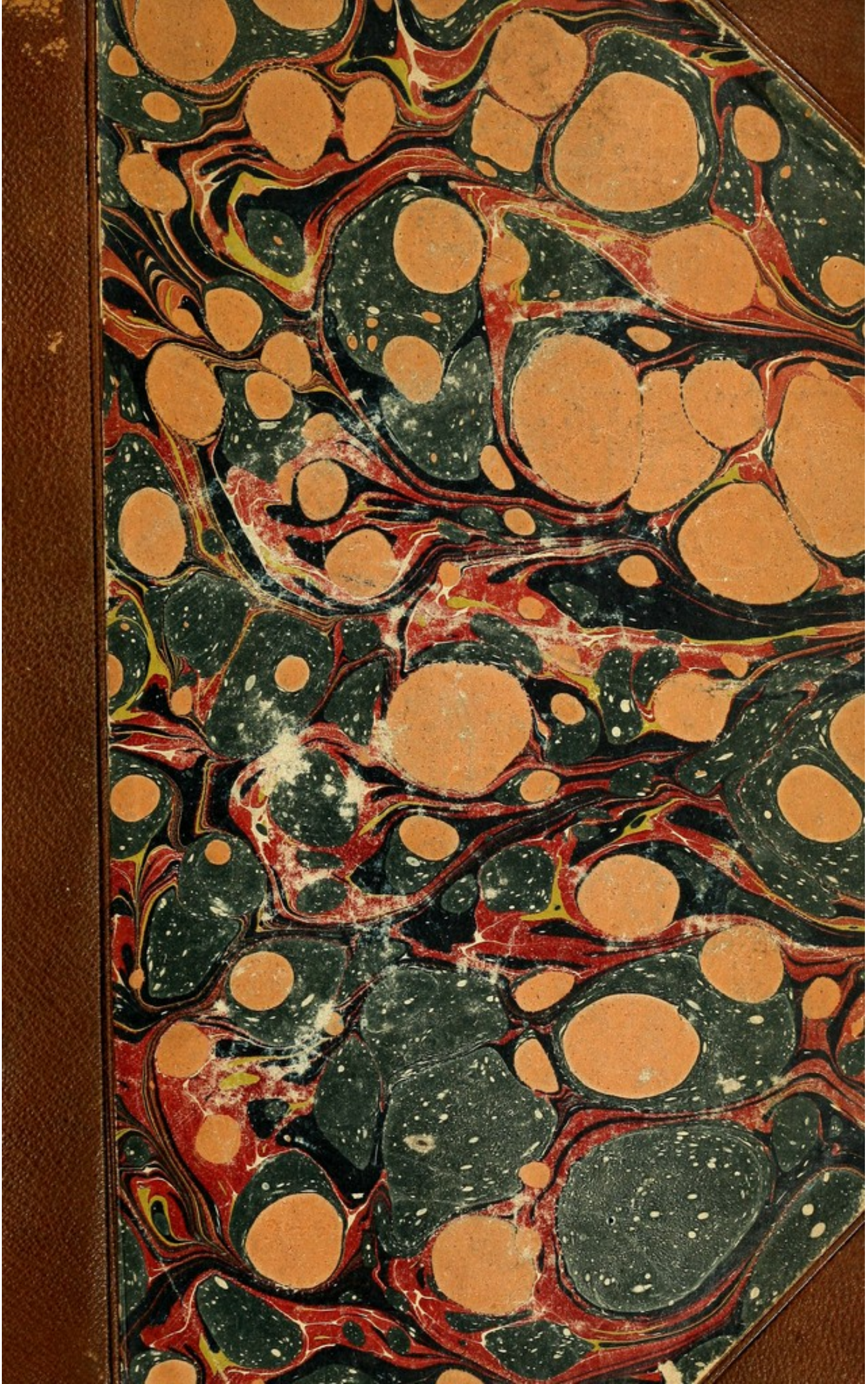
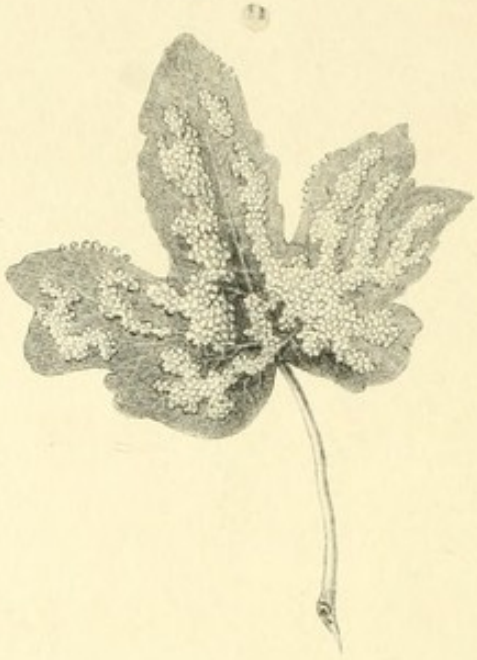
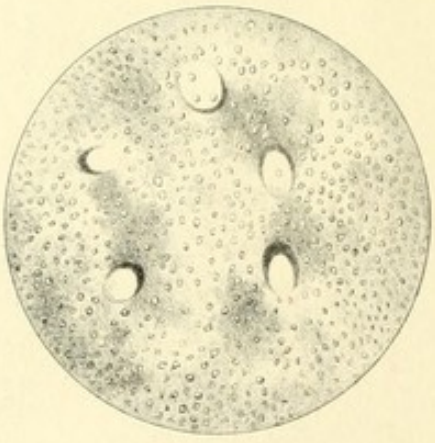
Researches to establish the truth of the Linnaean doctrine of animate contagions : wherein the origina, causes, mode of diffusion, and cure, of epidemic diseases, spasmodic cholera, dysentery, plague, small pox, hooping cough, leprosy ... are illsutrated by facts from the natural history of mankind, of animals, and of vegetables, and from the phenomena of the atmosphere / by Adam Neale.





Maple Leaf



Disk of Vesicles

See p. 168.

C. Hullmandel's Lithography.

RESEARCHES

TO ESTABLISH

THE TRUTH OF THE LINNÆAN DOCTRINE

OF

ANIMATE CONTAGIONS;

WHEREIN

THE ORIGIN, CAUSES, MODE OF DIFFUSION, AND CURE,
OF EPIDEMIC DISEASES,

SPASMODIC CHOLERA,

DYSENTERY, PLAGUE,

SMALL POX, HOOPING COUGH, LEPROSY,

&c. &c. &c.,

ARE ILLUSTRATED BY FACTS
FROM THE NATURAL HISTORY OF MANKIND, OF ANIMALS,
AND OF VEGETABLES,
AND FROM THE PHENOMENA OF THE ATMOSPHERE.

BY ADAM NEALE, M. D.

PHYSICIAN TO HIS MAJESTY'S FORCES DURING THE PENINSULAR WAR;
AND ONE OF THE PHYSICIANS EXTRAORDINARY TO HIS LATE
ROYAL HIGHNESS, THE DUKE OF KENT,
&c. &c. &c.

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TO

HIS ROYAL HIGHNESS

AUGUSTUS FREDERICK,

DUKE OF SUSSEX,

EARL OF INVERNESS,

KNIGHT OF THE MOST NOBLE ORDER OF THE GARTER,

PRESIDENT

OF THE ROYAL SOCIETY OF LONDON,

&c. &c. &c.

THE FOLLOWING RESEARCHES

ARE, WITH THE UTMOST RESPECT,

DEDICATED

BY HIS ROYAL HIGHNESS'S

MOST OBEDIENT HUMBLE SERVANT,

ADAM NEALE, M. D.

PREFACE.

BETWEEN the sciences of medicine and of astronomy, this analogy exists, that both are essentially founded on accurate observations: in both, all calculations, as to the future, can only be formed from a knowledge of the past: and, in both, the more minute and circumstantial our knowledge of foregone facts, the more likely we are to arrive at true and just conclusions.

In one circumstance alone does medicine appear to possess an advantage, namely, that in the inspection of the bodies which are the subjects of its contemplations, we can subject them better to the operation of our visual senses, by the aid of the microscope, than astronomers, whose objects being placed at such immense distances, can only be observed through the medium of a telescope.

But, in astronomy, on the other hand, its cultivators possess many great and striking advantages over physicians, not only from the certainty they are capable of attaining from the due employment of the exact sciences, but also, from the determined periods of the revolutions of the heavenly bodies, which are

not to be influenced by the numerous accidents ever occurring in the minor affairs of this earth.

In medicine, also, it must be borne in mind, that although there is no lack of observations, yet so loosely and inaccurately has the greater portion of these been made, so completely have they been intermingled and overwhelmed by masses of most illogical and unphilosophical reasonings, so much have they been scattered through a vast variety of ponderous and unreadable volumes, that, even with the greatest inclination to arrive at truth, its attainment is, in many cases, most difficult, nay I would add—nearly impossible.

Besides, medical writers often have been men not of the most extensive views, and remained but too contented with merely skimming over the surfaces of events, and amassing fortunes, rather than bent on extending the limits of their science : and even when more happily constituted, their daily attention has been necessarily so engrossed in the minute, and often painful. practice of their profession, that but few, comparatively speaking, of the more generous, or better qualified, have left behind them writings, which can be made useful to the future advancement of medicine. True it is, that amongst the great numbers who have written upon our art, there have been several of clear and powerful intellects, but most of these, having taken up some early bias, or set out in an erroneous direction, have generally become imbued with some fanciful, but splendid, theory, and passed their lives in the pursuit of unreal visions.

Of great physicians, also, by far the majority have been men living and practising their art in crowded cities, or holding professional chairs in universities in similar localities, and from those very circumstances having had but little leisure or attachment for the study of natural history. How few, therefore, of such men as Hippocrates, Galen, Linnæus, Darwin, Ramazzini, Mason Good, T. Forster, Sims, and a few more, can we enumerate, who have been not only accomplished physicians and writers, but excellent naturalists and philosophers:—and whose works will always continue to enlighten future ages.

On the whole then I fear that it must be admitted, that even at the present day medicine may be considered as still in its infancy, and that it will probably require a series of ages before it can be pronounced to have attained its manhood.

It is therefore from a full conviction of the necessity of recalling the attention of philosophers towards the discovery of some better foundation for good practice, that I have thus presumed to point out the slippery, sandy, and unsound nature of the present basis of medical reasonings.

Having no motive but that of benefitting mankind by aiding in the promulgation of useful truths, I have ventured to come forward as an advocate for that of the Linnæan doctrine of animate contagions, believing that it is founded on facts, and in the everlasting nature of things, and that by its developement alone, physicians will be at length directed to the true method of curing diseases.

In conclusion I may add, that having passed much of my life amongst large masses of men, and having had opportunities of witnessing many of their severest maladies and sufferings, I have ventured into the *arena* in the absence of better qualified, or more willing, observers, to bear testimony to the universality of the Linnæan doctrine; in the hope too, that if the following researches should serve no better purpose, they may at least awaken attention in those who are interested in such enquiries,—and who I would ask are not interested in the truths, of medical science?

The field of inquiry itself is ample, and as the attainment of some firm foundation in medicine must eventually contribute mainly to the happiness and well-being of society, it presents one of the fairest scopes for the honest ambition of men of generous and humane minds: and to such I commend the further prosecution of the task, fully convinced myself that its success must be certain and imperishable, and that sooner or later, truth must and shall prevail, even in medical science.

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"physic suppose the human body to consist of a "cerebrose *Medullary* part of which the nerves are "so many processes (and which is commonly called the *nervous system)*, and a *cortical* part including the *vascular system*: the former being the animated part, or that in which the sentient, moving principle peculiarly resides, is considered as deriving its nourishment from the most subtile fluids of the vascular system and its energy from an electrical principle inhaled by the lungs. "The *exanthematic* class of "diseases are supposed to be excited by some external causes, which we call contagion, and which he pronounces to be *animalcula.* This idea which is more fully developed in one of the theses contained in the fifth volume of the work entitled *Amœnitates Academicæ* was defended by J. C. Nyander and published 1757—and as this is the paper which we are about to discuss; as the Latin work too, in which it is contained is both rare and high priced; and as the whole collection is considered by the biographers of Linnæus to be of equal authority with that Professor's own writings, we have judged it most convenient to insert its translation, which runs thus:—

Exanthemata Viva, &c. &c. Resp. J. C Nyander 1757. ANIMATE EXANTHEMATA.—Thesis proposed by John C. Nyander, a native of Calmar, under the Presidency of Doctor Charles Linnæus at Upsala, 23rd June, in the year 1757.

Of all diseases, there are hardly any of which the originhas appeared to Physicians to be more abstruse, than those called contagious: inasmuch, as a body,

hitherto in the most perfect state of health and in the strict observance of every rule of diet, is found equally liable to be contaminated, as that of one giving himself up to every sort of excess, provided only, there shall be too near an approach to a person labouring under disease.

And our wonder is the greater on observing that there are many other contagious diseases, which being indigenous amongst us, arise as it were spontaneously almost every year, such, for instance, as the itch, hydrophobia, hooping cough and dysentery; whilst there are others again which never arise, except from holding intercourse with diseased persons having these complaints from a foreign derivation: such for instance are the plague, measles, small pox and syphilis. And here it will suffice to quote a few of the conjectures which have been formed by some of the most learned physicians in respect to the origin of these, since various opinions have been cherished by various writers.

They have been ascribed to putridity, by Fracastorious, Rhodius, and Mindererus; to a sulphureous self-increasing putridity by Hoffman; to a sort of fermenting miasma by Junkerus; to somewhat corrosive by Alpinus; to an acrid volatile salt by Sylvius; to an arsenical virus by Sorbait; to imagination and terror by Rivinus; whilst others again have imputed them to virulent exhalations from the earth; others to celestial influences and conjunctions of the planets; some also to exhalations from heaps of dead bodies corrupting and vitiating the atmosphere;

and others, as Kircher, &c., to a verminous putridity. But, of all the above quoted causes, which are universally brought forward by authors, that appears to us to be the most probable, which asserts "that contagion arises from living animalcules," as Rivinus and others, who ascribe the itching of Exanthemata to the existence of acari. In our attempt therefore to proceed by this path, we shall expatiate no further than we may feel ourselves justified by the guidance of our experience, and whenever we shall arrive at that point which is only probable, but which has not hitherto been actually made the object of ocular demonstration, we shall merely touch upon it with all brevity, and state it as an hypothesis.

Contagious diseases then, for the most part, all coincide in this peculiarity, that they are attended with exanthematous eruptions, either externally or internally, insomuch that even hydrophobia is said to produce certain pustules underneath the tongue; so that in all contagious maladies there exists a certain exanthematous matter, the eruption of which usually mitigates the febrile symptoms;* that the presence of this matter excites bodily uneasiness, if not feverish actions, and that, even in its mildest form, the disease is exacerbated at some certain hour of the day, or towards evening. That the power of the disease is increased by *sweet* articles, but diminished by *bitters*, and that the irritation is excited by *fat* articles of diet. That it is somewhat repelled by cold, but like every thing animate, is cherished by warmth,

* Vide Hoffmann. Systema. IV. 122-3.

although it appears to be expelled by great heat: thus, from the application of heat, the itch and every exanthema is augmented, and from increase of heat and fever driven outwards to the warm surface of the body. That they are destroyed by *Anthelmintic* remedies, and therefore *Sulphureous* remedies cure the itch: and thus *Mercurial* medicines, (as they are destructive to nearly all insects), cure both the itch and syphilis, and prove preservative both from the plague and small pox. And that as tobacco kills all minute insects, fumigation with it prevents contagion. That both analogy and the sense of itching in the pustules of contagious diseases, seem to warrant the same inference. That both in itch and dysentery, the existence of minute insects has been the subject of ocular demonstration. That Langius had observed them in measles; and Kircher in the plague; Hauptmann in syphilis (animalcules resembling slugs); Zeigler in Pœtechiæ; Lusitanus and Porcellus in small pox, and that the last mentioned had observed also worms in cases of serpigo and other cutaneous diseases.

Both from analogy therefore, as well as from all the experience hitherto acquired, we may very easily believe that very minute insects of that kind, such for instance as *Acari* of various species, may be the causes of several contagious diseases. Nor is their size or structure at all repugnant to such an idea—since there are animalcules so minute that the human eye unassisted by the microscope cannot even perceive them. The lynx-sighted Lewenhoek observed

thousands of insects (or animalcules more properly speaking) which added together scarcely equalled in size the hundredth part of a grain of sand, and even in those fluids which to the naked eye seem altogether pure and diaphonous. While the accurate and ingenious Reaumur has stated it to be his opinion, that that obscure vapour which somewhat darkens the atmosphere in summer, is nothing else than myriads of insects, so minute, as entirely to elude human vision. And the same naturalist has demonstrated, that these do not exist separately only, but also congregated in societies similar to those of bees and ants, and that these also observe amongst each a certain regular order.

From any evidence of our senses, therefore, we must draw no argument, as to the impossibility of the thing: for the divine PROVIDENCE of the all-wise creator of the universe is equally manifested in the most minute, as well as in the greatest, of his arrangements. Whilst we inspect a living acarus, we feel assured that, minute as it is, it is provided with muscles, nerves, veins, arteries, and viscera: and that all these, however small, are yet adapted to contain the most subtile fluids, calculated to circulate through them: all this too we are perfectly warranted in believing. Whence these animalcules shall have proceeded we may well wonder, but we are scarcely warranted in that wondering, if at the same time we but think that these being of such very minute proportions, that they hardly exceed in size the atoms of the atmosphere, can yet fly through the

air and seek out the most minute chinks, exactly in the same way as mucor arises constantly from its seeds, sowing themselves wherever any putrid matter shall exist in a state fitted for their reception.

SCABIES.

THE ITCH.—Of all contagious ailments, this probably is the most common, and the most obvious to our senses. It is a well ascertained fact that this cutaneous malady is excited by the *Acarus Syro*, which, although so minute as scarcely to be seen by the naked eye, can be generally detected lurking under the skin, where there is a certain bluish spot, and that it can be taken out upon the point of a needle and placed upon the nail.* If then we place it upon the skin and breathe upon it gently, so as to excite it by the warmth of our breath, it can be easily distinguished creeping away and displaying its minute structure, till it shall have found out a wrinkle in the skin, when it immediately begins to make a burrow for itself exactly in the manner of a mole, by digging down with its claws. The Acarus, (No. 1195 in Linn. Fauna Suec) although a little more highly coloured, resembles it very much. If a morsel of cheese, or a little flour be placed aside for some time, so as to remain undisturbed, we frequently observe

* The acarus is not to be sought for in the midst of the pustule itself, but is generally observed at some distance off following the furrow of the cuticle. It has deposited its progeny in the pustule itself, which is broken in the effort of scratching, and these disseminated by the patient's own nails—This being the law of nature.

myriads of these insects or mites feeding on either of these substances; hence too, it happens, that when nurses, instead of using the powder of lycoperdon, or flowers of zinc, scatter wheat-flower on the groins and armpits of infants, suffering from *Intertrigo*, these parts become frequently attacked with the itch, which will return there again and again after being cured, unless that practice be left off: and these infants too will communicate the infection to others. We therefore conclude that the acari produced in wheaten or oat-flour, and those of the itch pustules, constitute one and the same species.

Dr. Zweib has observed these acari depositing their eggs, multiplying themselves in a very short period of time, and has seen them living for several days, outside the body. But Lewenhoek has long taught and delineated them as being viviparous.

We find therefore that the itch is propagated constantly, either by means of actual contact, or by articles of dress, or from associating with infected persons. The itch-insect seems to be impatient of cold, but agrees well with warmth, wherefore the itch is repelled by cold and exasperated by heat, so that we have found that the same cause which shall have excited the itching externally, hath produced fever internally, which has not ceased before full eruption or efflorescence. Wherefore reasoning on this phœnomenon, and comparing it with the causes of exacerbations in fevers, (which also excite of themselves a very violent itching), it is natural to entertain the opinion of these also being contagious.

For a like effect seems to betoken a similar cause, and nature, which is ever self-consistent, is scarcely ever wont to make violent starts—Although, from the obscure nature of the subject, we do not feel ourselves warranted in further assumptions.

In the Itch of animals (called mange) acari are detected with greater difficulty, not however that they are altogether exculpated from them, since there is another species (the Acarus Exulcerans) which we can easily discover by means of a magnifying lens, which are distinguished by four hind legs and twice as long as their body : and thus the cause too of this malady is placed beyond all doubt. And as we are in the habit of preserving specimens of insects in our museums by the presence of the ambrosiacal drugs, such as musk, civet, sweet flag, camphor, the essential oil of birch-bark, &c. ; so we also find the exhibition of these remedies proves quite successful in driving outwards the eruption of exanthemata, when they have been suddenly repelled. When musk has been suspended in a necklace round the throats of infants, it has been found effectual in preserving them from small pox when raging epidemically, as has been proved experimentally by our president Linnæus, and as is customary with the inhabitants of Norway, and as appears to be the case from some instances quoted in the lately published Acta Petropolitana.

In respect to the *Itch of old age*, the same reasoning applies, and experience has also demonstrated the existence of acari therein. When it has once attacked the body, should it go off spontaneously, it

very seldom returns. Some years since we observed two goats infected with the mange chiefly in the mouth and face, one of them died of it, but the other, to whom musk was given, became perfectly sound within the short space of three days.

THE DYSENTERY.

The Dysentery is an epidemical itch, attacking the internal surface of the intestines, as appears from the dissections of the bodies of those who die from Dysentery, and that it is propagated by means of places of necessity, and through common sewers, there is not any experienced physician who now entertains a doubt. Bartholine narrates the case of a certain Danish physician at Heilsinburg in the last (17th) century, who having been frequently attacked by Dysentery, examined his excretions, and found them swarming with living insects, in a state of motion, and so minute that he could scarcely observe them. And in this place we must not omit to mention a case in the highest degree illustrative of the above quoted fact.

About four years ago, Dr. Rolander being then a pupil of and boarded in the family of our president Linnæus, having been attacked with Dysentery, was cured in the usual manner with preparations of rhubarb and paregorical remedies. Eight days thereafter he relapsed into the same disease, and was again cured by the same remedies. But a period of eight days having again past, he was a third time

attacked with Dysentery. A rigorous enquiry was now instituted to detect the cause of this, but all in vain, seeing that the patient enjoyed the same table and followed the same course of life with all the other members of the family, who were enjoying perfect health. Therefore our learned President advised the patient (who was much addicted to the study of Entomology) to examine carefully his dejections, by which it might the more clearly appear, whether the above quoted observation of Bartholine really held good or not. On Rolander's doing so, he reported that he had observed myriads of animalcules, and which upon being accurately described proved to be exactly similar to those of flour. And some one conjectured that the cause of these was to be found in a certain nocturnal beverage, whilst others again conceived that this was not adequate to produce such an effect.

Rolander had not been accustomed to take any beverage during his meals; during the night therefore, being incommoded with thirst, he was in the habit of swallowing a very diluted beverage from a cup (a bicker) made of juniper wood; on inspecting this cup, he found a small whitish line scarcely to be perceived by the naked eye, running between the crevices of the wooden staves of the cup, and having applied a magnifying glass, he found that all this white line consisted wholly of innumerable acari, of the self same species with those which he had remarked in his excretions. On the beverage being poured into the cup they did not stir, but at midnight

having quitted their retreats, they emerged to the surface and floated and remained there till the hour of ten in the morning, feeding themselves; when they dived and re-entered the chinks they had quitted. This fact he discovered after repeated observations. Having taken out these acari and placed them upon a moistened watch-glass, they were found to be but little irritated by the adfusion of various liquors, and that even after the application of oil itself they remained unhurt: but they were particularly annoyed by the application of spirits of wine (alcohol) and most especially by the spirituous tincture of rhubarb. A fact especially worthy of notice, seeing that rhubarb is actually a specific for Dysentery, and that the Lapathum Acutum or sharp pointed dock, which is a plant very nearly related to it, is a common remedy for the itch, and is demonstrative both of the affinity and analogy of the two diseases, and their remedies. These acari adhered firmly to the wooden cup after three ablutions in hot water. Rolander also searched for them in other situations, and found them most frequently in vessels containing acid beverages and also beneath the bungs of casks. That Dysentery, which infects the territory of Sweden almost every year, during the harvest time, as well as that which is common in camps, most probably derives its origin from the self same acari lurking in acidulous beverages, and which, by means of the necessaries, are propagated, and thus give rise to what is called contagion. In the Old Testament therefore it was enjoined that every sol-

dier should immediately bury in the ground his own excretions. Would it not therefore be advantageous both to the Swedes and all soldiers who are encamped, to use in preference earthenware and metallic drinking vessels, because these insects can only with difficulty adhere to such vessels. It is hurtful, as the common proverb goes, to drink during the night when languid from an empty stomach, unless the superior portion of the beverage be first poured off and rejected. The vulgar are ignorant of the real cause for this custom, but the above recited observation, proves that these acari are then in motion, and hence no doubt has arisen this fashion. A pain in the bowels is excited by a draught of vapid liquor, which again is generally suppressed by taking a small quantity of proof spirit which in its power of injuring these acari, approaches nearest in efficacy to rhubarb.

THE HOOPING COUGH.

This disease not so much known to our progenitors as at present, now generally attacks our infants. The Epidemy therefore of this malady must of necessity be such a miasma that it can easily evaporate from the sick* and be propagated and multiplied, but we

* Cases are extant of healthy children having entered a house, and there to have only once met a patient suffering from hooping-cough, and having been very soon after siezed with the same malady : as also that physicians in making visits from one patient to another, have carried away with them the miasma of this disease, and have thus been the means of infecting others. And this last observation is that of a fact well known to medical men.

apprehend that all these predicates can only be attributed to something endued with life. The domestic remedy which the Vestrogoths or Norwegians commonly employ against this malady consists of *the infusion of the Ledum Palustre*, (a plant which is also employed to cure swine and cattle of lice) and which being remarkable as a most powerful narcotic and strong scented poison to insects, seems to denote that the causes of this malady also are to be found in animalcules. And to this is to be conjoined the very remarkable fact noticed by Dr. Wahlbone of Calmar, who prescribed for an infant, labouring under this disease, some musk julep, made according to the London Pharmacopœia Formula, from which remedy after being taken for two days, the patient's body became flushed with an efflorescence or slight itching, and the hooping cough disappeared: a short period having elapsed, the complaint returned, and the itching having receded internally, he again administered the same remedy, which again produced its first effect, and the infant was perfectly cured. May not therefore the hooping cough be derived from a certain species of acari, which more particularly affect the organs of respiration, and thence derive their nourishment, since the disease is both cured and relieved by the same sort of remedies which destroy acari.

Why this same disease, like the small pox and the measles, should attack us only once during our lives, and but very rarely returns, we are just as ignorant as why the itch of old age should not make more frequent attacks.

THE SMALL POX.

Between the small pox and the before mentioned diseases there is a great correspondence. It originates from some unintelligible cause either in Europe or America,* and is never transferred to us (in Sweden) except by means of contagion. But it is very likely that it is excited in the same manner, more especially as children who have been fed too much on a *sweet* diet, and whose fluids are unusually bland, are more infected with this disease, in like manner as they are with the itch.

Some years ago, when small pox was very fatal at Upsala, and was carrying off nearly all the infantine population in the neighbourhood, our president Linnæus, suspended necklaces containing musk around the necks of his own children, as has long been the custom amongst the Norwegians; by which means he succeeded in preserving them uninfected from this fatal scourge. It has latterly become the custom to foment the thighs of patients labouring under small pox, in the common way with a fomentation composed of milk sweetened with sugar; whereby, the insects appear to be attracted as it were to those parts of the body; for the thighs seem to become quite beset by pustules, but all the rest of the body is much less affected with the eruptions.

* Small pox appears to have been introduced from Arabia at first, as we shall shew hereafter.

It is a custom with the Chinese in preparing their children to receive the small pox, to administer previously some mercurial and sulphureous remedies and a little saffron also (with which last drug the Chinese Sailors dye their shirts to prevent their being absolutely devoured with vermin), is applied to the eyes, to guard these delicate organs from the small pox virus, they also add a quantity of musk to the matter used in their inoculation, which is there performed by stuffing some dossils of lint contaminated with the pus up the nostrils.* By which addition of musk they think to expel the acari from the sanies produced in the frontal sinuses—they also excite some artificial issue, which is not allowed to be healed up, till the whole disease has quitted the body, being of opinion that the exanthematous matter is chiefly accumulated there, from somewhat animate, which, owing to the urgency of the internal injury, is driven outwards and thus seeks vent, which, being thus obtained, procures relief to the patient.

THE MEASLES.

This is a disease, which from its nature and foreign origin, seems nearly allied to the small pox—the seeds of columbine (*Aquilegia*), (which are poisonous, and nearly resemble those of *Staphisagria* or staves-acre, commonly exhibited as a remedy against the

* This barbarous method of inoculation is attended often with fatal consequences, from infecting the schneiderian membrane, followed with caries of the tender turbinated bones of the nose, &c., &c.

itch in children, and which, in the hands of ignorant old women, have frequently proved fatal to infants, when given in too great doses). These seeds of *Aquilegia*, in Sweden when powdered on some musk are very commonly given, as a remedy, to patients suffering from measles and small pox, that the eruptions may, by these means, be driven outwards to the surface of the body, and the internal viscera relieved from the violent action of these diseases. In the obstinate cough and oppression of the breast which affect persons attacked with measles, when scarcely any thing is found to avail, flowers of sulphur, in small and repeated doses, conjoined with febrifuges, are found to be quite a specific. In a word, all remedies which are found to be efficacious, either as curatives or prophylactics, to persons attacked with either small pox or measles, also possess great efficacy in destroying insects, either because they cannot endure the smell of these medicines, or because they are thereby driven outwards to the surface of the body, and expelled.

THE PLAGUE.

It seems to be an assured fact, that the plague never arises in the seaport towns of Sweden, unless from a contagion imported from foreign countries. That it is multiplied and propagated—that it also rages and abounds chiefly in low and putrid regions in the warmer countries. That it gathers strength and becomes more inveterate when

assisted by a certain corrupt state of the atmosphere, being checked towards winter, but breaking out afresh on the coming on of spring and summer. That according to the testimony of Dr. Timoli, it, the plague, is not found to enter houses that have been thoroughly cleansed and purified. That its advent is generally foretold and preceded by several, and for the most part contagious, diseases. That it is always attended by exanthematous eruptions. That its miasma can be equally swallowed mixed with the saliva, or introduced through the pores of the skin. That the powers of this miasma, according to the experiments of Dr. Sylvius, are weakened by acids diffused through the atmosphere, and destroyed by acids themselves. That this pestilence, when lately for the first time it broke out at Moscow, was cured, according to the testimony of *Schreiber*, by mercurial medicines, the most noted remedies against the itch arising from acari. That musk and camphor also, according to the same author, were found to avail greatly in the cure of the plague. All which observations, which are most true, appear to indicate that insects are in reality the cause of pestilence.

THE SYPHILIS.

That syphilitical diseases, we are of opinion, more especially as they never arise without the contact of fluids, (through sexual intercourse, &c. &c.) seem conjoined by an intimate analogy with the plague, and that they take their origin also from ani-

malcules, but which insects are aquatic. Hence also, it seems to appear, that fevers of that kind are excited by acari, seeing that they too are expelled by medicines appropriated to their destruction. Wherefore, that the itch and the dysentery may frequently arise amongst ourselves (Swedes) follows from the above recited facts, since it appears that the cause of the former is common in the flour of grain, while that of the latter is to be found in our drinking cups. But, on the contrary, that the insects producing the plague, small pox, &c., are exotic, and it appears probable cannot exist amongst us unless imprisoned in an infected body, or some other, to them, properly adapted abode. Perhaps the cause of this circumstance is to be attributed to our more severe climate, or to the more tender nature of these acari; for if we may be permitted to reason from more obvious to more subtle facts—while some insects are indigenous amongst us, some there are only to be found in summer, while we observe others again, which are only found to live within our houses, where the artificial warmth of a fire preserves them alive. These last we are of opinion, have proceeded from countries lying more towards the south, but of all these the tenderness has not been equal, for we also observe insects which have come hither from the warmest regions of India, and which have adapted themselves to our climate and country. The same thing has happened, likewise, to those animals, of whom a much greater number must have been found formerly in some particular places; whence indeed

they must have diffused themselves far and wide and produced their own melancholy effects. Of these, some it may possibly be conceived, have become domesticated amongst us, and thence we may be able to explain why some diseases, formerly unknown, have arisen in certain localities and become disseminated afterwards. Hence too, we are naturally led into that track, whereby we can discern the reason why certain diseases are more prevalent at some particular seasons of the year. For besides, that most contagious diseases rage chiefly during the summer quarter, being that when all insects most abound, the greatest difficulty, and arising from the artificial œconomy of these animalcules, which, by the wonderful analogy of exanthematous diseases, we acknowledge, may possibly be solved—namely, in what manner does a dead body always throw out its own peculiar eruptions, according to the variety of circumstances, from the internal parts towards the surface, in so determined a manner. What I say, is more probable, than that organised animals effect this? What more adapted for this act, than the most minute insects, whose wonderful manner of existence, excites the admiration of the best naturalists? What is there to hinder these most minute insects from inhabiting our bodies, seeing that we cannot be said to be altogether free from others of greater size? For many entire insects, of various kinds, both in a state of metamorphosis and even after having suffered their changes, have been found alive in the human stomach, &c. &c.

CHAPTER II.

REASONS IN SUPPORT OF THE INTRO-ANIMATE DOCTRINE OF PATHOLOGY.

Such is the exposition of the intro-animate doctrine of human pathology, as handed down to us by Dr. Nylander in the Amænitates Academicæ edited by Linnæus. That it is really founded in truth the author of these pages is induced to believe, from the following considerations.

1. Whoever has dedicated his days to the study and practice of medicine, must, as we conceive, have been struck by the reflection, that the means of his art consist almost exclusively, in the perpetual administration of minute, and often repeated doses of the most potent animal, vegetable, and mineral poisons—and, that the efficacy of his labours depends, not only on the skill with which he selects these poisons to suit each individual case; but also, still more on the delicacy with which he adjusts their minute doses to the living powers of the human body: so that, while suppressing the increased actions constituting disease, he shall not at the same time destroy the life of the human being in whose behalf he is acting.

2. Pursuing these reflections, he will be naturally induced to believe, that powers productive of morbid actions, since they are only to be combated successfully by the instrumentality of such powerful poisons, must needs be, not mere inert and dead matter, not any abstract quality or quantity, nor any mere metaphysical idea or mental conception; but, something in fact real and palpable, some substance or substances endued with life, perhaps also with motion, and, in all probability, minute living microscopical objects, or some zoophytical creatures or polypuses.

3. This idea having been once excited, it is probable that he would endeavour to prove either its falsehood or veracity—as upon casting his views abroad throughout nature, he would soon find that every living individual, both of the vegetable and animal kingdoms, is, like ourselves, the subject of diseases followed by death—and by pursuing his investigations in that direction, he would likewise observe that the greatest source of all their infirmities and decay, consisted in the attacks of myriads of minute insects or animalcules, constantly engaged in their destruction.

4. Hence then, he would be led to believe that, as nature is ever uniform and constant in producing similar effects by nearly similar means, never acting as Dr. Nylander has observed, "by fits and starts," that as the diseases, both of plants and inferior animals, are nearly all produced by the attacks of insects and animalcules; so also that in the maladies of the human body, insects and animalcules must, in

all probability, produce many of our sufferings and ailments.

In a steady pursuit of this enquiry, the author has been astonished at finding how extensively this doctrine has been confirmed and supported by parallel and analogical facts.

Thus we shall find, that there does not exist a single vegetable, whether flower,shrub, or plant, which is not preyed upon or consumed by several minute parasitical insects. And the fact is equally true with respect to all animals, whether inhabitants of the air, of the earth, or of the water—We may select for instance the following. The wheat-plant, upon which so much of our nourishment depends, is liable to the attacks of a minute orange-coloured gnat (Cecidomyia Tritici, KIRBY) which appears in swarms in our wheat fields about the 21st June, and deposits its eggs within the glumes of the wheat, upon the inner chaff. The larvæ are produced from the eggs in the course of eight or ten days, and having first devoured all the pollen of the flower, descend around the lower part of the germen, and there subsist upon the substance destined to have formed the grain of wheat.

By the 1st of August, generally, the maggots leave the ears and descend into the ground about the depth of half an inch, where they are supposed to pass the winter in a pupa state, emerging next year about the 21st June, as before stated, when the wheat is again coming into bloom. This small gnat is the cause of the disease called "blight" in wheat, as appears from the researches of the late Sir Joseph Banks: and

which fact has been since corroborated by the observations of various accurate naturalists. Besides to the ravages of "Cecidomyia" wheat is also subject to those of several other insects, which attack it both in its growing and hoarded state, but which, to avoid prolixity, we have endeavoured to point out in one of the synoptical charts, annexed to this volume, showing the diseases of plants, and the individual insects which occasion them.

