. She received every attention that thoughtful solicitude could bestow during her illness, and is honorably mentioned in the report of the Visiting Justices: yet while those who survive have all received some substantial tokens of public approbation, Mrs. Reynolds' grave remains without a mark to record her fate. Surely the Magistrates or the Medical Officers will among them contribute a tablet to her memory!

remarkable than that she died of coma, evidently resulting from suppression of urine, and from uric poison in the blood. She had been purged for some days without heeding it; and feeling ill, she took a large dose of the chloroform mixture, she was then giving to several of the patients; and was narcotized by it for many hours. After this she became livid and collapsed, and cramped. She was acutely distressed by *cingulum præcordiale*, and described minutely a burning sensation from the stomach up the course of the epigastric nerves "to the roots of her ears." After two days the bowels became quiet; sickness abated; pulse feebly rallied to 80; urine was passed; and in some respects she appeared better: but the thirst and the distressing oppression continued. Next day, the 31st of October, a relapse came on: she was more livid; urine was suppressed; vomiting returned; pulse 90, almost imperceptible; burning in chest more distressing; rejected all medicine. She became gradually more drowsy and unconscious, and died on the fourth of November, the eighth day after the attack of collapse.

15.—*Pathology of Cholera.*

To enter on an elaborate discussion as to the pathology of malignant cholera, would require much more comprehensive materials than are included in our Asylum Reports; my endeavour in this section will simply be, therefore, to indicate some inferences, which may be drawn from the details under review.

It appears proved by the foregoing analysis of symptoms, that neither diarrhœa, nor vomiting, nor any profuse excretion of serum, are indispensable to the fatal existence of cholera. It cannot, then, consist essentially of disorder or disease in the bowels, *as a primary lesion*.*

The attacks were too sudden to admit of a supposition, that a gradual morbid alteration in the blood could have occasioned them: or that the changes observed in the blood after death, could

* Connected with this deduction, it may be remarked, that several patients suffering from ordinary chronic diarrhœa conjoined with organic disease, lived on unaffected by the pestilence around them: and in one or two that died during the epidemic, the fatal result appeared in no way accelerated by the atmosphere of cholera in which they expired.

be a cause rather than an effect of the disease. And if the blood were primarily poisoned, how was it that any patients who had taken no medicine to alter the state of the blood, and had suffered no remarkable excretion to purify it, recovered ?

Pain and cramps were not universal, or even general concomitants, for they were only recorded in one-third of our cases ; therefore, the cerebro-spinal nervous system, is not the original seat of the disease. Of six cases of *General Paralysis* among the females at that period, three were attacked by cholera, of whom two died : and the other three were unaffected. Half the cases of *Hysteria* in the female wards suffered from diarrhœa : none from cholera. And of the *Epileptics* five, out of twenty-five, had diarrhœa : and six cholera : of whom three lived and three died. The numbers in each class are small ; but they may serve to suggest that no very close affinity exists in the sources of these several complaints, which are all, more or less, cerebro-spinal.

The excessive coldness of surface in livid cholera is peculiar, and not observed in any other malady. It is startling, even to a medical man, accustomed to such cases, to lay one's hand on a breathing conscious individual, and feel the icy chill of a corpse ; —to touch an apparently livid corpse, and feel it breathe and move. If the cause of animal heat were accurately understood, surely this symptom would afford a clue to the mysterious labyrinth of cholera : and the two questions would reflect mutual light on each other. The diminution of temperature is evidently synchronous with a paralysed condition of the vascular system, and especially with the circulation of the blood through the lungs. The vital fluid stagnates in its reservoirs : little, if any, of the venous blood becomes arterialized (or decarbonized) ; its capacity for the evolution of caloric is unchanged : combustion in the lungs is arrested : and no fresh stream is poured forth from the heart. This state is in direct contrast to what obtains in pneumonia, when a quick hard pulse indicates excessive, forceful, action of the heart, and quick circulation through the lungs : combustion is rapid ; and is always accompanied by a *hot* state of skin, as remarkable as its opposite cold lifeless condition in cholera.

If the blood were primarily affected by the pestilence, and dark thick carbonized blood circulated through the brain, how is it that

the mental faculties are so little disturbed, as they are often found to be, even to the latest moments of collapse?*

Whence arise the burning sensation in the præcordia; the urgent thirst; and the craving for cold air, cold water, cold liquids of all sorts, and the cold stone floor to lie on? If the ganglionic nerves and the par vagum be the seat of chief disturbance, the distress about the region of the stomach may be readily explained: and when we reflect on the vivifying effect of cold pure air, as what the blood needs, and the lungs and skin literally gasp for, to relieve impending and actual asphyxia; while warmth internally but stimulates the heart and aggravates its oppression, and externally rarifies the air and makes it less reviving;—we may admit a conjecture founded on these facts, as at any rate worthy of further consideration.

Only two cases were examined *post mortem*, one male and one female; the rapid succession of attacks, and the incessant demands on the attention of the resident medical officers, not leaving them leisure to prosecute this department of inquiry;—one, too, in which so little has been hitherto gained with respect to cholera: and these exhibited nothing more remarkable than has often been detailed in similar autopsies. The auricles and large veins around the heart gorged with dark blood; and the livid, shrunk, and patchy hue of the skin, were among the chief abnormal appearances. In the female it is noted,—

* * * “The stomach large, having, at the cardiac end, about half a pint of fluid; pyloric end distended with air: intestines lined at one part of the jejunum, where opened, with a kind of yellowish, curdy, or albuminous matter, limited in quantity. Stomach striated transversely, and obliquely, and intestines striated transversely, as if from ecchymosis, after violent action of the muscular fibre. In the peritoneal cavity there was probably a pint of dark morbid fluid, lying partly in the loins, partly in the pelvis. Urinary bladder apparently quite empty, being scarcely visible.” * * * “Gall bladder distended to a healthy degree with bile: the cystic, hepatic, and common ducts were traced to the duodenum, and found open. Left semilunar ganglion of a red colour, perhaps rather more coloured than natural. Nerves of solar plexus very slender.” * *

* “Wherever the blood is darker than natural,” says THACKRAH, “and just in proportion to that change, are the vital functions impaired or abolished.”—(*On the Blood*, 2d edit., p. 182):—but the converse of the postulate may be, and is often, equally true.

And the following extract is from the post-mortem record of the male patient examined. After describing the external aspect of the body, and the condition of the viscera in the chest, it is stated:—

Abdomen.—Stomach very long and greatly contracted: small intestines, traced downward, appeared healthy through three-fifths of their course: three intus-susceptions were then met with, only enclosing half or three quarters of an inch, each, of the gut: the parts were very lax, and resumed their proper state on the slightest extention: no flakes of lymph: some degree of congestion of the tube, above and below the affected parts: lower part of the ileum dark in colour; parietes thin; contents healthy bilious fæces, in a liquid state; mucous membrane highly injected: caput coli inflated: transverse colon much contracted, and apparently containing pellets of fæcal matter in the sacculi. Urinary bladder very much distended: liver large, dark, especially on the inferior surface: gall bladder very large, fully distended, with thin watery bile: spleen not large, but engorged.” * * * * *

It seems clear, then, that cholera does not depend on any uniform state of organic disease in the blood, heart, lungs, cerebro-spinal nerves, or in the mucous lining of the alimentary canal: and we are driven to the hypothesis which ascribes its seat to the ganglionic system of nerves.

The nature of an attack of cholera is purely functional: and in this it resembles the most formidable classes of disease that human nature is subject to,—tetanus, hydrophobia, puerperal and infantile convulsions, hysteria, epilepsy (?) often paralysis, and probably in many cases, insanity itself. The effects of the most deadly poisons are of the same kind, producing death without palpable lesion of organ or structure.

