

On famine fever and some of the other cognate forms of typhus : a lecture held for the benefit of the sufferers in East-Prussia, February 9, 1868 / by Rudolf Virchow.

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ON
FAMINE FEVER
AND
SOME OF THE OTHER COGNATE FORMS
OF
TYPHUS.

A LECTURE

HELD FOR THE BENEFIT OF THE SUFFERERS IN EAST-PRUSSIA

FEBRUARY 9. 1868

BY

RUDOLF VIRCHOW
PROFESSOR IN THE UNIVERSITY OF BERLIN.

WILLIAMS AND NORGATE,
14, HENRIETTA STREET, COVENT GARDEN, LONDON,
AND
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1868.

EXAMINE REVER

SOME OF THE OTHER LATEST WORKS

TYPIST

THE NEW BOOK

THE NEW BOOK

THE NEW BOOK

A LEXICON

THE NEW BOOK

THE NEW BOOK

THE NEW BOOK

RUDOLF VIRCHOW

THE NEW BOOK

WILLIAMS AND NORCOTE

THE NEW BOOK

THE NEW BOOK

1881

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Twenty years have passed since last that form clad in terrors — famine fever — appeared among us. In vain do we seek to deny its presence now in one of our German Provinces. Behold it! That dual-nature in which seem to unite the two most terrible scourges of mankind, famine and disease! It is no longer the pauper inhabitants of villages and small towns merely, that are exposed to its baleful influences; its empoisoned breath has already touched others in a higher station — witness the doctors and nurses who have fallen a sacrifice to their devotion.

And still science is reproached with taking no cognizance of famine fever! It is for science to rebut this charge. Wherefore let it be our task this day to vindicate the truth and throw such light on it that to us at least no blame may attach.

But *does* science gainsay the connection between famine and typhus? It would be hard to attempt to gainsay a thing for which since thousands of years the history of mankind has ever and again supplied new examples. I do not mean by this the so-called Universal History as it is mostly taught in schools, and of which a French Admiral lately said, it was little else but a story of wars and treaties! Fortunately that is not the opinion held in Germany, England and Ame-

rica. And after having repeatedly heard, even from the mouths of government officials, that the Prussian school-master bore his full share in the victories on the Bohemian battlefields, it is not asserting too much when I say, that the history of warfare is merely the external history of peoples. Their internal history is made up from very different sources. On the one hand it notes the glorious victories of civilization, the progress of the human mind in knowledge — that we call the history of culture; on the other, it preserves the remembrance of the ever new impediments in the path of life, of the painful sufferings of humanity, — that is the history of medicine, known I grant but by few, though not therefore a less instructive branch of general history.

In our present enquiry we must follow up three courses of investigation; for from the terrors of famine and pestilence, the third, — war — is never far off. Like three brethern, — the apocalyptic riders — they go forth “to kill with the sword, with hunger, and with death”. Camp fever is a mate in all respects worthy of famine fever! The one cannot be disjoined from the other in a scientific enquiry. Within the memories of many still living they have always been thought of as combined.

Thucydides speaking of the Athenians when they were visited by the great pestilence, which swept away Pericles and numberless others besides, during the second Peloponesian War (B. C. 430 — 25) says: — “In those times they remembered themselves of the following saying, which, as the oldest inhabitants gave out, had been foretold a long while ago: Come will a Doric War, and hand in hand with it the plague. Now”, he

goes on, "people contend that in this saying of the Ancients not hunger (limos) was meant, but plague (loi-mos)." An idle contest, for they, dearth and famine, prevailed as well as pestilence. The popular saw of the Middle Ages was more correct. It ran thus:

War, pestilence and scarcity,

D'ye hear o' the one, soon the other you see.

And there was opportunity enough in the Middle Ages of testing the correctness of this rhyme; for, for many a century, the history of wars and sufferings alone chronicled the fates of nations. We call them the dark ages, because the history of culture found little or nothing for her pen.

As the light of knowledge grew brighter, the intervals between the wars became longer. The prolonged terms of peace quickened the intercourse between nations, and promoted agriculture, industry, art and science. Notwithstanding the increasing dearness of corn, famine became rarer, and at last so rare that even the old proverbs dropped into disuse. —

The famine in Upper-Silesia (1847—48) was the first in Germany for more than 70 years, the last great famine fever having raged in the years 1770—72. Camp fever had not re-appeared since the great Napoleonic campaigns, when of a sudden before Sebastopol in 1855—56 it broke forth again with all its ancient virulence. Amongst the other rich blessings which a long and prosperous peace had bestowed on nations, was also that of a higher condition of health. Two generations had passed, and pale famine had not reared her head on German soil. Was it astonishing that even in science the old knowledge once possessed had fallen into abeyance?