Of the various diseases which are occasioned in animals by the attacks of animalcules, a notable instance is afforded by the sheep. It is well known that this most useful quadruped is subject to a disease called "the rot," which every year proves fatal to several thousands of these animals in all the marshy districts in Great Britain, more particularly in Romney marsh, on the coast of Kent.

Dissections prove that this mortality is caused by the devastations of a minute creature, called by naturalists a Planaria, or Fluke-worm—by Linnæus, the Fasciola Hepatica. These Planariæ are found abundantly in muddy springs of water, in ditches in fenny districts, and also on the surface of the fields among the grass in wet seasons. Being in their natural state very minute, not exceeding a grain of mustard-seed in size, they are swallowed by the sheep either in drinking or cropping the herbage, and carried down into their stomach. On getting into the intestines they next enter the gall-ducts, and passing through the gall-bladder, enter upwards by the biliary pores into the substance of the liver, where they fix

themselves by one of their two pores, and then exerting a curious faculty, which they possess of throwing out a calcareous matter, like the polypi which produce corals and madrepores, they clog up all the channels by which the bile is wont to flow into the gall-bladder. This forces the bile to regurgitate and re-enter the mass of blood, causing jaundice and yellowness of the whites of the eyes. The whole system then soon becomes diseased, and dropsy following, the animal dies; before which time its wool separates and falls off in patches from the whole frame, just as in the cachetic diseases of the human body, the hair usually falls off from the head in great quantities before death.

Nor are the ravages of this animalcule confined to sheep, for from the investigations of Goeze, Muller, Block, and other naturalists, we find that they not only infect almost all the more useful domestic animals known in Europe, but, that they infest the human race itself, and most of the wild animals, as for instance the wolf, fox, ferret, badger, &c.; and are also found in the gall-ducts of the black eagle, bat, and other birds.

CHAPTER III.

MURRAIN, OR PLAGUE, IN HORNED CATTLE.

It is well known that cows and oxen are subject to a pestilential disease called the murrain or garget. On opening the carcases of those which have died from this Epidemic, their spleens are found enormously enlarged and diseased, as also the liver, stomach, mesenteric glands. Blood flows copiously from the mouth and nostrils, and the whole mass of blood seems to have lost its vitality, and is verging on putridity.

In a review by Dr. Watson, of Gmelins *Flora Siberica,* published in the Philosophical Transactions in 1753, it is stated, that when Steller (a pupil of Linnæus), was at Tobolsk, in Siberia, in 1738, there had been an affliction of *pestilential carbuncles* amongst the population there, which were so contagious as to seize upon those who approached the persons so affected. The disease had first begun in horses and oxen, and had afterwards seized upon the human species. This malady had affected the cattle in various manners; some had suddenly set off a running

with all possible speed, and continued to do so, till they were quite exhausted and dropped down dead. On other cattle carbuncles arose, which were dressed with a thin poultice, made of an herb mixed with yeast—whilst a large quantity of this herb was mixed with their food: and by these means, great numbers were cured. The herb is stated to have been the Centaurea, squamis ovatis, foliis pinnatis, foliolis decurrentibus linearibus, serratis et integris. Flor. Sibiric. tom. II. p. 89. Fab. 41. which is the same plant as that figured in the Hort. Lugdan. Batavorum. p. 89. Fab. 41. and called *Cyanus Floridus Odoratus Turcicus, seu Orientalis major, flore luteo,* to be collected during its time of flowering (but the powder is made before the flower stalk had appeared). The wounds were sprinkled with powdered sal amoniac and healed speedily. Human beings were treated in the same way, only that they were made to take the herb in decoction, and it proved with them equally efficacious.

In the travels of Townson in Hungary, mention is also made of a similar epidemic visitation which afflicted the horned cattle in Hungary, Servia, and the Bannat of Temeswar, in the year, 1790. This, according to Kirby and Spence, is caused by a minute fly or gnat, for concerning its true genus, they tell us there is some doubt amongst entomologists; Fabricius calling it a Rhagio (*Rhagium Columbaschense*), while Latrielle, a more modern and perhaps better authority, sets it down as a *similium*; but to whatever genus it belongs, says Kirby, it is certainly

a most destructive little creature. In Servia and the Bannat of Temeswar, it attacks the cattle in infinite numbers, and penetrates, according to Fabricius, their generative organs, but according to another account, their noses and ears, and by its poisonous bites destroys them even in the short space of four or five hours!

Much injury was sustained from them in the year 1813, in the palatinates of Arad in Hungary, and in the Bannat: in Baulak not fewer than two hundred horned cattle having perished from its attacks, and in Versetz at least five hundred. It makes its appearance towards the latter end of April or beginning of May, in such indescribable swarms as to resemble clouds, proceeding, as some think, from the region of Mehadia, but according to others, from Turkey. Its approach is the signal for universal alarm. The cattle fly from their pastures, and the herdsman hastens to shut up his cows in the house; or when at a distance from home, to kindle fires, the smoke of which is found to drive off this terrible assailant. Of this the cattle are sensible, and as soon as attacked, run towards the smoke and are generally preserved by it. (See Kirby and Spence's Entomology, vol. 1. p. 151). These murrains appear chiefly in hot dry seasons, when insects are most numerous. They are attended by a swelling of the throat, a hanging down and swelling of the head, rattling in the windpipe, shortness of breath, palpitation of the heart, staggering, breathing very hot and short, tongue shining and often aphthous, with a flow of rheum and a great

scouring of the bowels, and flow of glutinous matter from the greater angles of the eyes.

The most remarkable plague or murrain of this kind in modern times is that described by Dr. Winklar, and inserted in the Philosophical Transactions of London. This malady broke out apparently in Italy, and spreading through Switzerland, diffused itself through Germany, Poland, Holland, and, lastly, reached England. Its progress was marked by the appearance of a bluish mist. Whenever this was perceived, the cattle, says Dr. W. were seen to come home sick; they appeared dull and heavy, and refused their food and many of them died even within 24 hours. Upon opening them, there were found large and diseased spleens, sphacelated and corroded tongues, and, in some places, those people who were not careful of themselves in the management of their cattle, were infected and died as fast as the beasts. It was observed that during the preceding year there had been three earthquakes in Italy.

The method of cure, says Dr. W., which succeeded best, was this :—as soon as the animal seemed seized, the tongue was examined, and if any aphthæ, phlyctenæ or watery vesicles, were discovered on it, it was scraped with a silver instrument, made with sharp teeth at the sides, till blood was made to exude from the aphtous spots : the blood was then wiped away with a piece of cloth, and the whole tongue washed several times with salt and vinegar. Then the following remedy was given internally. Take of soot, sulphur, gunpowder and sea salt, each equal parts,

mix them with as much water as will make a mixture thin enough to be swallowed, and give a table spoon full for a dose, three or four times a day. This was given both to the sick and healthy cattle in Swisserland, where very few died, whereas elsewhere, almost all those attacked, perished. It was remarked too, that this contagion appeared to travel slowly, but regularly onwards: it proceeded at the rate of 14 miles English, or two German miles, in 24 hours. This was its regular progress during the whole time of its continuance, and it never happened in very distant places at the same time. ****** No cattle escaped by the way; as even those which were kept within doors, fell ill at the same time and in the same manner as those in the open fields.

Dr. Slare was of opinion that this was owing to certain insects, which could not fly faster than at the rate of two German miles a day, and that these travelled regularly and spread the mischief as they passed; "but there were a wanting some judicious per-"sons, versed in such observations, to have examined "the state of the air and the cattle on this occasion" (See Ph. Trans. No. 145). These murrains have been noticed generally to have preceded and ushered in attacks of pestilence in the human race. Homer in his Iliad b. i. states this as having been the case at the siege of Troy; and Dr. Murdock Mackenzie says, that in the year 1745, a murrain broke out amongst the cattle in Turkey, which proved the forerunner of a "very hot plague" that same year at Constantinople.

In further corroboration of these opinions, that murrain is caused by poisonous insects, we may quote some passages from the travels of Mr. Bruce in Abyssinia.

That ill requited and illustrious traveller states that, on his return from Abyssinia, towards Egypt, in his passage through the woods and plains of Nubia and Sennaar, he traversed a country perhaps the most unhealthy and pestilential in the world. So much is it beset with poisonous insects, that both men and women (at Sennaar) anoint themselves at least once a day, with camel's grease mixed with civet, which they imagine softens their skin and preserves them from cutaneous eruptions, of which they are so fearful, that the smallest pimple, in any visible part of their body, keeps them in the house till it disappears. For the same reason, though they have a clean shirt every day, they use one dipt in grease to lie in all night, as they have no covering but this, and sleep upon a bull's hide, tanned, and very much softened by this constant greasing, and, at the same time, very cool, though it occasions a smell that no washing can free them from. Bruce adds that no horse, mule, or ass, or any beast of burden will breed or live at Sennaar, or many miles around it. Poultry does not live there. Neither dog nor cat, sheep nor bullock, can be preserved a whole season there. They must go all every half year to the sands. Though every care be taken of them, they die in every place where the "fat black earth" is about the town, during the first season of the rains. The principal cause of this

is the existence of prodigious swarms of a poisonous fly called the Tsaltsalya, literally the dog-fly, called also by the Arabians the zimb or zebub in the Chaldaic. This pestilential fly is about the size of a humble bee, and in flying makes a loud buzzing noise, supposed by Bruce to be caused by the vibration of three bristle-like antennæ which project from its nose, with which it inflicts a severe wound and instills a deadly poison. On its approach, and at the very sound of its buzzing, all the herds in the plains fly madly towards the water—the dog-fly pursues, and when the cattle exhausted drop from terror, stabs them repeatedly with his three-fold sting and the animals perish from the carbuncles thus caused, which end in mortification.

CHAPTER IV.

THE PESTILENCE, OR PLAGUE IN THE HUMAN RACE.

THIS disastrous affliction of mankind, is attended nearly with the same symptoms, and arises from the same causes, as the plague or murrain of horned cattle; and, as appears from the accounts of the carbuncular epidemic at Tobolsk, already quoted—is curable also by the same means.

There seems to be little doubt that the plague has been a prevailing disease in Egypt from the earliest ages. For although Herodotus avers, that ancient Egypt had not been subject to any great visitations of pestilence, yet the authority of Moses is directly contrary on this point. Modern travellers agree in stating that the plague breaks out almost every year, commencing either in February or March, and ceasing entirely, generally, about the 24th or 26th of June. This cessation of plague is attributed by the superstitious Greeks to the occurrence of St. John's day, at which time the first dew, or the *nuckta*, as it is called, falls in Egypt, and it is said that few, if any, fresh cases occur after that day; so that all the

Franks, who have been living "shut up" in their own houses, come forth and communicate freely with each other, after the summer solstice. But it is also a very remarkable fact, that a beetle held sacred by the ancient Egyptians, and called by them the Solstitial Beetle, quits its pupa state, on the 26th of June annually, and emerges regularly from the earth: and as this scarabæus is known to feed greedily upon fleas, grubs, and other insects, it is not improbable that it acts the part of an ichneumon, sent by divine Providence, to put a stop to the further progress of the plague insect.*

That the plague is, in fact, propagated, and regularly inoculated by the bite or agency of a minute insect, will, I think, be admitted, on considering the following circumstances.

The first symptom of plague, is a dark, livid, spot, about the size of a silver penny piece, which is discovered about the ankle or wrist joints, near the superficial veins. This is soon followed by a glandular swelling, either at the top of the thigh or in the armpit. And, if the token or plague spot appears on the right wrist or ankle, the bubo or glandular swelling is found in the right armpit or thigh; and *vice versâ*. This, I believe to be, invariably the case, although this coincidence has been hitherto unnoticed by writers on the plague, no doubt from inadvert-

* Herodotus in the third book of his history, states that the bull Apis, had the figure of an eagle on the back, the tail divided, and under the tongue an insect like a beetle, § 28.

In the British museum are numerous figures of beetles in baked earth, found in the mummy pits of Egypt.

ency to the important conclusion to which it leads :— that the dissemination of plague is caused by inoculation.

The symptoms of the plague are various, and have been reported differently by authors, some of whom, I suspect, had seen but few cases. Here, therefore, I shall quote those signs enumerated by Dr. Murdoch Mackenzie, who spent more than thirty years either at Smyrna or Constantinople, about the middle of last century, and whose admirable communications to Drs. Mead and Clephane, are published in the Philos. Trans. in 1764. He says that the plague appears in a different manner in different countries, and that it shows different symptoms in the same country in different years: and thus the mortality is greater or less according to circumstances, as in small pox, &c. But that, in general, it comes on first by a chilliness and shiverings, even in the hot months of July and August, so very much resembling the first approaches of ague, that it is impossible to distinguish one from the other at first sight. This cold fit is soon accompained with a loathing, nausea, and desire of vomiting, which at length obliges the patient to discharge a vast quantity of bilious matter; with great oppression on the thorax, and at the mouth of the stomach, attended at times with a dry cough, as in an intermitting fever; and even in this stage it is with difficulty distinguishable. The patient soon experiences a violent headach and giddiness, with some slight convulsive motions, he breathes hard, and his breath and perspiration are fœtid, his eyes

seem muddy, he looks affrighted, sad, and pale, he has an insatiable thirst, his tongue is yellowish with a red border; there is a total loss of appetite, with restlessness, great inward heat, and more than could be expected from the attendant degree of fever, which last is sometimes moderate, but increases towards night. The patient very often bleeds at the nose. In this dismal state he sometimes continues for days, till the venomous matter begins to be separated, in some measure, from the blood, and discharges itself critically on the surface, by the cutaneous eruptions of buboes, carbuncles, blains, petechial spots, and some small vesicles or blisters; but all these symptoms are not to be looked for in the same patient. When the cutaneous eruptions appear and increase sensibly, the patient finds himself better, and somewhat relieved from the great oppression he suffered under before. Some persons in the above state, have a very violent fever, sometimes with delirium and phrenzy ; others are sleepy, stupid, and make no complaint. Such as are furiously delirious, seldom live so long as those who are sleepy and stupid :—but if they do live long enough to have a good deal of eruption, followed by an abatement of phrenzy, they may recover, more probably than such as are stupid and sleepy.—See Phil. Trans. vol. 12, of Shaw's Abridgment.

Our knowledge of plague, after remaining for a long period in a very uncertain state, was destined to be augmented and rendered more accurate by the plague having been unluckily imported some years since

(1813) into Malta, where it shewed itself amongst the inhabitants first, and finally was communicated to some soldiers of the British garrison, then in Valetta.

Sir A. B. Faulkner, then physician to the forces in the island of Malta, has published an account of this epidemical visitation. From his volume, we select the following case, which occurred to Mr. Stafford, a regimental surgeon, who attended the man. Its date was the 10th of July, 1813, and the name of the sufferer was ROBERT CLARK, aged about 24. Spare habit, lively disposition—had never been in hospital previously—had mounted guard this morning, after a minute naked inspection, when not a suspicious spot was to be seen on his body or extremities. His feet and hands had been carefully washed. About noon, Mr. S. says, I was sent for to visit him, he having been taken suddenly lame, while on sentry. On examining him, I found a small pimple in appearance, between the large and next toe of the right foot. The pain he declared to be excessive, and likened it to a burning coal. Whilst inspecting it, I could discover rising from it a red streak, which speedily ascended up the inside of the leg: and very soon after, a swelling took place in the inferior inguinal gland. He was immediately sent to the hospital. The foot was well washed with warm water, a cataplasm applied to it, and the whole of the inside of the leg was rubbed with unguent. hydrarg., without any regard to quantity, as long as he had any strength to rub it in; and calomel and jalap, each ten grains, given him at the same time. On seeing him in the

evening, the pain from the pimple had abated, but was still severe, with a considerable pain in the groin. His physic had operated repeatedly. He seemed to have some fever and apparent giddiness in the head, but did not complain of headach. On visiting him in the morning, I found the pimple had now the appearance of a small ill-conditioned ulcer. It was again cleansed and the cataplasm renewed. On washing away the mercurial ointment to look at the absorbent vessel, I found it considerably enlarged, and having smeared my finger with a little unguent hydrarg. (by way of precaution), I traced the absorbent vessel, from the sore up to the bubo. It no longer appeared charged with a red fluid, but had a yellowish look. The tumour was at this time the size of a pigeons egg. The ointment was again repeated, as well as the cathartic bolus. This method was continued, until the mouth became very sore. The ulcer soon healed, and the buboes gradually disappeared. He went to his duty again on the 25th August, and has continued well.

His description of the first attack was this :—that he was standing sentry on the top of the arch, through which was the only passage from the city of Valetta, into the country : that a pest-cart had that instant passed through heavily laden with dead bodies, from which proceeded a horrid smell : that the attack was instantaneous, as though he had been shot. I was instantly sent for, and was with him within three minutes, my quarters being near his post. My opinion (Mr. Stafford says), was, that from some defect in

his shoe, some *pest dust* had got in, and was the true cause of his complaint. He had mounted guard at seven o'clock in the morning, and had marched half a mile from his barrack to his post.

Now, as Mr. Stafford does not inform us what that is, which he calls pest dust; and as we know of nothing dead which could produce such an effect, I think we are fully warranted in concluding that this pimple on the foot had been caused by the sting of something living, and that this living substance was, in fact, an insect of some sort, which had escaped from the dead bodies contained in the pest cart, as it passed beneath the arch, and which stung the sentry in the foot, as just stated. Many reasons besides concur in making us believe that such was really the fact. The plague, as has been already stated, acknowledges Egypt as its birth-place, and has been from the earliest times endemial there. The Egyptians, of all people on the face of the earth, are most addicted to the rearing of myriads of pigeons and domestic poultry. From the accounts of Denon, and other travellers, we know that all their farm houses have large dove-cotes attached to them, and that they breed doves, not so much from the value of these animals, as to procure their dung, which forms a necessary manure for the rearing of water-melons, gourds, and other garden vegetables. Now pigeons are of all animals the most afflicted with vermin, they abound, says Kirby, not only with *Nirmi* and fleas, but also with the bed-bug, and Kirby recommends that their lockers should never be attached to any house on

this account. This then is a source of uncleanliness which is peculiar to Egypt. And to this cause, conjoined with some others, may be attributed the constant spreading of pestilence amongst the Egyptians. Secondly—That insects coming from the bodies of birds, poultry, or insects, are, in some way or other, connected with the rise and propagation of plague, may be inferred from a passage in one of the Books of Moses. It is there stated, (Numbers, xi. 31), that there went forth a wind which brought quails from the sea, and let them fall by the camp, &c.: that the Israelites gathered and ate them, and that "while the flesh was still within their teeth" they were smitten by divine vengeance "with a very great plague". It is also well known that quails, swallows, and birds of passage, abound, as well as other birds, with *Nirmi* and spider flies. But some annotators upon this text affirm, that for the word quails we ought to substitute locusts, as the proper translation of the Hebrew word. "Their immense quantities", says the Rev. Mr. Beloe, "seem to form an argument in favour of this latter opinion, not easily to be set aside; to which may be added that the Arabs, at the present day, eat locusts when fresh, and esteem them when salted a great delicacy".

It is stated that when Captains Irby and Mangles were travelling round the southern extremity of the Dead Sea in the end of May, they had an opportunity of observing the depredations of locusts. In the morning say they, we quitted Shobek. On our way we passed a swarm of locusts, that were resting them-

selves in a gully; they were in sufficient numbers to alter apparently the colour of the rock on which they had alighted, and to make a sort of crackling noise while eating, which we heard before we reached them. Volney compares it to the foraging of an army. Our conductors told us, they were on their way to Gaza, and that they pass almost annually. In 1650 a cloud of locusts, were seen to enter Russia in three different places; and they afterwards spread themselves over Poland and Lithuania in such astonishing multitudes that the air was darkened, and the earth covered with their numbers. In some places they were seen lying dead, heaped upon each other to the depth of four feet; in others they covered the surface of the ground like a black cloth: the trees bent with their weight, and the damage the country sustained exceeded computation—They have frequently come from Africa into Italy and Spain. In the year 591 an infinite army of locusts, of a size unusually large, ravaged a considerable part of Italy, and being at last cast into the sea, (as seems for the most part to be their fate) a pestilence, it is alleged, arose from their stench, which carried off nearly a million of men and beasts. In the Venetian territory, likewise in 1478, more than 30,000 persons are said to have perished in a famine chiefly occasioned by the depredations of locusts.* Perhaps, however, we ought to add that we do not believe that any stench from the dead locusts could, alone, cause plague, but

* Mr. J. Rennie's Insect Transformations, p. 250.

such a mass of putrid animal-matter is always attended by the generation of living insects, and the bites of these must have communicated the plague by inoculation! Nay even in Great Britain we are annually visited at harvest time by swarms of a small red insect, named a harvest bug or *Phalangium*, which according to the testimony of naturalists, have, by their bites, been known to produce fever in the reapers.

But here it will be proper to state, that although my opinion is distinctly, that plague is disseminated and inoculated by the bites and stings of noxious insects, yet, that the disease is, in its first commencement merely a malignant fever, arising from the inhaling of putrid miasmata, either from the malaria of marshes, or of dead animals, soon after which the noxious flies or insects being called into life, by the heat of the climate, commence biting or stinging the bodies of the sick, and thereafter attacking those of the sound, the disease becomes extended and communicated in a manner so mysterious, so frightful, and so rapid, that it acquires the name of the plague or pestilence. And that this is really the case, seems proved by the fact, that during winter and early spring, when insects remain in a state of torpor, malignant fevers, both at Cairo and Rosetta, in Egypt, as well as at Constantinople, Smyrna, &c., are not attended by buboes and plague spots. But upon the increase of the solar heat in February, March, and April, the insects being roused from their winter sleep, again re-commence their at-

tacks, and then all the newly seized, show the usual symptoms, plague spots, buboes, &c. Hence too, at Constantinople, as appears from the writings of Dr. Murdoch Mackenzie, the plague generally withdraws or expires, on the setting in of winter or cold weather, but regularly breaks out again in the ensuing spring months. Thus, in his communications to the Royal Society, already quoted, he has given us the following table, of the visits of the plague during a period of fourteen years, which is both extremely curious in itself, and fraught with the most important deductions to science.

TABLE of the appearances and cessations of the Plague at Constantinople, by Dr. Murdoch Mackenzie.

Yrs.	Appeared.	Ceased.	Remarks.
1748	10th May	November same year	
1749	16th March . .	20th October	
1750	21st April . . .	17th September	
1751	15th May . . .	17th September, 1752	
1753	31st May . . .	17th September, 1754*	Caterpillars numerous
1755	June . . .	Very little plague this year	
1756	6th March . .	12th December, same year	
1757	Not at all . . .		
1758	23rd April . . .	October, same year	Caterpillars numerous
1759	4th April . . .	10th September, same year	
1760	24th April . . .	10th November	
1761	10th March . .	Not at all, but	
1762	Continued on till	19th December	

Dr. M. Mackenzie adds, that on the 20th October, O. S., of the year 1751, a vast quantity of snow fell —and that there were but few cases of plague in 1752. But in 1751, the cases had been more general, and attended with more fatal results at Constantinople, than had been known for the preceding space of fifteen years. But, by a previous letter, the doctor had recorded to the Royal Society, that on the 2nd September, 1754, there had been a terrible shock of an earthquake—on the 6th a storm; and from the above table it appears, that the plague had ceased eleven days afterwards—which fact induces us to insert here the following Analogy.

CHAPTER V.

ON THE ANALOGY BETWEEN THE DESTRUCTION OF THE SUGAR CANE ANTS IN THE ISLAND OF GRENADA, IN 1780, AND THAT OF THE INSECTS PROPAGATING THE PLAGUE AT CONSTANTINOPLE, IN 1754.

About seventy years ago, the sugar eating ants, (*formica saccharivora,* Linn.) appeared in such numbers in the island of Grenada, as to put a stop to the cultivation of the sugar-plant, and a reward of £20,000 was offered to any one, who should discover an effectual method of destroying them. Their numbers were incredible. They descended from the hills like torrents, and the plantations, as well as every path and road, for miles, were filled with them. Many domestic quadrupeds perished in consequence of this plague. Rats, mice, and reptiles of every kind became an easy prey to them; and even the birds, which they attacked, whenever they alighted on the ground, in search of food, were so harassed, as to be at length unable to resist them. Streams of water opposed only a temporary obstacle

to their progress, the foremost rushed blindly on to certain death, fresh armies instantly followed, till a bank was formed of the carcases of the drowned, sufficient to dam up the waters, and allow the main body to pass over in safety. Even the all-devouring element of fire was tried in vain—when lighted to arrest their route, they rushed into the blaze in such myriads of millions as to extinguish it. Those that thus devoted themselves to destruction, for the public good, were but as the pioneers of the army, which was thus enabled to pass on unimpeded and unhurt. The entire crops of standing canes were burnt down; and the earth dug up in every part of the plantations. But vain was every attempt of man to effect their destruction, when in 1780, it pleased Providence, at length, to annihilate them, by the torrents of rain, which accompanied a hurricane, most fatal to the other West Indian islands. (See Castle, in Philos. Trans. xxx. 346 p.)

Let us now compare this with that visitation of the plague at Constantinople, in 1753-4, as quoted in the last chapter. In the year 1753, the plague broke out on the 31st May, as we have shown, and instead of ceasing in Autumn, as it commonly does, it prevailed during the whole of the winter, until the 2nd of September, 1754, when an earthquake took place, which was so severe and extensive, as to throw down much of the fortress called the "Seven Towers," shattering all the turrets on the city walls, from the Seven Towers to the Adrianople gate; all the cupolas of the portico of the mosque of Sultan

Mahomet the 2nd; four large stone buildings called Hans; seven minarets of the smaller mosques: the mosque called the Little Santa Sophia; the prison of Galata, and doing much injury in Scutari, Balat, and along the Bosphorus; killing more than 2000 persons; throwing down the entire city of Sivas, in Armenia, and making a deep lake spring up on the space it had occupied. On the 6th September, (four days afterwards), about nine at night, there appeared a cloud due west of the city, when it began to lighten and thunder, and the thunder continued to roll without any interval, till half an hour past ten o'clock at night, when it ceased, and the night became very serene and calm. About ten, when the thunder was to the north of the city, it rained very heavily for one quarter of an hour, then became clear, and all the stars shone out. Dr. M. Mackenzie thus continues, "Such a peal of thunder I never heard in any country; for I can aver that it did not stop for one minute during one hour and a half's time." But lo! on the 17th September, that is to say, eleven days afterwards, the plague entirely ceased, and hardly shewed itself again till the 6th March, 1756.

These extraordinary facts are taken, the former from Kirby and Spence's Entomology, and the latter, from the Phil. Trans. as before stated. They materially serve to strengthen the opinions we have hazarded, as to the propagation of pestilence. And they also shew, that the divine Providence has provided a speedy remedy for such severe visitations, in the electrical changes to which our atmosphere is

subject. For that electricity has the power of destroying minute animate creatures, we know from a variety of facts—especially from these. It has been noticed by the fishermen of the Thames, as well as other large rivers, that quantities both of eels and flat fish are observed floating, and dead, on the surface of the waters, immediately after storms of thunder and lightning: and the persons who deal in medicinal leeches, often experience to their loss, how much electrical vicissitudes destroy the small animals in which they traffic. I observed a few years ago, in a French newspaper, that, a trader in leeches, on his return from Poland, where he had been to collect his merchandize, happened to be passing through Mentz during a thunder storm, and that, in consequence, he encountered a severe loss, from the death of about 150,000 leeches. And from the late experiments of a French naturalist, at St. Omers, it would seem that electrical changes have the power of destroying leeches, by coagulating their blood.

CHAPTER VI.

OF THE LEPROSY, ELEPHANTIASIS, OR LEPRA ARABUM.

From the works of Herodotus it appears that it was the opinion of the ancient Egyptians, that the health of the human race is most materially influenced by the nature of the food received into the stomach—an opinion which we cannot for a moment doubt must be founded in truth. And, influenced by this knowledge, the same author informs us that the priests of ancient Egypt never ate fish nor beans; probably, because they had remarked that these two articles of diet produced some peculiar maladies. The priests also, dreaded so much the attacks of vermin, that he says that every third day they shaved every part of their bodies, that they lived on geese and beef, and drank wine, but were not permitted to eat fish.

The lower castes of the ancient Egyptian people, however, did eat fish *solely*, whilst all ate bread made from the flour of maize, or Indian corn, but considered the use of wheat and barley, the common

articles of food in other countries, as mean and disgraceful.

What then was the disease, which the Egyptian priests were so careful to prevent, by this attention to diet? From our present state of knowledge, we venture to assert that it was the leprosy, the lepra arabum, or elephantiasis. Let us pursue this subject somewhat further. Mr. Bruce, in his travels in Abyssinia, states some curious facts in proof of the great influence of food in causing various maladies. Thus, he says, that having heard that there was a caste of men in Abyssinia, who lived upon the flesh of the crocodile, he had a great curiosity to behold some of these people, and that having made known his wishes, the king of Abyssinia sent for some individuals of that abject caste, who dwell in villages near the great lake, towards the sources of the Nile. These people being brought to the capital, Gondar, were shewn to Mr. Bruce. They are described as being the most miserable looking wretches in existence, and Mr. B. says, that besides their shocking cadaverous look, they were covered with leprosy and vermin. The same observation is said also to apply to those Africans who are accustomed to feed upon locusts, as they, too, are generally covered by vermin, and apt to die of the disease called *Phthiriasis*. Amongst other very valuable papers in the collection called *Amœnitates Academicæ*, is an essay on the leprosy, by Uddman, dated 1763, in which it is stated that this disease has long been endemial in Norway, and several parts of Sweden, particularly on the eastern

coast of the gulph of Bothnia and in Finland, also in the islands of Aland and Gothland—and that so long ago as 1631, a pest-house had been erected in the parish of Croneby, for the reception of the lepers of that vicinity—as to the cause of this malady, the author favours the idea of exanthematic animalcules, and from the frequency of this disorder on the sea-coast, where the inhabitants live much upon fish, and particularly herrings, which abound with the sea hair worm (*Gordius marinus,*) he adduces arguments to show that it probably originates from these worms; and a similar opinion was entertained by Martin (another of the pupils of Linnæus), who travelled in Norway; and who observing very closely the nature of the leprous diseases prevailing on the shores of the Baltic sea, was led to attribute them to a species of gordius infesting the skin. This opinion must, I think, be true, for I have observed that leprosy is a most common disease at Lisbon, amongst the poor, whose general diet is chiefly composed of fried sardinhas, a small species of herring resembling sprats. For the same reason, also, the Portuguese inhabitants of the city of Rio Janeiro, on the coast of Brazil, are said to be very liable to elephantiasis.

The disease too, it may be remarked, is much more common amongst the poor of some catholic countries, than the same classes in protestant states: owing, no doubt, to the injudicious religious ordinances of the former enjoining the use of fish diet. But let us now enter more fully into particular statements, respecting this dreadful disease, *leprosy*.

About 25 or 30 years before the year 1748, an extraordinary disease appeared in some persons in the isle of Grande Terre, Guadaloupe. It begins imperceptibly by the eruption of a few livid red spots on the skins of the white, and of a yellowish red on those of the blacks. These at first are not attended with pain or any other symptom, but nothing avails towards removing them. The disease goes on slowly but surely, increasing for several years. These spots augment and extend indifferently over the skin of the whole body, they are for the most part flattish, but sometimes a little raised. As the disease advances, the upper part of the nose swells, the nostrils become enlarged and the nose itself softened. Tuberosities appear on the cheek-bones, the eye brows become inflated; the ears thickened; the ends of the fingers and even the feet and toes swell; the nails become scaly, cracked and *splintery;* the joints of the feet and hands separate and mortify; ulcers of a deep and dry nature are found in the palms of the hands and soles of the feet, which, after healing, apparently return again.—In short, when the complaint reaches its last stage, the patient acquires a perfectly hideous appearance and falls, as it were, to pieces,—one joint falling off after another, like the claws of a crab fish. As all these symptoms come on very slowly and almost imperceptibly, many years elapse before they are quite developed, the patient not suffering any acute pains, but on the contrary feeling a remarkable degree of numbness both in his hands and feet. Such persons too, perform their natural functions all the

while—eating, drinking, and sleeping as usual: and when even the mortification has taken place, and deprived them both of fingers and toes, the wounds heal spontaneously, without any medical assistance; but when the disease comes to its last period, these unfortunate persons become most hideous and horribly deformed, and truly objects of compassion.

This complaint too is observed to have several other unhappy characteristics:

1. As being hereditary, and that some families are more predisposed to receive it than others.

2. That it is contagious, being imparted *per coitum*, and also kept up by associating with those diseased.

3. That it is incurable, or, at least, that no remedy has yet been discovered to cure it. Mercurials, antimonials, sudorifics, and all antisyphilitical antidotes have, as yet, been tried in vain, for all these have been employed by reasoning from analogy founded upon their common mode of being communicated; but alas! so far from having been found of any service, these seem rather to hasten on its fatal termination; the most dreadful symptoms appearing all the sooner and those thus treated, perishing some years earlier than those who had undergone no treatment.

A very just fear of becoming infected, the difficulty of examining the infected before the disease has attained its acmé, the length of time it lies hid, from the precautions the unfortunate sick take to conceal their diseased state, the uncertainty of the primary symptoms, all these had produced an extra-

ordinary state of dread in the inhabitants of the island of Guadaloupe. They all suspected one another, since neither virtue nor merit availed, to preserve them from being attacked. They called this disease the leprosy, wherefore they presented several memorials to the persons in power, laying before them a recital of the above-mentioned facts, and of their just apprehensions for the public welfare; the anxiety caused in the colony, by their distrusts, and the complaints and heart-burnings to which they gave rise; citing the laws formerly made against such lepers, enforcing their expulsion from all society. Finally, they requested a general official visitation of all those suspected of this disease, that those found to be really infected, might be at once removed into particular hospitals, or confined within some separate district.

The French ministry having perused these memorials, acceded to the prayers of the colonists, and issued the necessary orders for an official inspection and report. M. Blondel de Juvencourt, then intendant of the French West Indian islands, imposed a tax on the negroes of Grande Terre, to raise the sum necessary to meet the requisite expences; and M. Le Merceir Beau-Soliel was nominated as treasurer. Dr. Peyssonel was appointed inspector of the suspected persons. Dr. Peyssonel having arrived at Guadaloupe, on his way towards Cayenne, where he had just been nominated to the post of physician botanist, received due instructions from the general commanding, and intendant general of the island, and commenced his enquiries by endeavouring to ascer-

tain, whether it was really true that a, disease which terminated so dreadfully, should, at its commencement, remain 10 or 15 years without any other appearance than these simple spots on the skin, which, in themselves, seemed so harmless. He therefore demanded a court of inquest to be held, in order fully to satisfy himself of the truth of this preliminary fact. Several surgeons therefore as practitioners, and several respectable inhabitants, as observers, were accordingly called together, who all concurred in verifying this same fact, which was inscribed officially in the registers of the island.

Report of the result of the visitation.

1. All the persons whom Dr. Peyssonel visited, were free from any symptoms of fever, and concurred in declaring, that they experienced neither inconvenience nor pain, but on the contrary, ate, drank, and slept, well, performing every natural function; which indeed seemed proved by their plumpness, which remained, even when the disease was most confirmed.

2. In the negroes the disease began to show itself, by reddish spots, a little raised above the surface of the skin, being a dry kind of tetter, neither branny nor scabbed, and without any discharge; of a livid red, and very ill-conditioned. The negroes often arrive in the island from Africa, having these spots upon them. These spots, too, are constantly found upon every person infected with this disease, being in greater numbers, in proportion as the disease is more inveterate.

3. Amongst the white inhabitants, the disease

shows itself at the commencement, by spots of a livid violet colour, without any pain, but are followed by little watery vesicles, especially on the legs, which bursting, give origin to small ulcerations with pale edges, different in their nature from common ulcers.

4. In proportion as the disease augmented, the hands and feet increased in size, but without inflaming, since neither redness nor pain, nor any œdema, accompanied it; but it seemed that the very flesh had increased in bulk. And this growth of the feet and hands was unattended with any sharp pain, but only with an increase of insensibility and numbness.

5. To this state succeeded white and deep ulcerations under the skin, which became still more callous and insensible, from which flowed a clear, serous, watery ichor, with but little pain. Next, the ends of the fingers became dry, the nails getting scaly and brittle, breaking off short and as if eaten away; the ends of the fingers themselves dropping off at the joints of the phalanges, and separating, still without pain, while the wounds cicatrized spontaneously. The distemper going on and increasing, hardness and lumps were formed in the flesh, the colour became tarnished, the nose swelled, and the nostrils widened; at last the nose softened like putty, the voice became hoarse, the eyes round and brilliant, the forehead deformed with tetters and tubercles, as well as the face itself: the eyebrows becoming large, and the countenance horrible: the breath fœtid, the lips swelled and thickened: large tubercles were formed under the tongue; the ears grew thick and

enlarged, and red and pendant; and such the increased want of sensibility in the parts, that pins might be pushed through the feet and hands of several, without their feeling the punctures. In short, Dr. P. was assured that these poor people perished by degrees, falling into a mortification; and their limbs dropping off spontaneously, without much pain, such persons continuing still to perform well their natural functions.