The pestilence, too, may be modified in its character by idiosyncrasy or other accidental causes. In infectious or epidemic fevers, the disorder, whether primarily in the blood or nervous system, is found to evolve itself more prominently in one case in the head, in another in the chest, in a third in gastro-enteritis, a fourth in jaundice, and so forth:—and cholera appears in similarly varied forms.

Supposing epidemic or infectious miasm to be conveyed, by the saliva or otherwise, into the constitution, and its primary effect to be on the system of organic nerves; it is readily to be comprehended, that according to peculiarity of constitution or local circumstances, the morbid influence may be impressed, in some

cases more especially on the stomach and bowels, and manifested in vomiting and diarrhœa: in others, that a paralysed condition of the heart's action may be antecedent to diarrhœa: in these, that the function of the kidneys may be suspended; and less so in those: and that some may be struck down, as if by cerebral paralysis, and the shock to the brain and its nerves destroy life, without any minor development of the disease.

This appears to the writer the most rational explanation of the phenomena of malignant cholera: and having been led to this conclusion by present experience, unbiassed, he hopes, by previous conjectures, he has been tempted to exhume from oblivion a paper that was published many years ago, and almost forgotten, till public interest in the subject was revived by the late epidemic. It contains some further arguments, which both afford corroboration to, and derive importance from, our present inquiry; and will be found in the appendix.*

16.—*Treatment.*

Amid the diversities of opinion as to the seat and nature of pestilent cholera, the medicinal treatment has ever been either empirical, or simply experimental. *Quot homines, tot sententiæ*, applies equally to its etiology, and to the recommendations for its cure: and the result of our experiments at the asylum do not, I fear, tend to elucidate the latter subject. "The treatment,—*the treatment*" of cholera, has been put forth as the chief theme for diligent inquiry; and it is assuredly the goal toward which inquiry should be directed: but I am not sanguine in hoping for much success in relieving or curing the malady, till something more definite has been ascertained of its pathology, and more precise knowledge acquired of the therapeutic effects of remedies, in that important class of nervous and functional disorders alluded to in last section, with which it seems in some measure allied.

It was averred, at the opening of this report, that much of the evidence from the statistics of the asylum was negative; and as to treatment, it is unfortunately altogether of that character. In attempting to relieve the wretched sufferers, the medical officers appeared to vie with each other, by availing themselves of every

* See Appendix G.

suggestion which their own experience or the recommendation of others rendered probable : and their directions were efficiently and perseveringly carried out, by the assistants and nurses.

Active treatment, and passive, were had recourse to ; and the caprice of some, the insane obstinacy of others, and the fatuous apathy of many, were dealt with in the best ways that seemed practicable. All approved remedies were tried ;—calomel in large and in small doses, opium, æther, chloroform, salines, ammonia, castor-oil, croton-oil, prussic acid, quinine, capsicum, &c., were in turn administered, with every due care, to such as would take them. In all (of the females) the hot-bath or wet-blanket, was employed : and for most of those who refused other medicaments, some more simple means were devised ;—even to the homœopathic absurdities of a teaspoonful of cold water every ten minutes, and the noted recommendation from Ireland of two drops of camphorated spirit every half hour. All with like ill success !

Dysentery and diarrhœa have so long been familiar to the attendants of the asylum (but less so than formerly, as we have seen) that the treatment of these complaints has become a matter of ordinary routine ; and the house-pills, known as “ cholera pills,” and “ dysentery pills,” are usually kept ready for immediate exhibition ; though not administered, except by order of one of the medical officers. In the great majority of cases, a few doses of calomel and opium, of which the pills chiefly consist,* given at repeated intervals of from two to four hours, alleviates the bowel complaint, and restores the patient to health in a day or two : and obstinate cases of dysentery, with bloody mucoid excretions, are generally relieved, so soon as the gums are affected by the mercury.

If calomel is contra-indicated, or salivation has commenced without relief, the acetate of lead is substituted : sometimes the nitrate of silver, both by the mouth and by enema : and I have lately given, also with good effect, the oxide of silver, either in pills, or combined with syrup of poppies and laudanum. The proportion of opiate is in all to be regulated by the necessities of the case : and if febrile symptoms are present, or local tenderness

* The formulæ of these, and some other medicines referred to, are given in Appendix H.

exists saline effervescents, fomentations, leeches, blisters, &c., are also had recourse to.

In treating the insane, however, it too often happens that the mental state of the patient, from derangement or fatuity, not only precludes a clear exposition of his sensations and symptoms; but also interferes with the plan of treatment most desirable: and it is therefore often difficult to estimate, either the amount of disease existing, or the effect of the remedies prescribed.

The usual method of treatment was pursued in the epidemic diarrhœa and dysentery of last autumn, with the addition of one or two astringent mixtures, noted among the formulæ: and in all cases short of cholera with a uniformly successful result.

Beyond this, in the state of collapse, no remedies seemed of much avail: and we cannot report of any one medicine, that it contributed invariably either to the relief or cure of the patient. The first who were attacked by cholera were treated with calomel, in grain doses every ten minutes, according to the plan recommended by Dr. Ayre: and that failing, after many trials, to produce any evident benefit, larger doses of calomel (gr x to a scruple) were administered; with no better success.

In the women's hospital every patient, as soon as brought in, was placed in a hot-bath, (about 108° to 110° Fahr.): and though this was among the most hopeful means of relief, I am doubtful whether it did any permanent good. One or two seemed better after it; and in a bad case that recovered, the patient felt much easier, and made water freely, immediately after coming out of the bath: but with these exceptions, it did not produce any obvious benefit; and to many all warm applications were distressing. So much did the poor sufferers often shrink from warmth, and entreat for cold, that I am disposed to regret the *cold*-bath was not tried, among other experimental remedies. Ice was given to, and relished by, one or two; but the supply was small, and no apparent relief encouraged the procuring of a larger quantity.

Chloroform, as one of the most diffusible of stimulants, was freely given; and at first some relief was hoped for: but it shared no better than the rest.

The only thing that assuaged the sickness, was the common effervescent saline, with citrate of potass; which was grateful to most

of the patients, and remained on the stomach better than any other medicine. But cold water was the favorite beverage, in preference to all other and more nutritious slops and ptisans, which ingenuity could suggest.

It is not matter for surprise, then, that the writer of this report, and the medical officers of the asylum generally, are sceptical as to the good effects of medicines in the blue stage of cholera: the only result of our experience being to negative approved methods of treatment, without anything positive to substitute in their place. Nay, even an entire *far niente* seemed to leave almost as good a chance of recovery: for two got well out of nineteen, who would not suffer any remedial means to be practised. Twelve would take neither food nor medicine during the attack; of whom one recovered: and seven others would take nothing but a little brandy and water; of whom also one recovered. Seventeen out of the nineteen, or 89 *per cent*, died: whereas of the remaining forty-five cases, who had some form of treatment, 71 *per cent* were fatal. Thus instead of forty-nine deaths, there would probably have been fifty-seven, if all had refused medicinal aid: and we may indulge the small satisfaction of thinking, that eight out of sixty-four females, were saved by prompt and active treatment, more than might have recovered, if no exertions at all had been used for their relief!

My task is now brought as far toward completion, as the ability and means at my command can accomplish: and it only remains, in conclusion, to refer to the few points which have been proved by our inquiry, and their general moral for the future.

IF it has been demonstrated, that malignant cholera was brought into the asylum by infection; and was not simply epidemic, nor a growth within its walls:—

That, (with such reservation as the reader chooses to make in regard to ~~ward~~ No. 3, men's ward) no defective arrangements or management of the institution; no want of cleanliness; of drainage; or of food; excited, or fostered, its development:—and

That no lack of prompt vigilance, or judicious medical treatment, so far as then known, aggravated the fatality of its course:—the problem is satisfactorily solved, so far as regards the inquiry of the Magistrates, and the responsibility of their Medical Officers.

And I trust it will be admitted, as an established fact, that the great mortality in the asylum, which preceded cholera, and which was the subject of our first investigation, had a different source; and was totally unconnected with the pestilence, which it did not augment in any sensible degree.