In the course of this long period medicine had made gigantic strides. Whole new territories of science had been annexed; pathological anatomy had come into being, teaching to note the changes in the internal organs, with a far greater closeness and precision. New methods of examination at sickbeds were introduced, rendering the diagnoses more nicely discriminative. New names for diseases came into vogue; well-known terms, hitherto bearing a general and vague meaning, were sharply defined, and restricted to one idea, while others which had a limited signification were widened and generalized.

Such had been the case with the word typhus — a very old one. We find it in the writings of the oldest Greek Physician which have come down to us — in Hippocrates who was living during the time of the Athenian plague. It literally means fog or vapour, and figuratively from that, a clouding of the mind, insensibility; likewise a condition of the brain in which its action is hindered or impeded, as when the consciousness is obscured and dimmed. We often say our head is so dull and heavy — the thinking powers obfuscated. It used to be supposed this dulness, or torpidity of the brain was accompanied with fever, or was a necessary condition of the same. Anyhow the word upon the whole was little in use in ancient times and still less in the middle ages. In modern times, however, it has been more frequently employed, though it first came into general use during the great Napoleonic wars when it was chiefly applied to *war typhus* or camp fever. Which disappearing with the years 1815—16, the name was retained and applied to other fevers, otherwise known as mucuous, nervous and such like. These were likewise

described as a strong fever accompanied with obfuscation of the brain, and great relaxation of the nervous system. To avoid confusion permit me for the present to call this manner of attack in contradistinction to the above, home-fever (Friedenstyphus).

About the last year of the war 1813 two Frenchmen, Petit and Serres, discovered that the abdominal organs, namely the intestinal glands suffered material changes under this fever. Not long afterwards in Germany, where similar observations had been made in the last century, the fact of these changes in the organs was confirmed, chiefly by von Pommer and Schoenlein, and thereby the conviction gained that this phase of the disease was essentially the enteric typhus (Typhus abdominalis, Ileotyphus). It lasted to be sure some 20—30 years, before this conviction was generally accepted. At present it is a common scientific acquisition.

What meanwhile had been done for camp and famine fever? For many a year no opportunity either in Germany or France offered for more exact investigation, and in England where it did exist, it was not observed with due attention. However the plague of 1848 in Upper-Silesia, the fever in the Crimean armies in 1856 furnished the experience (which had meanwhile been made in England) that those changes in the abdominal organs which were the unfailing accompaniments of home-typhus did not appear. Thus was the fact established of there being *two different sorts of typhus*, the one of which, our common typhus, having nothing in common with either camp or famine fever, while the other certainly did present points of connexion. In a former

work I have called this second *simple* typhus, in contradistinction to that enteric typhus known by its complicated changes in the intestinal organs.

Now the question arises, are camp fever and famine fever one and the same disease? The difficulty of answering this question has been considerably aggravated by the circumstance, that for a long time fortunately, no proper comparative observations on these two forms could be made. Later when the opportunity did occur, it appeared that the cases generally stated as famine fever were again divisible into two different groups, only one of which it seemed could be classed along with camp fever. Let us first consider this one.

One Girolamo Fracastoro, a doctor of Verona, was the first to give a circumstantial description of a pestilential fever which broke out in Upper-Italy in 1505 after a failure of the crops. From a peculiar eruption which came out consisting of red flea-bite-looking marks (*morbus peticularis* or *pedicularis*) the people gave it the name of the "flea-bite fever", which is the origin of the term Petechial fever or Petechial typhus. In Germany the term "spotted fever" was usually employed. In contradistinction to the typhus abdominalis the name exanthematic also came into use. In fact the eruption is frequently so excessive that inexperienced persons, nay unskilful medical men have mistaken this illness for measles.

The connexion between spotted fever and dearth was acknowledged from the very beginning, though from considerations bearing upon atmospheric changes and the altitude of the stars, to which even in those days a still greater significance was attached in the opinion of the

learned, it never came into sufficient prominence. The terrible plague in the years 1770—72 which desolated the whole of the North and a part of South Germany and France, left no further doubt about the connexion, between the same with dearth and failure of the crops.