6. These unfortunate lepers lived thus easy, as it were, for several years, even for 15 or 20: for the disease begins insensibly and goes on augmenting slowly.

7. Antisyphilitic remedies, indiscriminately employed for all, had proved totally unavailing, for even when they palliated some symptoms, they often seemed to hurry on the disease itself; besides, in no case, were there any symptoms besetting the sexual organs themselves, or betokening any thing like syphilis.

8. In some, it is true, there were peculiar symptoms; thus, sometimes the hair fell off, and was succeeded and replaced by a more silky sort: in others, *worms appeared in their ulcerations*; want of sleep and frightful dreams afflicted some, while others entirely lost their voice, or it was softened down to a small treble tone like that of eunuchs: and others emitted a peculiarly offensive fœtor.

9. Nearly all of them, anxious to conceal their malady, attempted to deceive and mystify the commissioners, alleging false reasons for their sores and ulcers, the greater part pretending that rats had bit-

ten off their toes, or that their ulcers were the effect of burns.

10. The commissioners were confirmed in their opinions, by experience supported by verbal evidence, that the disease, was not any modification of syphilis, having no symptom of that ailment; but that it was in very fact, the true lepra, or elephantiasis of the ancients. Hence they had no hesitation in deciding that these unfortunates should be considered, and treated, as real lepers, and made subject to all the provisions of the ordinances legally provided for such cases.

11. Moreover they were assured by their observations, that the disease was really contagious and hereditary; but yet, that the contagion was neither so active nor virulent as those of the plague, or small pox, nor even of the ring-worm, itch, scald head, or other cutaneous distempers; for, if it were, the American colonies would be utterly destroyed, and those persons so infected, mixed, as they are in every habitation, would have already contaminated all the negroes they came near.

12. They next came to the conclusion, that this poison could only be communicated by long frequenting the company of the infected, or by means of sexual intercourse. Besides, they observed that even then, the disease was not always communicated, because they had heard of husbands cohabiting with their wives, and wives with their husbands, &c.—of whom only one party had the disease—one remaining sound, while the other was leprous. They also saw families

living, and communicating with, infected persons, yet never being infected, and thus they became convinced that there required a particular predisposition to render them liable to receive this contagion.

13. As to what regards the hereditary nature of the disease, that is assuredly true. They had witnessed entire families infected; and almost every child of a leprous father and mother, insensibly fall into leprosy; and yet, in several other families, they had observed some of the children leprous and others remaining quite sound. Thus the father had died even of the disease, and yet the children reached advanced age without becoming leprous. So that although it was decidedly hereditary, yet it seemed to be analogous, in degree, to that of families in which gravel, gout, consumption, &c., are hereditary, but which, although often transmitted from father to son, are yet never so regularly so, as to affect every one of the family.

14. They quite failed in discovering any certain rule for judging precisely, at what age any of the descendants of infected persons, might show symptoms of the disease; but, as far as they could observe, it seemed to them, that in females, the first symptoms came on generally when menstruation first occurred; and continued slightly till they had borne one or two children; and that then the more severe symptoms supervened. But as for men and infants, there seemed to be no rule for forming any judgment.

15. They did not imagine that the air, water, or manner of living at all influenced its production:

since they had found as many affected thus in the most lofty situations, as in low marshy plains; and if many negroes were contaminated in the *Grande-Terre*, where they drink the foul waters of ponds and lakes, they saw an equal number leprous in those places, where they drank of fresh running streams and rivers; yet they thought the former situations adequate to discover and unveil the still lurking disease.

16. They persuaded themselves, that the first origin of the disease among the negroes was brought from the coast of Guinea, in Africa; since nearly all the negroes from that country told them, they had come from thence with these reddish spots, thus having the first and certain signs of the disease already commenced.

17. As to the infected whites and negroes of Guadaloupe, they were informed, that the disease had never been known amongst them, till 25 or 30 years before; when out of charity, they had received a miserable object from the island of St. Christopher, whose name was Clement, and who, about the year 1694, had fled for refuge to Guadaloupe. It was the family of the Josselins, called the Chaloupers, that had protected him, which family, as also that of the Poulins, they found infected, by communication with this refugee, as old Poulin declared to them. It is thought that others became infected by communication with the negro women, more especially in its very commencement, when the disease is much masked, and at a time when they had not begun

to mistrust each other: an idea the more probable, as they saw many mulatto children, the offspring of female negroes, infected and leprous.

18. However this may be, this disease has had its progress; and during this visitation, the commissioners examined 256 suspected persons,—namely, 89 whites, 47 free mulattoes, and 120 negroes: among whom they found 22 whites, 6 mulattoes, and 97 negroes infected with the leprosy, in all 125 persons. There were 6 whites and 5 more negroes whom they could not visit, for reasons stated in the process. The remainder 131 persons seemed to them quite sound; not that they could undertake to answer for their future state of health, especially as to the children, the offspring of lepers.

Signed at *Basse Terre*, the 10th August, 1748. { Peyssonel, Le Moine, Moulon.

The foregoing statement has been extracted from the 50th volume of the Phil. Trans. for the year 1757. The details will be found, on comparison, to coincide very accurately with Dr. Adams' report on the same disease, as it existed at the time of his residence in the island of Madeira. (See Dr. Adams' work on Morbid Poisons).

About 12 years ago, I was consulted by a gentleman in Devonshire, who had lately returned from Rio Janeiro in Brazil, in bad health. He had been born in Lisbon, but both his parents were English. His complaints had come on gradually at first, with spots upon the skin, succeeded by a crop of boils, and, on

arriving in England, he had experienced great redness in the face and forehead. But what he chiefly complained of was, a complete degree of numbness and torpor in both hands and feet, which he had first discovered by finding that, while in the act of shaving himself, he had often blistered his hands and fingers without feeling any pain. Various remedies had been used without effect. I suspected the real nature of his complaints, and on examining the palms of his hands and soles of his feet, discovered them to be very dry and traversed with deep fissures, from which exuded a thin watery ichor. I next looked for what Dr. Adams has stated to be one of the most characteristic tokens of this dreadful malady, namely a swelling of the lower cluster of femoral glands. This was present also, as well as entire baldness of the pubes, and a complete state of *Impotentia*. His history of his complaint was, that he had unfortunately been induced, while living in Lisbon, to receive as valet into his service, a man affected with elephantiasis, whom he had retained for some years, but whom he had at length discharged; if I recollect rightly, for having worn his body linen. He had also cohabited for a time with a mulatto female at Rio Janeiro, but had no reason whatever to suspect that this woman was contaminated with elephantiasis. Warm baths, electricity, blisters, frictions, &c., were prescribed by me without effect, and the poor gentleman, having gone to London and consulted Mr. Abernethy, then the great medical oracle of the day, he had, acting on his advice, tried

for a time, pills composed of calomel and antimony, but derived no benefit from them. While in this sad state, an action was brought against him by a young lady in Rio Janeiro, for non-fulfilment of a contract of marriage, into which he had entered by some letters, written, while yet ignorant of his situation. As the damages sought were very great, such indeed as he could not have paid, without being quite ruined, and as the pursuing party was vindictive and obstinate, and would listen to no offer of compromise, (instigated probably by the selfish advice of some petty-fogging attorney), the cause at length came on before the Court of King's Bench, at Guildhall. At his request I attended to prove his total inability to fulfil any matrimonial engagement. But after allowing the prosecutor's counsel to state the case, and read all the poor gentleman's love-letters, (which, as usual, were sufficiently ridiculous, and amused the town when re-echoed by the daily press), my patient's counsel consented very foolishly, as I think, to a reference of arbitration at chambers in the Temple. Thither, of course, I went and stated his case, and although I endeavoured to explain to those lawyers, the dreadful state of my poor patient, and although I carried with me the coloured engravings of Dr. Adams' work on Morbid Poisons, yet, such was their ignorance of pathology, that they either could not, or would not, understand the melancholy and hopeless predicament in which he was placed. I afterwards heard, with much sorrow, that an award had been made against my unfortunate patient, for several

hundred pounds; which joined to the incidental law expences of defending the suit, &c. &c., went near to ruin him, and render him embarrassed in his circumstances for the remainder of his life. But to return to his case, some years since I learnt that his toes began to drop off, and when I last met him, he told me that he had lost two, if not three, of these. But in all other respects, he enjoyed tolerable health, as is usual with people in the same situation.

I have since regretted that I was not then aware of the entozoal nature of this disease: and that this gentleman was not advised to make use of the plan so strongly recommended by Dr. Russell, and which Dr. Uddman also informs us, he had used in Norway and Sweden with good effect. Which method of cure consists in giving large quantities of sea-water, assisted by *enemata* of that fluid, conjoined with frictions of warm and acrid oils, which Dr. U. states, he had found more beneficial than any thing else. Latterly, Dr. Elliotson, of St. Thomas' hospital, has recorded the cure of one case, with repeated small doses of solution of arsenic. (See the Lancet).

My friend, Mr. Fraser, late surgeon of the civil hospital at Gibraltar, informs me that two thirds of the Hebrew population of that town are affected with elephantiasis, and that fried sardine-fish, forms a great part of the diet of the poorer classes in that town, as well as in Lisbon, as already stated The old negro women of Trinidad cure the elephantiasis or tuberculated leg, by the following poultice.—Take the mayock or cassava root, scraped and boiled into a poultice, apply it three times a day.

CHAPTER VII.

OF ERGOTISMUS. (NECROSIS USTILAGINIA. *Sauvages*).

THE next diseases to which I shall advert are very singular, and, as they arise either directly or indirectly from the agency or poisonous stings of insects, come, very properly, under our notice in pursuing the present enquiry. And more especially after elephantiasis, to many of the symptoms of which they are, in some respects, very analogous: fortunately, however, these diseases, do not always endure for life: neither are they at all hereditary or contagious.

ERGOTISM, then, is produced, in the human body, by feeding on bread made from diseased grain, called ergotted rye.

This malady, which appears to be the most horrible pest which has ever afflicted mankind, must, one would think, have been little noticed, or known by the ancients, since few accounts of this disease are to be found in their writings.

Langius, Schmeider, Salerne, and Read, who all, and severally, witnessed this malady, have left us detailed notices of its ravages: and Tissot, in the

second volume of his Opuscula Medica, has given us a very good historical sketch of these epidemics; although, as he acknowledges fairly, he had never had the misery of witnessing or treating the disease personally. In 1782, Dr. Wollaston having presented to the Royal Society, the history of an extraordinary case of mortification of limbs, in a poor family, at Wattisham, about sixteen miles from Bury, in Suffolk, where Dr. W. at that time resided; and about the same time the Rev. Mr. Bones, then minister of the parish of Wattisham, (whose humanity led him to show a particular attention to the sufferings of that unhappy family), having transmitted to Dr., afterwards Sir George Baker, bart. every circumstance which he could observe, or collect, relating to the disease; these letters were communicated to the Royal Society, and both accounts were published in the second part of vol. 52, of Phil. Trans. (Abridgement, vol. 11. pages 626-28, and 647.)

Dr. Baker afterwards wrote to Dr. Tissot of Lausanne, and requested him to communicate all he knew, or could collect, of the disease called Ergotism —a disease said to be frequently epidemic in several provinces of France, and believed to arise from eating rye, vitiated by the vegetable disease called Ergot.

Dr. Tissot, in answer, states, that there are three principal diseases of wheat and rye,—viz. the *rubigo*, *ustilago*, and *secale cornutum*.

The *rubigo*, (mildew in English, rouille in French, and ruggine in Italian), is composed of a reddish yellow glutinous powder, which adheres to the stem

and glumes of many graminaceous plants, preventing their growth, and depriving the grain of its nourishment, whence it wastes away and becomes shrivelled, and yields little or no farina. This disease called also, the mildew blight, or rust, is at first of an orange colour, but afterwards changes to a deep chocolate brown.*

The ustilago, (nielle or bruline in French, fuligine in Italian), is a generic name, denoting a black degeneration of wheat, and other bread corn, of which there are two species, the carbunculus (charbon) and caries (la carie). Bonnet's words are *Les Grains étaient composés des plusieurs feuillets posés les uns sur les autres, et qui laissoient entr'éux des vides— ces vides étaient remplis par une poussière noirâtre.*

The carbuncle is a disease of corn which is scarcely to be distinguished by its outward appearance, except that the grain appears rounder, where the internal substance has been converted into a black, viscid, fœtid powder. Such grain, is sometimes, much swelled; hence M. Duhamel called this disease "*la bosse.*" According to Bonnet, the nature of "*charbon*" is best seen in the grain of maize, or Indian corn. The English farmers call the carbuncle in wheat, rotten corn.

Some grains of maize have been found as large as a pigeon's egg, full of the black powder just mentioned. The caries, which, by the French, is commonly called *nielle*, infects wheat, barley, rye, and

* Sir Joseph Banks published on this subject an account of the disease in corn, called by farmers the blight, &c.

other plants, attacking not only the grain, and seeds, but also the flowers and leaves, under the form of a black, viscid, powder, completely enveloping the grain and flowers, and destroying whatsoever it touches. This disease attacks the corn when flowering, thereby preventing it ever coming to maturity. The black powder has very little taste or smell.

The caries has been known from time immemorial, but the carbuncle is modern, and never observed in Lombardy before the year 1730, nor at Cesina, according to Giannini, before 1738.*

But the "Ergot" or "Secale Cornutum" is quite another disease. It attacks rye, and two or three other graminaceous Alpine plants, according to Haller. It is an irregular vegetation of the rye-grain, becoming of a brownish-green colour, irregularly compressed, and often from fourteen to fifteen lines long. When put into the ground, such seed never vegetates; it abounds most in rainy years, or in hot summers succeeding to a wet spring time. The ancients were not altogether ignorant of the evil occasioned by the use of vitiated grain for food, and Galen has given some useful remarks thereon. (See Galen de alimentor. facult. l. i. c. 37.)

The mischief following from the use of secale cornutum in food, is of the most serious kind, and, as it is probable, that this disease of rye, has existed from time immemorial, it is believed that mankind have suffered from the disease in all bygone ages; although none of the ancient physicians have described

* See Count Giannini. Delle Malattie del Grano in Herba. 4to. Pesaro. 1759.

those disorders. The first accurate account having been published in 1596. Frederick Hoffman, in his general pathology, notices both forms of the disease. We shall notice first, the convulsive or spasmodic, and then the gangrenous, form. In 1596, a disease, attended with convulsions, was epidemic in Hesse and its neighbourhood. It was described by the medical faculty of Marpug, who, in 1597, published on the symptoms, causes, and method of cure, of this disease. It seems to have been from this source that Sennertus borrowed his account in his Treatise De Febre Malignâ cum Spasmis—Lib IV. Cap XIV.

From his account we may select the following particulars :

1. Those seized with epilepsy rarely recovered.
2. Those who became insane from it, remained so till their death.
3. Although some lived for fifteen years afterwards, yet, annually, during the months of January and February, they found themselves ill.
4. This disorder was not altogether free from contagion.

Ergotism was prevalent in Voigtland, in 1648, 1649, and 1675. In 1702, it spread through the whole country of Friburg. In 1716, it was epidemic in Saxony and Lusatia. It afflicted various parts in Germany, in 1717, and appeared in Silesia, in 1722. It appeared in Suboth, in Silesia, and at Wartemburg, in Bohemia, in 1736. Dr. Brughart described the former, and Dr. Saine the latter, visitation, and they severally attended as many as 500 patients.

Dr. Saine states, that the disease began with a disagreeable titillation of the feet, as if ants had been creeping up them, which was soon succeeded by a violent cardialgia, or pain of the stomach, the hands were next affected, and then the head.

This sense of formication was followed by a violent contraction, not only of the hands and feet, but also of the fingers and toes.

The patients exclaimed that their hands and feet were on fire, while their bodies were bedewed with copious sweats. After much pain, the head became heavy, and vertigo supervened, with dimness of sight. Some either became totally blind, or saw objects double. They staggered like drunken people, and lost their recollection. Some became maniacal, others either melancholic or comatose. Those above fifteen years of age, became frequently epileptic, and to the major number of these, the disease proved fatal. The epileptic affection was accompanied with opisthotonos, and the foam which flowed from the mouth, was either tinged with blood, or of a greenish yellow colour. The tongue was often lacerated during these convulsions, and in some it was swoln to such a degree, as to impede the voice, while it was attended also with a copious flow of saliva.

If epilepsy came on after cardialgia and vomiting, it was certainly fatal. Those seized with chilliness and shivering, "after the feeling of formication," suffered less from convulsions in their hands and feet. Moreover, the patients were afflicted with a most voracious appetite, frequently insatiable—but in a few there was on the contrary a loathing of food. One

person had abscesses in the cervical glands, but they were not at all of a pestilential character. They were exceedingly inflamed and painful, and discharged a yellow pus. Another had petechiæ on the feet, which lasted for eight weeks. In some cases the face was disfigured with blotches. The pulse, in every instance, was like that of a healthy person. In some, the disease lasted a fortnight; in others a month, in others again six or eight weeks, and in some, even for as long a period as twelve weeks, but with intermissions. Of this disorder there died 100 persons, chiefly infants, or under fifteen years of age. Of 500 patients, 300 were infants or under fifteen. Two families were entirely carried off, not a single individual of either house having escaped. *The disease, however, was not contagious.* Those who had a continued fever, and who sweated profusely, recovered soonest. Those who expired, seemed to be seized with palsy and apoplexy, a short time before they died. In women, after intervals of remission, the disease was aggravated at the menstrual periods, and, this being over, they complained chiefly of debility, till the next monthly period, when an exacerbation of the disease took place. Those who recovered, were, for a long time, afflicted with a weakness in the limbs, or a stiffness of some joint, together with a dullness of intellect.

In 1741, this disease appeared in Neumarck, where it raged till May, 1742,—and here the sick were always attacked with febrile symptoms, which had not been the case in Bohemia.

CHAPTER VIII.

GANGRENOUS ERGOTISM.

GANGRENOUS ERGOTISM (*Ergotismus Gangrenosus*), is the next form of this disease to be described.

This disease was known in France, in some provinces, as far back as 1630, according to the testimony of Dr. Thuillier, physician to the duke of Sully, prime minister of Henry IV. In 1650, 1670, and 1674, it raged in Aquitania, in Sologne, and in the Gatinois district; and in 1674 near Montargis.

The first symptom was a numbness of the legs, then a pain with slight swelling, devoid of inflammation, to which succeeded rapidly, coldness, lividness, mortification, and dropping off of the limbs. At Sologne there was no fever and the pains were slight. No remedies were applied, but the nose, fingers, hands, arms, feet, legs, thighs, sphacelated spontaneously and dropped off. In 1695, Dr. Brunn saw at Augsburg, a woman labouring under a spasmodic disorder and a gangrene of the hands, from eating spurred rye, and was told by her attending surgeon, who had previously been obliged to amputate one of

her feet, which had also mortified, that it was owing to eating such vitiated bread-corn, that so many of the inhabitants of the Black Forest were afflicted, not only with convulsions, but also with mortification of the extremities. In 1709, Sologne was again visited by the same disease, a fourth part of the rye crop having been that year infected with the ergot or spur. M. Noel, surgeon to the hospital, or hotel Dieu, of the city of Orleans, had under his care more than fifty *ergotised* patients, chiefly men and boys. The disease generally commenced in the toes, often extending upwards to the superior parts of the thighs. The first symptom experienced, after partaking of this noxious bread, was a sort of intoxication. And the limbs of four of these patients having been amputated, the mortification extended to the trunks of their bodies and they died: whence Tissot has inferred that it is dangerous to amputate before the mortification has stopped its progress.

At Blois, in France, the occurrence of the following melancholy case is related by M. Fontanelle. *Un paysan fut attaquè de la maniere la plus cruelle, la gangrene lui fit tomber d'abord tous les doigts d'un pied, ensuite ceux de l'autre, apres cela la reste des deux pieds, et enfin les chairs de deux jambes, et celle de deux cuisses se detacherent successivement, et ne laisserent que les os. Dans le temps qu'on ecrivit la relation, les cavites des os de hanche commencoient à se remplir, des bonnes chairs qui renaissoient.* (*Hist. de l'Acad Royale des Sciences. anno* 1710. *p.* 80).

In the same year, 1709, memorable for a hard frost, this disease appeared in the canton of Lucern, and again in 1715 and 1716, at which time also it was epidemic in the cantons of Zurich and Berne—Langius has left us an account of it. (*Acta Eruditorum. anno* 1718. *p.* 309).

Since that time the disease had never recurred in Switzerland, as far as Dr. Tissot could ascertain: but since 1709 it had been epidemic at Orleans, within the space of thirty years, four or five times, according to Mons. Noel. (*apud Quesnay Traite de la Gangrene*).

Indeed, it seems to be endemic in that part of France. For M. Duhamel has given a description, communicated to him by M. Mulcaille, of a very malignant form of this disease, which prevailed in Sologne, and proved fatal to the majority of those who were seized by it. It commenced with a sense of weariness and pain in the feet and legs, which, after becoming livid, mortified. The parts were then rather dryish than moist. *Worms were often engendered in the mortified parts!* The toes separated from their articulations, and came off from the metatarsal bones: and thereafter the foot, leg, and even the thigh, which last dropped off from its articulation with the pelvis. The same happened to the superior extremities; and instances had occurred in hospitals, of persons having survived for several weeks after their arms and legs had rotted off, when nothing remained alive but their heads and trunks. For this loss of the limbs was never followed by hœmorrhagy.

They had not succeeded in curing any one of these patients: and upwards of sixty had died. (*Mem. de l'Acad. Roy. des Sciences. anno* 1748. *p.* 528).

Mons. Salerne has described (Mem. Math. et Phys. presentes a l'Acad. Roy. des Sciences. tom II. p. 155.) another similar epidemic visitation, of which the following were the principal phœnomena.

1. It attacked persons of both sexes and all ages.

2. It did not spread higher up than the knee-joints; whereas in the preceding year, a boy ten years old had lost both his thighs, and his brother, 14 years old, had lost the leg and thigh of one, and the leg of the other side, and both had expired after 28 days of suffering.

3. Some recovered from these sphacelations of their limbs, but they seldom lived long thereafter.

4. Amputation, appeared only to accelerate the fatal termination of the disease.

5. Out of 120 patients scarcely four or five recovered: all the rest expired within six months.

6. The blood was so viscid that it would hardly flow from their veins.

7. An inflammation of the skin, denoted a suppuration in that part.

8. There was no occasion either for a torniquet, or the application of ligatures to the arteries after amputation.

9. In Sologne, which is a marshy country, the disorder commonly attacks the feet.

10. As from the commencement of the malady, in all cases, their intellects are more or less impair-

ed; the patients were quite incapable of giving any account of their feelings; their countenances were yellow, and they became so much emaciated, that they resembled dead bodies.

11. The disease was by no means contagious. Mons. Puy, chief surgeon to the hospital of Lyons, informed Dr. Tissot, that he had often witnessed in that city, and always in rainy years, some instances of this disease brought in from the neighbourhood. And amongst them was that of a female, both of whose lower extremities dropped off. The most distressing symptom which these poor patients suffer is the sensation as of a burning fire in the affected part of the body—he also added, that he had heard of some instances of this disorder having occurred in the province of Dauphiny. Dr. T. next quotes various authors to shew that the use of spurred rye has proved poisonous to quadrupeds, poultry, and other brute animals, as well as to the human race.

He then puts the following queries:—

1. What is the cause of this degeneration of the rye?—he remarks that this question is involved in great obscurity; but that M. Aimea, who had shewn that the *caries* was owing to the seeds being contaminated by situation, had promised to enquire into the causes of the spurring of rye.

2. In what manner does the spurred rye produce its deleterious effects?

In answer to this question he remarks, that there are many vegetable poisons whose mode of operation we do not understand, and that the *secale cor-*

nutum is one of these; but that it has an acrid nauseous taste in common with many other deadly poisons.

This vitiated rye seems to infect the humours with a poisonous taint, which either irritates the nerves so as to excite spasms; or corrupts the blood and, thereby, produces gangrene.

3. In what way does the *nigella* prove hurtful?

It is an acrid viscid poison, and if a person walks barefooted in a field covered with it, his feet and legs will be ulcerated.

4. How comes it that this poison, at one time produces spasms, but at another gangrene, sometimes with, but generally without, the presence of fever?

These are all questions involved in much difficulty, and of which a solution is only to be expected after numerous observations and experiments. Dr. Tissot remarks, that the whole subject is most worthy of the attention of physicians, as presenting many phænomena which, if well understood, might throw great light on some obscure points in physic. In regard to the treatment of this disease, the medical practitioners at Marpurg, gave purgative medicines at first; and thereafter sudorific bitters. Langulius recommended acids, Langius prescribed an emetic in the beginning, and afterwards sudorific bitters; directing his patients to abstain from all sorts of food, which were viscid or fat, or otherwise of difficult solubility in the stomach. The use of hot, or new, bread was especially forbidden as being much more hurtful than stale bread; the vitiated rye being found to lose much of its poisonous quality by keeping; hence this disorder is most pre-

valent immediately after harvest: becoming gradually less frequent, until at length it entirely ceases; although there still remains a supply of the *secale cornutum*. The only part of Muller's practice (which consisted chiefly in giving antispasmodics) which Dr. T. approves of, was the application of blisters. In Sologne the pains were relieved by blood-letting, and the mortification was sometimes stopped by the external application of a decoction of vitriol, alum and common salt. In the instance of a boy whose leg had mortified, M. Puy made a large incision down to the bone, after which he perforated the bone in several places with a trephine, nearly the whole bony surface exfoliated, but its loss was gradually supplied by growth of callus, and new granulations having sprung up, the patient at length recovered completely.

Having himself had no experience in such cases, Dr. T. only suggests, that after venesection prescribed according to circumstances, it might be proper to give an emetic of Ipecacuana once or oftener, then the bitter cathartic salt, followed by large doses of elixir of vitriolic acid and cinchona, with the decoction of chamomile. He further suggests the application of large blisters to the back of the neck and os sacrum, and after deep incisions made into the affected parts, to foment them constantly with a vinous decoction of cinchona.

He doubts much the propriety of the term of *Gangræna Ustilaginea*, as applied to this disease.

He asks if this be the disease called *Morbus Ardentium*, which he opines to have been a species of

Erysipelas, frequently terminating in gangrene. According to M. Puy such was frequently the form of this disease in Dauphiny. Dr. T. is of opinion that the disease of the poor family at Wattisham (to be detailed in the next chapter), was the same malady as the gangrenous ergotism.—Because

1. In Silesia two whole families were destroyed by it, in consequence, as is presumed, of some peculiar predisposition—And in Sologne, two brothers had the disease much more severely than any of the rest. While at Blois only a single individual appears to have been ill of it. Other observations show that some individuals are very readily affected with gangrene.

2. In Silesia the disorder particularly attacked children; the English patients were young persons and a mother weakened by giving suck.

3. They were all lean and unhealthy, a proof of a vapid blood.

4. It has been observed in other places that the disease was aggravated by a damp and confined air, by pork and bacon, and by a milk diet; all which circumstances concurred in Downing's family.

5. This poor family, as we shall show, lived, not only upon bad bread, but also upon bad mutton, bad bacon, and bad peas; each of which must have contributed its share towards exciting the gangrene.

6. The disorder was not contagious.

CHAPTER IX.

CASE OF DRY GANGRENE, AT WATTISHAM, IN SUFFOLK.

THE following extraordinary case of mortification of the limbs in a family, at Wattisham, in Suffolk, was transmitted to the Royal Society of London, and published in its transactions for the year 1762. The report was drawn up by Charlton Wollaston, M. D., F. R. S.

John Downing, a labourer at Wattisham, in the month of January, 1762, had a wife and six children; the eldest a girl about 15 years of age, the youngest aged four months, being also, at that time, all very well, as the man himself and neighbours assured Dr. W.

On Sunday, the 10th of January, the eldest girl complained in the morning of a pain in her left leg, particularly in the calf of that leg—increasing severely towards evening. The same evening another girl (her sister), 10 years old, complained also of violent pain in the leg. On the Monday, the mother and another child, and on the Tuesday, all the rest of the

family, except the father, were affected in the same manner. Their pains were excessive, insomuch that the whole neighbourhood was alarmed by the loudness of their shrieks. The left leg of most of them only was affected; but in some, both legs. The infant was removed from the mother's breast as soon as it fell ill, and survived only a few weeks. The nurse told Dr. W. that it, too, seemed to be in violent pain, and that its legs became black before death.

Dr. W.'s enquiries have been very minute; he was told that in about four, five, or six days, the diseased leg became somewhat less painful, and turned black gradually: appearing at first covered with spots, as if bruised. Then commenced the affection of the other leg, with the same excruciating pains, and in a few days thereafter, that, also, began to mortify. In a very little time, both legs were perfectly sphacelated. The mortified parts separated from the sound spontaneously, the attending surgeon, having in most of the cases no other trouble, than merely to saw through the bone, with little or no pain to the patient. The separation took place generally about two inches below the knee; in some, rather lower, and of one the feet separated at the ankles, without any surgical aid. In others, the separation was less perfect. The eldest girl had one leg taken off, and the other was entirely sphacelated, but the surgeon had delayed removing it, owing to a large abscess which had formed under the hamstrings, attended with a swelling of the thigh. The mother's right foot had come off by the ankle joint, while the other leg had wasted

to the bone, black and extremely fœtid, what little remained of flesh being quite putrid and almost dried. In one child alone, was one of its legs saved, but with the loss however of two toes even from that. Three of the children had lost both legs, and another child both its feet. This then was the existing state of the family. Mary the mother, ætat 40—The right foot gone from the ankle joint; the other mortified, wasted to a mere bone, but not yet off. Mary ætat 15—One leg off below the knee; the other entirely sphacelated. Elizabeth ætat 13—Had lost both her legs below the knees—Sarah ætat 10—Had lost one of her feet at the ankle joint. Robert ætat 7—Both legs had fallen off below the knees. Edward ætat 4—Both feet had fallen off at the ankle joints. An infant of four months old had died.

The father had been attacked about two weeks after the rest of the family, but in a slighter degree, the pain being confined to two fingers of his right hand, which turned blackish and withered for some time; but were then better, and he had recovered the use of them.

It is remarkable, that during the time of this dreadful calamity, the whole family are said to have appeared well in some respects;—that is to say, they ate heartily and even slept well, when their pains began to abate. When Dr. W. saw them, they all seemed free from febrile symptoms, except the girl already mentioned, who had an abscess in the ham. The mother looked emaciated, and had but very little use of her hands. The rest of the family even seemed

well. One poor boy, in particular, looked as healthy and florid as possible, and was sitting on his bed, quite jolly, drumming with his stumps! Dr. W. enquired as to the nature of their diet, but obtained no satisfactory information. The man was a day labourer, and his wife and children span, and they lived by their joint industry. They had not suffered from exposure to severe cold, for the beginning of January had been very mild. Nor is it very uncommon that one limb should perish from sphacelation, attended with similar symptoms as in these cases, but that a disease of this kind should run through a whole family, with such amazing rapidity and violence, is indeed most extraordinary. A nurse, who had lived with them from the beginning of their illness had not been affected. True it is, that she had not lived in the house with them before, but had been frequently with them.

Dr. Baker, afterwards Sir George, recollecting, on hearing this communication to the Royal Society, what he had read of the effects of bread made from ergotted rye—now wrote to the Rev. Mr. Bones, minister of Wattisham, near Stowmarket, in Suffolk, and obtained from him two communications,—the first, merely re-stating all the particulars just mentioned, and in the second, revealing the real nature of their diet. He says, "I have taken all possible pains to inform myself of every circumstance, which may be deemed a probable cause of the disease, by which the poor family in my parish has been afflicted. The following is an answer to your queries :—

Water.—This they have taken out of a ditch, or pool of standing water, at their own door, as is common in this clay country. We have no spring or well in the parish.

Beer.—They have generally bought their beer at a public house. But in August last, the poor man, brewed two bushels of malt in a large brass kettle, which is commonly let out to the poor.

Bread.—We have no rye. This family have been used to buy two bushels of clog-wheat, or rivets, or bearded wheat, (as it is variously called in this country) every fortnight. Of this they have made their household bread. This wheat they have bought of the farmer with whom I lodge, who tells me, that last year he had some wheat *laid*, which he gathered and threshed separately, lest it should spoil his samples. Not that it was mildewed, or grown, but only discoloured, and smaller than the other. This "damaged wheat," he threshed out last christmas; and then this poor family used no bread but what was made of it, as likewise did the farmer's own family, and some others in the neighbourhood. We observed that it made bad bread, and worse puddings. A labouring man of the parish, who had used this bread, was affected with a numbness in both his hands, for about four weeks, from the ninth of January. His hands were continually cold, and his finger ends peeled. One thumb, he says, still remains without any sensation.

Pork.—This they generally bought pickled of the farmer with whom I lodge. * * * * * * *

In this part of the country, there is a great deal of old ewe mutton killed, between the first of November and January, *some of which is very poor and rotten,* and is usually sold at three half-pence or perhaps one penny a pound. In December last, this family lived for three weeks, at least, on this mutton, of which, they bought a quarter at a time, weighing seven or eight pounds, for one shilling. The man is so prepossessed with notions of witchcraft, and so obstinate in his opinion, that I cannot excite in him even a desire of attributing this disease to any other cause. Since my last letter to you, Mary, aged 16, who sat for fourteen weeks in a great chair, and for seven days without feet, or flesh on her leg bones, has consented (at length) to have the bones taken off. She is now in bed, the abscess in the ham is healing, and she seems likely to live. The father's fingers are almost healed, but he every day feels severe darting pains in many parts of his body. The mother lies in bed with her leg bones bare, which she will not suffer to be taken off. Her hands are still benumbed, but not black. Her fingers seem to be contracted. The rest of the family are recovering." Dr. Baker adds—Though we undoubtedly excel the ancients in the knowledge of poisons, yet a great deal of that subject still remains unknown to us.

Second communication to the Royal Society, by Charlton Wollaston, M. D., Pall Mall, 29th Oct., 1762.

Most of the unhappy sufferers have survived the calamity. The father is perfectly recovered; except that his two fingers remain in some degree contracted.

The mother is still alive. Some little time after my last communication, her husband broke off the tibia of the remaining sphacelated leg, (the bone was quite decayed) about three inches below the knee, but the fibula, being sound, the surgeon was obliged to saw that through. The stumps of both legs, still continue unhealed: and as the ends of the bones in both of them seem to be carious, and the woman will not consent to any further operation, they may perhaps never heal—neither in this, nor in any of the other cases, did the mortification spread beyond the original separation. Her right arm is considerably wasted, and the fingers contracted. The eldest girl, Mary, died within a few weeks after I saw her. The second girl, Elizabeth, is perfectly well; the sores quite healed. The third girl, Sarah, is not yet well. Her foot separated at the articulation of the os scaphoides with the astragalus. The os calcis and astragalus are both of them carious and probably keep the wound from healing, The two boys are perfectly recovered, and seem in every respect as healthy as possible. As to the causes * * * * The corn with which they made their bread was certainly very bad: it was wheat that had been cut in a rainy season, and had lain on the ground till many of the grains were black and totally destroyed: but many other poor families, in the same village, made use of the same corn, without receiving any injury from it. One man lost the use of his arm for some time, and still imagines himself that he was afflicted with the same disorder as Downing's family. * * * * * * * He has long since perfectly recovered.

CHAPTER X.

INSTANCES OF DRY GANGRENE WHICH OCCURRED AMONGST THE SICK OF THE BRITISH ARMY.

I have had the misery of witnessing sundry cases of dry gangrene, occurring amongst the sick of the British army, at three several periods—and, although, from the loss of baggage and memorandum books, I am unluckily unable now to enter into any minute particulars, yet as every notice of so important a disease, cannot fail to illustrate, in some degree, its obscure and mysterious origin, I will venture to give, from memory, all that I can recollect.

The first instances which I beheld were in the Naval hospital at Haslar, in the spring of 1809, amongst the sick which returned to England after the battle of Corunna. These men had undergone very great fatigue and severe privations, and after accomplishing a most fatal campaign, were attacked, in great numbers, with a dreadful sort of disease, to which was subsequently given the appellation of Corunna fever. Amongst its various and frightful symptoms, which astonished and confounded the medical atten-

dants, such as large vibices and petechiæ with sphacelations of the face, nose, and lips, and severe suppurations of the parotid glands, many of these poor men were seized with a severe erysipelatic affection of the feet and legs, which speedily swelled, became of a marble coldness, and of a dark livid hue, and then mortified. On recovering from their febrile symptoms, several of these men lost their feet and legs at the articulations, precisely in the same way as has been stated in the two foregoing chapters. In some the army surgeons performed amputation above the knees, and in these the result was favourable, as the patients finally recovered with the loss of their inferior extremities after a long and lingering convalescence. But, in the far greater number, the result was fatal.