But surely some useful inferences may be gleaned from the evidences we have been examining, and from the fearful visitation they record. To those who have had patience to follow our argument throughout its elaborate details, many will have suggested themselves in its successive sections, which are too numerous to be included in one general summary: and, instead of recapitulation, it may suffice to point out what seem to be the most important lessons to be remembered, in case such an epidemic should again break forth, in this or other similar establishments.

First—Our experience teaches the precaution of not admitting into the Asylum fresh patients from infected districts. This doctrine is at variance with that of the Board of Health; and may seem to encourage, more than it really does, the unquestionable evils of quarantine enforcements: but it is possible that quarantine regulations, like all other politic measures, may be carried too far, and abused; and thus create evil, when good might otherwise have resulted. At any rate, it should make us hesitate before rushing to the opposite extreme: and, assuming the possibility of infection, one cannot help reflecting, whether some, amid the many thousands of victims to cholera during its late epidemic visitation in Great Britain, *may* have been influenced to disregard all risk of communication, by the confident assurances of the Board, in their earlier, and in most other respects very judicious, notifications.

Secondly—We have learnt, that when cholera is abroad, it is especially necessary, not only to observe all sanitary precautions, as to cleanliness, drainage, and ventilation; but that all in feeble

health, if not the entire household, should have an abundant supply of animal diet.

Thirdly—That it is not enough to be satisfied, at such times, that our rooms and wards are well ventilated and clean: but they should be thoroughly fumigated by an atmosphere of chlorine gas; and a quantity of chlorides of lime or zinc thrown into the drains and sewers.

Fourthly—That any patients suffering from protracted diarrhœa or dysentery, should be removed from the ward; and their room, and clothes, and bedding, purified before being again used.

Fifthly—That in case any unusual number of the inmates of a ward have disordered bowels, it will be prudent to change the whole of their attire; and remove them, in a body, into some other healthy apartments; while their former ward undergoes a thorough process of purification: and

Sixthly—We have been fatally taught, that it is most important to use every possible vigilance to avert the approach of cholera; for, if it once find an entrance, no human resources are of much avail, to mitigate its intensity or abate its ravages.

Perhaps it may be thought that this more protracted discussion adds nothing to the inferences already supplied by our former reports: and possibly it does advance little beyond the sentiments therein suggested: but, as opinions formed on general impressions, are little better than guesses at truth, till they are brought to the ordeal of rigid induction; and as the deductions herein advanced were important to myself, and still more so to the interests of an institution with which my own are publicly associated,—even if they have no wider range of usefulness,—it has been a labour of satisfaction to bring them to the test.

It would have been easy to extend this little work by quoting and discussing the sentiments of many excellent writers on cholera.* Extracts and bibliographic references have been studiously avoided, however, as my object was not to write a treatise

* Foremost among which must be named Dr. COPLAND's complete text-book of the disease, in the article *Pestilential Cholera*, in his *Dictionary*.

on the disease, but simply to relate the facts which have come under observation in a certain department of practice: and being ever deeply impressed by the maxim, *μεγα βιβλιον μεγα κακον*, I have endeavoured to compress the details into as little compass as possible; reserving to myself the advantage of collating and comparing them with the writings of others, when my materials for reflection were completed, and I could enjoy an opportunity of study and reference at leisure. The inquiry was begun with a mind free from bias in favor of any doctrine or any theory; and only anxious to arrive at *truth*, and to learn *facts*, from the experience into which I had been cast: and if these pages shall be found to elucidate our views of mental disease, and in any degree to mitigate the condition of the insane; or to have added any fragments of value to our knowledge of cholera, their object will have been accomplished, and the busy leisure of some months will not have been spent in vain.

A P P E N D I X .

A. DIETARY OF THE ASYLUM. (PAGE 40).

THE DIETARY of the Asylum has been so frequently detailed in the reports of the Director, that it would seem superfluous to repeat it here, except for such readers as are not familiar with the institution, and for sake of more immediate comparison with the subject of the text. The ordinary allowance to each patient, male and female, is as follows:— a pint and half of porridge—(made with equal parts of flour and oatmeal, and about a sixth to an eighth part milk) and six ounces of bread, for breakfast: and a like quantity of bread, and of porridge, made alternately with milk and with beer, for supper. At dinner, three days a week, six ounces of meat without bone, uncooked; which is equal to about four ounces and three quarters when cooked; with yeast dumplings (weighing three or four ounces each) potatoes, or other vegetables: four ounces of meat in rice stew, made savoury with onions and potatoes, on Saturdays: and a pint and half of good soup, thickened with oatmeal and vegetables, and a further ration of bread, on the other three days of the week. Two-thirds of a pint of table beer is allowed to each of the men at dinner, and half a pint to the women: and those patients who are employed, whether out of doors in the fields, gardens, laundry, kitchen and other offices, or workers in the sewing room, or helpers in the several wards,—amounting to nearly one half of the resident inmates,—have a like daily allowance of beer, with a large slice of bread, for luncheon; and also for “drinking” in the afternoon.

Now, as the object of the West Riding Asylum, like that of other similar county establishments, is not only to be a “Hospital for the Insane,” with a view to their judicious treatment and cure, but also for the safe and kind guardianship of the incurable and the demented; its requirements as to ordinary diet are, that the patients shall have a full quantity of wholesome (and inexpensive) farinaceous and vegetable

aliment, sufficient to satisfy their appetites ; with such a proportion of animal food as is necessary to preserve them in good health, and to contribute, in the curable, to their recovery. It should not be wasteful on the one hand, nor sparing on the other, in aught that would aid in restoring bodily vigour to exhausted patients, whose restoration may depend mainly on a good supply of nutritious food.

But the appetites of the insane are proverbially capricious ; and some patients require a much larger amount of food than others, or than persons in good health : so that it is impossible to adapt one dietary to meet the habitudes and fancies of even a majority of those who are to partake of it. It is important, therefore, to ascertain, not only what is allowed by the prescribed dietary table, but also what is relished and consumed by the patients : and this inquiry will shew, that each has, in fact, as much as he needs. The daily rations of all sorts, except meat, vary materially with the circumstances of each ward ; and the distribution is regulated, not so much by what is allowed, as what the appetites of the ward require. The quantity of meat served to each, is beyond the appetite of most persons, especially of females ; but the more hearty profit by the less craving demands of others : and though some of the morbidly voracious would devour an inordinate quantity, their appetites are not to be taken as a standard, and there is generally enough left in the ward after meals, for them to partake of a second distribution. None of the broken victuals, are ever returned to the kitchen ; but such portions as are daily unconsumed, are collected from the wards, as food for the pigs, and thus under shape of good hams and bacon, they become again offered to the inmates, as daily rations, in a more palatable form.

The porridge for breakfast and supper is at least as nutritious, as the watery infusions of tea and coffee, which form the general morning and evening meal of the poor ; and too often their dinner also. But many of the working patients who prefer it, especially of the women, have tea and coffee allowed ; and all whose friends can supply them with means, may procure that indulgence, of which a considerable number avail themselves. The aggregate of solid food served for each person on full diet, actively employed, is about 206 ounces per week : for those on common diet, and unemployed, who are inactive, and merely vegetate in the wards, about 145 ounces : while those that require extra allowances, are unlimited as to provisions and animal food.*

* The dietaries recommended by the Poor Law Commissioners for workhouse fare assign from 140 to 202 oz. per week of solid food. The prison inspector's tables of diet for different classes of prisoners range from 147 to 224 oz. The Hanwell dietary is very similar to that of the Wakefield Asylum.