Those were years of great calamity. Summer cold, winter with hardly any great frost; for the most part dull damp weather with such floods of rain in all low-lying districts that unheard inundations were the sequence. The following are the numbers of rainy days in the respective years from 1768—1772, viz:

1768	177
1769	201
1770	208
1771	175
1772	166,

accompanied by an invariably low state of the mercury, continuous westwind and the light of day almost constantly obscured by trains of flying grey clouds. In the middle valley of the Elbe they reckoned in 1769 nine, in 1770 only five and in 1771 ten quite bright days. On the 30th of May the thermometer reached only 4°, and on July 12 a heavy fall of snow came down on the Hundsruock. The foremost consequence was a total failure of the harvest in the year 1770. The scarcity of corn soon increased to all the terrors of a true famine, more especially in the Altmark, Eichsfeld, throughout all Bohemia and Moravia, Hannover, the Rhenish Provinces and France. Arand, the head physician in the town of Heiligenstadt in the Eichsfeld, has left us a very lively description of his impressions of which the following is an extract:

“Never shall I think but with horror of the misery of our country, of the afflicting distressing and cruel condition of our fellow countrymen. Those who sickened, lay without hope. Hay, second crop, garden fruits, vegetables and grain were spoiled and rotting. The farmer beheld his labours which had cost him the sweat of his brow perish utterly and miserably. Floods of calamity — the most dreadful of them famine — rolled over their heads. You could see the grain on the stalk just sprouting — but unseasonably, and only partially dried by the heat of the stove they were taken and consumed by the famished poor to appease the cravings of hunger. The scant remains were garnered damp; the chopped straw could scarcely be used at all for fodder, while it was impossible to save the thrashed grain from rotting. The former was dangerous for the cattle, the latter for men.

The consequence of three such successive years of failure of the harvest was an incredible dearth, inconceivable alike to the oldest people as to their descendants. The most terrible distress, in short the extremest famine oppressed the poor. Trade came to a still-stand. All the channels of gain were closed. The complete want of money forbade the enjoyment of bread. A sixpenny loaf could not suffice for one person, much less for a whole family, for there was no nourishment whatever in the *dear* (lieben) bread. It was no wonder then that these wretched creatures, in order to support their miserable existence, should take to food fit for cattle, and against nature. I mean for instance, grass, thistles, and unwholesome sorts of cabbage, bran-porridge, roasted rye-gras, vetches and other grain fruits made hot. Nay

the distress at length compelled them to resort to that fare on which foxes feed.

All that was unaccustomed and abnormal nourishment, and had a material influence on what we call *the fever*."

But the fever which spread far and wide, and which by contagion passed to the better classes, was described in pretty similar terms by all observers, under the name of spotted or putrid fever.

Ireland likewise was visited in the year 1771 with the epidemy, spotted fever. I admit that this fact has only recently excited our attention, only indeed since we got to know that it constituted the heading to one of the chapters of human misery. Since now almost two hundred years Ireland may be considered as the *principal seat* of the famine fever. It is not too much to say, that as Egypt was from the plague, so has Ireland ever since 1708 been desolated with ever new visitations of this most malignant of epidemies — the typhus fever (Petechial-Typhus). No other country in the world can be even distantly compared with it in this respect. Public attention and solicitude were chiefly directed to this point since the plague of 1817—19 when 44,000 individuals perished, and the eighth part of the entire Irish population sickened. At that time several cases occurred also in Edinburgh and London, since when new epidemies have followed in quick succession, among which the inconceivably virulent one of the years 1846—1848 calls for notice. It first appeared after a wide-spread failure of the potato crop. The total of those who were seized throughout the whole country was calculated at more than a million, 40,000 being set down to Dublin

alone. The poor Irishmen left their green island in crowd. But whither they went, the typhus went with them. Above 300,000 had been seized in England, chiefly in Liverpool where 10,000 died. In 1847 75,000 Irishmen emigrated to Canada. Wellnigh 10,000 of them perished partly on the way out, partly in quarantine; but all could not prevent its being brought into several American towns. Simultaneously with this Irish plague, although in no immediate connexion with it, famine fever showed itself in Flanders and Upper-Silesia spreading as an epidemy. Since 1836 the population of Flanders had not been in so prosperous a condition, owing to the factories having supplanted the hand-loom; and 1845 witnessed the complete victory of machine labour over that of the hand. Close upon this came in 1846 the total loss of the potato crops, and but a very indifferent grain-harvest. The distress became so great that in many places the inhabitants could only find turnip-parings, dandelions, cabbage-leaves, carrots, diseased potatoes, sometimes a little brown bread to eat. Nay many families could not even procure themselves those luxuries every day. Here the epidemy broke out, and the summing up at the close of the year 1847 showed that the population of West-Flanders in consequence of the numerous cases of death was reduced to the standard of 1841, and the population of East-Flanders to that of 1842. Of 60,377 who were seized 11,900 died, i. e. almost 20 per cent.