The next occasion which I had of witnessing a degree of this malady was, when principal medical officer to the military general hospital at Deal, amongst the troops which returned from the fatal expedition to Walcheren. The type of the fever under which these men suffered was remittent and intermittent, and the part attacked with dry gangrene, was neither the feet nor hands, nor the upper nor lower limbs as in the preceding cases—but the scrotum. Amongst the many hundreds who underwent the Walcheren fever in Deal hospital, there were at least six or eight whose scrotums entirely mortified, and sloughed away leaving the *Testes* exposed, with the covering only of the Tunica Vaginalis—all these men however finally recovered—the exposed parts having

soon thrown out healthy granulations, which healed and became covered with a thin membrane.

The third, and last opportunity I had of seeing and treating this disease was at Ciudad Rodrigo, in Spain, in the autumn of 1812. I was then the principal medical officer of the large military hospitals there, and the whole of the sick of the British army, passed down through these hospitals after the rapid retreat from the attack on Burgos. The troops, at that period, had likewise undergone very severe fatigue, attended by great misery and many privations. Heavy rains had fallen on them almost daily, during their marches from Monasterio beyond Burgos; and the roads in many places passing over stratums of a deep and soft clay, had given way to the pressure of the artillery, waggons, &c, and the brooks, having become swoln, dilated themselves into large quagmires. Through these the poor soldiers, in passing by wading, were frequently completely drenched, and many of the army followers with their baggage, cattle, children &c. were often swallowed up—their feet having become entangled in the deep mud in these sloughs. Thus, on coming near to Ciudad and on the whole way through the evergreen oak woods between Salamanca, San Munos, and Ciudad Rodrigo, the straggling from sheer fatigue was great, and of the stragglers many perished. For ten or twelve days thereafter, the peasants and detachments sent out for that purpose, collected many debilitated persons left behind in the woods, and on being brought to the hospitals, these were found suffering from fever

and sphacelation, and mortification of the feet and legs. Of these many died—while, of the survivors, several suffered amputation—and of these a few recovered. But, in a great majority, the powers of life had been so much exhausted by hunger, fatigue, lying in the damp forests, &c. &c. that all means proved unavailing to rescue them from death. Of these, one poor fellow, I remember, entreated me to take off one of his legs which had mortified nearly up to the knee—all the staff surgeons having fallen sick or died at Ciudad Rodrigo; I eventually complied with his request and took off his leg above the knee, but although he lost very little blood during the operation, and although the stump at first had a healthy appearance, yet in a few days, his strength and appetite failed, livid coldness and mortification attacked the stump, and the poor soldier died in spite of all our efforts. Mr. Henry Grasset, a staff surgeon, now in Quebec, was one of those attacked with mortification of both legs, which became cold and black up to the knee joints: but, fortunately, by rubbing them with liniments of oil of turpentine, camphor, aqua ammoniæ, and by giving him large quantities of stimulants, particularly decoction of bark and snake root (serpentaria), he recovered so far, that he was enabled to undergo the journey down to Santarem, whence he soon after reached Lisbon, and was embarked for England, where he got speedily well, without having suffered the loss of his feet or toes, since which he has been serving in Canada. The medicines which then appeared to be most efficaci-

ous were frequent doses of camphor, ether, wine, brandy, and snake root, with the external application of oil of turpentine and other embrocations, with warm fomentations of chamomile and alcohol. Having passed through the winter months, I was myself about this time exposed to wet weather, and having been stung in the right ankle by some poisonous insect, a festering sore was produced, soon followed by a relapse into an old intermitting fever, which necessitated my removal to Coria soon afterwards, leaving behind me many hopeless sufferers in the hospitals at Ciudad Rodrigo.

Besides the causes already mentioned, as likely to have produced this dry gangrene, I ought not to omit that during the preceding very sultry and unhealthy summer, nearly all the bullocks, for feeding the army, had been driven up from the province of Tras Os Montes, Portugal—and on reaching the banks of the river Aguada in Spain, which crosses an extensive savannah (at the end of which stands Ciudad Rodrigo impending on a rock over the river) many of these cattle were found affected with a *murrain* and died in great numbers. The surviving cattle were driven on to the army, but, I believe, many of these were far from being sound when slaughtered—but necessity, under such circumstances, required that their flesh should be issued out to the troops: and perhaps this too contributed to throw the troops into the very sickly state, in which they were found to be after the retreat from Burgos. That year I had many opportunities of inspecting the carcases of the slaughtered

cattle, and besides enlarged livers and spleens, and aphthous tongues and enlarged absorbent glands, I found in several of the most unhealthy, great affections of the cellular tissue, which was either melted down into a gelatinous consistence, or approached suppuration. In our auxiliaries, the Spaniards, whose privations and fatigue were excessive, I saw some few cases which approached very near to plague, if they were not really that disease itself. But, as they never entered our hospitals, there was no communication between the sick of the two armies, and although our mortality was great, fortunately no contagion arose.

CHAPTER XI.

OF INSECTS DELETERIOUS TO MAN AND ANIMALS —AND OF THEIR EPIDEMIC AND DISASTROUS VISITATIONS.

INSECTS have very aptly been denominated "the armies of the Almighty." And judging from their often dreadful and irresistible visitations, it is not to be wondered, that they should have been considered as the ministers of that dread and mysterious power, commissioned to fulfil the decrees of "the divine nemesis."

Every summer, in Hungary, the shepherds who sleep in temporary huts near their cattle, are obliged to anoint with oils and animal fat, to preserve themselves from the poisonous stings of myriads of gnats, hatched in the adjoining bogs and morasses. Even in England, in the year 1736, the swarms of gnats, at Salisbury, in Wiltshire, were so immense, as almost to constitute a plague, appearing in dense clouds, and ascending above the height even of the steeple of the cathedral. And in the month of August in 1766, the same phenomenon occurred at Oxford. The like also happens, yearly, in the savan-

nahs of Surinam, and the burning plains of Lybia and Sennaar. Bruce relates that he found the negro king there anointing himself with buffalo butter and elephant's fat, to ward off the stings of venemous insects.

Dr. Clarke, the traveller, complains often in the course of his journey through Syria, of the great annoyance he experienced from all manner of insects, and mentions the droll saying of the Pacha of Tiberias "that the king of the fleas held his court there". With the ravages of the chigoe or jigger, called also the nigua, tungua, and pique (*Pulex penetrans.* Linn.), the accounts of all travellers in the West Indies and South America are filled, nor can we forget the fate of the unfortunate Spanish friar, who wishing, enthusiastically, to import some living specimens of that insect into Old Spain, for the sake of science, permitted them to nidify between his toes, but fell a victim to the mortification thus produced, during his voyage from Hispaniola to Europe. And both Ulloa and Jussieu agree in stating that there are two South American species of this dangerous insect. In Britain, the harvest-man, or bug, (Acarus autumnalis of Dr. Shaw), is a minute hexapode insect of a deep scarlet dye, which buries itself at the roots of the hairs in the legs of the labourers during our harvest time, and sometimes even occasions dangerous fevers. Bugs, the chinche, or wall louse, abound every where, and St. Pierre, in his voyage to the Mauritius, describes a very dreadful one there, whose bites create large swellings. The wheal bug (reduvius serratus

of Fabricius) abounds in the West Indian islands, and communicates a sort of electric shock to the person whose skin it touches. Bartram, in his travels in the West Indies, mentions the tabanus, the burning fly, (brulot of the French), a sand fly, whose bite can only be likened in pungency, to the prick of a red hot needle, or spark of fire. Bats and swallows frequently swarm with the grubs of bird flies, which feed on them, and the eggs or pupa-like grubs of which are hatched by the heat of their bodies while incubating. These grubs, or flies, are fond of human blood, and on the death of the birds, quit their bodies, and attack the first living creature they happen to alight upon. In Knox's account of Ceylon, mention is made of some black ants, called caddia, whose bites are likened to the burnings of coals.

The *Scolopendra morsitans*, in South America, frequently enters the bed-rooms of the inhabitants, and attacks them while sleeping: and Ulloa speaks of one sort at Carthagena, which is even a yard long, and of which the bite is mortal. And the Coyba or Coga, of the same continent, is said by Ulloa to be a red acarus, much smaller than a bug, whose venemous bite causes tumours, gangrene, and even death. Also there is the œstrus hominis, a species only lately discovered in America, in low swamps and fens, and described by Humboldt and Bonpland. Of the Tsaltsalya of Abyssinia we have already spoken, and in Lapland, besides clouds of gnats which darken the air, the woods abound with an œstrus, which fastens upon the backs of that useful quadruped, the rein

deer, and ovipositing in its skin, produces warbles, terminating by mortification, fever, and death.

The vegetable, as well as the animal, kingdom is subject to the devastations of insects, which thus, in a more indirect manner, prove destructive to mankind, by ruining their gardens and fields. In the year 1574, such were the numbers of the insect called the dor beetle, in Gloucestershire, that they quite darkened the air, and on falling into the river Severn, absolutely choaked up the gratings of the streams which turned the mills in that district. (MOUFFET).

The illustrious French naturalist, Reaumur, states that in the year 1735, France experienced a terrible visitation, from immense swarms of the grub of a lepideptorous insect called the plusia gamma, which, whether it was a moth or butterfly, seems not yet decided by writers on Entymology. It derives its name from being marked on its wings with a gilded character resembling the Greek letter gamma. This insect although common in Great Britain, as Spence says, seldom causes us much injury. But in the year above mentioned, it became of a sudden so mysteriously and incredibly generated, and multiplied in France, as to infest the whole country. On all the great roads there were to be seen vast numbers traversing in all directions, passing from field to field, and devouring every green herb in their way—more especially were they destructive to the kitchen gardens, where they devoured every thing, whether pulse, salads, or pot herbs; so that nothing absolutely was left, but the stalks and veins of the leaves.

It was generally affirmed by the multitude that they were poisonous, as it was believed that, in some instances, the eating them had been followed by fatal effects—and the use of salads and pot-herbs was prohibited for several weeks in Paris in consequence. Reaumur proved, by accurate calculations, that a single pair of these insects might produce, in one season, a progeny of 80,000; so that, but for the intervention of the ichneumon flies, destined by a Divine Providence to keep their increase in check, there is no possibility of calculating to what extent their amount might at some times proceed.

Dr. Murdoch Mackenzie, of Constantinople, states, in his correspondence with the Royal Society of London, that, after a great murrain amongst the black cattle in Turkey, in May 1745, there followed in the beginning of June, in the same year, immense swarms of butterflies, and that there were great numbers of caterpillars creeping every where, and afterwards a very violent plague. And after observing the same phenomena, in the years 1752 and 1758, he, Dr. M. M., foretold to Sir James Porter, the British ambassador in Turkey, that they should have a hot plague in those years; which accordingly happened, particularly in the months of August and September, 1758.

About the year 1660, the anjoumois moth, or corn butterfly, is reported to have been so numerous in France, and to have committed such ravages, that upwards of 200 parishes were nearly ruined by its visitation. And the French government offered a very large reward for any effectual remedy against it. This reme-

dy was found out: and consisted in the heating the diseased grains of corn in an oven, so as to hatch and destroy the ova of the insect, which had been deposited in the diseased grains of wheat, barley, rye &c.; of these diseased grains nothing was then left but the empty husks—for the heat was so managed that the eggs were hatched, but the vitality of the sound grains not destroyed—so that the good seed afterwards germinated when sown. For it has been thoroughly ascertained, that, although the eggs of insects can resist a very excessive degree of cold, without being deprived of their vitality, they are easily destroyed by a comparatively slight degree of heat: and the adjusting precisely the exact degree of heat so as to destroy the eggs without injuring the life of the sound grains, constitutes the summit of this art. But as the baking of large quantities of seed corn, has been found extremely inconvenient and expensive, besides being liable to accidents—subsequent experiments were made of steeping seed corn in strong alkaline lyes, made of quick-lime and water, and even in arsenical solutions—and this method has been found much easier in its application and equally destructive to the eggs of insects—so that in Great Britain it has become a very common practice both with turnip seed and corn.

In Great Britain the insect which proves most destructive to the interests of mankind is the orange coloured corn-gnat (*Cecidomya Tritici.* Kirby.) Its history says Rennie, was first investigated by Kirby and several other intelligent naturalists. It is ve-

ry small not unlike a midge, orange-coloured, with wings rounded at the tips, and fringed with hairs. They are first observed in the wheat fields about the 21st of June, when the wheat is coming into flower. They generally repose on the lower parts of the stems during the day, and become active about sunset, they have been seen flying about on cloudy mornings as late as seven o'clock—and, on rare occasions, depositing their eggs in shaded situations as early as two in the afternoon—their movements seem to be influenced by the rays of light, of which they seem impatient, frequenting the most umbrageous parts of the crop. Their eggs, which they deposit in the glumes of the florets of the grain, are generally visible about the 23rd June—the larvæ on the 30th of that month, and the pupa on the 29th July. The flies were observed depositing eggs on the 28th, and finally disappeared on the 29th July; thus having existed through a period of *thirty nine days*.

By the first of August all the maggots leave the ears of corn, and descend into the ground about the depth of half an inch, where it is supposed they pass the winter in a pupa state.

The decrease of this destructive insect is confided to the care of two ichneumon flies, which deposit their eggs in the larvæ.

In America, the corn crops are attacked by visitations of another small gnat, the Hessian fly (*Cecidomyia destructor*). Its devastations seem to have been first observed in 1776, and it was erroneously supposed to have been conveyed amongst straw, by

the Hessian troops from Germany. It was first noticed in the wheat fields of Long Island, from which it spread gradually at the rate of 15 or 20 miles round in one year, so that in 1789, it had advanced 200 miles from its original station in Long Island. Other accounts state that it did not travel more than 7 miles annually, and did little serious damage before 1788. Their numbers are described as almost incredible. The houses in the infested districts swarm with them to so great a degree, that every vessel was filled with them: 500 were actually counted on a glass tumbler, which had been set down, for a few minutes, with a little beer in it. They were observed crossing the Delaware river like a cloud : and even mountains do not seem to interrupt their progress. As in the case of the English wheat-fly, the American Hessian fly, has also a formidable enemy in a minute four winged fly, (*Ceraphron destructor*. Say.) which deposits its eggs in the larvæ. Were it not for the Ceraphron indeed, Mr. Say thinks, that the crops of wheat would be entirely destroyed, in those districts where the Hessian fly prevails.

CHAPTER XII.

OF THE GUINEA WORM. (*Filaria Medinensis.* Linn.)

In ditches and ponds throughout Great Britain, more particularly in those with clayey bottoms, it is common to find a minute worm, resembling an eel in miniature, which twists and winds itself into all sorts of contortions, and is extremely vivacious. This animal is the Gordius Aquaticus. But there is a much smaller worm called the Filaria, constituting a genus of intestinal worms consisting of 18 species. Of these one inhabits both the Indies and Africa, and is frequent in the morning dews—it is called the dracunculus or guinea-worm. It often enters the naked feet of the slaves, and creates the most troublesome itching, accompanied by inflammation and fever—And if it be incautiously broken, grows with redoubled vigour, often occasioning a fatal inflammation. It is often 12 feet long, and not larger than a horse-hair.

The most extraordinary part of the natural history of these worms is, that they seem to live indifferently in the waters of the fields, or within the intestines of insects, and other animals, the human race not excepted. Hence they have been called by

RUDOLPHI *Entozoa*, and by LAMARCK *Vers rigidules*. These little worms have been found in insects of every order, and their attacks commonly produce the death of the insect, although, they appear, not to devour those parts most essential to life. From the accounts of Dr. Mathey, it appears, that the worm *(Filaria)* has the property of apparently dying, and becoming again resuscitated, by emersion into water. But how long this phenomenon can be made to take place after its seeming death, does not appear.

De Geer states, that, he had seen them two feet long: and Gould, detected them within ants, of the small length of six inches. They are like the *Gordius aquaticus*, bifid or forked at one end, brown above, grey below, and black at each extremity. These animals, appear to die as soon as they quit the body, upon which they have been preying, except they are immediately voided into water, when their animation and activity goes on undisturbed. For in water, their bodies undergo every possible inflexion, often lying and twisting themselves in a vast variety of ways; so that, when confined within the body, even of an insect, from their extreme suppleness, and amazing powers of contortion, they find sufficient space to pack together, their often enormous length.

Their usual residence, we have stated, to be, clay, and Mr. W. S. Mc Leay, found them very common at Putney, in clay, at the bottom of pools. How they propagate their species, is at present unknown, as also, in what manner they are introduced within the bodies of minute insects. For as to larger ani-

mals, it seems probable, that their ova, are diffused in the waters which they drink, and that these ova are then hatched in their intestines.

Another genus of the same class is called *Ligula (abdominalis)*. Dr. Frank Nichols (in his paper in the Phil. Trans. of 1755, on worms in animal bodies) says, that fish, are to appearance, more subject to worms than other animals, that the cod, often shows small slender worms, coiled up like snakes, on the surface of its liver, and that the bley, in the Thames, in the month of July, is often distressed by a long flat worm, which by possessing and eating its liver, prevents the fish from compressing itself to that specific gravity, which is necessary for its quiet continuance under water; so that, it emerges, and is obliged to skip about on the surface, till it becomes a prey to its foes, or dies suffocated, from being so often out of water, and deprived of that action of the water, which is analogous to the force of the air to us in breathing."

Hence then it would seem, that a fish diet as well as drinking the water of impure pools, &c., is favorable to the generation of worms in animal bodies. And hence too, the negroes of the coast of Africa, and the West Indian islands, as well as the inhabitants of Egypt and Arabia, may derive their great tendency to intestinal worms, as well as to attacks of what is called the Guinea-worm, which appears, to be the Filaria infesting the cellular membrane under the skin.

The instance which is related by Bruce, the tra-

veller, of his own individual sufferings from this disease, may be inserted here, as a very accurate description of this affliction.

"The next complaint," says Bruce, "as common in these countries, (the shores of the Red sea) is called *Farenteit*, a corruption of an Arabic word, which signifies the *worm of Pharaoh;* all bad things being by the Arabs, attributed to those kings, who seem to be looked upon by posterity, as the evil genii of the country they once governed. This extraordinary animal only afflicts those, who are in the constant habit of drinking stagnant water; whether that water is drawn from wells, as in the kingdom of Sennaar, or found, by digging in the sand, where it is making its way to its proper level, the sea; on filtering down the sides of the mountains, after the intertropical rains. This plague appears, indiscriminately, in every part of the body, but oftenest in the legs and arms, and scrotum. I never saw it in the face or head; but it generally comes out, where the bone has least flesh upon it. Upon looking at this worm, on its first appearance, a small black head is extremely visible, with a hooked beak, of a whitish colour. Its body is, seemingly, of a white silky texture, very like a small tendon, bared and perfectly cleaned. After its appearance, the natives, who are used to it, seize it gently by the head, and wrap it round a thin piece of silk, or small bird's feather. Every day, or several times a day, they try to wind it up upon the quill, as far as it comes readily, and upon the smallest resistance, cease, for fear of

breaking it: I have seen five feet, or sometimes more of this extraordinary animal, winded out with invincible patience, in the course of three weeks. No inflammation then remained, and scarcely any redness round the edges of the aperture, only a small quantity of lymph remained in the hole, or puncture, which scarcely issued out upon pressure. In three days, generally, it was well, and left no scar nor dimple, implying a loss of substance. I myself, (says Bruce) experienced this complaint. I was reading upon a sofa, at Cairo, a few days after my return from Upper Egypt, when I felt in the fore part of my leg, upon the bone, about seven inches below the centre of my knee pan, an itching, resembling what follows the bite of a musquito. Upon scratching, a small tumour appeared, very like a musquito bite. The itching returned in about an hour afterwards; and being more intent upon my reading, than my leg, I scratched it till the blood came. I soon after observed something like a black spot, which had already risen considerably above the surface of the skin. All medicine proved useless, and the disease not being known at Cairo, there was nothing for it but to have recourse to the only known manner of treating it in this country. About three inches of the worm, were winded out upon a piece of raw silk, in the first week, without pain or fever; but it was broken afterwards, through the carelessness and rashness of the surgeon, when changing a poultice, on board the ship, in which I returned to France: a violent inflammation followed; the leg swelled, so

as to scarce leave appearance of knee or ankle; the skin, red and distended, seemed glazed like a mirror. The wound, was now healed, and the discharge ceased, when there was every appearance of mortification coming on. The great care and attention procured me in the lazaretto of Marseilles, by a nation, always foremost in the acts of humanity to strangers, recovered me from this troublesome complaint. Fifty-two days had elapsed since it first began; thirty-five of which were spent in the greatest agony. It suppurated at last, and by enlarging the orifice, a good quantity of matter was discharged. I had made constant use of bark, both in fomentations and inwardly, but I did not recover the strength of my leg entirely, till near a year afterwards, by using the baths of Poretta."—(See Bruce's Travels in Abyssinia). Dr. Baillie, in his Morbid Anatomy, says, that he once found the Guinea-worm in the scrotum of a dead body, and accounts for it, by supposing, that this man, (probably a soldier or sailor) had, during his lifetime, been attacked by this animalcule, during a residence in a foreign country.

Of the extraordinary manner in which insects are sometimes introduced into the human stomach, the following case may be quoted as an instance. It has been perfectly authenticated, both by medical men, and competent naturalists, and is published in the Dublin Transactions, by Dr. Pickells of Cork.

"Mary Riordan, aged 28, had been much affected by the death of her mother, and at one of her many visits to the grave, seems to have partially lost her

senses, having been found lying there on the morning of a winter's day, and having been exposed to heavy rain during the night. When she was about fifteen, two popular Catholic priests had died, and she was told by some old women that if she would drink daily, for a certain time, a quantity of water mixed with clay taken from their graves, she would be for ever secure from disease and sin. Following this absurd and disgusting prescription, she took from time to time large quantities of the draught; some time afterwards being affected with a burning pain in the stomach (*Cardialgia*), she began to eat large pieces of chalk, which she sometimes also mixed with water, and drank.

"Now, whether in any or in all of these draughts she swallowed the eggs of insects, cannot be affirmed; but for several years she continued to throw up incredible numbers of grubs and maggots, chiefly of the church-yard beetle (*Blaps mortisaga*. Fabr.). "Of the larvæ of the beetle," says Dr. Pickells "I am sure I considerably underrate, when I say that not less than 700 have been thrown up from the stomach, at different times since the commencement of my attendance. A great proportion were destroyed by herself to avoid publicity; many too, escaped immediately by running into holes in the floor. Upwards of 90 were submitted to Dr. Thomson's (the well-known author of "Zoological Researches") examination; nearly all of which, including specimens of the meal worm (*Tenebrio molitor*), I saw myself, thrown up at different times. The average size was about an inch and a half in length, and four lines and a

half in girth. The larvæ of the dipterous insect, though voided only about seven or eight times, according to her account, came up almost literally in myriads. They were alive and moving." Altogether, Dr. Pickells saw nearly 2000 grubs of the beetle, and there were many which he did not see. Mr. Clear, an intelligent entomologist of Cork, kept some of them alive for more than twelve months. Mr. S. Cooper cannot understand whence the continued supply of the grubs was provided, seeing that larvæ do not propagate, and that only one pupa and one perfect insect were voided; but the simple fact that most beetles live several years in the state of larvæ, sufficiently accounts for this. Their existing and thriving in the stomach, too, will appear less wonderful, from the fact that it is exceedingly difficult to kill this insect; for Mr. Henry Baker, repeatedly plunged one into spirits of wine, so fatal to most insects, but it revived, even after being immersed a whole night, and afterwards lived three years.

That there was no deception on the part of the woman, is proved by the fact that she was always anxious to conceal the circumstance; and that it was only by accident that the medical gentlemen, Drs. Pickell, Henick, and Thomson, discovered it. Moreover, it does not appear that, though poor, she ever took advantage of it to extort money. It is interesting to learn that by means of turpentine, in large doses, she was at length cured."

See also a paper by Mr. Henry Baker, on the Blaps Mortisaga, or church-yard beetle, in the Phil. Trans.

CHAPTER XIII.

OF THE PHTHIRIASIS, OR PEDICULAR DISEASE.

ALTHOUGH most of the diseases which afflict the human body, are more or less humiliating and destructive of human pride—yet of all of them there is perhaps no affliction which is so distressing and mortifying to our feelings, as that which forms the subject of this chapter. If we consider too, that some of the personages who have held the highest rank and consideration amongst mankind, have perished by it, we must the more lament the lot and sad destinies of humanity.

Thus we learn from history that Sylla, the Roman Dictator, the two Herods, Queen Pheretima, Pherecydes, the philosopher of Scyros, Antiochus Epiphanes, the Emperor Maximin, and Philip the Second of Spain, &c. &c.—were either devoured by Phthiri or eaten up by Scoleches or worms.

Fortunately this disease is but little known in Great Britain, insomuch that there are many physicians now living, who, like myself, have never seen a case of it. The late Dr. William Heberden however,

has left us a short memorandum on the subject, which I shall here transcribe from the 71st chapter of his commentaries.

"Aug. 23, 1762.—I was this day informed by Sir Edward Wilmot, that he had seen a man who was afflicted with the morbus pedicularis. Small tumours were dispersed over the skin in which there was a very perceptible motion, and a violent itching. Upon being opened with a needle they were found to contain insects in every respect resembling common lice, excepting that they were whiter. Sir Edward Wilmot ordered a wash consisting of four ounces of spirits of wine, four ounces of rectified oil of turpentine, and six drams of camphor. The day following he told me all the insects had been killed on being touched with this liquor, and that all the itching had immediately ceased." * * * * * * * * * *

At various times the wounded of the British army in Spain, were extremely distressed by the generation of worms in their wounds, occasioned, of course, by the blow-fly having deposited its eggs upon the wounded surfaces, and which being speedily hatched by the heat of the mens' bodies, became worms, and fed upon the discharge and granulations. I recollect this more particularly happened to those, who were wounded in and around Badajos, who, on being sent down to Abrantes and there embarked on the Tagus to proceed to Lisbon, were found swarming with worms. The application which we found answered best, consisted in applying pledgets of lint soaked in camphorated spirits of wine and oil of turpentine,

proving in this, as in all other cases of disease produced by insects, that camphor and oil of turpentine are the most certain and invaluable remedies.

The Rev. Mr. Kirby says, that there is reason for thinking, that at least three descriptions of insects are concerned in the various cases that have been handed down to us under the common name of Phthiriasis—these are (*pediculi*. Linn.) lice, mites (*Acari*. Linn.), and larvæ in general.

Whether pediculi or lice, breed and bury themselves under the skin, is yet a disputed point;—wherefore some doubts have been started, whether the death of the poet Alcmene, and of Phericydes Scyrius, the philosopher mentioned by Aristotle, must not have been occasioned by some other insect. Aristotle (lib. 5. cap. 31.), speaking of the lice to which he attributes these fatal effects, says that "they are produced in the flesh, in small pustule-like tumours, but which have no pus, and from which when punctured they issue.

The exact words of Aristotle, describing this disease, are these.—"Pediculi ex carne quibus futuris emergunt seu pustulæ quædam sine pure exiguæ: quas si pungas, pediculi exeunt. Accidit morbus hic nonullis hominibus pro nimio corporis humore, et quidem aliquos fœditate obiisse proditum est, ut Alcmenem poetam, et Pherecydem Scyrium, quibusdam item morborum generibus copia nascitur pediculorum. Genus pediculi, ferum vocatum, est durius eo, quòd magna ex parte provenit, et corpori detrahitur difficilius. Pueris pediculi in capillo magis, viris

minus. Omnino feminæ, magis quam mares pediculum sentiunt. Minus laborant eorum capita, quibus pediculus in capillo est. Quin et ex cæteris animalibus complura pediculo infestantur: ut aves et phasianæ, quidem intereunt, nisi se pulverent. Omnino quibus penna caule constat, iis pediculus gignitur. Nec ea quibus pilus est, carent eodem, *excepto asino, qui non pediculo tantum, verum etiam redivo immunis es.* Boves utrumque id habent, oves, et capræ, redivos habent, *pediculo vacant.* Suibus quoddam pediculi grande, ac durum familiare est. Canibus proprium *ricinus*, qui ab eodem animali nomen *cynoraistæ* accepit. Genus autem unum-quodque pediculi ex corpore ipso sui animalis enoscitur. Proveniunt largius pediculi mutatione aquarum, quibus lavare se solent ea, quorum natura pediculum patitur. In mari etiam pisces hoc malum infestat: verum non in piscibus ipsis, sed limo gignitur simili multipedibus asellis, nisi quòd caudam hoc ampliusculam habeat. Genus pediculi marinum simplex unùmque est, ubique proveniens; sed maxime in foraminibus, et cavernis. Insecta hæc omnia sunt, et multipeda, et exanguinia. Asilus thunnorum sub pinna oritur, specie scorpionis, aranei magnitudine. Maris quod a Cyrena in Ægyptum panditur, piscis, Pediculus nomine circa delphinum est, qui omnium pinguissimus fit pabuli copiâ, quæ delphini opera suppeditatur." (De Hist: Animal: c. xxxi. l. v.)

In addition to the above, we may here state, upon the authority of LINNÆUS, that the larvæ of three females of the blowfly. (*Musca Vomitoria*) will de-

vour the carcase of a horse as speedily as a lion would do; and we easily give credit to this assertion, since we know, that one mother of an allied species (*M. Carnaria*) produces about 20,000, and that they have been proved by REDI, to increase in weight two hundred fold, within twenty-four hours. And here too, we shall subjoin a most extraordinary fact, illustrative of the voracity of these maggots, as given by KIRBY and SPENCE, and also quoted by Mr. RENNIE in his "Insect Transformations" extracted originally from Bell's Weekly Messenger. "On Thursday, June 25th, died at Asbornby, Lincolnshire, John Page, a pauper, belonging to Silk-Willoughby, under circumstances truly singular. He, being of a restless disposition, and not choosing to stay in the parish workhouse, was in the habit of strolling about the neighbouring villages, subsisting on the pittance obtained from door to door: the support he usually received from the benevolent, was bread and meat; and after satisfying the cravings of nature, it was his custom to deposit the surplus provision, particularly the meat, betwixt his shirt and skin. Having a considerable portion of this provision in store, so deposited, he was taken rather unwell, and laid himself down in a field, in the parish of Scredington, when, from the heat of the season at that time, the meat speedily became putrid, and was of course struck by the flies. These not only proceeded to devour the inanimate pieces of flesh, but also literally to prey upon the living substance; and when the wretched man was accidentally found by some of the inhabi-

tants, he was so eaten by the maggots, that his death seemed inevitable. After clearing away, as well as they were able, these shocking vermin, those who found Page, conveyed him to Asbornby, and a surgeon was immediately procured, who declared that his body was in such a state, that dressing it, must be little short of instantaneous death; and, in fact, the man did survive the operation but a few hours. When first found, and again when examined by the surgeon, he presented a sight loathsome in the extreme; white maggots of enormous size were crawling in and upon his body, which they had most shockingly mangled, and the removal of the external ones served only to render the sight more horrid." Kirby adds, "in passing through the parish last spring, I enquired of the mail-coachman whether he had heard this story; and he said the fact was well known." The year in which this remarkable circumstance occurred is not mentioned.—See Rennie's Insect Transformations, and Kirby and Spence's Entomology.

CHAPTER XIV.

OF THE ACARUS SYRO, OR INSECT WHICH OCCASIONS SCABIES.

Dr. Joseph Adams, in his Observations on Morbid Poisons, enters at some length into the discussion of the question respecting the existence of the *Acarus Syro* (*Exulcerans.* Linn.) in cutaneous diseases, particularly in the itch. But the doctor seems unluckily to have given up his mind to the splitting of hairs, or finding out distinctions without differences, and owing to this unlucky propensity, notwithstanding an old woman at Madeira, extracted the insect from the skins of itch-patients, notwithstanding the insect was placed upon his nail and seen to run about, and notwithstanding it burrowed into the doctor's own skin, and inoculated him with the itch in the most convincing and demonstrative manner, still he seems to have been casting about in his usual manner for some hair-drawn distinction on which to hook up a doubt that the disease caused by the *Acarus Syro*, was the real itch, but something else no one can exactly say what. However, we are obliged to the

Doctor for having the insect delineated carefully, as it appeared when greatly magnified. And to his figure we refer our readers.

The Doctor, who seems to have been "convinced against his will," because Mr. Hunter (who is evidently the great object of his idolatry), had doubted the existence of this insect, gives us some interesting facts: which we may receive with the more confidence, as coming from what the lawyers call "an unwilling witness."

He states that the first intimation of this insect which he had met with, is contained in a paper by Dr. Mead, in the Philos. Trans. containing the substance of a letter from Dr. Bonomo of Rome. The late Dr. Willan, as Dr. J. Adams asserts, favoured the doubts of John Hunter, but thought the difficulty of disputing a fact supported by credible eye-witnesses, might be compromised by supposing that the animalcule is not necessary to form the disease, but that the vesicles of the itch prove a convenient nidus for its ovum. Dr. Bonomo remarks the great difficulty he had in discovering the egg of this animalcule, which may be easily conceived, when we recollect, that De Geer first described it as about the size of a nit, but on placing them both together under a microscope, he found the nit four times larger.

One peculiarity was remarked by Dr. Adams in this insect, which is, that it possesses the power of leaping, with a force not less than that of a flea. And he says that the insect is well known in Ireland, where it is called the flesh worm. In Madeira it is

called Oucam or Oucao, and that there, when the disease reaches the head, so as to produce a general scabbiness, it is called Zagra—both words being, as he suspects, of Moorish origin. He says there is no doubt that these Acari are often torpid during the winters, even of the mild climate of Madeira. He goes on to state that both himself and his friend Mr. Benger having inoculated themselves with these acari, in July 1801, he, Dr. A., permitted it to go on till October, when being then thoroughly infected, he finally cured himself and friend, by the application of an ointment, composed of one dram of white præcipitate of mercury, and an ounce of white pomatum. "The effect of this on us both was almost incredible. In three days time the itching nearly ceased, and the fever entirely. However, it was found necessary to have recourse to the ointment occasionally, for near a month afterwards: little cuticular elevations, and some vesicles arose at different times during that period, and when they arose, were constantly attended with symptoms of fever. From that time we felt no further occasion for any remedies." He then proceeds to find out that the disease produced by these acari, is not really the itch, but something else, and after a great deal of what I am inclined to think a mere ringing of changes upon words, he says that there is another peculiarity attending their cure. "Though the relief from precipitate is experienced so early, yet if that remedy is not occasionally resorted to for near a month, after all the symptoms seem to cease, the disease constantly returns. It is most probable, that

during that time young insects are evolved from their eggs, or that they arrive at such a state of existence as to propagate; and this is the more probable because the disease will sometimes subside of itself during the winter, mild as that season is in this climate (Madeira), and return in spring. Even if cured late in the autumn, it rarely happens that it does not return in spring". This same proneness to return has been noted in a species of itch to which children of European parents, born in Calcutta, have been found to be subject, and with which they are sometimes found to be infected on their arrival in England. Dr. Willan, I believe, has called this *the Malabar Itch.* It is attributed to an infection communicated to them by their black Indian nurses. But that the disease is by no means confined to the inhabitants of warm climates, is evident from the following passage in Fabricius (Faun. Greenland),—who says of it, Habitat in vesicula scabiei Groenlandorum, qui illum acu eximere scientes, mihi miranti, ut vivum animal incedentem ostenderunt.—En Groenlandos Entomologos!

Dr. Adams proceeds to state, that in the course of his enquiry he found that the Italians have the word *setole,* which literally signifies a bristle, or horse hair, but is used to express a small worm, which sometimes is found in the inner palpebræ and produces intolerable pain—And he asks, may not some very obstinate ophthalmiæ arise from such causes—The unguentum hydrargyri nitrati, is a well known remedy for tedious inflammations of the inner eyelids—And

Moufet in his Theatrum Insetorum has the following passage, which we shall here insert, as bearing upon this subject.—Syrones intra oculos generari posse, quibusdam impossibile videtur, sed id fieri vidimus, et ex epistolâ D. Le Jeune regii chirurgi, ad Jacobum Guillemæum olim factum esse accepimus; cujus hœc sunt verba. Scias, inquit, quod in membrana conjunctiva, syrones quidam majusculi, vagis hic illic reptatiunculis ac morsibus tantum excitant pruritum, ut abstinere quin frices haud possis? Ego hoc in casu, remediis usus sum a majoribus contra phthiriasin præscriptis, sed sine ulla utilitate. Tunc amici ægrotum ad fœminam miserunt, quæ coram me acu argentea adeo dextre, et nullo cum dolore syrones extraxit, ut mihi miraculo esset! Et sane nisi propriis luminibus gradientes bestiolas vidissem, syrones ibidem ortos fuisse nunquam credidissem. (*Moufet Theat. Insect. lib. 2. Cap. xxiii.*)

Sir J. Banks also stated to Dr. Adams, that several persons belonging to the Endeavour brig, while at Otaheite in 1769, were troubled with a severe itching round the eyelids; and were cured by an Otaheite woman, who, with two small splinters of bamboo, extracted abundance of very minute lice from between the cilia, scarce visible without a lens, but the motion of which, when laid on the thumb nail, was distinctly observable.