It may justly then be stated, that each patient is allowed as much as he can eat, of such viands as are provided; and the only question that remains is, as to the quality, and chiefly with reference to the proportion of animal food. Whether any other arrangement of the materials at present in use, might be devised, more acceptable to the caprice of the patients; or any other slight alterations occasionally made in the daily routine for sake of variety, besides what are frequently contrived: may be subjects for the consideration of the Director, or for the deliberation of the medical officers, but are beyond the scope of my present report. This note is intended simply to detail the system of diet, *as it is*; and it will be sufficient for our purpose to shew, by statistical evidence, that neither the quality nor amount of food, bore any palpable relation to the degree of mortality, or to the pestilential sickness, which are the objects of investigation.

B. CLASSIFICATION OF MENTAL DISEASE (PAGE 50).

As the divisions of insanity in the foregoing tables differ somewhat from any the writer has previously met with, it is necessary to add a few words in explanation of the terms they contain: and he is not without hope that, as a nosological arrangement for statistical purposes, it may be found useful in the classification of mental disease.

Protracted disturbance and general weakness of the mental faculties, may be comprised under three chief divisions,—PARTIAL INSANITY,* GENERAL INSANITY, and IMBECILITY; and these may be sub-divided into the following orders and genera.

PARTIAL INSANITY.

- a. Perversion of the moral feelings and the emotions: (*sentiments and instincts*).

* The recent judgment of a learned Lord, in the highest court of justice in the kingdom, has failed to convince me of the incorrectness of the above designation. Notwithstanding the urgent tenor of his Lordship's argument, I feel persuaded those most familiar with the study of mental derangement, will accord in retaining the class of "partial insanity;" to include cases in which certain ideas and associations are alone the subjects of continued aberration, or hallucination, while the individual is perfectly rational *quoad* all other associations, than those in which his morbid thoughts are commingled: and to distinguish them from cases of mania, or melancholia, or dementia, in which there is general incoherence of thought, or generally impaired mental power.

I.—MORAL INSANITY.

- b. Partial aberration of the intellectual faculties and sensations :
(*reason, judgment, and perception*).

II.—MONOMANIA, chiefly dwelling on one subject
of hallucination, or train of
associated ideas.

III.—DELUSIONS, on more than one subject : while
the mind is healthy in the con-
templation of other topics.

GENERAL INSANITY.

- a. Derangement with exaltation.

IV.—MANIA, (*madness*).

1. Acute.
2. Chronic.
3. Recurrent.

Varieties, Hysteric.
Erotic.
Puerperal.
Epileptic.
Senile, &c.

- b. Derangement with depression.

V.—MELANCHOLIA (*melancholy*).

1. Acute.
2. Chronic.
3. Recurrent.

Varieties, Hysteric.
Erotic.
Puerperal, &c.

IMBECILITY.

- a. Acquired imbecility, or weakness of understanding ;—the result
of previous disease.

VI.—DEMENTIA.

1. Partial.
2. Complete (*fatuity*).

- b. Congenital imbecility.

VII.—AMENTIA.

1. Partial (*silliness*).
2. Complete (*idiotcy*).

(COPY.)

C. REPORT OF THE DIRECTOR (PAGE 59).

MY LORDS AND GENTLEMEN,

IN compliance with the direction of your Chairman, I beg to present a Report "of the state of the health of the resident Officers, "and Servants, of the Institution, and whether any augmentation of "their number is required, and whether any further assistance, variation, "or supply of any sort is requisite to abate, if possible, the present "alarming state of the health of the Patients."

1ST.—*Of the Male resident Officers of the Institution.*—I report with gratitude, that though each one has suffered from the premonitory symptoms of Cholera, not one has been so attacked as to render him unfit for or unable to perform his duties.

2ND.—*Of the Female Officers of the Establishment.*—From constant watching, sleepless nights, and the premonitory symptoms of Cholera, the Matron (Mrs. Corsellis) became unable to attend to her duties; she was recommended to be removed from the Institution.

Since her absence (on the 21st October) she has continued to suffer from ill health, and is still unfit to resume her duties in the Establishment.

About three weeks since, one of the Assistant Matrons was attacked with Rheumatism, and is not yet sufficiently recovered to take her part in the management of the Asylum.

The other Assistant Matron (Miss Roseden) has been enabled regularly to attend to her duties. Her attention to the sick and to every one in the Asylum has been most efficient, and her conduct throughout this trying visitation, is beyond all praise.

3RD.—*Of the Male Servants.*—With two exceptions, all have been sufferers from indisposition consequent on their attention to the sick, and five have been confined to bed for a shorter or longer period. They are all now so far recovered as to be able to take the charge of their respective wards.

4TH.—*Of the Female Servants.*—Excepting a solitary instance, every Female Servant has been indisposed, and six have been confined to bed. They are all now taking a part in the management of the wards. The conduct of Mrs. Reynolds, whose duties have been most assiduously performed, and who, in conjunction with Mrs. Hall, has had the entire charge of the hospital, in which have been placed at one time no less than nine or ten patients suffering from disease, deserves the warmest

commendation, Her own words may be quoted: "If I should die, I shall have the satisfaction on my death bed of knowing, that I have done my duty."

5TH.—*Augmentation in the Number of Officers and Servants.*—Mr. Marshall, one of the Visiting Surgeons, has kindly offered his services, and has, since the 20th of October last, slept in the Asylum, and has taken part in the nightly attendance upon the patients.

Under ordinary circumstances, the staff of Officers and Servants is sufficient for the proper management of the Asylum; but in a visitation such as the present, the number of servants is not adequate for the extra duties they are called on to perform. An additional number of servants have therefore been and are still employed in the wards of the Institution.

The ordinary Staff of Servants is as follows: Males 17; Females 13. Total 30.

The extra Servants are: Males 8; Females 8. Total 16.

Of the extra number of men temporarily employed, three have resigned their situations in consequence of illness.

When the disease first made its appearance in the Institution, the fact was communicated to the Rev. J. A. Rhodes, the Chairman; to Joseph Holdsworth, Esq., and to several other Visitors of the Asylum; from one and all, I received unlimited authority to provide every thing that would add to the comfort of the patients and promote their cure. I trust the Visitors will find that this authority has been duly exercised, and that on a retrospect of what has been done, it will appear there has been no omission on the part of any of the Officers of the Asylum to carry out the anxious and benevolent wishes of the Visitors.

In presenting this Report, it will be unnecessary for me to dwell on the first appearance of the disease in the Institution, or of the spread and fearful consequence of its visitation, as the Visiting Medical Officers have been directed by the Visitors to present "a report on the past and present state of the Institution."

I may however add, that I have received from the Visiting Medical Officers the most valuable aid and assistance, as well as from all the resident Officers and Servants of the Asylum.

I have the honor to be,

My Lords and Gentlemen,

Your obedient Servant,

C. C. CORSELLIS,

Director.

WEST YORK ASYLUM, Nov. 3rd, 1849.

D. GOMERSAL WORKHOUSE (PAGE 77.)

GOMERSAL WORKHOUSE is an old-fashioned building, of red brick, with high pointed roof and gables, situated on an elevated hill, sloping toward the south, about a mile equidistant from the villages of Birstal and Gomersal: and when I visited it on the 22d of last April, without previous notice, it appeared a model of cleanliness, order and comfort among its inmates. It is under the care of MR. and MRS. SEYMOUR, and their active daughter; who shewed me all over the establishment, and from whom I gained the following particulars relative to it, and to *Elizabeth Fenton*, before her removal to Wakefield.

There are three workhouses in the district to which Gomersal belongs, the Dewsbury Union, of which this is devoted to females only. It is capable of lodging seventy persons, and is often full: at that date, there were only fifty; the average is about sixty-five. They have several airy day-rooms, or sitting-rooms; and the majority sleep in two lofty dormitories on the third story, beneath the high roof of the building. There are proper offices for kitchen, laundry, &c.; and a commodious hospital, containing four or five beds, for occasional use, under the direction of the medical officer, MR. MICKLETHWAIT, who visits twice a week, and often daily; and whose entries in the books of the House were readily laid before me.