The potato disease had come to Upper-Silesia in 1845, and repeated its visit the following year, when the distress became so great that the circles were forced to make loans to enable them to distribute flour to the

poor. The annexation of the free state Cracow by Austria and the consequent imposition of duty blighted all of a sudden the hitherto flourishing linen and woollen trade of the small towns. The poor people had to sell their cattle, then the store of sourkraut the favourite food of the lower classes likewise came to an end, and nothing was left but diseased potatoes, clover and scarcely eatable fruit. The opening of the summer excited great hopes, but copious falls of rain and inundations came later, the potato disease broke out anew, in short the harvest was a complete failure. The fever now broke out. When I published my report in the summer of 1848, the following was the picture I drew: "A desolating epidemic and a terrible famine are raging at the same time amongst an impoverished, ignorant and dispirited people. In the canton of Pless died in one year 10 per cent of the population; six and a half of starvation and fever while the official lists tell us of $1\frac{3}{10}$ of downright starvation alone. In the district of Rybnik, 14.3 per cent of the inhabitants fell sick in eight months of the fever, of whom 20.46 per cent died, and it was officially corroborated that a third part of the population had to be wholly maintained for six months. In the beginning of 1848 the two districts reckoned as many as 3 per cent of orphans. Thirty-three doctors as many priests and brothers of Charity and other helps and assistants were seized and not a few of them paid their charity with their lives." The total number of those swept away by famine and disease in the province is computed at 20,000.

In all these epidemics the number of which we could easily swell, it was the spotted fever with its well-known symptoms that decimated, nay more than decimated the

people. It was, therefore, a natural connexion of ideas that the term famine fever, or famine typhus (typhus famelicus) or famine plague should repeatedly come to be substituted in learned treatises or by the people for that of petechial typhus, exanthematic typhus and spotted fever.

Another peculiarity, however, had meanwhile attracted the attention of medical men. In 1843 Henderson an Edinburgh doctor publicly uttered the conviction which till then had *silently* been gaining ground viz. that besides the enteric typhus and the spotted fever there was a third typhoid disease differing from the enteric fever in the absence of all abdominal changes, from the spotted fever in the absence of the eruption, itself being characterised by the peculiarity of sudden relapses after apparent recovery. It received the name of relapsing fever (Typhus recurrens).

Historical researches have proved that the malady is not by any means a new one, and although it is to be regarded as doubtful whether this form of sickness was known to the ancients and in the middle ages, it may be assumed as a fact, that it has afflicted Ireland epidemically at intervals since 1739. However that may be, it is rarer by far than the other forms. Beyond and excepting Great Britain and Ireland only one great epidemic in Russia 1864—65 and several less considerable ones in Belgium 1865—67 have been as yet described. Since 1855 it has never again reappeared in England or Scotland.

Till now it has never been made perfectly clear what the relations between spotted fever and relapsing fever are. It would seem from the observations al-

ready made that many epidemics at the outset inclined principally to relapsing-fever, yielding at a later period to spotted fever, and in proportion as the epidemic lasts and increases in strength, the relapsing fever loses ground leaving spotted fever to stand alone. Relapsing fever being a milder form of disease, the supposition is not far fetched that it is merely a less malignant degree of the same fever. Trustworthy observers oppose to this the result of their observations viz. that contagion from relapsing fever only produces relapsing fever, and spotted fever only itself again.

This excessively nice question is of subordinate importance for us at present, for it changes in little or nothing its relative position to famine. Murchison who lays a peculiar stress on the distinction between the two says expressly: "Epidemics of relapsing fever come usually with the spotted fever epidemic, always appearing under the influences of want and hunger."

Let us now cast a glance at the war fever. What is comprehended under this name, may according to peculiar circumstance be subdivided into several groups. First in the category comes the dreaded camp fever (*Typhus castrensis*). In the earliest times already they were aware of this danger which frequently brought worse losses in their armies than the bloodiest engagements. It may remain an open question whether the plague which broke out in the naval encampment of the Greeks before Troy assumed just this form. It is very much more probable that it was that malignant camp fever which in the year 395 B. C. raged among the Carthaginians when they were besieging Syracuse under Hamilcar, and of which Diodorus has left us

a description. However the plague which broke out in the army of Ferdinand the Catholic, when laying siege to the Moors in Granada in 1490 is now regarded as the first undoubted epidemy of putrid fever; it cut off 17,000 men. The French host suffered still severer losses in 1528 in the camp before Naples, about the same period to which Fracastoro's classical description of spotted fever in Upper-Italy belongs. The French policy of intervention in Italian affairs which for so many centuries has troubled the fate of that lovely country, met at that time with its first decided check to which camp fever did not a little contribute. Thirty thousand French succumbed before the pestilence in sight of Naples, amongst whom their leader Lautrec.