Hence too, I think it very probable that the contagion of the Egyptian ophthalmia, so long the scourge of the British troops after their return from that country, may have arisen from a species of the same in-

sect, and not from the fine sands of the desert, or the night dews—but of this fact I have not had any opportunity of satisfying myself, since I commenced this enquiry.

Certain it is, however, that in India, when the mangoes are ripening, which is in the hottest time of the year, the eyes are attacked with a disease, whilst a small black fly, which feeds upon the mangoes, and is named the *eye-fly*, abounds and is asserted to carry the infection from one person to another. K. and S.' Entomology. 1. 130.

CHAPTER XV.

OF THE HARVEST BUG INSECT, OR *Phalangium*. AND OF THE ŒSTRUS, OR GAD FLY.

THE phalangium, in entomology, forms a genus of wingless insects, of which the characters are—a mouth with horny mandibles, the second joint with a very sharp moveable cheliferous tooth, feelers filiform, without anteneæ. Eyes—two on the crown and two on the sides. Legs—eight; abdomen, generally rounded. They are predaceous insects, and in the various stages of their transformation, prey on the smaller insects and worms. The larva and pupa are eight footed and resemble the perfect insect. There are nineteen species.

The general form of this family of insects resembles that of the crab. Like the crab-race too, some of the species are terrestrial and some aquatic, and they have all a wonderful power of shaking off a limb when entangled, to preserve themselves from destruction. The following species are chiefly worthy of notice in this Essay.

1. Phal: Grossipes. Body minute, cylindrical, glabrous; shoulders tuberculate, legs very long,

body dirty red, very minute and slow. It inhabits the seas of Europe, and insinuates itself into the shells of muscles and destroys the fish. It is probably the cause of a disease which attacks persons who have partaken of muscles in some particular months, and which is called in some parts of England being muscled.

2. Phal: Opilio. Long legged spider—shepherd spider—harvest spider, or harvest man. It inhabits Europe and America, and wanders about chiefly by night. The legs are uncommonly long and slender, and when caught by one of them, the insect parts with it to save his body, and makes off without any apparent uneasiness.

3. Phal: Arenoides. Chelæ or claws toothed, villous body oblong, soft, *livid*, woolly, with inflated claws. This insect inhabits the Cape of Good Hope, and the southern parts of Russia. *Its bite is extremely poisonous, occasioning livid tumours and sometimes death.*

4. Phal: Cancroides. Abdomen obovate, depressed, ferruginous, cheld or claws oblong, hairy. Inhabits Europe, in cellars and other damp places; and is the little insect that gets into our legs, and under the skin, in the summer season, causing a painful itching. There is another variety with ovate chelæ, the scorpio cimicoides of Fabricius.

5. Phal: Acaroides. Abdomen cylindrical, yellowish; cheld ovate, smooth. Inhabits America: twice as large as phal. cancroides, and its bite said to be extremely painful and dangerous, even mortal.

THE ŒSTRUS—or *god fly—quasi*, the *gad fly*, or *breeze fly*.—Is a genus of two winged insects, and its characters are—mouth with a simple aperture not exserted, two feelers of two articulations, orbicular at the tip, and seated on each side in a depression of the mouth; antennæ of three articulations, the last subglobular, and furnished with a bristle on the fore part, placed in two hollows in the front. The face of this singular genus is broad; depressed, vesicular, and glaucous, and has some sort of resemblance to the ape kind. They are extremely troublesome to horses, sheep, and black-cattle, depositing their eggs in different parts of the body, producing tumours and even death. The larvæ are without feet, short, thick, soft, and annulate; and often furnished with minute hooks. There are twelve species, namely—1. *æ. bovis* of the ox. 2. *æ. equi* of the horse. 3. *æ. hæmorrhoidalis*—the smaller horse gad-fly. 4. *æ. veterinus*—cattle gad-fly. 5. *æ. ovis*—sheep gad-fly. 6. *æ. cuniculi*—the rabbit gad-fly. 7. *æ. buccatus*—Carolina gad-fly. 8. *æ. tarandi*—rein-deer gad-fly. 9. *æ. trompi*—also of the rein-deer. 10. *æ. antelopi*—of the antelope. 11. *æ. fasciculosus*—the tufted Siberian gad-fly And lastly 12. *æ. hominis*—the human gad-fly. Body entirely brown. Inhabiting South America, and depositing its eggs under the skin, on the bellies of the natives. The larva if disturbed, penetrates still deeper, and produces an ulcer which frequently proves fatal.

Four of the species above enumerated, are connected with very interesting facts: the knowledge of

which, may prove useful in elucidating human pathology, and of these we shall now make further mention.—These are those of the ox, the horse, the sheep, and the rein-deer.

The ox gadfly, deposits its eggs in the backs of horned cattle, under the skin, which on being changed into larvæ, create by their irritation a large boil or purulent tumour. By the pain thus inflicted, extreme terror and agitation are occasioned, and the animal attacked runs wildly about, with its tail erected, and in a tremulous motion, and communicates its agitation to the whole herd. To avoid the attacks of this fly, we see herds of cattle standing for hours together, in the midst of ponds and streams during the hot months of summer. Whilst the hœmorrhoidal, or smaller horse gadfly, which attaches itself to the inner lips and nostrils, both of horses and cattle, is, we believe, frequently the cause of putrid fevers in cattle ; and the eating the flesh of cattle killed under these circumstances, is, we doubt not, sufficient to create typhus or putrid fever.

The females of the horse gadfly deposits its eggs on the hairs of horses, selecting always those parts, which the horse can reach and lick with its tongue, by which process the eggs are taken up and swallowed by the animal. On reaching the horse's stomach they are there attached by the minute hooks before mentioned, hanging most commonly about the pylorus or upper orifice of the stomach. Their numbers are various, being from half a dozen to more than a hundred. Here they are hatched by the heat

of the horse, and, on attaining their full growth, about the latter end of May, are passed through the horse's intestines, and voided from the end of May to the end of June, and even later; on falling to the ground, they find out some hole into which they retreat, and change to the chrysalis, after which, in about six or seven weeks, they appear in the shape of a perfect fly. The larvæ thus evacuated, are called *botts* or botworms. As to the sheep gadfly, it usually deposits its eggs on the inner margin of the nostrils of sheep, causing them to shake their heads violently, and hide their noses in dust or gravel. The larvæ crawl up into the frontal sinuses or roots of the horns, and, when full-fed, are again discharged through the nostrils.

Next as to the *Œstrus Tarandi* or gadfly of the rein deer before mentioned, we have received an excellent description of this curious insect, from the pen of Linnæus, and others, who have visited Lapland, by which we find that the wandering or mountain Laplander is compelled annually to undertake the most arduous journies to the coast, for the preservation of his deer, which constitute the whole of his wealth. Whale Island, (says Mr. De Broke, Travels in Lapland, page 75) during the summer months, is never without three or four families of mountain Laplanders, with their herds of rein deer. The causes that compel these people to undertake their long and arduous migrations, though they may appear singular, are sufficiently powerful. It is well known, from the account of those travellers, who

have visited Lapland during the summer months, that the interior parts of it, particularly its boundless forests, are so infested by various species of gnats and other insects, that no animal can escape their incessant persecutions. Large fires are kindled, in the smoke of which the cattle hold their heads, to escape the attacks of their enemies; and even the natives themselves are compelled to smear their faces with tar, as the only certain protection against their stings. No creature, however, suffers more than the rein deer from the larger species (Œstrus Tarandi) as it not only torments it incessantly by its sting, but even deposits its eggs in the wound it makes in its hide. The poor animal is thus tormented to such a degree, that the Laplander, if he were to remain in the forests during the months of June, July, and August, would run the risk of losing the greater part of his herd, either by actual sickness, or from the deer fleeing, of their own accord, to mountainous situations, to escape the gadfly. Hence the Laplander is driven from the forests to the mountains, that overhang the Norway and Lapland coasts, the elevated situations of which, and the cool breezes from the ocean, are unfavourable to the existence of these troublesome insects, which, though found on the coast, are in far less considerable numbers there, and do not quit the vallies; so that the deer, by ascending the highlands, can avoid them."

The wild herds of rein deer ascend the mountains in the summer to free themselves from these parasitical insects of the forest; and the tame deer often

wander from their masters for the same object. These insects, particularly the *œstrus,* so terrify the herds, that the appearance of a single one will render them furious. SCHREBER the naturalist, has left us a delineation of these flies. The Laplanders say that one of their objects in going to the coasts is, that the deer may drink the sea-water; and that he takes *one draught, which destroys the larvæ of the fly, but never repeats it !*

Our dragoons and farriers are accustomed to rub the swellings or wurbles on their horses' backs, caused by the gad-fly, with a mixture of soft soap and gin; which they consider the best remedy to kill the grubs and cure the swellings.

Here too, we may take notice of another insect, or rather a species of worm said to be a native of Lapland, and originally mentioned by Linnæus under the name of the *furia infernalis.* And although that great naturalist, is said to have altered his opinion late in life, and even to have doubted as to its existence, yet, as Dr. Clarke supposes himself to have been wounded by this creature during his travels in Sweden, and as the Laplanders themselves have no doubts whatever as to its actual existence, we shall here transcribe Mr. De Broke's account of its fatal powers.

In 1823, the Laplanders are stated to have suffered so greatly in their herds, that five thousand head died from the sting of this creature : and that even the wolves and other animals that preyed upon the dead carcases, caught the infection, and died with

the same symptoms. A Laplander who possessed five hundred deer, perceiving the destruction among them, thought it best to kill the whole herd; but so quickly did its ravages spread, that the disease proved more destructive than the knife, until all perished. Great numbers of cattle and sheep were likewise destroyed by its attack, and it fell in some degree upon the human species, a few having become victims to it. A young girl who was shearing some sheep, which had died from the attack of the *furia*, felt, while thus employed, a sudden pain in one of her fingers, which rapidly increased, and on examining the part, she found a small puncture, like the prick of a needle; her master, who was by, had the presence of mind to cut the finger off on the spot, and it was the means of saving her life." (De Broke's Travels. p. 99.)

The best cure for this malady was found by Linnæus to consist in a poultice of fresh curds or cheese upon applying which, the worm which had burrowed into the skin, quits its retreat, and comes out into the poultice. Hence it seems probable, that it is the grub of a species of the fly called piophila, which is known to lay its eggs in strong scented cheese, and of which we shall here take some notice.

THE CHEESE MAGGOT, or HOPPER.—The parent of this maggot is the cheese-fly (***Piophila Casei.*** Fallen). It is very small and black, with whitish wings, margined with black. It is furnished with an admirable instrument for depositing its eggs, an ovipositor, which it can thrust out and extend to a great length, so that it can penetrate a considerable depth

into the cracks of old cheese, where it lays its eggs, 256 in number. Swammerdam says of them, "I have seen them myself thrust out their tails for this purpose to an amazing length, and by that method bury the eggs in the deepest cavities. I found, in a few days afterwards, a number of maggots which had sprung from those eggs, perfectly resembling those of the first brood that had produced the mother fly. I cannot also but take notice, that the rottenness of cheese is really caused by these maggots; for they both crumble the substance of it into small particles, and also moisten it with some kind of liquid, so that the decayed part rapidly spreads. I had once observed a cheese which I had purposely exposed to this kind of fly, grow moist in a short time, in those parts of it where eggs had been deposited, and had afterwards been hatched into maggots; though, before, the cheese was perfectly sound and entire."

CHAPTER XVI.

ON THE DYSENTERY AMONGST THE BRITISH TROOPS.

I think it may be considered as a point sufficiently established by the observations both of Bartholine and Rolander, that the Dysentery is caused by the presence of a very minute species of mite (most probably a hydrachna or water-mite,) which is received into the human stomach and thence finds its way into the great intestines, and produces all the phenomena of this dreadful disease. This, I say, I shall assume as proved—For although I have attended several thousand cases, and although I have more than once suffered the disease in my own person, I cannot add, that I have seen these insects myself, from not being formerly aware of their asserted existence; and also because I had no microscope with me whereby I could have examined them, when my personal opportunities of satisfying myself occurred most frequently. But I can see no difficulty in believing what has been stated by such credible eye-witnesses, and besides, the following facts, seem to me

to corroborate the probability of such an origin very greatly. When at Deal general hospital, during the return of our Soldiers from Walcheren, I recollect, amongst others, this singular occurrence :—

A party of the Royal Artillery which had been embarked on board the Westmoreland transport, was blown by stress of weather into the Downs, and, after a few days, sent to the hospital about 18 severe cases of dysentery. But as this detachment had not arrived off Walcheren until the business there had terminated, and had therefore never been landed, and as they had suffered no sickness until they reached the coast of England, it became an object of enquiry to ascertain how this had occurred. And upon making proper investigation, it came out in evidence that this transport had originally taken its water from Woolwich, where the troops had embarked—But, having nearly exhausted its supply, had refilled its water-casks at Flushing—these casks had not been tapped until the vessel reached the Downs; and, upon making use of this water, a few days thereafter, the soldiers were attacked very severely with dysentery. Orders were sent on board to throw away all the water, which they had taken from the wells or ditches at Walcheren, and the dysentery immediately ceased, on the troops having good water served out to them.—The second instance is this :—

During the campaigns in Spain, our troops were generally well supplied with an abundance of common salt, which was frequently obtained by opening

the depots of salt, which are plentifully spread over most of the heaths and pastures in that country, in small lone houses, erected specially by the proprietors of the travelling flocks of Merino sheep, called mestas. On one occasion the troops being forced to quit Spain and fall back behind the River Coa, on the Portuguese frontier our men became extremely unhealthy, and dysentery (always the scourge of troops upon actual service) increased to a most alarming extent—upon proper investigation this state of things was found to be chiefly caused by *a deficiency of salt,* which had failed, from our being cut off from the supplies before stated, as there are neither flocks of Merino sheep, nor depots of salt in Portugal. I conceive, therefore, that, the free use of salt is of the utmost importance to troops during a campaign, as it is known to be one of the greatest antidotes to the generation of all living insects in men and animals. The soldiers themselves have assured me that of all the privations to which they were exposed, during the peninsular warfare, they found that of common salt the greatest.

The third instance occurred to me in the spring of 1812, when I was directed to take charge of the general hospitals, at Coimbra. Here I found one hospital, which was dedicated chiefly to surgical cases, in a dreadful state from dysentery. Few men were sent to this hospital who were not attacked with it in a few days after their admission. This was not the case in two other hospitals in that city. On examination I found that the privies and common

sewers belonging to this large convent were in a dreadful state of neglect, either choaked up or overflowing, and upon having them cleansed out, this severe visitation of dysentery ceased.

The last instance to which I shall advert, was my own case at Malta, in 1823. Soon after my arrival there I was attacked with dysentery, which proved unusually obstinate, in spite of great attention both to remedies and diet. At length, on examining the water I had been drinking, I found it (like all the rest in that island, preserved in tanks) swarming with minute insects, and on using it only after being boiled and filtered, I soon recovered from the disease. It may be useful to state that probably with a view to preserve their troops from dysentery, the Romans were accustomed to issue rations of vinegar to their men on service, and it is a fact that the addition of a few drops of vinegar to a glassful of water, will generally be found efficacious in killing all living insects in it, not excepting the *wire-worm*, which it destroys in a few minutes. Hence, probably, the Roman custom of using vinegar and water as a beverage, and hence too the care, (almost religious) with which that sagacious people always procured spring water, by means of aqueducts, not only for the people of Rome, but for their troops and colonies. I may add also, that I believe, of all army diseases, the dysentery is by far the most destructive, as not less than three-fourths of the mortality amongst the British troops arises solely from that disease—It is therefore of the greatest importance to ascertain the causes from which it derives its origin.

In conclusion, we may add, that the native Spaniards and Mulattoes in the island of Trinidad, are in the habit of curing dysentery by administering the following ptisan three or four times a day in wine-glass-fulls. A decoction is made from the tender leaves of the Guava plant, with some of the sour-sock called Caracolla by the Spaniards, and some of the unripe fruit of the Guava plant added—This decoction is said to cure the disease very commonly within five or six days.

In the same island also, the natives cure the swellings caused by the burrowings of the Chigoe flea, by rubbing their limbs and bodies with hog's lard, mixed with common salt.

CHAPTER XVII.

OF THE FEVER CALLED ACRODYNIA.

This disease has been epidemic in Paris and its environs since the year 1828; nor do I know whether it is yet altogether extinct. It was one of those very mysterious visitations for which it seems almost impossible to account, unless by supposing it to originate from a kind of universal *acariasis*.

It was generally unaccompanied with any great degree of fever, but affected the whole nervous system in a most peculiar manner; especially, by a most painful sense of *formication* in the hands and feet, as well as a degree of numbness which seized first upon the members and thence spread over the whole trunk of the body. The cellular tissue of the cutaneous structure then became affected, the hands and feet swelled, and œdema attacked the face and several other parts of the body. The formication and painful numbness of the extremities were so characteristic of the complaint, that at Paris, and elsewhere, in France, it was known by the name of *mal des pieds et des mains*. On this account M. Chardon

Jun., who published an account of it, has called it *Acrodynia.* It attacked immense numbers in France, and was described as being not very dissimilar to a disease lately known in our West Indian islands, by the strange name of "the dandy fever."

The disease generally came on with a sense of the most painful *formication* in the fingers and ankles, spreading thence to the arms, thighs, and trunk of the body. The patients compared their sensations to that of a thousand punctures from the points of lancets. An intense degree of heat aggravated all their sufferings, and obliged them to keep their feet out of bed. The perversions of sensibility were extremely various, and distressing. Many, on putting the soles of their feet to the ground, felt as if treading upon the points of needles and pins. The muscular powers of their members, were likewise greatly affected. Several could hardly move their lower extremities, without feeling great agony. The fingers were generally in a state of permanent contraction. *Subsultus tendinum* was no uncommon symptom, as well as cramps, spasms, &c.

A characteristic symptom of this malady was an affection of the mucous membranes—sometimes this amounted to acute *gastro-enteritis,* and was attended with smart fever, of no long duration. The digestive organs were always much disordered in their functions, and even *cholera morbus* was frequently developed in the course of the disease! Inflammation of the *tunica conjunctiva oculorum* was not an unusual attendant, as also pulmonary catarrh. In short, all

the mucous membranes suffered more or less. *Dysury* and *gonorrhœa* were not unusual as well as *scabies.* The skin was affected, in various ways, but an intolerable sense of stinging, followed by erythema, were the usual precursors of the different complaints. Eruptions of all kinds took place, some resembling *urticaria*, some like small pox, others like *varicella, pemphigus, &c., &c.* There was, in fact, no limit to the cutaneous affections. The next train of phenomena consisted of dropsical effusions in various parts of the body—œdematous, ascitic, and anasarcous. Copious perspirations also occurred, in a periodical manner. Sleep was not to be obtained owing to the irritations and pains. The senses too, were often strangely and suddenly affected. The sight, hearing, or smelling in some, were altogether lost. The duration, of this malady varied, as much as its symptoms.—In some, recovery followed in a few weeks : whilst the convalescence of others, endured for several months. The prognosis was favourable when the disorder of the internal organs was slight, but unfavorable in opposite conditions. Great numbers fell victims to this epidemic, many from its consequences, more particularly dropsy.

In several of the hospitals, the most careful inspections were performed, but without obtaining any very satisfactory information. M. Louis, at *La Charité* examined very carefully some who perished from the more exquisite forms of the disease, but could find nothing either to account for the disease itself, or the death of the individuals. In some of

the public establishments however, it was stated, that portions of the *medulla spinalis* were found softened and partially disorganised.

The treatment, as may be easily imagined, in so strange a disease, was very varied. Venesection appeared sometimes to be useful, more especially in the commencement, and wherever symptoms existed, of congestion in the blood vessels of the head. But under all other circumstances, the relief from it was very fleeting, or negative. Leeches applied to the abdomen produced no mitigation of the cholic or diarrhœa, but were much more useful, when applied in the course of the spine. Taking away blood by cupping was of use, as was also warm bathing—especially vapour and sulphur baths. Saturnine lotions, and even unctuous applications were found occasionally to alleviate the painful sense of *formication*. And the burnings of moxa upon the spine were found beneficial in a few instances. But blisters produced by far the most successful results, especially when followed up by a purulent discharge. They were applied along the spine, and to the most painful parts, and were dressed with antimonial preparations. Emetics at the beginning too, were administered with some benefit. M. Cayol was said to have given cathartics combined with opiates, with advantage. But the disease was generally found to run its course, in spite of all the variety of internal remedies employed. This epidemic attacked all classes, but was chiefly fatal to the poorer members of society. Amongst the troops, the officers suffered but little, as

compared with the private soldiers. Males were more frequently affected than females. The bread, wine, and other articles of diet, were alternately suspected as causing it, but no discoveries of any thing deleterious were made, and no appretiable vitiation of the atmosphere could be discovered. A peculiarly offensive smell prevailed in Paris and its neighbourhood during the prevalence of the epidemic. But the real nature of the causes remain still veiled in obscurity; nor can I imagine any more probable, than that before alluded to;—the prevalence of an universal affection of minute *acari*, infesting the cellular tissues, and, of course, only cognisable, if at all, by microscopical examination.

Many facts were brought forward to prove, that the malady was communicable, or in other words contagious. And perhaps there are but few epidemics which do not assume this character, at some period of their course. But it is added, that the French physicians never broached the doctrine that the epidemic was imported "from abroad." Upon the whole, it appeared as if, every kind of treatment were to be equally unsatisfactory, or perhaps ineffectual.

This account is chiefly abstracted from Dr. James Johnson's Analysis of M. Chardon's Treatise in the Chirurgical Review for December, 1830.

CHAPTER XVIII.

OF THE SMALL POX.

Although the introduction of the vaccine inoculation has materially tended to divest small pox of much of that fearful interest with which we used to contemplate its history: still, enough of danger remains, to make us recur, in an enquiry of this nature, to the contemplation of a disease, which, has had such a powerful influence, on the history of mankind. In collecting therefore into a small compass some notices of epidemic visitations, we cannot entirely omit a recurrence to that of small pox, which naturally falls within the scope of these illustrations, although, as to myself, I cannot add from my own experience any thing worthy of remembrance. However, Bruce in his travels, having taken occasion more than once, to make some remarks, on its history within the tropics, these we shall here introduce, as throwing some light upon the subjects which we have been discussing.

"In that flat district of Abyssinia, called Maitsha, lying in the eleventh degree of north latitude, near

the great lake of Tzana, such is the terror of the small pox (says Bruce) which comes here seldom more frequently than once in fifteen or twenty years, that when one of their houses is tainted with the disease, the neighbours, who know this contagion might infect the whole colony, surround the house in the night, and set fire to it, which consumes it in a minute, whilst the unfortunate people belonging to it (who would endeavour to escape) are unmercifully thrust back with lances and forks into the flames, by the hands of their own neighbours and relations, without an instance of one ever being suffered to survive. This to us will appear a barbarity scarcely credible: it would be quite otherwise, if we saw the situation of the country under that dreadful visitation—the small pox; the plague has nothing in it so terrible."

Mr. Bruce goes on to state, that "the first appearance of the small pox is said by the Mahometan writers to have occurred during "the War of the Elephant" which took place during the conjoint reign of Abra and Asba, kings of the Ethiopic Abyssinia. These princes undertook an expedition, into Arabia Felix, which produced the war so called, and the occasion of which was this. The temple of Mecca, situated nearly in the middle of the Arabian peninsula, had been held in the greatest veneration for near 1400 years, probably from the notion entertained by the people in its neighbourhood, that Adam had pitched his tent upon that spot. Here also was a *black stone* (probably a meteorolithe), supposed to possess extraordinary sanctity, as being that,

on which Jacob had laid his head, when he enjoyed "the vision of angels." The most probable account of the origin, however, of this temple, (according to Mr. Bruce) is, that it was built by Sesostris, and that he had been worshipped there as a divinity under the appellation of Osiris.

On account of the veneration, in which this tower and its idol had been held by the Arabians, Mr. B. supposes, that the thought was first suggested of making it the great commercial emporium between India and Africa; but Abra wishing to divert this trade into another channel, built a very large temple near the Indian ocean, and in order to encourage a greater resort thither, he bestowed upon it, all the privileges heretofore enjoyed by that of Mecca. The Arabian tribe named *Koriesh*, in whose country Mecca stood, being much alarmed at this, entered the new temple during the night time, burnt all that could be consumed, and polluted its remains. On which Abra assembled a considerable army, with which he invaded Mecca, the king himself being mounted on a white elephant, whence the name of this war. Its termination according to the Arabian historians was miraculous—For a vast number of birds named *ababil*, came in flights from the sea, *having faces like lions*, each carrying in his claws a small stone about the size of a pea, which they let fall upon the Ethiopian army, in such numbers, that every one of them was destroyed. At this time it is said that the small pox first made its appearance, and the more probable account of the destruction of

the Ethiopian army is, that they perished from this distemper. This war is supposed to have terminated in the manner above mentioned, about the year 360 of the Christian æra.

It is difficult to form even a conjecture as to what the Arabian writers meant by the birds named *ababil:* but reasoning from the analogy of the facts before stated, it is probable, that they might have been some birds of passage, or perhaps swarms of owls or bats, covered with pestiferous insects, which, by their bites, propagated this new morbid poison, and disseminated it in so sudden a manner, through the beleaguering army.

In approximation to the above we may state that it is related (in the ecclesiastical history of Theodorite, *lib* ii. *cap.* 30.) that Sapor, king of Persia, was compelled to raise the siege of Nisibis by a plague of gnats, which attacking his elephants and beasts of burden, caused the route of his army, and Moufet has collected several instances of the inhabitants of various cities having been compelled to desert them, owing to extraordinary multiplications of this plague. And hence, like other conquerors, they have given their names to bays, towns, and even to considerable territories. Thus we have Mosquito Bay, in St. Christopher's; Mosquito, a town in the island of Cuba; and the mosquito country, in North America.

CHAPTER XIX.

CURIOUS INSTANCES OF PESTIFEROUS INSECTS.

The Rev. Dr. Render, in his "Tour through Germany", published in London, in 1801, observes at page 65—About 15 years ago, an excellent law was passed and observed with great punctuality at Frankfort, as well as in all other parts of the empire of which the emperor Joseph II. was then legislator, and which deserves to be imitated in foreign countries. This law prohibits the burying of dead bodies in any chapel or church whatever. Neither rank nor opulence can obtain permission to evade it, as in the enforcement of it no respect is paid to persons.

"It is horrid" said the Austrian emperor, "that a place of worship, a temple of the supreme Being, should be converted into a pest-house for living creatures. A person who upon his death bed makes it a condition of his will to be buried in a church or chapel, acts like a madman, he ought to set his fellow-creatures a good example, and not to do all in his power to destroy their constitutions, by exposing them to the effluvia arising from a corpse in a state of putrefaction."

"How pernicious the burying in churches is to a congregation, *particularly in protestant churches which are not fumigated* as those of the Roman catholics are, before and during the service, will appear from the following serious instance of the consequences resulting from it. My readers will, I hope, permit me to suppress the name of the clergyman, and the place where, this event took place, as I am very sorry to say, the reverend gentleman, who was much esteemed for his integrity, and well known by his literary genius, proceeded rather too far in the matter. The case was briefly this:—

"In the month of July, 17**, a very corpulent lady died at * * * in * * * *. Before her death, she begged as a particular favour, to be buried in the parochial church. She had died on the Wednesday, and on the following Saturday, was buried according to her desire. The next day the clergyman preached her funeral sermon; the weather was uncommonly hot, and it ought to be observed, that for several months preceding her death, a great drought had prevailed, not a drop of rain had fallen, and consequently it was an uncommonly sultry season. The succeeding Sunday, a week after the lady had been buried, the protestant clergyman had a very full congregation, upwards of 900 persons attending, that being the day for administering the holy sacrament. The weather still continuing very hot, many were obliged, during the service, to walk out for a time, to avoid fainting, whilst some had actually fainted away. It is the custom in Germany, that when people wish

to receive the sacrament, they neither eat nor drink (that day) till the ceremony is entirely over.

The worthy clergyman preached about one hour and a quarter; he then consecrated the bread and wine, which ought to remain uncovered during the ceremony. There were about 180 communicants. A quarter of an hour after the ceremony, before they had quitted the church, more than 60 of them were taken ill, several died in the most violent agonies; others of a more vigourous constitution survived by the help of medical assistance: a most violent consternation prevailed through the whole congregation and town. It was concluded that the wine had been poisoned, and so it was generally believed. The sacristan, and several others belonging to the vestry were immediately arrested and put in irons.

"The clergyman, on the succeeding Sunday preached a great deal of enthusiasm, and pointed out to his congregation several others concerned in the plot. This enthusiastic sermon was printed.

"The persons accused underwent very great hardships: during the space of a week they were con fined in a dungeon, and some of them even put to the torture, but they still persisted in their innocence.

"On the Sunday following, the magistrate ordered that a chalice of wine, uncovered, should be placed for the space of an hour upon the altar, which time had scarcely elapsed, when they beheld the wine filled with myriads of insects; and by tracing whence they came, it was at length perceived, by the rays of the sun, that they issued from the grave of the lady who

had been buried the preceding fortnight. The people not belonging to the vestry were dismissed, and four men employed to open the grave and the coffin : in doing which, *two of them dropt down and expired upon the spot !* and the other two were only saved by the utmost exertion of medical talents. It is beyond the power of words to describe the horrid sight of the corpse when the coffin was opened. The whole was an entire mass of putrefaction, and it was now clearly demonstrated that the numerous insects, both large and small, together with the effluvia which had issued from the body, had caused this pestilential infection, which was a week before attributed to poison. On this discovery, the persons accused, were of course instantly liberated, and every atonement made by the clergyman and magistrate, for their misguided conduct." p. 72.

"See a pamphlet published at Leipsic, in 1770, entitled Pernicious consequences of burying in churches. Schadlicke Folgen die Toden in Kirchen zu begraben."

In the summer of 1679, a very remarkable disease broke out in the little town of Czierck, in Poland, and its environs, caused by some unknown winged insects ; the stings of which, wounded mortally both men and animals. Thirty-five persons and a great number both of horses and horned cattle, perished in this district only. These insects suddenly alighted upon the uncovered parts of the body, such as the face, neck, and hands, and stung severely. Speedily hard tumours arose, and if within the first three

hours, these were not removed, either by means of the actual cautery, or knife, all other means proved unavailing, and the persons stung, died a few days afterwards.

These insects had four wings, and six feet, and a long stylet issued from behind, inclosed in a sheath, which opened longitudinally in two divisions. Some were marked on the back with yellow rings, but others were entirely black, and the latter were the most poisonous. They were so very tenacious of life, that it was difficult to kill them. Fortunately they disappeared during a north wind. It was believed that they proceeded from some pestilential carcase. (O Zanam Hist. Med. des Mal. Epidem. Tom. 5. 272, also Ephem. Natur. Curios. Ann IX. Obs. 184.)

In the first volume of Dr. Southey's Omniana. p. 75, is the following passage, entitled Tomb-flies :—

When the French, in their war with Pedro of Aragon, took Gerona, a swarm of white flies is said to have proceeded from the body of *St. Narcis,* in the church of *St. Phelin,* (I copy says Dr. S. the names as they stand in the Catalan author Pere Tomich. ff. 39.) which stung the French, and occasioned such a mortality, that they evacuated the city. This is so extraordinary a miracle, that there is probably some truth in it, because miracle-mongers have never the least invention, and because a curious fact in confirmation of it is to be found in the monthly magazine for December, 1805 " In preparing for the foundation of the new church at Lewes, it became necessary to disturb the mouldering bones of the long

defunct, and in the prosecution of that unavoidable business, a leaden coffin was taken up, which on being opened, exhibited a complete skeleton of a body that had been interred about sixty years, whose leg and thigh bones, to the utter astonishment of all present, were covered with myriads of flies (of a species perhaps totally unknown to the naturalist) as active and strong on the wing as gnats flying in the air, on the finest evening in summer. The wings of this nondescript were white, and for distinction's sake, the spectators gave it the name of the coffin-fly. The lead was perfectly sound, and presented not the least chink or crevice for the admission of air. The moisture of the flesh had not left the bones, and the fallen beard lay on the under jaw."

Such a swarm of flies (observes Dr. S.) very probably proceeded from the saint's coffin; that he produced them by virtue of his saintship, and that they produced the infection among the French, would be believed in that age by all parties.

In the second volume of his Omniana, Dr. Southey says there is a curious passage in the adventures of Robert Drury. An insect like a cow-tick, called *poropongee,* is found in that part of Madagascar which the Virzimbeers possess, and in no other part of the country. Its bite is said to occasion an illness which lasts six or eight weeks, *but to which no person is subject a second time!* and the Virzembeers took care not to destroy this insect, because they found it a good protection against their neighbours who used to invade them. Vol. 2. p. 262.

There is a fact stated in Dr. Dover's *Ancient Physician's Legacy*, which although not quite similar to the foregoing, yet as it serves as an illustration, seems to be well deserving of our attention, and shall therefore be quoted. Dover, it may be here stated, was an extraordinary character, and united in his own person the very incongruous professions of physic and buccaneering. He says, "when I took by storm the two cities of Guyaquil, under the line in the south seas, it happened that, not long before, the plague had raged amongst them. For our better security, therefore, and the keeping our people together, *we lay in their churches*, and likewise brought thither the plunder of the cities:" "*we were very much annoyed with the smell of the dead bodies.* These bodies could hardly be said to be buried: for the Spaniards abroad use *no coffins*, but throw several dead bodies one upon another with only a drawboard over them; so that it is no wonder that we caught the infection."

"In a few days after we went on board, one of the surgeons came to acquaint me, that several of my men were taken after a violent manner, with that langour of spirits that they were not able to move. In less than forty-eight hours we had in our several ships, 180 men in this miserable condition," &c. &c.

CHAPTER XX.

OF THE PUERPERAL FEVER, ITS PROPAGATION, AND REMEDIES.

THAT there is another febrile disease, which is propagated by inoculation, and the contagion of which is *animate* we are also induced to believe by the following paragraph extracted from the Manchester Advertiser, quoted in the Morning Herald newspaper of Tuesday 19th April, 1831.

"The puerperal or child-bed fever continues unabated in its virulence. We are informed upon sufficient authority, that there is a great probability of its having been in several instances, conveyed from the numerous anatomical dissecting rooms in this town (Manchester). One gentleman who pricked his finger, while dissecting a putrid body, had a gathering produced, and of *seven* females, whom he attended while this sore lasted, *six* died. Another gentleman who lost four or five patients, distinctly traces the origin of the infection, to one of his apprentices who had been dissecting. The fact is that in London, the pupils are not engaged in practice, and the teachers seldom, if ever, practice midwifery, and we think that in country towns, pupils who are dissecting, ought

not to attend their master's female patients in labour; and that the dissectors themselves should abstain from practice, and give the students the benefit of their labour in the improvement of their art."

It is well known that the mortality from this fever was at one time very great in a certain hospital in Dublin, where the women in child-bed were lodged in a ward immediately over the surgical cases; and that all the plans which were adopted as curative, proved most inefficacious till a physician (Dr. Payne I believe,) thought of administering the rectified oil of turpentine in graduated doses, since which time (and by removing the surgical cases from beneath) the disease has become much more rare, and the cures much more frequent in Dublin. Now it is a well known fact also, that oil of turpentine is of all substances yet known the most effectual in destroying all sorts of insects. Hence I would infer that the disease arises from one of the animate class of morbid poisons.

We have well authenticated records of the puerperal fever having prevailed eleven times epidemically in Europe in modern ages. Namely in 1662 at Leipsic :—in 1662 at Copenhagen :—in 1723 at Frankfort :—in 1746 at Paris :—in 1767 in Normandy :—in 1770 in the hospital of St. Marx at Vienna : —in 1771 in the lying-in hospital of Westminster :— again in Vienna in the years 1776 and 1780 :—again in Paris in 1782 in the Hotel Dieu :—in 1786 at Arzago in Lombardy :—once more in London in 1787 :—and lastly in Somersetshire in 1811.

CHAPTER XXI.

OF THE DISEASES OF VEGETABLES CALLED GALLS.