From them I learnt, that the establishment is generally healthy, and has been so since the occurrence of malignant typhus fever, which was fatal to fourteen or fifteen within a few weeks in 1842. Since that, there has been no prevailing epidemic; and the inmates were in their usual state of health up to September of last year, 1849. About that time cholera was prevailing fatally in Leeds, though no cases except those herein narrated, occurred in Birstal or the neighbourhood, till the following month. Bowel-complaints, however, were general in the district; and in the week ending September 1st, four cases of diarrhœa were under treatment in the workhouse: but they were in old people, and were said to be not severe or remarkable.

On the 6th of September a dirty Irish woman, and her four children, were brought into the workhouse. They were on their way from Leeds to Huddersfield, and were picked up on the road, having passed the previous night in chairs, unable to obtain a bed in Birstal; and the mother too ill to proceed. She was evidently attacked by cholera, and then in so exhausted a state that she was unable to speak: the children

also were ill and purged. They were all placed in the hospital, which is detached from the house, and carefully nursed: but the woman died in collapse the same afternoon, seven hours after admission. The children were suffering from diarrhœa and dysentery during the following week, and one of the other inmates of the house was also under treatment for diarrhœa.

During the week ending September 15th, five more of the women had diarrhœa; and on Saturday the 15th, one *Crawshaw* was attacked, while carrying water, with cholera. She was at once taken out of the house to the hospital; became worse during the night; and died the following day. Another, named *Brierley*, was found to be ill next morning, and was removed to hospital, where she died soon after *Crawshaw*, on Sunday, September 16th: and one of the Irishwoman's children, an infant, died a day or two after. In the succeeding week five other inmates were ill with diarrhœa, and all taken to hospital: but no more died.

The next week ending Sep. 29,	there were	4	diarrhœa	1	dysentery;
“	Oct. 6	“	2	“	0
“	... 13	“	0	“	1
“	... 20	“	0	“	1

After which the tendency to disordered bowels seems to have subsided.

Bearing in mind these facts and dates, we will now turn to the case of *Elizabeth Fenton*. The wife of a stone-mason, who deserted her many years ago, leaving her with two children to the care of her parish; she has been in the union-houses for eleven years: first at Dewsbury, and for the last six years at Gomersal. She was subject to fits, and during the epileptic attacks was violent and unmanageable.

She usually slept, with another epileptic female, in one of the dormitories: but while in her epileptic and maniacal paroxysms, she was placed in a restraint-chair, often with a strait-waistcoat on; where she remained, and was sat up with for three or four nights, till she became tranquil, and returned to the dormitory. She had generally good bodily health: but her bowels being habitually costive, she frequently took, by order of the surgeon, especially during the fits, doses of the house aperient,—Epsom salts and ginger.

Fenton had suffered one of her epileptic attacks during the week preceding September 15th, and had been sat up with, and in the chair in one of the sitting-rooms on the second floor, for two or three nights. The surgeon saw her every day; and had ordered some medicine, which she refused to take, and an aperient dose (a tablespoonful of salts with ginger) to be given every second morning. This dose she took on

Sunday morning, September 16th, and was purged by it accordingly ; but not, it is said, more severely than usual.

Some weeks before this, however, the Lunacy Commissioners had visited Gomersal workhouse, and had recommended that *Fenton* should be removed to the county asylum : and orders having been given to that effect, the Relieving Officer called, unexpectedly to the people at the workhouse, and took her away on Monday, September 17th, the day of her admission into the asylum. Hence it was, that she was removed while under the operation, as the mistress of the workhouse supposed, of the purgative dose of the day before.

She had been unusually violent the week previous ; but the paroxysm was passing off, and she had so far "come to herself," that on the night before her removal (Sunday night) she returned to her bed in the dormitory, where she slept as usual.

One of the women who died of cholera, *Brierley*, had slept in a single bed in a remote part of the same chamber ; the other, *Crawshaw*, belonged the other large room. Both had been taken ill, and removed to hospital, while *Fenton* was in the chair, in a sitting-room on the second floor : but both were lying dead in the hospital when she was brought from Gomersal to the asylum.

It is further worthy of remark, that *Fenton's* bedfellow remains quite well, and never suffered even from diarrhoea or other ailment, except occasional fits.

From the books laid before me I gathered the following statistics relative to the ordinary amount of mortality in the establishment.

Table XLII.—Annual Mortality in Gomersal Workhouse during the last ten years : and ratio *per cent* on average number resident,—viz : sixty-five.

	No.	Per cent.		No.	Per cent.
1840.....	10.....	15·3	1845.....	16.....	24·6
1841.....	6.....	9·2	1846.....	12.....	18·4
1842.....	18*	27·6	1847.....	15.....	23·0
1843.....	13.....	20·0	1848.....	16.....	24·6
1844.....	11.....	16·9	1849.....	21.....	32·3

Out of 116 adult females who had died in the workhouse during the last ten years, 31 had attained the age of eighty and upward : and two had reached their ninetieth year. The average age of the whole was 64·7 years : a fact which bears evidence to the general salubrity of its situation.

* Including deaths from typhus fever. Both inmates and the family of the superintendent had it, and Miss Seymour informed me, that only herself and one other of the cases recovered. Fifteen died in seven weeks.

(COPY.)

E. REPORT OF MESSRS. WEST AND DAWSON (PAGE 79).

GENTLEMEN,

WE have inspected the Drainage and Ventilation at the Wakefield Lunatic Asylum, and such other circumstances as might be likely to bear upon the breaking out, or spread, or mortality of disease; and have to report:—

As to Drainage.—That the plan is in our judgment complete and efficient. That judging from every place where, by our desire, and in our presence, the drains were opened, the inclination is sufficient for the rapid discharge of foul water and ordinary refuse, and the stone and brickwork perfectly sound. That in most places the drains were quite clean, and free from any deposit; and where there was any lodgment, it was almost always small in quantity, in great part sand, and of comparatively inoffensive character. In two places we found foul offensive deposit to the depth of $4\frac{1}{2}$ inches, and six inches respectively; but we ascertained from openings made in different directions, and at moderate distances, into the same two drains, that these two deposits were strictly local, and small in extent. We did not find upon the premises, or in the neighbourhood of the Asylum, any collection of filth or stagnant water, except ordinary manure heaps, and watering ponds; and these are at a considerable, and we think at a sufficient distance from the main buildings of the establishment. With the two exceptions named, the present flow of water keeps the drains quite clean, without flushing. Only part of the drains are at present furnished with the means of flushing. The drains communicate with the tall shaft, in order to draw off and get rid of any foul air which may be generated in them. The two places where the deposit referred to exists, are in the Women's Airing Court, No. 15, (at the spots marked L. 1, on the wall, and W. 5, on the plan), and on the east, outside the boundary wall, at the spot marked W. 6, on the plan.

As to Ventilation.—This in our opinion is sufficient and good. We judge from the number, size and kind of openings for the admission and exit of air, compared with the size of the respective apartments, and the number of persons generally therein, and by other means. The temperature of some apartments was found to be higher than we might think most desirable; but this arose from proximity to steam pipes, or other means of producing warmth, and was not traceable to deficient ventilation. From repeated observation, the keeping open of windows

generally and of doors when practicable, appeared to be the regular practice. The chimneys were not closed. This applies principally to the old building: the new building is ventilated by two large shafts, with fires to create a powerful draught.

As to the water used in food, we have not yet had time to examine this part of the subject; but we think that whether likely or not to furnish any clue to the main object of inquiry, no investigation of the sort which we were directed to make, would be complete without including the water also.

As to general cleanliness we found it every where carried out to a high degree.

On a review of the whole circumstances we have found in regard to the matters submitted to us, nothing to recommend for improvement, nothing which in our judgment can account for the appearance, or increase, or mortality of disease. The visitation, fatal as it has been to many, must be considered either as the immediate infliction of Divine Providence, or as dependant on causes of which nothing as yet is known, and over which therefore in respect to our inquiry, human means have as yet no control.

All appears to have been done which could be done.

We have preserved copious notes of the particulars of our observations, a copy of which can be furnished when required.

WILLIAM WEST, F.R.S.
JOHN DAWSON.

ASYLUM, WAKEFIELD, Oct. 30, 1849.

F. INFECTION—PERIOD OF INCUBATION (PAGE 85).

The following cases were mentioned to me by a lady, who had been visiting in Perthshire shortly after their occurrence: and her narrative has been precisely corroborated by a letter I received, in reply to my inquiries on the subject, from DR. IRVINE of *Pitlochrie*, the medical attendant of the parties.

In the beginning of August last year, an old woman, *Mrs. R.*, went to see a married daughter at Broughty Ferry, near Dundee, where cholera was then prevalent and fatal. Feeling poorly with diarrhœa, she was anxious to return to her home near Moulin: and on her way thither, she stayed all night at the house of another daughter in Perth. There she was attacked with decided cholera, and died in a few hours:

but not before two other daughters (one a domestic of Dr. Irvine) had been summoned, who were with her when she died. This was the only case heard of at that time in Perth.

It was arranged that *Mrs. R.* was to be interred in the churchyard of Logierait, twenty-three miles from Perth;—a strange mode of burial in a case of cholera! Accordingly, the corpse was conveyed there, on the 11th of August. On their road the funeral cortège passed near the abode of another part of the family; and two remaining daughters of the old woman, who had not been to Perth, insisted upon having the coffin opened, to take a last look on the remains of their parent: at the sight of which they were much shocked, and distressed by her altered appearance. The funeral then proceeded onward to the grave.

Next morning, the 12th, one of these women was ill in Cholera, and died in the evening: and during the following night, the other was also attacked, and was dead in 20 hours. And, to complete the domestic fatality it must be added, that the house of the daughter in Perth, where *Mrs. R.* died, was next day found closed; and on breaking it open, its sole tenant, who had lived alone, was discovered dead on the floor, by her bedside:—whether from the effect of intoxication, to which she was addicted, or of cholera, or both, seems uncertain.

It is further stated, that all the daughters were fond of ardent spirits, except the two who went to their mother at Perth when she died. These last suffered no illness: and no other case of cholera had then been met with in the district, nor occurred subsequently within ten miles of that place.

REMARKS ON MALIGNANT CHOLERA, ITS PATHOLOGY AND MEDICAL TREATMENT* (PAGE 108.)

(Reprinted from *THE LANCET*, Feb. 9, 1833, p. 625).

SPASMODIC CHOLERA has happily, at length, so far abated its fatal ravages in this island, as to allow medical men leisure from the harass, fatigue, and excitement, into which they have been thrown for twelve

[* In addition to the reasons mentioned in the text, for this reprint, I am the more readily induced to hope it may aid our investigation, by the valued testimony of the late Editor of the *Medico-Chirurgical Review*, (Dr. JAMES JOHNSON) who, in writing to me at the time of its publication, expresses the following decided opinion;—"I have, this evening, read the whole of your paper on cholera, and have no hesitation in saying that it is one of the most rational and probable explications of the phenomena of that mysterious disease which I have yet perused."]

months past, to look around them, and review what has been done by themselves and their contemporaries in investigating this dreadful malady; consequently, we may now hope for some more satisfactory exposition of it than has yet obtained amid the contention of opposing factions, and the inveterate warfare between contagionists and anti-contagionists. In every quarter of Great Britain, carefully-observed facts have been quoted, and a profusion of monographs have been published on the subject; some excellent, and all showing an ardent desire on the part of the profession to struggle successfully with this new pestilence. But, so far, no theory has received more than a partial assent, as accounting for the complex train of symptoms which accompany the disorder; nor has any principle of treatment been laid down, that furnishes a key to the operation of the various remedies which have been hitherto employed with apparent advantage. Both the nature and treatment of cholera are still involved in a mist of doubt and uncertainty: the most skilful research has failed to throw more light than that of probability on the one, nor has acute observation and experience, in many millions of cases, been more successful in establishing the other.*

* * * * * *

The minutest analytical induction has been applied to the disease, and the result has been the accumulation of so voluminous a mass of valuable evidence on all points connected with it, as was never brought to bear upon one subject since medicine became a science. Analytical reasoning is the main-spring of medical argument; but after a disorder has been so thoroughly analysed, that the collection of facts becomes cumbrous on our hands, we may be excused in venturing to resort to synthesis. If ever such a mode be allowable,—though speculative hypotheses too often take the place of legitimate deduction,—it is surely the case now, in the malady under consideration.

* It was stated in *THE LANCET*, several months since, that twenty millions of persons have perished by cholera; but if we add up the statistical accounts, we shall find this far below the reality; eighteen millions were carried off in the East Indies alone. *JOHNES* estimates the total number of victims to the pest at two or three times that amount; therefore, averaging one-half of those attacked to have died, there must have been since 1817, upwards of *one hundred millions of cases* of spasmodic cholera.

[In *Dr. KNOX's* little volume, which contains an admirable epitome of the bibliography of cholera, an erroneous inference is quoted from this note, which I feel sure the author will do me the justice to correct, when he has an opportunity. The deduction is, that fifty millions of persons having died, there have probably been, *at least* twice as many cases of cholera:—not, as *Dr. KNOX* assumes, that out of a given number of cases one-half had died. The reader will, at once, perceive an obvious distinction between the inferences computed.—*July, 1850.*]

In order, then, to illustrate more strikingly the pathology of cholera, let us for a few moments dismiss the analysis of the disease entirely from our argument. Let us *suppose* some irritating, morbid, infectious, or epidemic influence, the effect of which shall be, through the medium of the bowels, on the ganglionic system of nerves. What, according to the principles of physiology and pathology, would be the train of symptoms produced by such an influence?

In tracing the answer to this query, we must bear in mind the following propositions, which are so well established that they may be regarded as axioms.

1.—The ganglionic or sympathetic class of nerves, convey neither sensation nor mobility, but their action is referred solely to the functions of organic life, and chiefly to the various offices connected with secretion.

2.—The cerebro-spinal nerves are the sources of feeling and motion; they supply all muscular structure, including both the voluntary and involuntary muscles; and hence,

3.—The muscular coats of the bowels, as well as the muscular envelopes of the bronchial tubes,* and the muscular fabric of the heart, are dependent on the motor branches of the cerebro-spinal system for their contractility; and, further,

4.—The viscera derive their sensation (as to pain) from the cerebro-spinal nerves, and their sensibility (to their own peculiar functional stimulus) from the ganglionic.

5.—From the intimate anastomosis between every branch of the sympathetic nerves, and a corresponding part of the spinal or cerebral system, irritation of the one class is speedily transferred to the other; and the pneumogastric nerves, being the pair most extensively connected with the ganglionic, are uniformly involved in such disorder.

6.—Irritation of a nerve of motion produces *spasm*, in the muscular fibres supplied by that nerve. Irritation of a nerve of sensation causes *pain*, which is generally felt at the extremity of its ramification; but the only perceptible effect of irritation on a nerve of sense, or a nerve of organic life, is the diminution, or total loss of its functional power.

7.—Secretion is a process of life by which the blood is converted into certain healthy products; and by affections of the sympathetic nerves, the secretions are altered in their nature. The only effect which we can conceive to be the result of a paralysis of those nerves, will be a conversion of the process of secretion into an *exudation* or *elimination*.

* See an ingenious paper by Dr. CARSON, junior, (Liverpool), in the *Lancet*, April 7, 1832.