It seems probable that the phenomena of eruptive diseases, may receive some illustration from a review of the circumstances attendant upon the formation of galls in vegetables. A variety of vegetables, particularly the oak, the rose, the willow, the maple, &c., are subject to a disease of excrescences called galls, which on being examined are found to be caused by the punctures of a class of small insects called *Cynips*. The history of these insects is very curious, especially from the power they possess, of perverting the laws of vegetation into a sort of morbid structure—They are of various kinds, and differ in several respects, but seem to have this quality in common, that they all deposit their eggs, under the outward covering of a plant, whence a little excrescence springs up, which affords both shelter and food for the embryo insect deposited within, and which on being hatched, eats its way through the walls of the

gall and escapes. These galls are found upon every part of a plant, as in the oak for instance they are to be seen on the catkins, the leaves, branch, stalk, or bud, and root.

In consistence too these excrescences seem to have but little in common with the plant to which they are attached. For those of the oak tree are sometimes found almost as hard as iron, while others are as juicy and pulpy as fruit And it seems to be not the tree but the nature of the insect itself which regulates this, since on the self-same leaf, we meet with both hard and soft, according to the different species of the cynips which has punctured it.

We are assured by naturalists that by careful observation and the use of a lens of sufficient power, we may observe the manner in which these excrescences are formed. That the little fly may be seen settling on the part, to which it is led by its instinct, and introducing a sort of sting which is its ovipositor beneath the epidermis of the plant, and that it then moves about as if to enlarge the orifice and deposit the egg. These eggs too, when examined first, in the body of the fly, and afterwards in the gall, are found to be so much increased in bulk, that Reaumur has supposed that they grow after having been laid ; in which case the egg will more resemble that of a viviparous than an oviparous animal. And thus the gall-nut will be (as he has conjectured) a sort of matrix or womb, from which juices are absorbed by the egg, in order to furnish the material of its growth.

The leaves of the dwarf maple are frequently found

covered with great numbers of small red warts or excrescences, caused by the punctures of a minute insect, which tumours bear a resemblance in vegetable life, to what we should call pustules in animal bodies. And indeed what are called galls in vegetables, are denominated warbles in animals, as we have before noticed in speaking of the Œstrus.

CHAPTER XXII.

OF POISONOUS INSECTS. LARVÆ FROM ABSCESSES, AND FROM THE LUNGS; AND OF THE ALEPPO PIMPLE.

Ulloa, the traveller in South America, has described a species of spider, or perhaps mite of a fiery red color common in Popayan, called *coya* or *coyba,* usually found in the corners of rooms or amongst herbage, the venom of which is so deadly, that on crushing the insect, should any of its juices be suffered to fall on the skin either of man or beast, it immediately causes large tumours, which are speedily followed by death. Travellers in the valley of the Neyba, where these insects abound, are warned by their Indian attendants, if they feel any thing stinging them, or crawling on their neck and face, not even to lift up their hand to the spot, such being the delicacy of this insect's texture, that the least pressure causes them to burst, without which there is no danger, as they seem otherwise harmless—and the coya may be blown away by the attendant. It seems to be altogether one of the most venomous insects known, as

it is described to be much smaller than a bug. Hamilton, in his travels in Colombia, talks apparently of the same insect, when he mentions a spider called *coya* found in broken ground amongst rocks, from the body of which so active a poison is emitted, that men and mules have died in an hour or two after its venomous juices have fallen on them. Ulloa also states that the only remedy amongst the natives, for counteracting the pernicious effects of this venom is, upon the first appearance of the swelling, to swing the patient over the flame of straw or long grass, which having effected with great dexterity, they consider him out of danger, This escape is probably produced by making the patient perspire freely.

Waterton, in his "Wanderings in South America" p. 53, gives the recipe by which the Macousha Indians prepare the poison in which they dip their arrows. The principal ingredient is a vine plant called *wouruli,* the roots and stalks of some other plants, and two species of ants, the sting of one of which is so venomous that it produces a fever ; a quantity of the strongest Indian pepper *(capsicum)*, and the pounded fangs of two species of serpents. These arrows have been long celebrated for their poisonous properties and the wounds caused by them are there thought to be incurable. In an old building, at Bordeaux, in France, strangers are shewn a vault, in which a party of 40 friars are said to have suddenly lost their lives from drinking of the contents of a hogshead of wine. On inspection of which a dead adder was found at the bottom of the cask, and which had caused this

catastrophe, by impregnating the wine with its venom. Now, in applying these facts to the practice of medicine, we must not omit to mention, that in numerous cases, insects find admission into the natural cavities of the human body, and after traversing it in some most inconceivable manner, are voided at various distant parts, as needles, after having been swallowed by heedless persons. Thus, in the *German Ephemerides* we read of the case of a girl, from an abscess in the calf of whose leg, came forth various worm-like insects resembling beetles (Mead's Medica Sacra 105). And Dr. Martin Lister, a skilful physician and good naturalist, mentions an instance communicated to him by Mr. Jessop, of a girl who voided three hexapod larvæ, similar to what are found in the carcases of birds, belonging probably as Mr. Kirby thinks to the genus *dermestes* or *anthrenus*.

The larvæ of some beetle appear to have been ejected even from the lungs. For in the London Medical Review, vol. 5. p. 340, there is the case of a lady stated, who, after a severe fit of coughing, expelled some clots of mucus, in which were found four grubs, the largest of which was nearly three quarters of an inch long, and the same individual, it appears, afterwards vomited more, of a similar size. In the Philos. Trans. 1665, Dr. Lister gives the instance of a boy, who vomited up several caterpillars with sixteen legs. Mr. Kirby thinks that the ova of these might have been swallowed in salad, and that as vegetables make a part of most persons' daily diet, enough of vegetable matter might have passed into

the stomach to support them when hatched. Linnæus says that the caterpillar of a moth (*aglossa pinguinalis*), common in houses, has also been found in the human stomach. In an old tract entitled Fulvius Angelinus et Vinautius Alsarius, *De Verme admirando per nares egresso*, printed at Ravenna, in 1610, there is the figure of a large caterpillar, as long as the middle finger, stated to have been expelled from the nostrils of a young man long afflicted with acute pains in the head. And D'Azara, the Spanish traveller says, that in South America, there is a large brown *moth*, which deposits its young in a kind of saliva, upon the bodies of persons who sleep naked; these introduce themselves under the skin without being perceived, and then occasion swelling, attended by inflammation and violent pain. When the natives discover it they squeeze out the larvæ, which are generally five or six in number. And this leads me naturally to speak of an inflammation and suppuration generally of the cheek, known in Syria, under the name of the *Aleppo pimple*. Dr. Alexander Russell in his "Natural History of Aleppo," has given a good description of this singular malady. He says that it is thought to be peculiar to Aleppo, and has acquired the name of the "Aleppo evil," or *Il mal d'Aleppo*. The natives call it HABT EL SENNE, or "botch of a year," from the supposed time of its duration. In Turkish it is named *haleb choban*, or "Aleppo ulcer." The disease however is not confined altogether to Aleppo, being almost as common at Antab, and all the other villages on the banks of

the rivers *Sajour* and *Coik*. The natives reckon two species of this disorder, which they distinguish by the names of "male" and "female", but there is a third kind of cutaneous distemper, which, although generally ascribed to the bite of a common millepede or woodlouse, seems to me (says Dr. A. R.) to be altogether of the same nature, although milder in degree. That called the male distemper makes its appearance in the form of a small hard red tubercle, which commonly passes unobserved for some weeks, as it gives no manner of uneasiness: afterwards it begins to increase, and usually comes to be the size of a six-pence, and after some months becomes scurfy on the apex. By degrees the little matter that oozes from it, forms into a thick crusty scab, which if not picked off or otherwise disturbed, remains upon it, until the parts underneath being healed, it falls off and leaves but a very small scar. The whole of its duration is seldom above eight months.

What is called the *female* species, begins like the former, but after a month or two it becomes somewhat painful, increases often to double the extent of the male, discharges much ichorous matter, from under the scab, coming by degrees to have the appearance of an ill-digested scorbutic ulcer, with a livid circle round it, but seeming to be no deeper than the *tunica cellulosa*. In this condition it remains for several months; and is in general about a year from its first appearance before it is cured; but its period is uncertain. After it is cicatrized it leaves an ugly scar, which for some months has an unseemly colour,

and remains through life. When they are irritated they seldom give much pain. The third kind, which they call the pinch of a millepede, begins like the two others, but seldom grows larger than twice the size of a pin's head, and never changes its appearance; remaining a small tubercle for several months without pain. After which it usually throws off a few scurfy scales and disappears; but some remain a much longer time."

"It affects the natives when children, and generally appears on the face, though they also have some on their extremities, for most of them have two, three, or sometimes more, it being rare that they have but one. In strangers it commonly appears some months after their arrival; *and they have them not so frequently on the face as the natives.* Very few escape, but they seldom affect the same person above once. Dogs and cats are as subject to the same disease as men, and it commonly breaks out upon the nose of these creatures. In respect to the cure (like the tooth ache or ague with us) every one pretends to have an infallible remedy for them; but the many beautiful faces daily impaired by the disease, are too evident proofs of their ill success. And in truth, from what I have observed, it is infinitely better to apply nothing, than any of the numberless medicines they make use of. Of several applications which I tried, both upon myself and others, I found the mercurial plaster the most efficacious. If this was applied at the beginning, it often prevented the disease making any further progress. If the pimples had commenced

running, they were hindered from increasing so much, as they would otherwise have done, and generally cured them before their usual time. This is to be understood of that called the "female"; for the "male" as well as the third kind, seldom require any medicinal application."

From this description I think it will appear clearly to any one versed in natural history, that the Aleppo pimple must arise, in all cases, from the bites or oviposits of some deleterious insect; as happens to animals from the gad-fly, or to vegetables from the oviposits of the cynips. And this appears to me the more probable on considering that at Aleppo, it is usual for the inhabitants, owing to the extreme heats of summer, to sleep on the flat roofs of their houses: so that this insect, which probably flies or creeps chiefly by night, takes its opportunity while they are thus unconsciously exposed to its visitations, to sting them during their repose.

CHAPTER XXIII.

OF THE HUMAN GADFLY. MAGGOTS VOIDED. FLESH-FLIES OVIPOSITING IN NOSTRILS. DEATH FROM MAGGOTS IN ENGLAND AND JAMAICA. LARVÆ VOIDED BY URINE AT IPSWICH. MILLEPEDES VOMITED ALIVE. INSECTS IN BRAIN AT STRASBURG. THE CAUSES OF PULMONARY HYDATIDS AND TUBERCLES.

In speaking of the gad-fly in a preceding chapter, (14th) it was stated that there exists one species which especially attacks the human race. And what is singular is, that although this insect had been inserted in Gmelin's edition of the *Systema Naturæ*, upon the authority of the younger Linnæus, yet its existence appears to have been overlooked until Humboldt and Bonpland mentioned it again. In speaking of the low countries under the torrid zone, where the air is filled with myriads of mosquitoes, which render it uninhabitable, they say that to these may be joined the *Œstrus Hominis*, which deposits its eggs in the skin of man, causing there painful tumours. Gmelin says, that it remains beneath the skin of the abdomen *six months*, penetrating deeper if it be disturbed, and becoming so dangerous as

sometimes to occasion death. He describes the *imago* as being of a brown colour, and about the size of a common house-fly. And Mr. Bracy Clark, in the Linnæan Transactions, states, that the gad-fly of the ox has been known to oviposit in the jaw of a woman, and the bots from its eggs finally caused her death. Lewenhoek in one of his epistles (October 17th, 1687), mentions the case of a woman whose leg had been enlarging with glandular tumours for many years, and that her surgeon gave him one which he had extirpated from it, in which were many small maggots: these Lewenhoek fed with flesh till they assumed the pupa state, when they produced a fly as large as the flesh-fly.

In the Edin Med. and Surg. Journal a case is stated by Dr. Reeve of Norwich, of a patient of his who, after great sufferings of many months duration, was at length relieved by voiding a considerable number of maggots agreeing exactly with those described by De Geer as the larvæ of the *Musca Domestica Minor*, (Authomya Canicularis, Meig), a fly known to be very common in apartments.

In Paraguay, S. America, the flesh flies are said to be uncommonly numerous and noxious. D'Azara relates that after a storm, when the heat was excessive, he was assailed by such a host of them, that in less than half an hour, his clothes were rendered quite white with their eggs, so that he was forced to scrape them off with a knife; adding also that he has known in that part of the world many persons, who after having bled at the nose in their sleep, were at-

tacked by dreadful head aches, when at length several great maggots, the offspring of these flesh-flies, issuing from their nostrils afforded them relief. In Jamaica, it is said that a large blue fly buzzes about the beds of the sick, during the last stages of fevers; and when they sleep or doze with their mouths open, the nurses find it very difficult to prevent these flies laying their eggs in the nose, mouth, or gums. Dr. Lempriere, in his essay on the diseases of Jamaica, II. 182, records an instance of a lady, who after recovering from a fever, fell a victim to the maggots of this fly, which from the nose ate their way into the base of the brain, through the *os cribriforme*. After mentioning this fact, Mr. Kirby states in his entomology, that he keeps preserved in spirits, an apode larva given to him by a surgeon at Ipswich, which had been voided by one of his patients in his urine. Mr. K. says it belongs to one of the *diptera* order of insects, but not to the fly tribe (Tanystoma Patr.) but rather to the *tipulariæ* of that author, with which however it does not agree so entirely as to remove all doubts. Its body is three fourths of an inch in length, and about a line in breadth, opaque, of a pale yellow colour; cylindrical, tapering somewhat at each extremity; consisting of twenty articulations without the head. Head reddish brown, heart shaped, much smaller than the following joint, armed with two unguiform mandibles; with a biarticulate palpus attached exteriorly to the base of each. These seem to be moved by a narrow black central tendon under the dorsal skin, terminating a little beyond the base of the first segment, &c. &c.

In the Phil. Mag. IX. 366, a case is stated of the larvæ of a fly called *Helophilus pendulus,* peculiarly formed for inhabiting liquids, having been found in the stomach of a young woman.

Bonnet states, (v. 144) that he had seen the certificate of an English physician, dated July 1763, stating that sometime before, a young woman who had been foolishly induced at the suggestion of some quack, to swallow live sow-bugs *(armadillo vulgaris)* or pill millepede (once with shame be it said a favorite remedy) threw up a prodigious number of them of of all sizes, which must have bred in her stomach. And Hermann, in his *Memoire Apterologique* 79 p. informs us that an acarus figured and described in his work (A. marginatus) was observed by his artist running upon the *Corpus Callosum* of the brain, of a patient in the military hospital of Strasbourg, which body had been opened but a minute before, and the two hemispheres and the *pia mater* just separated.

In the *Cosmocritica* of Cornelius Gemma, p. 241, it is stated, that on dissecting the brain of a woman, there were found in it abundance of vermicles and *punaises* (bugs).

Dr. Mead, in his *Medica Sacra,* quotes from the *German Ephemerides,* the account of a woman (suckling a child) from whose breast proceeded very minute vermicles, which, Kirby noting the fact again, thinks might very probably be mites, and perhaps that species, which from its feeding upon milk, Linnæus denominates *Acarus Lactis.* The former phy-

sician also records on the same authority (*Medica Sacra,* 104 and 5) the dreadful case of a French nobleman, from whose eyes, nostrils, mouth, and urinary passage, animalcules of a red colour, and excessively minute, broke forth day and night, attended by the most excruciating pains, and at length occasioned his death.

Another very miserable case, somewhat similar to the last, is recorded by Mouffet in his *Theatrum Insectorum*, and is that of a lady Penruddock, of whom he records that swarms of acari abounded in every part of her body, her head, eyes, nose, lips, gums, and soles of her feet, tormenting her day and night, until in spite of all remedies, the flesh of her body being consumed, she was finally relieved by death from her dreadful sufferings.

From a knowledge then of all these facts, we are, I think, warranted in concluding that, when consumption of the lungs comes on soon after dysentery; as is the case very frequently in the soldiers of the British army, particularly in those serving in the West Indian islands, it is, I think, quite consistent with the analogical reasoning to be deduced from the foregoing facts, to conclude that the ova of the acari infesting the intestines, have been transferred thence to the substance of the lungs—Probably by the route of the lacteal vessels through the *receptaculum chyli* and thence into the veins, &c., and that these being deposited in the pulmonary tissues, are there converted into what we usually call hydatids, and then into tubercles.

In like manner as we have shewn while speaking of the galls of vegetables, that the ova of the cynips go on growing after being deposited in the parenchymatous substance of the leaves. But in suggesting this, to me very probable cause of tubercular phthisis, I by no means wish to impugn Dr. Baron's very ingenious doctrine of the conversion of tubercles into hydatids, as I would only go one step further back, in asserting my belief that these hydatids are themselves the ova of acari, which in this unnatural situation, within a living animal body, assume a novel and extraordinary growth. And we refer our readers to the annexed prints, as objects of comparison between the appearances of vegetable galls and animal hydatids, the first taken from a species of dwarf maple, common in the hedges of the neighbourhood in which we reside, and the latter from the pages of Dr. Baron's Illustrations of Tubercular Diseases.

In further elucidation of the changes of appearance and structure, which animated substances are prone to acquire from being placed in new and unusual situations, we may here notice a circumstance, which the late celebrated professor John Robison, of Edinburgh, used to state in his lectures on natural philosophy, and which was afterwards introduced by him while editing the lectures of the illustrious Dr. Black, (vol. 1, p. 236). Professor Robison, while visiting a coal-pit, was much struck with the singular appearance of a strange looking plant, which he caused to be rooted up and planted near the mouth of the pit, and on visiting it a few weeks

thereafter, he was surprised to find that this very remarkable vegetable was only a plant of common tansey, the large colourless etiolated leaves having died away, and being then succeeded by a crop of green and aromatic foliage as usual. And somewhat of a similar change we doubt not happens to the ova of most animated beings when deposited within the living bodies of other creatures; except indeed to those of the ichneumon tribes of animals, whose natural nidus appears to be in such situations. We may quote as one instance too, the enormous and bloated bulk which the minute *planaria graminea* assumes after being introduced within the *pori biliarii* of the sheep's liver, which we before noticed in our observations on the rot. We subjoin a print of the animal in its natural form, and after it has resided some time in the liver.

CHAPTER XXIV.

HISTORY OF THE PESTILENCE OF THE FOURTEENTH CENTURY.

MEZERAY the French historian, in his Life of Philip de Valois, states that in the year 1349 the plague raged universally throughout France, and Dr. Mead states that this pestilence commenced in the kingdom of Cathay, to the northward of China.

In Athanasius Kircher the Jesuit's Chronology of remarkable plagues (*Scrutinium Physico medicum Contagiosæ Luis quæ Pestis dicitur, Rome* 1658. *Quarto)* it is recorded, that during the pontificate of Clement the sixth, Charles the fourth being then emperor, a cruel pestilence raged, which destroyed two-thirds of the human race. Villanius, the historian of Florence, says also, that it commenced in Upper Asia, in Cathay, in 1346, from a most filthy smelling vapour, supposed to proceed from a certain fiery body which either fell down from the atmosphere, or was eructated from the earth. That this vapour like a fire consumed all that stood in its way, animals, houses, trees, &c., for the space of fifteen

days journey all around. *And some most filthy little beasts furnished with feet and tails,* as also worms, and a small sort of snakes in a numberless multitude, fell at the same time from the atmosphere upon the earth, the stench and putrefaction from which, infected the very air, and all the regions circumjacent. A pestilence having arisen from thence, spread around, depopulating the whole of Asia, and afterwards Egypt, Greece, and Italy. Thence it passed into France, Spain, and England ; and at length into Germany. In the city of Florence alone, Villanius says there perished 60,000, but St. Anthony says 100,000. Many prodigies are said to have preceded this plague in Asia, such as horrible openings and gulfs in the earth, exhaling a poisonous vapour, &c. (Kircheri Scrutinium, &c. p. 247).

Now these "filthy little beasts" seem to have been no other than the rat-tailed larvæ of a species of fly, which inhabits cess-pools, and is known to entomologists by the name of *Eristalis tenax*, and Kirby says that they are the most disgusting in appearance possible. That these larvæ do sometimes appear in most extraordinary multitudes I can myself vouch from observing a fact which happened at Edinburgh about the year 1790, when I was a pupil at the high school there.

On a sudden, one day, there broke forth a swarm of these larvæ from some humid vaults that were connected with the necessaries, and the dissecting rooms of the late Dr. Monro, the second of that name. These countless myriads proceeded, march-

ing like an army down one of the wynds, or long alleys leading into the Cowgate, and having nearly reached the south bridge, turned on a sudden to the left, and proceeded along a rising street to the north, leading towards Hunter's Square, and the Tron church, where their career was terminated by the multitude (with staves and stones,) who came out to gaze upon such an extraordinary spectacle. The march of these larvæ continued to the best of my recollection, for at least three days, and their numbers must have exceeded many millions; their line of march extending nearly to a quarter of a mile, from the back of the new college to Hunter's Square. Many persons must be now living who can remember to have witnessed this phenomenon.

But to return from this digression, "the plague of insects" in China occurred in 1347, while Edward the third sat on the English throne. In the same year there occurred in our own island a great flood of the Ouse, and a comet "of frightful aspect" is recorded to have appeared. Diseases of an epidemic character and shewing various "phases" followed, such as pleurisy, quinsy, and spotted fevers, terminating at last in the real Oriental plague, with buboes and carbuncles. It is recorded that in London so great was the mortality that 50,000 bodies were interred in one week, the deaths at Norwich were almost as numerous. Venice lost 100,000 people : Lubeck 90,000 : while the deaths in the kingdom of Spain amounted to 20,000,000!!!

In the following year, while pestilence was still

raging in the South of Europe, the northern regions were equally afflicted.

In the kingdom of Denmark it assumed a novel form, and was there called the *Sorte Diod*, or "black death." This I strongly suspect, was much the same pestilence as that which is at present raging at Riga and Dantzic, and the shores of the Baltic sea. There was then an epidemic raging amongst cattle, and a pestilence amongst fishes, which last were observed to be covered with blotches, as is now stated to be the case with the fishes of the river Dwina, cast in myriads on the shores.

In 1358, the city of Florence lost 100,000 citizens as stated by Boccace in his wonderful description of that calamity. Petrarch has stated that very few escaped it. It was particularly fatal to lying-in women and was said to have been preceded or attended by a great murrain; between which and human pestilence there exists, as I have already stated, an inevitable and fatal connection;—as between cause and effect.

CHAPTER XXV.

OF THE CAUSES OF THE EPIDEMIC FEVER AT GIBRALTAR.

Amongst those epidemic fevers which I attribute more or less to the operations and existence of insects, I would add those of Gibraltar.

This garrison town has been for the last 17 years, subject to the most severe visitations of a fatal epidemic fever. It first broke out in 1804, then in 1813 and 1814, and lastly in 1828. There cannot be a doubt in the mind of any impartial person who has perused the accounts which have appeared at various times of this epidemic fever, that it was not an *imported* contagion, but arose on the spot, from the circumstances of a vast number of strangers and emigrants having been allowed to take up their residence in the town of Gibraltar, and being huddled together in very close and ill ventilated lodging houses of the most miserable description. Thus, a population of about 30,000 persons came gradually to be collected within the precincts of a town, which had only been calculated for containing a population of from 12 to

15 thousand. And from this accumulation upon a sultry and ill ventilated spot, the worst effects followed; as from the nature of the locality it was quite impossible to increase the number of houses, so as to meet the wants and exigencies of so great a multitude.

From the absence too of proper police regulations, dunghills of great magnitude, or "dirt depots," as they were called, were allowed to be formed in various parts of the town, which generated the most offensive and unhealthy miasmata; and after these were removed the common sewers and drains, either from being badly constructed or neglected, burst open and yielded up equally disastrous effluvia. *Swarms of flies in myriads, so enormous, as to be scarcely credible,* were generated, and covered like black curtains the walls of the houses and wards of the civil hospital, and the whole conjoined with the sultry rays of the sun, in a spot so densely peopled, and which from its close vicinity to a towering mountain is never perflated by any of the winds from the east, was calculated to produce such a state of atmosphere as is apt on all occasions to engender epidemic disease. Can we wonder then at the consequences which followed from such a state of things? Must we not rather admire the pertinacity of those who attempted, in spite of such evidence to persuade themselves and the public, that it was an *imported* contagion brought from the Havannah (where there was then no yellow fever) in a Swedish merchant ship, called the Digden—which ship, be it observed,

had a clean bill of health and had not any sick on board, on her arrival at Gibraltar. It would be wandering into too wide a field of painful controversy, to examine a mass of most incongruous evidence in support of this opinion—and we shall therefore content ourselves with stating, that, on the excessive population having fled, and the garrison being placed under canvas on the open space called the *neutral ground*, the epidemic ceased—particularly on the coming on of the usual autumnal rains and cool weather, which destroyed the *animate* sources of the contagion.

One remarkable fact attending this disease was, that every person who survived its attack, was found to be swarming with vermin on their recovery. And this was the case in men, women, and children, of all ranks, ages, and conditions. Round worms also were frequently voided in the course of the disease.

The symptoms, were those generally attending what is called the yellow fever: such for instance as —severe head-ache, blood-vessels of the eyes turgid, dorsal pains, P. very quick and full, great irritability of stomach, constant retchings and vomitings of bilious-like matter—black vomit, &c. &c. Disease went on to the 7th day, when free perspiration was followed by a favourable crisis. Many died in 3 days. The plan of treatment at first was various. Local and general blood-letting and the free use of calomel. The latter plan was pushed to a great extent, but without much success, and at length recourse was had to a free internal use of olive oil in frequently repeated doses, which seemed to be of great advantage, as

well as extensive blistering. Such was, at length the scarcity and value of all remedies, that 12 dollars came to be the price of a quart bottle of castor oil, and olive oil was then substituted—probably from its use having been found advantageous in countries ravaged by the plague. *Apropos* to which, I may here take the opportunity of stating that the late Mr. George Baldwin, our Consul General in Egypt, had the merit of first calling the attention of the public to the advantages to be derived from frictions of olive oil in cases of plague. His observation, he states, was first directed towards it, from having been informed that all *oil-porters* in the Levant (whose dresses are constantly saturated with oil from the nature of their occupation) were found to be altogether exempt from the attacks of plague during its visitations. Reasoning on this fact, he was naturally led to conclude, that oily frictions might possibly prove effectual in preventing and curing the disease,—and the event fully justified this able and humane man's conclusions. He next communicated his ideas to father Louis of Padua, who had charge of the pest-house at Smyrna, during a period of 27 years. This worthy ecclesiastic made trial of the remedy, and found it to be more efficacious than any other method of cure, which had been recommended. In 1793 twenty-two Venetian sailors, inhabited during 25 days the same low damp chamber in which three persons sick of plague had died. They preserved themselves from the contagion, by means of frictions of olive oil. In the same year three families of Armenians, composed of thirty

three persons, having taken the same precautions, assisted their relations sick of plague, and even slept in the same beds, without being attacked with the malady. In 1794 one poor woman remained shut up in the same chamber along with 13 persons having the plague, she nursed them all and preserved herself, by means of oily frictions. One Ragusan family had that year two of its members attacked by plague; they soaked themselves (so to speak) literally in oil, and, in consequence, all escaped. At this day the use of oily frictions is very generally adopted on the shores of Syria. During a year when the plague swept off a million of the inhabitants of upper and lower Egypt, the porters and preparers of oil escaped. The same observation was made at Tunis; and, in fine, it has been observed also, that tanners and curriers who employ oil in the preparations of their leather, have generally been exempted from the attacks of pestilence. But oily frictions ought to be employed at once, on the first attack, as the delay of a day or two renders this remedy of no avail. At Jaffa, in 1798, frictions of oil were employed by the physicians of the French military hospitals. With respect to the sick at Gibraltar, the olive oil was given internally, in doses of three or four ounces repeated every two hours. The first doses were generally rejected by vomiting, but by persevering steadily in its use, it at length remained on the stomach, and allayed the irritation and soreness of the throat and stomach—Sleep followed, which was succeeded by perspiration and a

crisis of the malady. The Spanish and Moorish physicians have long been accustomed to administer olive oil in this manner. All agree that if not superior in efficacy to other remedies, *it proved at least as effectual as any thing else:* at least it never proved injurious.

CHAPTER XXVI.

ON THE MEANS WHICH MIGHT BE EMPLOYED TO RENDER THE LOCALITY OF GIBRALTAR HEALTHY.

As we have stated that one of the principal causes of the insalubrity of the town of Gibraltar, is owing to its close proximity to a lofty mountain, which completely prevents its being perflated by winds from the north-east, it follows that if any plan could be adopted for ventilating its streets, the best effects might ensue. Nor is this a mere conjecture or untried project, for artificial ventilation has been proved to be effectual, in other places similarly circumstanced. I shall first quote these two instances and then proceed to explain the plan more fully.

Thus, the town of Montalvan in Arragon, is ventilated in a very simple manner. It stands in a deep valley surrounded by mountains, and is exposed to excessive heat. Much wine is made in the neighbourhood, and every house has its cellar underneath, dug to a great and unusual depth, because of the hot situation. Every cellar has its vent-hole to the street,

and from each of them a stream of cold air continually issues out and cools the town. There is no doubt, adds Dr. Southey, from whose Omniana I now quote, that this advantage was not foreseen. The second instance is from bishop Burnet's account of the town of Chavennes. "It stands at the very foot of the mountains, at the roots of which they dig great cellars and grottos, and strike a hole about a foot square 10 or 12 feet into the hill; which all the summer long blows a fresh air into the cellars, so that the wine therein drinks almost as cold as if it were in ice. But this wind-pipe did not blow when I was there, which was towards the end of September, for the sun opening the pores of the earth, and rarifying the external air, that which is compressed within the cavities that are in the mountains, rushes out with a constant wind; but when the operation of the sun is weakened, this course of the air is less sensible." *(Burnet's letters from Switzerland)*

The plan therefore, which I would recommend, to the adoption of Government, consists in making a tunnel completely through the rock of Gibraltar, in the direction of north east and south west. The effect of which would be, to admit the cool breezes from the north east during the heats of summer, into the centre of the town. The length of this tunnel would be, I suppose, about three quarters of a mile in extent. And as it is well known, that the calcareous rock of Gibraltar abounds with large natural cavities, it is most probable, that some such cave would be laid open in the course of this operation, and probably

some spring of fresh water might be discovered, or fresh water lake, the waters of which might prove of great utility to the garrison. At the same time it would be advisable to excavate a large cavity in the side of this tunnel, for the purpose of forming a public ice-house, on the plan of those which exist in the town of La Valetta, in Malta. This ice-house should be kept well furnished with packed snow or ice, which could easily be obtained by means of a public contract, either from the northern summits of Etna, to be shipped from Catania, or from the snowy mountains of Granada in Spain. I can speak with confidence on the great advantages which might be derived from the external use of ice in ardent fever, as I had some opportunities of proving them during my residence at Malta, in the summer of 1823, and amongst others, in the case of a captain of the 18th regt. whose name I have forgotten, whose life was despaired of, but who recovered after having had a large crown of snow applied to his head, for some hours.

The expence possibly of such a tunnel would amount to £50,000, but this expenditure would I conceive be of small moment, when placed in comparison with the value of the lives of the garrison and its inhabitants. Moreover, the work might be accomplished by the troops themselves, on making a small addition to their daily pay. The tunnel between the Medway and the Thames, from the neighbourhood of Rochester Bridge, is two miles and a quarter in extent, cut through rocks of chalk and Kentish ragstone, and the expence, including the

excavation of the canal, amounted to somewhat about £200,000. So that I imagine the calculation of £50,000 would be perfectly adequate to complete the proposed tunnel at Gibraltar. As to the nature of the epidemic of Gibraltar, it is merely a severe form of remittent fever, not the yellow fever of the West Indies; for I can appeal to the surviving officers who were at Cuidad Rodrigo and Salamanca in 1812, whether the fever which then prevailed amongst our troops, was not frequently attended with black vomit and the other symptoms of West Indian yellow fever. More especially would I appeal to the evidence of Dr. John Howell, now physician at Clifton, who himself experienced a severe attack of fever at Salamanca and Cuidad, and who recovered happily after having had the black vomit for several days.

CHAPTER XXVII.

OF THE SCARLATINA.

THE scarlatina is, perhaps, one of the most common epidemics prevalent in Great Britain. Few years now pass, without some cases of its having occurred in the great boarding schools in and around London, where its contagion lies dormant during winter, and breaks out during the heats of summer. It is one of the diseases called *exanthemata* and its efficient cause or specific contagion, is (I doubt not) *animate* as well as that of the other exanthematic fevers. Its animalcules seem to attack, in preference, the mucous membrane lining the upper part of the gullet, and the rete mucosum under the epidermis, the first of which is generally covered with aphthæ in the progress of the disease, and the latter after efflorescing with a miliary scarlet eruption, throws off the cuticle in branny scales on the subsidence of the disease.

It has become the practice of late to prescribe a few drops of the tincture of belladonna as a preventive, when the disease breaks out in a boarding school; and this medicine produces an efflorescence on the

skin and wards off the disease. Dr. A. T. Thomson, in the medical gazette vol. vii. p. 806, speaking of this remedy says, "I generally continue the use of the belladonna, gradually augmenting the dose until a scarlet eruption covers the skin, when I stop until this disappears. Whilst this eruption is out, the cough ceases, and if it do not soon subside, the habit is so far overcome, as to prevent the recurrence of it with as much severity as before". Such may be the common interpretation given of the operation of the belladonna, but in the language of the doctrine of intro-animate pathology it would run thus, that the belladonna being one of the most active of vegetable poisons, drives out the animalcules, causing scarlatina towards the skin, or rete mucosum, where they perish without producing the usual consequences of creating febrile action—or in other language of the non-initiated, they produce a counter-irritation which relieves the mucous membrane of the air-passages.

At all events, the effects are analogous to those of the seeds of columbine mixed with musk, as given in Sweden to patients under measles and small-pox, and with Dr. Nyander, I agree in thinking that, like them, the belladonna "drives out the animate contagion to the surface, and thus relieves the internal viscera from the violent action of the disease".

CHAPTER XXVIII.

OF THE EPIDEMIC SPASMODIC CHOLERA, MORT DE CHIEN, OR MORDECHI OF EASTERN INDIA.

THIS terrific disease which is now "frightening our isle from its propriety," besides being a most interesting subject for discussion, falls perfectly within the scope of these researches, since it is calculated to illustrate powerfully the "doctrine of animate contagions."

It first appeared in its present epidemic form, as all medical men now know, at Jessore, a town in Bengal, about 100 miles to the north-east of Calcutta, in August 1817. Since that time, it has passed throughout India, China, Persia, and Syria, and has entered Russia in two directions, through the government of Orenburg, and the shores of the Caspian sea at Astrachan. It now threatens us with invasion from the shores of the Baltic, at Riga and Dantzic.

Many of the most horrible symptoms which have ever characterized pestilence, seem awfully united in this singular malady. It attacks suddenly, proves

rapidly mortal, and seems to resist, at least in Europe, the most active treatment. Its animalcules or efficient causes, advance in their flight like invisible locusts, and spread devastation far and wide—but more fatal still than locusts, braving large rivers and extensive seas, they have been wafted over three thousand miles of ocean, and devastated the secluded vallies of the islands of Mauritius and Bourbon. There the disease stopt, and thanks probably to the sturdy barrier of quarantine opposed to it, at the Cape of Good Hope, it did not penetrate into Europe by that route.

The symptoms of this disease are for the most part some of the following:—

The attack is sudden, often at midnight, or early in the morning, and generally without any previous warning.

Intense headache and giddiness, oppression at the chest and pain of stomach, sometimes preceded by cramps in the hands or feet. Vomiting soon follows, first of the aliment contained in the stomach, and next of a glairy fluid resembling mucilage or rice water, suppression of urine, &c. A burning thirst, and cold clammy sweats succeed, the skin feeling to a bystander like that of a damp slimy frog. The greatest anxiety then supervenes, succeeded by severe cramps in the legs, thighs, belly, region of the stomach and chest, with trismus and tetanic rigidity. The countenance assumes a deadly hue, and the eyes appear sunk in their sockets. The coldness of the body and limbs increases. Insensibility of the

perceptions follows. Hiccup then comes on, often followed by dreadful faintings, and the action of the pulse and heart becomes almost imperceptible. The voice is now nearly inaudible from debility and hoarseness. The respiration most painful and laborious at long intervals—and, finally, death closes the sad scene of suffering.

The spasms are often so violent as to cause death in two, four, or six hours, or even it is said in a few minutes, if immediate assistance be not at hand to administer some appropriate remedy. But in the greater majority of cases, if antispasmodic and anodyne remedies be immediately given, there is great likelihood that the symptoms will give way, more especially if the person attacked can be speedily placed in a vapour bath, such for instance as that excellent portable one invented by Captain Jekyll of the navy; which has so frequently been the means of saving the lives of soldiers and sailors in the royal navy in India, when attacked with this disease.