Some physiologists may hesitate to allow the third and fourth postulates; but I think it may be proved, that the functional sensibility of the involuntary muscles is derived from the sympathetic nerves; and that the impression received by them, which JOHN HUNTER aptly termed "the stimulus of necessity," is communicated to the motor branches, by which the muscular action is performed. Just as in a paroxysm of sneezing or coughing, the involuntary action of the muscles is owing to irritation of a nerve of sensation. In the eye, the phenomenon of winking, though performed by muscular nerves, is the result of a "stimulus of necessity," felt by the branches of the fifth pair in the conjunctiva. Numerous similar illustrations might be adduced. I decline in this place entering into a physiological discussion of the truth of the above postulates; but, being myself satisfied of their correctness, I am convinced of the soundness of the corollaries founded on them.

Taking these data as the groundwork of our argument, we will endeavour to answer the problem advanced, viz. : what would be the train of symptoms excited by a given influence on the ganglionic nerves.

The immediate effect would be a disordered state of all the alvine secretions, inducing diarrhœa. Constipation could not be the result, as that would imply a tonic or astringent influence, which is contrary to the premises. The diarrhœa not being caused by irritating food, morbid biliary secretion, or drastic ingesta, but merely by the alvine secretions being more watery than natural, there would be no pain, because the nerves of sensation (which are sparingly distributed over the intestines, with the exception of the rectum and the stomach, where only they are needed) are not acted on by any irritating matter within the bowels; but the motor branches, distributed throughout the whole length of the alimentary canal, are much more intimately concerned. From their universal anastomosis with the ganglionic nerves, there would arise a spasmodic action of the coats of the bowels and stomach; a violent and peculiar vomiting, with little or no concordant action of the diaphragm or abdominal muscles, merely a contraction of the organ itself; accompanied by incessant purging, not with tenesmus or tormina, but the evacuations would be expelled without effort, and by a sort of pumping action of the bowel. This state having lasted a longer or shorter period, the fœcal matter of the bowels would be all carried off; but, the cause still remaining, the ganglionic nerves would become paralysed. Elimination would take the place of secretion into the intestines, and the watery parts of the blood be rapidly drained off; diarrhœa, or sickness, or both, still continuing to carry out of the body the evacuations, now become pale and serous, without smell or any of the characteristics of fœcal matter.

Meantime the irritation would be extending along the whole of the sympathetic nerves. A change would take place in the secretions of all the glandular system. When the powers of organic life are weakened by fever, bilious diarrhœa, &c., we observe that, in proportion as the secretion of the bowels is increased, the other secretions are diminished ; so, in the case we are supposing, we should expect a total suspension of them. The bile would be no longer thrown into the duodenum ; the pancreatic juice would fail to supply its portion, whatever that may be, to the alvine discharges ; the urine would be suppressed ; the detrusor muscles of the bladder would be in a state of spasmodic contraction, while the viscus itself was empty ; the throat, tongue, and mouth, would be dry, and the skin livid and without perspiration : or, perhaps, a cold moisture might exude from the capillary pores ; the eyes would be devoid of tears, and, from the experiments of *Mons. Dupuy*,* we might expect them to sink in their sockets and become dim. The irritation would also have extended to the spinal column. Great pain and spasms would be liable to take place in all the muscles. The pneumogastric nerves would be especially affected : hence much disturbance in the circulation and respiration would ensue. This would be further increased by the blood having been deprived of great part of its fluid constituents ; the circulation would be almost suspended, and the heat of the body, consequently, fall to a very low degree ; the blood would hardly be propelled through the lungs ; of course the veins near the heart would be in a state of violent congestion ; while, by means of the recurrent branch of the eighth pair, as well as from dryness of the larynx, the voice would become altered in tone and gradually lost. These symptoms would go on increasing with dreadful rapidity, and in a short time occasion death, without any disturbance of the mind, or any lesion of a single organ of sense ; touch, perhaps, alone excepted.

These are all, and they are the only symptoms, which we could calculate upon resulting from the cause we set out by stating ; and it is unnecessary to ask the reader to compare them with the symptoms of spasmodic cholera. Any one who had the painful office of visiting a patient labouring under that horrible malady, cannot fail to recognize in this supposed case, an accurate picture of the real disease.

Let us now turn to the analysis of cholera, and see how far it accords with our synthetical production. In all important particulars, *post-mortem* examinations, the most perfect of all our tests, confirm to the letter, the correctness of the view here taken. It may, indeed, be objected,

* Quoted by MR. H. BELL, from the *Journal de Medecine*, tom. 57, p. 343.

that dissection does not always show the ganglia to be unnatural in appearance, and a long list of cases might be quoted in support of this objection; but I cannot allow them to have much weight. We do not expect the scalpel uniformly, or even generally, to expose distinct organic lesion in cases of paralysis and other disorders of the brain; and why should a more palpable alteration of structure be demanded in a similar affection of the ganglionic nerves, the pathology of which is less perfectly understood than that of the brain? If physiological signs of disordered function in this obscure system are detected, we must not refuse to be convinced they exist, though a visible lesion of structure is not always perceived. It is, however, at the same time to be recollected, that positive disorganization has frequently been noticed.

The blood has been proved by *Dr. O'Shaughnessy, Dr. Clanny, Mr. Rose, &c.* to be vitiated during all stages of cholera. Though the results of their experiments slightly differ, yet they all agree in the main point, viz.: that the serous, i. e. the watery and saline parts of the blood, are wanting. Upon this cause the above chemists suppose the disease to depend; but they seem to have stopped short in their pathological reasoning when just on the verge of important truth. *How does this serous portion become wanting?* If all the secretory vessels were in a state of health, there would be no possible mode of escape for the serum, except by the natural secretions. Unless, therefore, we suppose that disturbance of the secretory vessels precedes the loss of serum in the blood, we must assume that an effect takes place without a cause. It has been demonstrated that the blood in all fevers undergoes some disorganization, which probably is the case also in cholera, independently of this *filtering*. *Dr. Southwood Smith, Dr. Brown,* and others, have spoken of the latter disease as a species of fever, and they undoubtedly have many points of resemblance; but till the pathological condition called fever is more correctly ascertained and understood, the comparison throws little light upon the subject. The writer thinks that the state of the sympathetic nerves has not been sufficiently inquired into, with regard to the latter class of diseases, fevers. He does not mean here to venture upon any hypothetical deductions as to their nature, but he wishes that the hint may be deemed worth attending to, by those who have opportunities for investigating it.

The view of cholera which is thus briefly sketched, occurred to the writer after a deliberate consideration of the subject, when in *Paris* eighteen months ago. It will be seen that the opinions advanced by several of the talented pathologists who have intermediately written on the disease, approach in some degree, though essentially they differ,

from that which he has ventured to suggest. The theory of *Mr. Hamilton Bell* (one of the most plausible which has been published) does not satisfactorily explain the occurrence of premonitory diarrhœa, nor indeed of diarrhœa at all, as a primary symptom: besides, the division of the nervous system into three "powers" is neither so simple nor so explicit, as that which is so beautifully demonstrated by *Mr. Bell's* distinguished uncle, *Sir Charles*. If *Mr. Bell's* theory were the true one, an injection of stimulant fluid into the veins, in order to rouse the action of the heart, or inhaling oxygen for a similar purpose, would, along with venesection, at once cure the disorder. The remark that saline injections seldom prove of permanent benefit, applies also to the views of *Mr. Annesley*, and those who consider a morbid state of the blood as the primary source of cholera. The hypothesis of *Dr. Kennedy* and many others, that the seat of the malady is the spinal marrow, would lead us to expect pain, cramps, and spasms, or palsy in the extremities, as invariable and early symptoms *preceding all others*, which is certainly not the case. Neither can it be allowed that vomiting and pain in the stomach necessarily precede diarrhœa, as might be presumed from *Mr. Lizars* having ascribed the proximate cause to inflammation of the eighth pair of nerves. If malignant cholera were a "gastro-enterite," as stated by *Mr. Christie* and many French writers, one would naturally infer that it might be subdued by those remedies which are found effectual in ordinary cholera-morbus and bilious diarrhœa. That such is not the case in the malignant disease is evidenced by the various other modes of treatment which have been resorted to with advantage; and especially by the paradoxical fact, that a drastic cathartic so powerful as croton oil has the effect, in spasmodic cholera, of *checking the diarrhœa* and substituting mild evacuations of fœcal matter for the "rice-water" discharges. Unless any hypothesis of the late unfortunate *Professor Delpach* be similar to the one at present under discussion, there is no view which has fallen under the observation of the writer, that is free from these various objections, or which will explain the singular anomaly just alluded to, except that which he is endeavouring to substantiate.

It is immaterial to the preceding argument whether cholera be epidemic, infectious, or contagious. In the MS. before alluded to,* similar opinions are advocated to those now generally prevalent among medical men who have seen much of the disease, viz., that it is usually

* An MS. lecture on the general subject of Cholera, read to the Darlington Medical Society; of which the above paper on the pathology of the disease was a supplementary portion.

epidemic, and occasionally, but rarely, infectious. The writer has also seen well-marked cases of malignant cholera, both endemic and sporadic. The atmosphere appears to have little share in producing or propagating the disorder, unless, as *Sir H. Davy* hinted, the air has "something more than its ponderable elements." Has the earth some influence on the powers of life which philosophy has not yet detected?

Let it not be said, however, that all this is speculative theory; for the great object of this paper is to elicit practical benefit in the treatment of cholera. So far various plans have been adopted, but few of them have been derived from any fixed principle. Most of them are recommended by experience alone; and experience, alas! has failed to speak much in favour of the most successful ones. In a large proportion of cases, where the patients' constitutions were very unhealthy, and the disease had got a firm hold, the most consummate medical skill appears to have been of little avail; but if those methods of treatment which have been found most serviceable can *all* be reduced to one and the same principle, and that principle be found to agree with the most plausible theory of the pathology of cholera, it is fair to infer, that by modifying and adapting our remedies to fulfil the indications thus pointed out, we may arrive at the most beneficial practice which the nature of the case admits of.

As paralysis of the ganglionic nerves is a pathological condition which has seldom, perhaps, presented itself to the mind of the therapist, we can only draw the indications of treatment from analogy. In ordinary loss of power of a nerve of sense (or, indeed, of any nerve), it is usual to employ stimulants; and hence, in our view of cholera, we should be induced *a priori*, to administer the only stimulants we know of, affecting the abdominal part of the ganglionic system, viz., aperients or purgatives, combined with calomel, perhaps adding a little opium at first, to allay the irritation of the spinal nerves. What does experience say to this? Let the following plans of treatment, decidedly the most successful on record, be my answer to the question:—

Mr. Searle's exhibition of large quantities of table salt.

Mr. Montgomery's employment of calomel, capsicum, and opium.

Dr. Kennedy's plan by bleeding and calomel.

Dr. Hacket (of Trinidad) and *Dr. Tegart's* recommendation of croton oil; a modified use of which was successfully adopted during the late virulent irruption of the malady at Stockton.

Dr. Ayre's frequently-repeated doses of calomel, a plan which *Mr. H. Thomas*, of Sheffield, acquaints me, has been attended with marked success in that town.

Mr. McIntyre's (of Newcastle) treatment by castor oil and aromatics, with calomel, small doses of opium, and copious enemata of warm gruel and turpentine; which was so successful in that gentleman's extensive colliery practice, that I am authorised, on his own information, to state, he and his assistants did not lose more than about 80 out of 700 cases.

With most of the above modes of treatment, early bleeding is insisted on. It is a point of great importance mechanically to relieve the loaded veins of a portion of their dark contents. And here it should be remembered, that a small pulse no more contra-indicates that practice in the malignant disease, than it does in enteritis; but, for a similar reason in both cases (so far as the cause of the weak pulse is concerned) urgently calls for venesection. More or less diffusible stimulus, in order to rouse the faltering powers of life, is also generally recommended in spasmodic cholera.

A word on the saline injections into the veins. If the foregoing sketch be correct, it explains the curious train of effects following this novel course of practice. Fluidity is restored to the blood; but it is like water poured into a sieve,—the liquid soon runs off by the bowels, which are not at all acted on by the venous injection, and the patient too often sinks from a state of apparent revival into one of fatal relapse. As a measure of the success which has attended this plan, the writer has collected from various periodical journals, reports of 105 cases, in which fluid of various kinds, generally a solution of salts, had been injected into the veins of cholera patients. He has arranged them in a tabular form, showing the age of the individuals, the number of hours which elapsed from the time of attack before injection was resorted to, the quantity injected in a given time, and the event. The following is a summary of his list.

No.	Hours ill.	Injected.	Cured.	Convalescent.	Under Treatment.	Died.
15 ...	4 to 12 ...	3 24 to 305 ...	1	2	—	12
13 ...	12 to 27 ...	3 23 to 292 ...	3	4	—	6
77 ...	unknown ...	3 14 to 640 ...	1	1	15	60
<hr/>		<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
105		3 14 to 640	5	7	15	78
<hr/>		<hr/>	<hr/>	<hr/>	<hr/>	<hr/>

The method has not often been successful, and seems now pretty generally abandoned; but, combined with the administration of aperients, calomel, and other remedial measures, it might, perhaps, be of great advantage. It has been by relying on the injections as a permanent instead of a temporary relief, that much of the failure of that system is probably to be attributed.

A mass of further authorities might be adduced, to convince the

reader that the view of cholera which is here briefly taken, is *practically* worthy of attention. The writer hopes what has been said is sufficient for that purpose: and, though not so sanguine as to believe that he has solved all the intricacies of the subject, or that the sketch he has given is free from objections, he thinks it is calculated to remove some difficulties; and shall esteem himself fortunate if his remarks advance us one step farther, in the elucidation of this important department of medical science.

T. G. W.

Stockton-on-Tees, January, 1833.

H. FORMULÆ OF REMEDIES (PAGE 109).

The following are some of the prescriptions used during the prevalence of diarrhœa and cholera, as referred to in the foregoing reports.

Pilula Cal. cum Opio.

℞ Hydrargyri Chloridi gr. ij
Pulveris Opii gr. i
Cons. q. s. ut fiat Pilula.

Pilula Dysenterica.

℞ Hydrargyri Chloridi gr. ij
Pulveris Opii gr. j
Pulv. Ipecac. gr. j
Cons. q. s. ut fiat Pilula.

Mistura Cretæ composita.

℞ Misturæ Cretæ ℥ vij
Sp. Ammoniac Arom.
Sp. Ætheris Nitrici aa. ℥ iij
Tincturæ Opii ℥ ii M.

Mistura Tragacanthæ composita.

℞ Olei Ricini ℥ ℥
Olei Cinnamoni gtt. iij
Tincturæ Opii gtt. xxv
Tinct. Cardam. comp. ℥ ℥
Pulv. Tragacanthæ comp. ℥ ij
Aquæ ℥ ii ℥ M.

Mistura Astringens.

℞ Confectionis Opii ℥ iij
 Pulveris Cretæ comp. ℥ ii ℥
 Aquæ Menthæ pip. ℥ viij M.

Mistura Chloroformis.

℞ Chloroformis ℥ ij
 Misturæ Acaciæ ℥ vi
 Aquæ ℥ v M fiat Mistura.

Ex qua hauriat cochleare magnum omni hora vel semihora.

Pilulæ Olei Crotonis.

℞ Hydrarg. Chloridi gr. xv
 Olei Crotonis gtt. i ℥
 Extr. Hyoseyami ℥ j M.

Fiat Massa in Pilulas viii dividenda, quarum capiat una omni quarta parte horæ.

Linimentum Crotonis.

℞ Olei Crotonis ℥ j
 Olei Terebinthinæ ℥ vij M.

Syrupus Argenti Oxydi.

℞ Argenti Oxydi gr. viij
 Pulveris Opii gr. vi
 Syrupi Papaveris Albi ℥ j M.

THE END.

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