Death, or symptoms of recovery generally follow within twelve hours, although some cases proceed for the term of twenty-four hours, and finally struggle through the malady. But such cases, it must be confessed, are very rare, for few are the constitutions which resist such a struggle above six or eight hours. The difficulty of curing this disease consists in these circumstances—first, the absolute necessity of succouring the patient almost as soon as attacked—secondly, the rapidity with which the powers of life are expended by the violence of the symptoms, and,

thirdly, the conflicting nature of the indications of cure, for while endeavouring by anodynes and æther to allay the spasms of the limbs and convulsive throes of the stomach and alimentary canal, the fear is, that by adding to the already hyper-carbonized state of the blood and want of irritability in the nerves of the heart and lungs, the circulating system may cease to act, and the patient die at once, *from absolute asphyxia!* To be convinced of this, we have only to attend to the discoveries made on opening the bodies of those who have perished from the disease. *The appearances on dissection* are generally the following:—There is scarcely any morbid appearance in the bodies of those who die in the early stages of the disease. But on laying open the abdomina of these, a peculiarly offensive smell is perceived, and the intestines are discovered pale and distended with air. But, if the disease has existed for some time, the intestines have a coloured appearance, varying from a deep rosy, to a darkish, hue, the stomach on being laid open, is discovered to be filled with a fluid, either dark and flaky, or green, or transparent; its internal lining sometimes seems perfectly healthy and entire; but more commonly it exhibits traces of inflammation, extending downwards to the duodenum. At times, there is discovered a layer of lymph coagulated and adhering to its internal coat. The great intestines are replete with a muddy liquor or dark coloured bile. The liver generally large and gorged with blood, but at times it is found flaccid and collapsed. The gall bladder

is invariably distended with dark green or black bile. The spleen healthy. The brain in general sound, but the great veins are always surcharged with blood and with much appearance of congestion in those of the head. In the numerous bodies opened by the Russian physician Joehnichen "*he invariably found fibrine separated in the heart, forming polypous masses partly obstructing the great arteries.*" But as the intelligent Dr. Keir, of Moscow, appears to have attended most particularly to the morbid changes, I shall give some extracts from his very able report, inserted in the appendix of Dr. Bisset Hawkins' clever work on cholera.

"The extremities in general were more or less livid and contracted, and the skin of the hands and feet corrugated; the features sunk and ghastly. On opening the skull, the blood vessels of the brain and its membranes were more or less tinged with blood, particularly towards the base. The arachnoidea had sometimes in several places lost its transparency, and adhered to the pia mater. A fluid was sometimes found effused into the convolutions of the brain in some quantity, and more or less of serum in the lateral ventricles. *The bloodvessels of the vertebral column and spinal chord more or less loaded with blood,* which was sometimes effused between its arachnoid and dura mater: *partial softening of the substance of the spinal chord* was sometimes met with, and *marks of inflammatory congestion in the large nerves. The lungs were generally gorged with dark coloured blood; the cavities of the head were filled with the same,*

and frequently containing polypous concretions. In all the dissections I was present at, very dark coloured blood, which, when extended on a white surface, resembled the colour of the darkest cherry, was found in the arch of the Aorta, and in other arteries." Further on, Dr. Keir observes, that all the other appearances in the stomach, intestines, and abdominal viscera, indicate a state of "congestion not inflammation," for he found that the liver was generally pretty full of dark coloured blood; the gall bladder much distended with tenacious ropy bile, of a dark yellow or green colour, the gall-ducts sometimes contracted, at other times not; the appearance of the pancreas, spleen, and kidneys, was various, frequently differing but little from their natural state; in other cases, rather surcharged with blood; the urinary bladder almost always collapsed and empty, &c., but that the stomach (which in one single case might to a superficial observation have been thought gangrened) was, on being held up between the eye and the light "evidently neither gangrenous nor dissolved in its continuity, but that its dark colour proceeded from a very general and great congestion of very dark coloured blood in its vessels." (***Dr. B. Hawkins on Cholera,*** p. 292-3.)

THE ETIOLOGY OR CAUSES OF EPIDEMIC SPASMODIC CHOLERA.

From a consideration of what has been observed, we are led to conclude, that the efficient cause or

contagion of cholera, acts in the first instance on the brain and nervous system—just as the venom of the cobra di capello and the rattle snake, or any other deadly animal poison;—that it is contained in the atmosphere, enters the human body, most probably through the nostrils, which are always open, and is applied immediately to the brain, by means of the extremities of the olfactory nerves, gliding along these upwards through the cribriform plates of the ethmoid bone. And this seems the more probable because "violent headache and giddiness" are said by Sir William Crichton to have been the *first* symptoms of the disease as observed at Moscow. *(Bisset Hawkins, p.* 100*)*

After "great langour, oppression at the chest, pain at the pit of the stomach and sides, and a very weak pulse"—reaction commences by the stomach rejecting its contents—first "its undigested food, and then a watery fluid mixed with phlegm, and frequent purging follow."—If by means of this severe "inverted action" of the alimentary canal, the "efficient cause" or contagion can be evacuated, without destroying the life of the patient, a healthy crisis takes place ending in perspiration and sleep, and any virus still remaining is gradually thrown off by critical abscesses, which Dr. Keir of Moscow states to have been "common in cases of recovery"—But if the body has received so large a dose of the contagious (animalcular?) poison, as to nearly destroy the vital powers; then comes on the last train of bad symptoms, such as, "severe pains, cessation or very scanty

secretion of urine, excessive thirst, cramps beginning at the toes and by degrees reaching the body; voice feeble and hoarse; eyes dull, and sunk into the head, the features changed and like those of a corpse; coldness, contraction, and bluish tinge of the extremities, coldness over the whole body, the lips and tongue becoming blue, cold and clammy perspiration. The vomiting and purging soon exhaust the patient; the spasms become greater, attacking the most vital parts; the pulse ceases; the beating of the heart becomes scarcely sensible; and the patient, after suffering the most horrid martyrdom, dies quietly, having a few moments ease just before his end. Dr. Keir, of Moscow, states, that, the thermometer placed under the tongue during two minutes, sunk in one case to 77°, and in another to 88° of Fahrenheit. So that, in these, the production of animal heat seems to have entirely ceased, and we can easily conceive that the loss of 10, but still more of 28 degrees of heat, would permit the blood to coagulate in the large cavities of the heart, and blood vessels. To this cause, then, I would principally attribute the speedy mortality that follows from attacks of cholera; when the patient seems to perish as surely and speedily as if he were thrown into the midst of a cold pond or river. Hence the first indication in all cases to be fulfilled, is to restore vital heat to the body, for without that, there can be neither circulation through the lungs nor any reaction, sufficient to throw off the disease. A vapour bath, therefore, is the most necessary of all instruments for the

treatment of cholera, and, from its portability and easy application, I know of no vapour-bath to be placed in competition with that excellent one invented by Captain Jekyll, R. N., before mentioned.*

The entrance of the epidemic into Orenburg, took place on the 26th August, 1829, and its approach was attended with some extraordinary circumstances, which tend strongly to support the train of reasoning pursued in these researches—"During the summer of 1830 (I quote from an anonymous paper in the Englishman's Magazine, No. 2) the Tartars, who frequent Moscow for purposes of traffic, predicted the approach of a pestiferous malady, which, however, the inhabitants, relying upon the local advantages of their city, would not credit. *Suddenly, however, the atmosphere was filled with dense masses of small green flies, which in Asia are the forerunners of pestilence, and are called plague-flies.* The streets swarmed with these insects; and as soon as the inhabitants quitted their houses they were covered from head to foot. *For a time however no attention was paid to this phenomenon, nor were any preventive measures against the cholera even thought of until intelligence arrived that this formidable disease had appeared in Nischid-Nowgorod.*" As we have seen no drawing of any of these *plague flies,* we are still doomed to remain ignorant of their real character. Possibly they were "tomb-flies"

* These patent baths are manufactured by Mr. Moysey, of Jermyn Street, Regent's Street, London, and sold for twelve guineas each. The whole apparatus being packed up in a small wicker basket.

issuing from the graves of those who had already fallen victims to this pestilence! Indeed I have lately heard from a scientific gentleman, of some "tomb-flies" which he had himself seen in a coffin in St. Matthew's church, Ipswich, about thirty years ago, *which were of a beautiful apple green colour.* He told me, that he was then a school-boy, and played the truant one day for the purpose of peeping into the coffin of a gentleman, who had died some time before, from the effects of the rupture of a blood vessel in his lungs. He was surprised at beholding the body, covered with some myriads of a beautiful long apple-green fly. Some of these he collected together, and carried away in a piece of paper, for the purpose of gratifying the curiosity of a Mr. Secamp, a naturalist and collector, then living in Ipswich. While they were still in his possession, he was seized with great headache, nausea, and vomiting, and fancied that the insects were in some measure, the cause of his illness. He therefore made haste to divest himself of his sacrilege, and recovered soon after he had disposed of these extraordinary precursors of "the Bottle Imp." I should add, that they were languid at first, but became more animated on exposure to the air, when their lively colours faded into that of an olive-green hue.

I can find no similar instance recorded of such swarms of green flies filling the air, excepting in "Plouquet's Bibliotheca Medica," under the article PESTIS; where if I recollect rightly (for I have not the book at hand) they are said to have appeared in

Germany, previous to that plague, which raged at Nimeguen, during the time of Dimerbroeck.

In the Rev. Mr. White's Natural History of Selborne, mention too is made of a visitation of smother flies or *aphides*, which took place in the village where he resided, on the 1st August, 1785. He says, "At about three o'Clock in the afternoon of that day, which was very hot, the villagers were surprised by a shower of *aphides* or smother flies, which fell in these parts. Those that were walking in the street at that juncture, found themselves covered with these insects, which settled also on the hedges and gardens, blackening all the vegetables where they alighted. My annuals were discoloured with them, and the stalks of a bed of onions were quite coated over for six days after. These armies, were then, no doubt, in a state of emigration, and shifting their quarters; and might have come, as far as we know, from the great hop plantations of Kent or Sussex, *the wind being all that day in the easterly quarter*. They were observed, at the same time, in great clouds about Farnham, and all along the lane from Farnham to Alton." (parag. LIII, Sir W. Jardine's edit.)

Perhaps no fact is better established than that all epidemic diseases are more speedily diffused and propagated during certain states of the wind. In Europe, Asia, and Africa, this is when the sultry wind blows from the south-east quarter, *i. e.* the Scirocco wind of the Italians and Sicilians, and the *Kamsin, Simoom*, or poisonous wind of the deserts of the Egyptians, Arabians, and Moors, of the coast

of Africa. In England, such a wind in spring, is generally attended by swarms of *aphides*, and is called a *blight* or *blighting wind*, by our farmers. In the West Indian islands, on the contrary, the wind which predisposes to, or brings destruction not "healing on its wings," is that which blows from the south. And the reason seems obvious. The wind which reaches Barbadoes, for instance from the southern quarter, has passed over the great swamps, and marshy woodlands lying at the mouths of the Orinoco and the lake of Maracaiba, and coast of the Carraccas, Surinam, and Demarara, in South America. And on the blowing of this wind, the yellow fever breaks out yearly in Barbadoes. Mr. Dale Ingram, a surgeon, who resided in that island six years, and who published in 1755, a historical account of the plague states, that in his time the endemial disease of Barbadoes known to Europeans by the name of the *yellow-fever*, broke out every year in Barbadoes, on the setting in of the *south winds*. His words are worth quoting. "This island then is nearly situated in 13° north latitude; the trade winds, for the most part of the year follow nearly the course of the sun; that is, they blow nearly nine months from east and north-east, seldom veering above two points of the compass. But in, or about, the latter end of *July or August, the winds shift to the south, on which change the rainy and sickly season sets in, and continues to the latter end of August, sometimes to September and the beginning of October, then the winds begin to blow again from the north-east, and*

it is then this disease (yellow-fever) disappears, the weather is again settled and serene." (p. 123-4.)

Ingram also says, "It may not be improper to observe, that as soon as the rainy and sickly season comes about, great flocks of birds of various kinds also come over from the continent, such as the grey plover, wild duck, widgeon, curlieu, with many others of the fissipede kind, nay so numerous are their flocks, that almost every pasture throughout the whole island is covered with them. And it may be further remarked that these fowls take flight, and return to the southern parts of America, as soon as the wind changes to the N. N. E. quarter, insomuch, that in a single day not one of these birds is to be seen. ***But this sudden flight is not more surprising than the equally quick disappearance of this direful disease at the same juncture.***" (p. 125-6.)

But to return to the cholera in Russia.

Dr. Reimona, of St. Petersburg, in a letter to Dr. Marc, communicated to the Academy of Medicine at Paris, states, "that the cholera was brought to Astracan by ships, and spread itself over Russia by the emigration of the inhabitants, principally those of the lower orders. This is the sole cause of its propagation in Russia; it has never shewn itself in any place, except where it has been brought by travellers, who came from infected places. *We have not a single instance* of a town or village, which without communication with houses or persons affected, has contracted the disorder. Several places surrounded by the disease have preserved themselves from it, by

a rigid *insulation.* It is a contagion *sui generis,* which we must not assimilate with the plague, and which will be more or less rapid, more or less extensive, according to the more or less wholesome nature of localities; *it has thus been more dangerous to the Jews, who live shut up in small rooms and in extreme filth.*"

Every one who has travelled through the south of Poland and Gallitzia, must have remarked, as I did in 1805, that the peasants there are carried on a bier to their graves, which are very shallow, wherein they are commonly interred without coffins. In cases of pestilence therefore, pestiferous flies and insects can easily find access to the bodies of the dead ; as they also can in Asiatic and Mahometan countries, and whoever has been obliged to pass a few nights in the houses of the Polish and Russian Jews, (the innkeepers generally in these parts of Europe), must have *felt cruelly,* how much they abound in all kinds of flies, bugs and vermin. In such countries, therefore, an epidemic disease is speedily disseminated, and soon believed to be infectious ; whereas in Hindostan and Eastern Asia, the natives being more cleanly in their persons, and bound by their religious ordinances, (Hindoos as well as Mahometans), to practise frequent ablutions ; clothing themselves also in white calicoes and muslins, (not in greasy woollens and decaying animal furs), pestiferous insects are more speedily destroyed, and cannot so easily nidify in their dwellings or about their persons. Hence, epidemic diseases, which in India, are

scarcely contagious, rapidly assume that character in Europe. Wine too being prohibited, and spirits little used, the Asiatics are more temperate in their habits of life, and gluttony and drunkenness, common vices in Europe, predispose the bodies of the poor labouring classes to receive such a disease as spasmodic cholera, from the over saturating their blood with carbon and hydrogen, which are ever predisposing circumstances during the times of pestilence; wherefore it has been remarked by the physicians of Russia and Poland, that the present malady chiefly attacks men rather than women or children, the poor and filthy, in preference to the affluent and cleanly; and sots and drunkards especially beyond all others. What an additional motive and encouragement is this, for being cleanly and temperate?—exemption from the attacks of pestilence and the increased probabilities therefore of a protracted and healthy enjoyment of life!

John Cormick, Esq., resident in Persia in 1822, in an excellent account of the symptoms and treatment of this epidemic, states, that the surface of the whole body became cold, more particularly the hands and feet which *assume a dark blue colour approaching to black*: and that the blood recedes from the surface, and accumulates in the cavities of the abdomen, thorax and cranium: the heart is felt to palpitate and labour hard to propel forward the mass of blood that is pressing upon it from the large veins. *While every thing indicates a want of circulation, and the* STAGNANT VENOUS BLOOD *gives a dark*

colour to the whole body, the eyes alone are of a bright red colour, and covered with arterial blood, *indicating the fatal accumulation that is taking place within. In many cases, the attack was so violent that* THE SUFFERERS SUNK AND, WITH A FEW EFFORTS TO VOMIT, EXPIRED.

This nearly resembles the description given by Oriental travellers of the death of those who are overtaken in the deserts of Arabia and Africa, by the poisonous Simoom or Kampsin wind, which disoxygenates the blood instantly, and causes almost immediate death. That same wind which according to Heroditus, overtook the army of Cambyses, on its route towards the Oasis Ammonica, to plunder the Temple of Jupiter Ammon, having previously plundered Egypt and killed their God Apis. The numbers which perished in the desert were 50,000 men.

In "Tully's narrative of a ten years residence at Tripoli, in Barbary," is the following passage, dated October 5th, 1792. The seasons have been particularly dry at Tripoli for the last two years, but the fatal effects of the want of rain have never struck us so forcibly as to day. Owing to *a strong land wind*, which has blown incessantly with increasing heat for the last five days, several Moors coming off the sands into the town have perished, who might have been saved, could they have obtained in time a draught of water. Four people died to day literally of thirst; they were with a caravan just arrived from the deserts, and expired a few minutes before the caravan reached this town. Not a drop of rain has descen-

ded from the atmosphere for several months, and such a dearth of water occasions the intense heat of the air to become in many instances fatal. The air here is heated to that degree at present, *that the insects cannot resist it. Scorched to death they drop in numbers from the burning atmosphere.* It is not usual for these extraordinary winds to blow here successively for more than three or four days; if they do, the heat which is then dreadful, increasing rapidly to the ninth, sometimes to the tenth day, *renders respiration so difficult as to occasion death!* p. 295-6.

Savary says (Egypt, vol. 4. p. 217.) sometimes the heat becomes insupportable, and the thermometer suddenly rises twelve degrees. The inhabitants call this season *Kampsin*, fifty. It seldom blows three days together, and sometimes it is only an impetuous whirlwind, which rapidly passes, and injures only the traveller overtaken in the deserts.

Volney again says:—When these winds blow, the atmosphere assumes an alarming appearance. The sky, at other times so clear in this climate, becomes dark and heavy; the sun loses his splendour, and assumes a violet colour; the air, though not cloudy, is gray and thick, and is filled with a subtle dust, which penetrates every where. This wind, always light and rapid, is not at first very hot, but it increases in heat in proportion as it continues. All animate bodies soon perceive it by the change it produces, *the lungs which a too rarified air no longer expands, are contracted and painful; breathing is short and difficult,* the skin parched and dry, and the body

consumed by an internal heat. In vain is recourse had to large draughts of water; *nothing can restore perspiration* nor can coolness be found, all bodies in which it is usual to find it, deceive the hand that touches them. Marble, iron, water, though the sun no longer appears, are hot. The streets are forsaken, and the dead silence of the night universally prevails.

Tully at p. 221, writes thus—Tripoli, June 1, 1790, "We have had for some days a dreadful heat in the atmosphere, which no description can give an idea of, to those who have not been in this climate. During the excess of it, after we had been for some hours watching the slow progress of a caravan over the sands, we were shocked at the horrible state it arrived in. For want of water many had died and others were in so languishing a state, as to expire before any could be administered to save them from the parching thirst. The state of the animals was truly shocking, gasping and faint, they could hardly be made to crawl to their several destinations, many dying on their way. This destructive heat lasted seven days."

Bruce, too, in his journey homewards from Abyssinia, describes his sufferings from this wind thus. "We were just two hours in coming to Rashid, for we were flying for our lives; the simoom, or hot wind having struck us not long after we set out from Imsserrha, and our little company all but myself, fell mortally sick with the quantity of *poisonous vapour* that they had imbibed." "We were so enervated, our stomachs so weak, and our headaches so violent, that we

could not pitch our tent." "On the 21st we travelled about five hours, yet from the weak state we were in, we had advanced but 7 or 8 miles, so dreadfully were the mules, camels, and horses, affected by the Simoom." And in crossing the desert of Nubia, he thus describes its dreadful approach. "At eleven o clock, while we contemplated with great pleasure the rugged top of Chiggre, to which we were fast approaching, Idris cried out with a loud voice, "fall upon your faces for here is the simoom". I saw from the south-east a haze come, in colour like the purple part of the rainbow, but not so compressed or thick. It did not occupy twenty yards in breadth, and was about 12 feet high from the ground. It was a kind of blush upon the air, and it moved very rapidly, for I scarce could turn to fall upon the ground, with my head to the northward, when I felt the heat of its current plainly upon my face. We all lay flat upon the ground as if dead, till Idris told us it was blown over. The meteor or purple haze which I saw, was indeed passed, but the light air that still blew was of heat to threaten suffocation. For my part I found distinctly in my breast that I had imbibed a part of it, nor was I free of an asthmatic sensation till I had been some months in Italy at the baths of Poretta, near 2 years afterwards." Further on he says. "The simoom with the wind at south-east, immediately follows the wind at north. The blue meteor with which it began, passed over us about 12, and the ruffling wind that followed it continued till near two." Next day the effect of breathing this poisonous vapour

was shewn upon one of Mr. B.'s attendants, which is thus described. On the 22nd, at six o'clock, as we were crossing the sandy flat, one of the party of Tucorory men was seized with phrenzy or madness. He rolled upon the ground, moaned, and refused to continue his journey, or rise from where he lay. It was death to stop with him; and each man barely able to support his own sufferings, could not participate in those of others, the wretched maniac was therefore left to die in frenzy among the thirsting sands, and under the scorching sun, which had already deprived him of his reason."

CHAPTER XXIX.

OF THE CURE OF THE SPASMODIC CHOLERA.

We may now proceed to offer a few remarks on the method of cure. Venesection appears to have been successfully used in India, in most cases where it could be performed immediately, and is recommended by Dr. W. Annesley; but, Dr. Keir, of Moscow having tried in three cases, which all terminated fatally, he gave up that practice and had recourse to topical bloodletting only: of which he speaks in terms of commendation. After placing the patient under the operation of Capt. Jekyll's patent vapour bath, I should recommend cupping immediately between the shoulders, which would take away some blood from the immediate neighbourhood of the spinal marrow, and tend powerfully to prevent the "softening of the spinal chord" and "congestion of the blood vessels" of that most important organ, which must prove fatal, by destroying the nerves of the heart and lungs. The next step that I should adopt, would be to soothe the convulsive throbs of the stomach and diaphragm, and produce a revival of the healthy per-

istaltic motion. This I should attempt by administering 50 drops of *Kyapooa Oil* in a wine glass full of warm water, as so strongly recommended by an anonymous practitioner in India, in a letter to Dr. Todd a physician of Brighton—If this remedy should fail, I would then give *ten grains of carbonate of mercury,* conjoined with an equal weight of *chlorate of ammonia,* made into a soft mass, by means of the inspissated juice of the bixa orellana, and wash it down with the Kyapooa oil and 10 drops of laudanum. I should much prefer however giving a grain of the acetate of morphine, if I could readily procure it, because all other preparations of opium must of necessity contribute to deprive the blood of its oxygen, and thereby destroy the irritability of the nerves of the heart and lungs. If the disease did not yield, I should proceed to vesicate the skin between the shoulders, either by means of mustard poultices, mineral acids, boiling hot water, or a broad faced hammer previously soaked in boiling water and immediately applied between the shoulders : and I should also advise rubbing the body and limbs with hot flannels and the powder of mustard seed. I should then repeat the *chlorate of ammonia and carbonate of mercury* with *bixa orellana* at intervals of two hours, until I produced sleep and perspiration or evacuations of the bladder and bowels. For drink I should allow the sufferer to take freely of warm lemonade, or a dilute mixture of nitric acid and water. As the effect of these would be to oxydate the blood and revive the action of the brain and nervous system.

This then constitutes my idea of the cure of the cholera ; except that I might make use of oil of turpentine both externally and internally, mixed with oil of kyapooa, or with peppermint, in case the former could not be procured. I should prohibit the use of ardent spirits, camphor and opium, except in very small doses, and under very particular circumstances ; as all these three substances tend powerfully to disoxygenate the blood, and thereby hasten the fatal issue of the disease.

I shall now proceed to detail my own sufferings during a slight attack of this complaint, early in the month of July, 1823.

I was then travelling through Italy, on my route to Malta, and after two days of painful journeying from Rome through the Poutine marshes, had slept at *Terracina*, and next day reached *Mola de Gaeta;* and while visiting the ruins of Cicero's villa there, was exposed to the disastrous influence of *a strong South East or scirrocco wind.* The day was very sultry, and the journey in the afternoon towards the little village of *St. Agatha*, most oppressive. At *St. Agatha* I was roused from my bed about two o'clock in the morning with all the symptoms of cholera. A most severe storm of thunder and lightning was then passing through the valley. Fortunately for me, I had brought from Paris, an ounce bottle filled with strong laudanum, of which I took at intervals doses of about thirty or forty drops, joined with some Eau de Cologne, of which I had also a bottle in my travelling trunk. After four hours

most severe suffering from cramp and oppression at the *præcordia*, the attacks of cholera ceased, and I fell into a state of syncope and collapse, in which I remained (as I afterwards learnt), about an hour, sleep followed and I awoke in a copious perspiration, and finding, on enquiry, that no medical assistance could be had nearer than Capua or Naples, I was assisted out of bed, carried into the carriage by the vetturino and a person of the inn, and, after great suffering, passed through Capua and finally reached Naples, where I slowly recovered. I consider that this was a slight sporadic attack of the true epidemic cholera for these reasons—First, that the disease was then raging at Latakia and Antiocha, on the coast of Syria, on the eastern shores of the Mediterranean, and, upon inspecting the *Maps of the course of Cholera*, published by Dr. B. Hawkins and Mr. Kennedy, (the latter in the Englishman's Magazine), the reader will perceive on drawing a straight line from these regions to St. Agatha, that they lay directly east and by south of *St. Agatha and Terracina.* Secondly, the matter vomited was the same glairy fluid resembling rice water, and the spasms about the abdominal muscles, diaphragm and region of the heart, resembled exactly those of the epidemic. I think I owed my recovery, under DIVINE PROVIDENCE, to the circumstance of my having fortunately the laudanum and Eau de Cologne at hand, and to my skin being in a perspirable state, from having been using warm baths at Rome for rheumatism

in my knees and ankles. My convalescence was tedious, as I was afterwards attacked at Malta with dysentery, owing to the state of debility in which I had been left by the attack of cholera, and then drinking the tank-water of Valetta, which at all times abounds with the ova of aquatic insects and animalcules, as has been already stated.

CHAPTER XXX.

ANALYSIS OF SOME REMARKS ON THE MORBID CHANGES OF THE FLUIDS IN CHOLERA, &c.

Mr. R. Hermann of Moscow, in his letter to Dr. Todd of Brighton, states that the fluids voided by stool and vomiting contained, besides water, *some acetic acid*, a small quantity of osmazome, salivary matter, butyric acid, and mucus. That they resemble very much gastric juice, but do not contain any free muriatic acid, &c. And again, noticing the state of the blood, he says that "it undergoes considerable changes during the cholera; that the blood of healthy persons *contains carbonic and acetic acids in a free state.* But that the blood of cholera patients contains *much less acetic acid*, and the quantity of the *crassamentum* relative to the serum, is *much greater* than in healthy persons; and the increased relative quantity of the crassamentum was found to be in direct proportion to the aggravated nature of the disease.

"That the blood taken from a patient two hours before his death contained 62.5 per cent. crassamentum, and 37.5 per cent. serum of the specific gravity

1.036. *reacting alkaline upon the litmus papers.* While, on the contrary, the blood of a healthy person, treated in the same manner, gave only 43 per cent. crassamentum, and 57 per cent. serum of specific gravity 1.027, reacting *acid* upon test papers." He concludes, from his experiments, that the change of the composition of the blood is produced by a part of its ingredients being abstracted by the discharges, by stool, and vomiting; and that the blood, by parting with *its acetic acid*, and a part of its watery particles, acquires that greater consistency, and that tendency of separating its fibrine, which is observed during the disease.

Mr. H. also found "the air immediately surrounding the patient to contain *a substance*, which, when deposited upon cooled substances, *resembled animal mucus*. It did not react upon test-papers, and was precipitated by sugar of lead and tincture of galls, bearing great analogy to the substance which Moscati separated from infected air."

Mr. H. is of opinion "that at a certain stage of the cholera, a miasm (or rather effluvium) is developed, and that, *under a certain predisposition* of the constitution, *the breathing of air containing the infectious matter communicates the disease.*" It also appears that in Moscow, *three individuals out of one hundred possessed this susceptibility for the disease.*"

In his opinion, the proximate causes of the symptoms appear to consist in a too copious secretion of the gastric juice, in a spasmodic obstruction of the absorbents of the digestive canal and the biliary

ducts, and in *a degeneration of the blood,* which, when arrived *to a certain height terminates the life of the patient by* IMPEDED CIRCULATION. And concludes that *the exciting of copious diaphoresis* is the only efficacious remedy against cholera, and *no patient recovered* at Moscow, without *this critical secretion.*

This communication seems to me to be in the highest degree useful and interesting: not only in explaining the phenomena of this particular disease, but also in leading us forward in that track which will ultimately end in displaying one of the great predisposing causes of most epidemic diseases. It is therefore, I opine, the most beautiful as well as useful application of chemical philosophy, which has as yet been made, to the knowledge of diseases.

It appears from a consideration of the Voltaic apparatus, that in order to develope the current of Voltaic electricity, it is necessary to apply acidulous solutions to the surfaces of the substances to be acted upon, and that, in exact proportion to the energy with which these acidulous liquors act, so is the energy of the electric currents evolved.

Assuming, hypothetically, then, that the vitality of the human brain and nervous system may be influenced in a somewhat similar manner, by the presence of oxygen or free acid qualities in the serum of the blood, it will necessarily follow, that whenever these oxygenous or acidulous qualities in the serum of the blood are diminished much below the natural and healthy standard, a weaker and slower evolution of nervous influence or vital power will take place

from the brain and nervous system, and the body will, thereby, be soon placed in a state *predisposed* to receive a morbid influence. In extension of these principles it will follow, that, whenever the secretion of nervous influence is diminished, the muscular powers or contractions will become more feeble, and, if this diminution should prove very considerable, the most important of all the muscles, that constituting the heart will totally cease to contract, and death will immediately ensue as a necessary consequence, from the want of circulation in the vascular system.

CHAPTER XXXI.

ON A CERTAIN STATE OF THE ATMOSPHERE AS PREDISPOSING TO MORBID ACTIONS AND EPIDEMIC DISEASES.

LET us next consider how far the opinions just proposed can be supported or confuted, by considerations derived from a knowledge of atmospherical variations. It seems to be an opinion almost generally received amongst medical philosophers, that animal life is materially influenced by the accidental qualities of the surrounding atmosphere. And it seems to be also agreed that, of these qualities, heat and light, whether positive and apparent, or modified and latent, (as in the conditions of electricity and galvanism), constitute, by far, the most essential properties of that atmosphere, as affecting the mere play of animal existence. Besides, I believe it is not denied that the most healthy condition of the atmosphere (at least as it affects the human body) is that wherein the atmosphere is in a *positive state* and the earth in a *negative state of electricity*: as in such a predicament it will follow, that the electrical essence or fluid will

be constantly flowing downwards from the surrounding atmosphere, and passing through the human body into the earth, whereby the body will remain *positively electrified*, but that the opposite condition of the atmosphere will be unhealthy—that is to say, whenever the earth is in a positive and the atmosphere in a *negative* state, for then, the current will needs be reversed, and be constantly flowing upwards from the earth into the atmosphere, and the human body will be thus constantly deprived of its electricity as fast as it can be supplied. And hence will arise a loss of muscular and nervous power, and an alkaline instead of an acid state of the blood and fluids; which it must be admitted from the foregoing premises, is the unhealthy state of the human body.

Now, in corroboration of the above reasoning, it does so happen, as I am well informed by a scientific friend, that the condition of the atmosphere of Great Britain has been for the last eight months, gradually verging more and more to a state of negative electricity. For, that De Luc's electroscope has been receding daily from its horizontal state of repose, and except about mid-day, when it inclines towards the horizon, that it has been for a long time verging more and more upwards in a perpendicular position. Whether we may be able to account for this phenomenon, by supposing the approach of any large comet from the regions of space, towards the orbit of this our earth, I know not, but the truth I believe to be as I have just stated.

Moreover, it appears from facts already noticed,

that a positive state of electricity in the earth and an opposite condition in the atmosphere, conduces to an energetic developement of *insectile* life, which is evinced by the coming on generally of *insectile* blights in orchards and corn-fields, during such states of the atmosphere and the prevalence of scabies, dysentery, small pox, measles, and epidemic diseases, in the human race. Till, at length, the DIVINE CREATOR is pleased to ordain the restoration of the order of the universe, by means of some great atmospherical convulsions, such as severe storms of thunder and lightning, or by the occurrence of earthquakes and volcanic eruptions, which appear to be generally followed by restoring the healthy balance of atmospherical electricity, and, thus, suppressing *the excessive developement of insectile life*, which, as we have endeavoured to show, is one of the principal causes of the destruction both of vegetable and animal life.

CHAPTER XXXII.

RESULTS OF MOSCATI'S EXPERIMENTS.

I WILL now advert to another part of Mr. Hermann's report on cholera, wherein he states, that he found the air immediately surrounding a person suffering from that disease, deposited upon cooled surfaces, *a substance resembling animal mucus*, and that it bore a great analogy to the substance which Moscati separated from infected air.

Towards the elucidation of which passage, I would add, that the illustrious and enlightened Count Moscati, of Milan, was commissioned some years ago, by the Italian government, to analyze the atmosphere of the Milanese rice-grounds, and to discover the qualities of the exhalations which they produced. He observed, that during the day time, in summer, and after sun-rise, these presented nothing at all different from the common exhalations of the earth; but having suspended in the evening, at three feet above the surface of the soil of a field of rice, some glass globes filled with ice, on the morrow at sun-rise, he collected from the external surfaces of these

globes the vapours which had been condensed thereon, and placed them in bottles. A few days thereafter, he discovered a flaky matter floating on the surface of the liquid. This was a species of mucous substance which exhaled a very fœtid cadaverous odour.

The same experiment was practised in the wards of the great hospital at Milan, by placing between the beds of the sick, similar globes filled with ice, and the condensed vapour thus obtained, presented the same results.

As these flocculent masses then, have been tested by sugar of lead and tincture of galls, and precipitated and thus proved to be "albuminous matter," it now only remains that they should be examined by a good, but faithful, observer, with the aid of a microscope of great power; when, if they should be found to consist of the spawn or ova of insects, the question would be decided, "whether morbific contagions consist of the ova of microscopic animalcules?" As to myself, I have scarcely a doubt, that such will be the fact, and in support of this opinion, I have the pleasure to know, that the late learned and Reverend Dr. Derham, in his Physico-Theology, has arrived at a similar conclusion, as in a note to the 4th chapter of book 8, he states, that he thinks "*the eggs of such insects as are oviparous may be light enough to float in the air.*"

We know, also, that all stagnant waters more or less abound with insects and animalcules; and that the former commonly are, according to Swammerdam,

the *Pulex Aquaticus Arborescens.* "These," Dr. Derham says, "he has often seen so numerous in the summer months, that they have changed the colour of the waters to a pale or deep red, sometimes to a yellow, according to the colour they were of, and that, besides these, there are other animalcules very numerous, yet which are scarcely visible without a microscope. In May, and the summer months, the green scum on the tops of stagnating waters is nothing else but prodigious numbers of these animalcules: so is likewise the green colour in them, when all the water seems green." (Note to CHAP. IV, B. 8.)

This would be a perfectly adequate source to furnish the albuminous matter discovered by Moscati in the miasmata of the Milanese rice-grounds; and assisted by the excellent instruments of the present age, philosophical enquirers can scarcely fail in arriving at the most important and ample discoveries. The track is certainly good, and only requires to be strenuously followed up. The object of pursuit, be it ever remembered, being the knowledge of truth.

On referring to that volume which is the source of all truth, we find, that previously to the memorable "plagues of Egypt," the waters of that country were, by command of the ALMIGHTY, "converted into blood," or in other words, that the aquatic animalcules were so miraculously multiplied, that the waters assumed that appearance, which was the first step in the order of causes, to produce the pestilence which was so soon to follow.

CHAPTER XXXIII.

OF THE THERAPEUTICAL, OR CURATIVE, MEANS TO BE EMPLOYED AGAINST THE AGGRESSIONS OF INSECTS AND ANIMALCULES.

It has been already stated in general terms, that all our most active remedies are, in fact, poisons, and that we can only employ their remedial virtues by so adapting their doses to our own powers of vitality, that while destroying the animate invaders of our bodies, we may not at the same time be ourselves destroyed.

Of the truth of this assertion, probably I can give no better illustration than the following fact, which occurred some years since in a large hospital in London, but which, for obvious reasons, shall remain anonymous.

A patient having been admitted into that establishment suffering under *Ascarides*, was prescribed for by a certain physician, then a young man—He probably having remarked the certainty with which the London pastry-cooks and confectioners are in the habit of administering a little infusion of quassia

to certain swarms of most unprofitable customers, (the domestic flies in their shop windows) bethought himself of giving a similar treat to the ascarides in his patient's bowels—He, therefore, boldly prescribed a powerful decoction of that wood to be thrown up the rectum, *more solito.* Next morning on the young physician's walking through the ward and arriving at the space then vacant, which had been on the foregoing day occupied by his luckless patient's bed, he turned sharply round to the nurse and enquired what had become of Thomas—"oh faith!" says the honest hibernian, "sure enough he's gone Sir." "Gone" said the doctor, "where?" "Bless your soul Sir, where should he be gone, but to the dead-house". And so it was sure enough, for the strong decoction of quassia proved so effectual a poison, that it not only killed the worms themselves, but the poor man that owned them.

I have inserted this extraordinary fact here, by way of a *caveat* to all young physicians, to warn them how very careful they ought to be, even in the inward administration of such a simple narcotic bitter as quassia wood: and also, that brewers' druggists, if any such should perchance cast their eyes on these pages, may be aware of the risk they run in poisoning his Majesty's liege subjects, by dosing them with quassia in the place of hops.

But to return more immediately to the subject of this chapter. Antidotes against insects may be divided into two classes, mineral and vegetable. The first class comprise, arsenic, mercury, metallic salts,

mineral acids, sulphur, sea salt, alkalis, lime, and their combinations. The second class, vegetables and vegetable products. Of these the most powerful, no doubt, are the essential oils, and camphor—and beyond all others, the rectified oil of turpentine. If a single drop of oil of turpentine be placed on the head of a caterpillar, that insect is immediately thrown into strong convulsions, his skin becomes covered with purple blotches and he dies immediately—The same happens to other insects, when treated in like manner. But oil of turpentine has also this good quality, that it is not noxious to human vitality, even when administered in powerful doses; a stout man being able to swallow one ounce of it, with as much facility as he could a glass of gin. Hence we find it a most excellent remedy in all cases of animate diseases, as even the tape worm (Tænia) is unable to survive one or two doses of it—and it is so harmless as a remedy, *in skilful hands*, that it can even be administered to delicate puerperal women, not only with safety, but the greatest advantage during puerperal fever. Nay, while the plague was at Malta, an attendant in the military hospital once gave, through mistake, two ounces of oil of turpentine, holding several grains of camphor in solution severally, to two soldiers suffering from plague, which medicine had been prescribed as an external application only, for carbuncles on their bodies. But strange to tell, so far from this excessive dose being hurtful, it proved of the greatest efficacy, as after cleansing out their bowels, a rapid amendment took place, and

they both recovered:—at a time, too, when recoveries were indeed very rare. And this fact I consider as a powerful evidence in support of the truth of "the Intro-animate Pathology." For why, I would ask, should camphor dissolved in oil of turpentine be more efficacious in Plague than all other strong stimulants, were it not that the causes of the disease being themselves animate, these remedies deprived them of life and then caused their expulsion from the body. Fixed vegetable oils, such as oil of olives, or of almonds, seem to stand next in the catalogue of simples, destructive to insects, with safety and ease. Of this, I need hardly cite any instances, as no fact is more generally and familiarly known, and the experience of oily frictions in the plague, confirmed by the evidence of Assalini, himself a physician attached to the French army in Syria: and the success resulting from its internal use in the Gibraltar pestilence, as well as in that of the Ionian islands, leaves us nothing farther to desire on that subject.

Perhaps, next in efficacy after these vegetable fluids, comes the semimetal mercury, and of this mineral I can recommend with the greatest confidence a particular preparation combined with *chlorate of ammonia*. This is the *carbonate*, and every chemist knows well how to form the combination by means of a double chemical affinity—nature has indeed given us mercury united in her own elaboratory with sulphur, but both native cinnabar and native œthiops mineral, are but weak destroyers of animalcular and insectile life; and therefore by no means powerful

remedies in the curing of disease; sulphur, also besides being yielded by the earth pure, is found in the form of sulphuret of antimony—and this is a good combination, although its use is now chiefly confined to treating the diseases of cattle. Sulphur in a variety of forms is used to extinguish insectile and animalcular life, both externally and internally. It is a safe and efficacious remedy, and deserves to be much more generally used, than it is at present. It appears that Hippocrates prescribed it of old in the cure of pestilence, and that he obtained high celebrity for its successful exhibition. Few simples are more fatal to insects, as many abhor the very smell of sulphur, and nature has given us a powerful antidote in sulphureted hydrogen waters, which cure eruptions and ophthalmies, and in garlic and onions, in which vegetables, sulphur is found combined with an acrid vegetable oil and the phosphoric acid. These vegetables are powerful remedies both as prophylactics and curatives, but modern refinement and delicacy are contrary to their frequent prescription: although it is a known fact in Italy and Sicily that rubbing the whole body and limbs with garlic, preserves from the plague by keeping insects at a distance.

The liquid sulphuret of lime destroys insects, and, if sprinkled near trees in gardens, kills or drives away all sorts of caterpillars. Even lime water alone given internally, is a useful vermifuge in the human body, and *lavemens* composed of it, kill *ascarides* both safely and speedily. Lime water is a very useful external application in cutaneous eruptions; and the

wash composed of lime water and *sub-chlorate* of mercury, or "black wash," is a well known destroyer of syphilitic animalcules, and therefore speedily cures the sores produced by them.

Ammonia also is powerful in the same manner, and cures syphilis in many of its forms. It is the basis, as to efficacy, in the various syrups and quack nostrums sold in France and England, as vegetable antidotes against that proteiform contagious disease.

Rhubarb too is a powerful antidote in animalcular diseases. Linnæus is warm in its praises, and I believe that when combined with lime water, it is one of the best remedies against the animal galls (tubercles) or hydatids in the lungs. The root of ipecacuan ranks highly too, and in dysentery singly or combined with rhubarb is one of our best remedies—but it is inferior in power to oil of turpentine in the cure of puerperal fever, the latter having superseded its use in the treatment of that fatal malady—The natural *sulphuret* of arsenic called orpiment, was formerly used by veterinary surgeons (in vapour) to cure the glanders, which is a disease caused by insects, in horses, similar to the *acariasis* of the human body, called phthisis pulmonalis. One of our old surgeons, Mr. Justamond, used arsenical orpiment, as an external application, to cure cancerous sores, and from the efficacy of arsenical preparations, generally, in that disease, I am inclined to place the poisonous contagion of cancer, amongst "animate contagions"—and the more especially, because, amongst all the remedies which prove even palliatives of the disease, I find

none but the most active vegetable poisons, such as belladonna, cicuta, &c.

It was believed and asserted by that great naturalist, Linnæus, that few studies would be of more avail in advancing the knowledge of therapeutics, than that of a sedulous attention to the families of plants, whereby, when one individual failed us, we might generally employ some other plant of the same family. Of this we might quote here many convincing proofs in corroboration, but the family of rhubarb, "The polygonous" affords us a striking instance, for if rhubarb fails, we may employ the sharp-pointed dock, or even sorrel or the curled dock—for the roots of the latter bruised and made into an ointment, cure scabies by killing the acari; and that the former has a power over the plague in some such manner, we learn by the following anecdote, which occurs in Assalini on the plague of Egypt, at page 68 of the English translation. "Some soldiers on their return from Gaza with a convoy, discovered at a distance a French soldier wandering amongst the sands, about two leagues from the fort, they went up to him and found him *with a bundle of sorrel under his arm*: this man had been attacked with the epidemic disease (plague), and in his delirium had run away from the hospital. During the fifteen days which followed, he had taken no other nourishment but sorrel, and he recovered perfectly." Assalini says that "he had met with this plant growing frequently in the deserts of Egypt, with its leaves scarcely above the level of the sands." I may add that it owes its strong acid taste

to the oxalate of potass, with which it abounds, and in medical virtues resembles both the "rhubarb" and the "docks"—Its leaves furnish "indigo" when properly treated by maceration, &c. &c. as do all the other "polygonous plants". And the negroes of Jamaica constantly use a bit of blue baize, (which is dyed with indigo) to cure the punctures of small venomous insects, which immediately subside on being rubbed with it. I have also known indigo to have cured bad phagedenic ulcers, (at my suggestion) on board a ship of the royal navy.

Then as to oil of turpentine, its powers of destroying insects, extend to all the other plants of the same family—the *coniferæ*. At Constantinople, and in all the Turkish bazaars, large quantities of an essential oil, of a powerful smell, are sold under the name of *oil of cedar*, which is generally used by the Musselmen to impregnate their dresses of furs and thereby drive away the moth. They dip a little cotton in this oil and place morsels of it in their chests for this purpose, amongst their costly garments. From Sonnini's travels I find that this oil, is, in reality not the essential oil of cedar tree, (*pinus cedrus*) but is prepared in the Grecian island of Argentiera in the Archipelago from a tall juniper tree (Juniperus *Oxycedrus. Linn.*) which is also found growing in the south of France and in the Bermuda islands, where it is likewise called a cedar. In order to prepare it, the Greeks select pieces of the oldest wood and that impregnated with sap, which is then a little blackish, cut it into small pieces, which are placed in an

earthen pot, having a small hole pierced at the bottom, they place a lid on this pot, which is securely luted with clay or putty, then kindle a fire all around it, and the heat causes the oil to distil downwards and issue from the hole before mentioned, where it is received in a vessel placed underneath. This oil is thick and as yellow as saffron, tinging yellow whatever it touches. With this oil they besmear the bodies of those affected with scabies, and it proves an excellent cure. It is nearly the same as the oil called in the south of France *huile de cade* which is employed for eradicating the mange in sheep and cattle, but the "oil of Kedros," is of a stronger virtue, from the tree having grown in a warmer climate.

I have entered into a longer detail as to this powerful remedy against insects, from what I now subjoin. Some years ago we had a brig of war pierced for 18 guns, called the Morgiana, which was built entirely of this cedar wood in Bermuda. This brig was unfortunately lost in a storm off the coast of Ireland. But I am credibly informed that during the three years of her existence, after being fitted out at Chatham dock-yard, she never had any, or at least fatal, sickness amongst her crew, or animals, on board:— and the only death which occurred during that period, was accidentally caused by one of the sailors falling from the fore yard arm. This is altogether so curious an instance of salubrity, that it is worthy of remark, proving in my opinion, strongly in favour of the "doctrine of animate contagions"—And as this oil could be easily procured in the Bermuda islands, I opine

that it would be a very valuable addition to our Materia Medica.

The essential oil of the birch-tree prepared in Russia, Sweden, and Lapland, is also very efficacious against insects :—and the Russian leather so useful in binding books, preserves their contents from insects in warm climates. This oil should also be used in medicine.

The oil of savine *(Juniperus Sabina)* merits more attention also from physicians than it has yet received. Its powers are great, particularly in certain syphilitic affections (*verrucæ*) and it should, I think, be more generally employed. Perhaps it would prove an excellent cure for every species of tetter and other cutaneous diseases, which all arise from certain species of insects. Our peasants, too, are in the habit of giving leaves of sabine to their children to expel worms. And cattle-doctors give them to horses to expel the botts. Oil of linseed is also a good remedy —And as to pure lime and lime-water, it is remarkable, that white-washers, felt-mongers, and tanners, are not subject either to cutaneous diseases or pulmonary consumptions, from their skins being constantly exposed to their action, and thereby kept free from the attacks of insects and acari.

Of the powers of Lichen Islandicus I have a very favourable opinion in diseases of the lungs from the same reason ; but the first decoction should not be thrown away as is generally done ; for it is the bitter principle rather than the gelatinous, which proves effectual. Then again, all the sorts of *soot* deserve hon-

orable mention, amongst remedies against insects. Soot is a favorite antidote both in Africa and the West Indian islands. How it acts except as a poison to animalcules I am quite unable to explain:—this I know, I have used it most successfully in tubercular affections in the lungs—that is the soot of wood made into pills with acid of benzoine and sulphates of alumina and iron in minute quantities. The negroes use wood soot as a good remedy against the *ver solitaire* in the island of Trinidad; and we have remarked that the Swiss administered wood-soot successfully to their cattle, during the great murrain, mentioned at page 29. Wood-soot on analysis is found to contain acetate of ammonia and charcoal, joined to a bitter essential oil. It is soluble partially in boiling water, and its extract forms the bistre used by artists.

The snake-root, (*Serpentaria Virginiensis*), is likewise a good antidote to animalcular life, and as it proves a successful remedy against powerful animal poisons, such as that of the rattle-snake, &c. &c., and promotes perspiration. I conceive that it deserves a very high place in medicine.

Whether the oil of *kayapoota* or cajaputi, which is distilled from the leaves of the melaleuca leucadendron, kills insects, I have not yet tried. It is a good stimulant, and has been much recommended against the epidemic malady improperly called cholera spasmodica, I should think it destroys insectile and animalcular life. By the way, ought we not to change the name of this fatal malady to that of *crio-rhœa asphyxialis*, as more appropriate, having reference

both to its icy coldness and the asphyxia in which it seems to terminate. Generally rue, wormwood, and all vegetable bitters, kill worms, and are therefore good remedies against animalcular diseases. And aloes and myrrh are mentioned in the Bible as the greatest conservatives against putrefaction or animalcular corruption. The bitter apple (colocynth) likewise comes under the same head; and Denon states that it is constantly found growing in the sands of the deserts of Egypt, together with the senna shrub.

Lastly, perhaps we ought to notice all preparations of chlorine: but from some experiments I have not found these to destroy insectile life so soon as the oil of turpentine. However, they are most useful in destroying the stench arising from putrefaction, and perhaps in a very concentrated form, may destroy animalcular life, in plague and other contagious diseases. It has certainly been ascertained that preparations of chlorine prove very effectual antidotes in the fever called scarlatina: as well as the *flos cerevisiæ*, or yeast given in doses, repeated, by teaspoonfuls, in beer, I apprehend that this last acts chiefly chemically on the nerves of the stomach by applying carbonic acid to the coats thereof, thereby exciting the energy of the nerves and of the brain itself, thus increasing the vitality of the human body, and, in this manner, destroying *animalcular corruption*.

CHAPTER XXXIV.

ON THE DIFFUSION OF EPIDEMIC DISEASES.

WHILE passing the foregoing sheets through the press, I have accidentally been a witness to the perfect truth of the doctrines inculcated, respecting the mode in which epidemic maladies are believed to be diffused. A philosophical friend suggested to me, that the minute insects, commissioned by the DIVINE OMNIPOTENCE for this end, are probably wafted in straight lines through the atmosphere in a similar manner to that pursued by storks, swallows, quails, and other birds of passage, but more especially by swarms of locusts, which last, "though they have no king," yet follow leaders who conduct their migrations, and observe a regular phalanx or order, like troops on their march. And that if "our eyes were opened" like those of the patriarch Jacob of old, we might perceive swarms of pellucid and minute insects winging their way on the bosom of the *south-east winds,* from one country to another, to fulfil their missions, in perfect lines and mustered ranks. This idea I feel to be so perfectly in harmony with

the order observed in this world, that my mind cannot withhold its assent, to such an imagination, as illustrative of the divine wisdom and power. But to return:—Sunday, 8th of August, 1831, it was new moon at ten o'clock in the evening: light winds variable from the south-west to the west and north-west quarters: thermometer between 79 and 83° in the shade, towards mid-day. On Monday, (9th), and Tuesday, (10th), I remarked (although the atmosphere was bright and clear) *a smell as if of burnt leaves,* which has been observed at times to precede pestilence. On the Wednesday morning, (the 11th) having been awakened by some noise as early as three o'clock in the morning, I arose half an hour afterwards, and on going to the window of my chamber, (which fronts the east), I remarked on drawing aside my window-blinds, (the sash having been left open all night on account of the oppressive heat of the weather), that the rain, which had been falling all night, *was still descending very heavily,* (as in a more southern climate), but that there was at the same time *a very thick mist, of a tawny-orange colour,* and that the wind was then *south-east.* In about an hour the rain ceased, and the wind having shifted successively to west, and north-west, the *mist* disappeared, and was followed by a clear day of sunshine. That afternoon, very many people were attacked in the city of R——, with severe cholera, attended with dreadful spasms: and on the following morning, Mr B. a practitioner in S——, (a small town at a little distance, built on a marsh, near an

estuary of the sea), was called up early to thirty persons all attacked suddenly with dysentery, attended with violent spasms. As to myself, after remaining at the open window for seven or eight minutes, observing this strange mist, I perceived a very strong and disagreeable bitterish taste in my mouth, which I could not get rid of, until I had gargled several times with a mixture of chlorate of lime and water. A neighbour of mine, who had been also awakened by the noise, and had gone towards her window, and looked out at the mist, was seized that afternoon with nausea and colicy pains, and other gastric symptoms, and an eruption on the sacrum, which did not disappear until she had called in medical assistance, and taken remedies for several days. On the same day, this lady's daughter, living in the adjacent town over which the mist had passed, (and who had been only a few weeks before in child-bed) was seized about three o'clock, p. m., with a very alarming attack of cholera, attended with strong spasmodic symptoms, which lasted several hours, but yielded at length to proper remedies; leaving her however suffering from debility for some days. Once before, I recollect to have witnessed *a similar tawny-yellow mist*, which occurred at Ciudad Rodrigo, Spain, in the morning of a dry day, during the month of August, 1812, the year in which the battle of Salamanca was fought. The mist was followed by great sickness amongst the British troops, from the yellow-fever before mentioned, which prevailed epidemically during the whole of that warm

summer and autumn, and was succeeded by the "dry gangrene" before noticed, after the retreat from Burgos. Dysentery and fever followed during the latter part of Autumn and the following months of winter: and the mortality was very great, more especially in the extensive military hospitals at Vizeu, in Portugal; where some regiments of foot guards, (which had lately joined us from England), were quartered. These troops were not *acclimatized,* as the French phrase goes, and were more particularly *victimized* by the epidemic. At Ciudad Rodrigo, about fourteen medical officers died, and many of the hospital attendants.

It will be recollected, that similar mists, (only recorded to be of a bluish colour), were noticed to precede the diffusion of the memorable murrain described by Dr. Winklar, and noticed in our third chapter. These mists, too, had a regular rate of travelling, precisely like those of insects, as exemplified in the history of the wheat (Hessian) fly, in its progress through North America; and has been noticed by all writers on the diffusion of swarms of locusts. All these insects, also, change their ground early in the morning, generally before sunrise, so that their flights have been hitherto but little remarked.

On the 16th August, wind being now due north, with a cloudy atmosphere, a storm of thunder and lightning, followed by torrents of rain, commenced in the county of Essex. Next day, the 17th, there was a renewal of the thunder storm, which crossed the river Thames, near Gravesend, and passed over the whole

of the county of Kent, being particularly violent at Maidstone, Chatham, Rochester, and Strood, and passing down in the direction of the hills towards Dover. On the morning of the same day, so early as between four and five o'clock, some persons living at Peckham Rye, a hamlet near Camberwell, to the south-east of London, remarked a body of vapour of extraordinary magnitude, arising apparently out of the earth, accompanied by a very loud rumbling noise. It resembled the smoke of a conflagration, and had a fiery appearance. It continued ascending for the space of three minutes, all the time attended by the noise above mentioned, and with a considerable degree of agitation, till it mixed with the clouds above it, which then appeared for a short time to partake of the same agitation. The air was the whole time exceedingly oppressive. On the afternoon of that day, (17th August), the city of Westminster was visited with an awful thunder storm, followed by torrents of rain, which flooded many streets and houses; and was especially violent over Westminster Abbey, one of the pinnacles of which church were struck and thrown down. On the same day the town of Liverpool was visited in the afternoon by a similar and equally appalling storm of thunder, lightning, and rain, extending about ten or fifteen miles all around. So that on inspection of the map, it appears that this great electrical convulsion extended quite across the island of Great Britain, from Liverpool to Dover, exactly in a line drawn from north-west to south-east, pursuing but in an opposite course

the same line which had been previously traced by the tawny yellow mist before noticed, as passing early in the morning of the 11th of August, from the south-east towards the north-west. Since which great thunder storm, the weather has become cool and agreeable, the constitution of the atmosphere has become healthy, the barometer has risen half an inch, and there is reason to believe that the tendency to epidemical cholera, which was becoming daily more apparent, has been materially checked. I request that the reader will compare this statement with what I have previously written, as to the cessation of the plague at Constantinople, and I think he will feel convinced that these great electrical convulsions directly tend to restore salubrity, by destroying the unknown (animalcular?) poison productive of pestilence.

CHAPTER XXXV.

ON THE CHANGES WHICH DEAD ANIMAL AND VEGETABLE SUBSTANCES UNDERGO, BEFORE BEING RESOLVED INTO THEIR FIRST PRINCIPLES.

With a view to ascertain the nature of those changes which all dead animal and vegetable substances undergo, the following experiments were made.

A piece of muscular flesh was cut from the leg of a calf about half an hour after it had been slaughtered, and inclosed within a glass tube, which was hermetically sealed by means of a lamp and blow-pipe. It was then exposed to the rays of the sun in a southern window during three days of summer. On the third day the whole of the internal surface of the tube was found to be covered with a bluish coating, resembling the blue covering of a plum, and was distinctly observed to be perfectly alive, consisting of minute animalcules, whose motions were perceptible even to the naked eye, but still more on the application of a magnifying lens. The same experiment was repeated with beef, mutton, lamb, pork, and fish,

with the same results: excepting, that of all flesh, pork became the soonest animated; and of all the fishes observed that of the mackerel was the soonest corrupted.

A seed of the common betony, *(Betonica)*, was bruised with a hammer, and then placed in some warm distilled water. On being examined about an hour afterwards, it was observed to be covered with myriads of living animalcules, and upon the death of these, the bruised seed was placed under the lens of a microscope, and found to be converted into a dark parasitical fungus, resembling, in its ramifications, a common sea-weed or alga. On losing this configuration, the whole was resolved into a minute powder: a carbonic or vegetable earth. It must not be forgotten also that this latter process appears, to take place in animal matter, after having suffered its animalcular decomposition, which in common language is called putrefaction. The presence of heat and moisture, in a small degree, seems requisite to permit these changes to take place; and the earth finally produced seems to be a *fifth* element: being quite distinct from all mineral earths known and observed in nature. Ought it not therefore to be considered as a *fifth* elemental body, solely fitted for the capacities of organized life.

The first change, therefore, I should call *animalcular corruption*, and the second *parasitical corruption*, both which seem to happen to all dead animal and vegetable substances, unless they are so much dried by the application either of solar, or artificial, heat,

as to be completely pulverised—but even in this state, on application of the requisite degree of moisture, those changes will follow, as we daily see in wheat flour made into paste, which in a few hours soon becomes covered with mucor—in which condition it is found to be a deadly poison when introduced into the human stomach. Hence we can account for the occurrence of "gangrenous ergotism" and the "dry gangrene" detailed in this work, since to infants and delicate children such food soon proves fatal. If however, we stir this paste daily, so as to prevent the growth of the parasitical mucor, it becomes sour, and is then found to be filled with myriads of animalcules, resembling eels, whose forms and motions can be distinctly observed on placing them under the lens of a microscope.

The purulent matter, expectorated by a person labouring under pulmonary consumption, was in like manner viewed through a powerful microscope and found to be filled with infinite myriads of small animalcules.

CHAPTER XXXVI.

SUMMARY AND DEDUCTIONS.

From a careful review then of all the facts before stated, I think we may be justified in coming to the following deductions.

1. That it is a general law of nature, from which even the human body is not exempted, that death (in most instances) is caused by the agency of parasitical insects and animalcules, which entering, nidifying in, and preying upon, the bodies of animals, or the leaves, trunks, or cortical matter of vegetables, and corrupting their vitality, in a longer or shorter period, produce this effect—death.

2. That the presence of such parasitical animalcules has been amply proved in many diseases of the human body, such as those of the skin,—scabies, guinea worm, leprosy, &c., by learned and competent observers: and in dysentery, phthisis pulmonalis, ophthalmia, and other maladies, by Rolander, Bartholinus, Linnæus, Lowenhoeck, Adams, Sir Joseph Banks, and other physicians, philosophers, and naturalists:—that their existence also is unquestionable

in phthiriasis and ulcers, as proved by a great variety of acknowledged facts; and witnessed, amongst others, by Sir Edward Wilmot, Drs. Mead, Heberden, Sir George Baker, Dr. Mouffet, and other physicians of equal veracity and authority:—and that their presence has been asserted and all but proved in plague, syphilis, scarlatina, puerperal fever, small pox, measles, hooping cough, acrodynia, yellow fever &c., by such men as Athanasius Kircher, Linnæus, Hauptmann Langius, and others of equal note.

3. That living parasitical animals have been found in almost every part of the human body, as in the brain, frontal sinuses, lungs, stomach, liver, intestines, kidneys, bladder, interstices of the muscles &c.—as appears from the researches of anatomists and naturalists.

4. That substances called vermifuge, or the most speedily destructive of insectile and animalcular life, have been found generally the most valuable and efficient remedies in the cure of a great variety of human diseases; but more especially in plague, syphilis, puerperal fever, scarlatina, acrodynia, yellow fever, cholera epidemica, leprosy, dysentery, small pox, hooping cough, measles, &c., &c.

5. That, from their extraordinary exemption from the contagion of plague, enjoyed by persons carrying on particular occupations, particularly those whose dresses are always saturated with powdered quick lime, as tanners, whitewashers, limeburners, &c., and also by all manufacturers and porters of olive oil in the Levant and coast of Barbary:—and from the great

efficacy of warm oily frictions and potions of olive oil: there seems to be little or no doubt that the efficient causes of plague consist in minute insects, whose vitality is incompatible either with oil or quick lime.

6. That as all living animals, clothed with fur or feathers, are universally believed, in oriental countries, to be the intermediate living agents in diffusing pestilence (cats, owls, &c., being invariably shot by the Franks during their times of seclusion) there seems to be much reason for believing that the insects of plague burrow in the skins of these animals and are thus transported from place to place.

7. That the birds of the air die in large numbers, and have been even known to forsake countries during times of pestilence: and when the last pestilence raged at Gibraltar, parrots, canaries, and other small birds in cages, and even poultry and domestic animals perished in great numbers. At Marseilles, during the plague of 1720, all the bakers died, probably from the acari or plague insects burrowing in the dry wheat flour of their ovens.

8. That epidemic diseases are generally diffused in three different ways: namely, either by immediate contact, intermediate contact, or through the agency of certain mists, or exhalations, carried through the atmosphere.

9. That instances of the first mode of diffusion, called contagion, are most frequent in plague, syphilis, leprosy, small pox, scabies, &c.

10. That the second mode of diffusion, or by intermediate contact, is that whereby these diseases

are generally said to be inoculated, as by the puncture of a lancet or needle, or the application of an infected dossil of lint to a moist or abraded surface or the pores of the skin; but, beyond all, by the agency of winged or creeping insects, which by puncturing the skin, apply the poisonous matter to the open mouths of the absorbent vessels; and which insects we have denominated "pestiferous."

11. That the third mode of diffusion, or the agency of certain mists or exhalations from the earth, is that employed by DIVINE PROVIDENCE, at the first commencement of all epidemics: by which these are wafted over rivers, mountains, and even seas; and which exhalations, being admitted into the nostrils and lungs, become thus immediately applied to the sentient extremities of the nerves, paralysing the brain and spinal marrow, and instantly putting a stop to the muscular motion of the heart, and causing asphyxia, followed by death. By this mode too, a multitude of persons are affected at the same time, and thereafter the disease is diffused as in radii from a centre.

12. That a non-electrical, or negatively electrified state of the atmosphere seems to be a most powerful predisposing cause at least in the human body, to prepare it to take on diseased action, and that, on the contrary, a highly electrified or positively electrified state of the atmosphere, is the most salubrious and conducive to human longevity.

13. That the winds from the *south-east* quarter (at least on this side of the equator), have been

observed in all ages to be of a highly deleterious character. That such winds have been found to be instantly fatal if inhaled in the deserts of Lybia and Africa, and are known under the names of Simoom and Kampsin by the Arabs, Moors, and Turks, and in Italy, Malta and Sicily, by the appellation of Sirocco winds: and that most epidemic diseases come to us from the S. E. quarter, and are brought by these winds, which are generally followed by a rapid fall of the mercury in the tube of the barometer, and are believed to be accompanied by a non-electrical state of the atmosphere.

14. That, on the contrary, the winds coming from the north-west quarter, are (on this side of the equator) of a highly salubrious quality: that they are frequently attended by clouds highly electrified, which, on discharging their positive electricity, and producing thunder storms and torrents of rain, restore the electrical equilibrium and salubrity; while, at the same time, they destroy insectile and animalcular life, which is always too energetically evolved by S. E. winds.

15. That the efficient causes of pestilence (believed by us to consist in myriads of transparent minute ova or animalcules), are wafted in straight lines over the surface of the globe, (on this side of the equator), on the bosom of S. E. winds, proceeding in regular daily distances, commensurate to the daily flights of deleterious insects, such as those of the wheat flies, aphides, locusts, &c., and which we believe might be visible to our eyes, if our powers

of vision were sufficiently powerful to perceive such minute objects.

16. That a "state of predisposition" in the living human body, consists in a state of debility however produced: either by great solar heat, breathing impure air, imbibing copiously intoxicating liquors, exposure to night air, or the action of previous diseases or loss of blood, or great negatively electrical variations of the atmosphere in which we live.

17. That the experiments of Count Moscati have proved that albuminous matter, which is the most putrescent of all substances, is generally floating in the air of marshes: and that similar experiments made by Mr. Hermann, in Russia, have proved the existence of a similar substance in the air surrounding the bodies of those who are suffering under epidemic cholera.

18. That all great pestilences have been attended by, but most commonly preceded by, a similar mortality amongst cattle, and the other domestic animals, not even excepting the birds of the air, or the fishes in rivers: and also by diseases called "blights" amongst vegetables.

19. That blights, amongst corn and vegetables, are caused by myriads of small insects and animalcules.

20. That the feeding upon the flesh of diseased animals and blighted vegetable substances, has been ever found a most powerful predisposing cause of pestilence, and that such food, has been ever found adequate to produce great mortality, as instanced in

dry gangrene and convulsive and gangrenous ergotism, which have finally become epidemic.

21. That a noisome stench has been generally observed to precede or accompany the prevalence of epidemic diseases; (as was remarked lately at Paris, during the disease called acrodynia or "dando" fever,) and as has been mentioned in the sacred writings, and by various accurate observers.

22. That great heat, attended by calms, and a non-electrical state of the atmosphere energetically develope insectile and animalcular life, and contribute to the evolution of mists and exhalations, which then arise copiously from all marshy plains and pools of stagnant water, which, at such periods, are prone to put on the colour of blood.

23. That violent electrical convulsions and thunder storms instantly destroy insectile and animalcular existence.

24. That deleterious insects are either finally swept away by strong north winds into the sea, there to perish, or that seasons of great pestilence are followed by violent storms of thunder, lightning, and rain, which destroy the ova or animate causes producing pestilence, and restore salubrity, as is yearly witnessed in Constantinople, Syria, Egypt, and Barbary.

25. That the universal experience of mankind in all ages bears testimony to the prevalence of these facts:—That they are confirmed by the writings of all historians, sacred and profane—and that the inspired writers more especially confirm the truths here inculcated.

26. That insects are always styled in the sacred volume the armies of the MOST HIGH GOD, and the destined ministers to fulfil his will: and that nothing is wanting to make these truths universally acknowledged but more accurate observations of what is now daily passing upon the surface of this our globe.

27. That all great pestilences have been commonly observed in this our hemisphere to have originated in the regions of the East, and to have been wafted on the bosom of S. E. winds over the other regions of the earth; as has been exemplified in the great pestilence of the 14th century, and more lately during the progress of the epidemic cholera; and that all minor deviations from this course have been only effected by the passing to and fro of multitudes of human beings in ships and caravans, bringing the insects with them—Nay, that even the sweating sickness which broke out in England in the army of Henry VII. on coming from France to Wales, was believed by the historical writers of that age, to have been brought from the isle of Rhodes several years previously.—See Dr. Caius de Ephemera Britannica —Lord Verulam's History of Henry VII. —Thuani Historia. Lib. 5.—Lord Herbert's History of Henry VIII.

ADDENDA.

The murrain in the Grecian Camp at the siege of Troy.—On referring to the Iliad, I find that I was in error while stating that the pestilence raged amongst the horned cattle, for Homer sings that it attacked the mules and swift dogs first, and then the Greeks.

In further illustration I find that dysentery is common both to dogs and horses, as well as to oxen and cows, cats, geese, and bees. It is more than probable therefore, that the pestilence in question was the dysentery, more particularly as we find, from the writings of the father of profane history, Herodotus, that this malady was known at the most early periods, as being particularly fatal to armies. Duchene also has recorded that, in 1316, England was ravaged by an epidemical dysentery, which not only attacked the human race, but also horses and dogs, horned cattle, and cats. A similar epidemic also raged in Germany, in 1414, according to Saxo, the historian. And about the latter end of the month of October, 1734, according to Albrecht, an epidemical dysentery accompanied by a swelling of the head, attacked the geese in the environs of the town of Coburg; and these poultry died with their bills wide open. This malady was attributed to their feeding on a great quantity of some particular grubs, which were found scattered extensively over the pasture lands, on which these birds were accustomed to range.

The great murrain of the 18th century.—It first broke out in Hungary, and was thought by some writers to have

been introduced thence by droves of cattle in 1711, into Italy and Germany. The disease was believed to be a sort of typhus fever, but it was in fact more properly a dysentery, and was, as I have endeavoured to show, propagated by a pestiferous (animalcular) mist. It appeared again in 1740, and prevailed ten years throughout the whole of Europe, amongst the horned cattle, the greater portion of which it destroyed. Besides the symptoms mentioned in the text at page 27, observers remarked a convulsive motion of the dorsal spine, from the head towards the very extreme point of the column.

Bloodletting, setons, bran-water, and *le mastigadour*, were the remedies which were thought in France to have succeeded the best, and their success was predicted on the animal becoming thin, on the ceasing of the discharge from the eyes and nostrils, and on its licking its own muzzle and skin. An eruption of small pustules on the skin of the neck, and dewlap and posterior part of the udder, and the return of appetite were likewise good signs, when some bran, rye meal or fresh grass were given. It was the custom to perfume all the cow-stalls daily, particularly in Normandy. were the murrain proved very violent.

This murrain broke out in Holland, and was well observed and described by the celebrated Dr. Camper in 1774. Dr. C. was very successful in its treatment, by prescribing bloodletting for the sick cattle, as early as the first or second day of the attack, for if delayed, that operation only proved fatal. He also prescribed, with success, a cooling powder, composed of nitre and cream of tartar, each one pound, camphor, in powder, two ounces, to be well rubbed together, and given in doses of half an ounce, in a little whey every three hours.

Professors Sauvages and Chaumel observed this murrain in the Vivarais district of France in 1745. And the faculty of medicine of Montpellier being consulted thereon, advised

prophylactic measures in preference to attempts to cure it. In 1766, this murrain attacked the horned cattle in Pomerania, Brandenbourg, and Mecklenbourg in Germany, with such violence that scarcely five out of one hundred escaped. The Baron de Malghan came to the singular resolution of inoculating all his herds, by means of a stripe of linen 18 inches long and one broad, impregnated with the fluid which dribbled from the nostrils and throat of the sick cattle, and which was introduced under the skin of the sound, in the form of a seton. They were then bled and put upon a regimen. By this method he lost only one fifth of his cattle. It was observed on this occasion, that the beasts which were penned up in the fields and kept in the open air, suffered the least from the epidemic.

In 1795, a severe murrain broke out in Lombardy, amongst the horned cattle. Professor Count Moscati, and Dr. Deho, Bonvicine and Gherardine, observed it accurately and published a description of its symptoms, of which we shall only notice, that towards the termination of the disease the dying animals had great rigidity and tension in their necks, and also *great sensibility along the spinal column.*

The same epidemic broke out in 1797, in the Venetian state of Friuli. The sheep and poultry were also attacked with it as well as the horned cattle. It was remarked at Montefalcone, that the house of a farmer, situated near a spring of sulphuretted-ferruginous water, was secure from the epidemic, owing no doubt to *the sulphureous vapour arising from the spring!* This fact is mentioned by Larrey, and a similar history is related by M. Graff, in his analysis of the mineral waters of Bavaria!

In conclusion, it appears that this malady was sufficiently characterized to be acknowledged when it became manifest, but it was difficult to seize exactly upon the moment of its invasion, to cut short its course by a large bleeding and antiphlogistic treatment, the only proper measures. The

rapidity of the transition from a state of inflammation to that of gangrene having been such, that scarcely any time was left for acting, and when the second stage of the disease had arrived all remedies proved nearly useless. Setons, joined to camphorated potions appeared to be the sheet anchors of hope; as to the *mastigadours* and *theriaca*, these remedies rarely succeeded.

Messrs. Volpi and Pozzi of Milan recommended as precautionary measures, bleeding the animals generally or topically, bathing or washing them with sponges, penning them out in the open fields.

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