It is uncalled for to pursue the history of camp fever through the long series of the wars of the middle ages and modern times. Let us conclude with a glance at the latest camp fever — that before Sebastopol. Typhus first appeared among the Allies in the December of 1854, after its having already taken some dimensions in the Russian army. It very soon found its way to Constantinople and into all the hospitals erected there. In the course of the following summer it almost entirely disappeared; then again in the December of 1855 reappeared with greater virulence spreading this time not only to Constantinople, but likewise to the hospitals of Marseilles, Toulon, Avignon, nay even to Paris. Odessa, Varna and the Turkish army in Asia Minor were seized. Jacquot, a French army doctor, calculates that in this second epoch of the French army alone, which was 120,000 strong, 10 per cent fell sick. The mortality, however, among the cases rose to 50 per cent.

The Crimean war exemplifies to us that it is not the besiegers alone who are exposed to the typhus but the besieged as well. There are fortress fevers of a more pestilential sort than are the camp fevers. The plague of Thucydides was such a one. It was engendered within the walls of Athens when the Attic peasantry crowded into the town from all sides seeking protection from the attacks of the Spartans. During the Napoleonic wars there were few of the larger fortresses in which during the state of siege the typhus did not rage. Saragossa, Mayence, Gaëta furnish us examples. Torgau was the scene of one of the most desolating epidemics in 1813. In this little town of 5100 inhabitants, 8000 horses and 35,000 men were cooped up together; in the time from the first of September 1813 to the surrender of the place the tenth January 1814, 20,435 men died in it, 19,757 being soldiers and 680 burghers. The total of mortality among the citizens in the time from January 1st 1813 till end of April 1814, within 16 months amounted to 1122, that is to say, to almost a fourth. The same year in Danzig two thirds of the French garrison, and a third part of the population fell a prey to diseases.

But later times have increased the number of typhus forms by giving us the knowledge of a third sort of war typhus of which the ancients were ignorant, hospital fever (*Typhus nosocomialis*). It was doubtless a great step in human progress, when war-hospitals were begun to be built, wherein to lodge and nurse wounded and sick soldiers. However there is no human arrangement but brings some form of suffering along with it, and every onward step is taken amid errors and mistakes. Thus the war-

hospitals turned to new sources of the typhus; very frequently real hotbeds of contagion, sending forth far and near their pestilential breath. After the victories of 1813 our own capital Berlin was taught to know what hospital fever is in its worst form.

Let us in conclusion touch upon ship fever (*Typhus navalis*), once the scourge of the navy, chiefly of the prison-ships. Fortunately it has diminished in proportion as good food and cleanliness have become the rule in war ships. We must hope that it will soon be unknown in emigrant vessels.

In the majority of cases camp fever is undoubted spotted fever. In some epidemics only, viz. in those in fortresses it was clearly a question of enteric typhus. As a general rule we can always assume that camp and famine fever may be regarded from the same point of view. But if this is the case, the question suggests itself: viz. what resemblance obtains between the incidents of war and famine so as to account for the similarity of effect? —

This brings us to the question of the grand causes of typhus which it is all the more encouraging to treat here as each man may choose for himself instructive points of view. It is at the same time of general value in so far as it offers an excellent example of how clearly and sharply defined modern science stands out as contrasted with the more or less mystic mode of thought of the ancients.

The old world referred every unusual appearance to special and divine intervention. Did they believe in many gods, it was then one of those who sent the scourge. Did they believe in one God, it was presumed

to be a dispensation from him. Herewith all research, properly so-called, was at an end. For would it not be audacious for the finite spirit of a mortal to divine some reason for a divine act? However terrible a burden the plagues were to bear which the Deity sent, there was no alternative but to submit. At most they were suffered to meditate on their own sinfulness and hope by atonement for the wrongs committed, to avert the wrath of God from themselves, and their friends.

To this the nations of the East added their belief in the stars. Though these were likewise heavenly bodies raised far above terrestrial vicissitudes, still it was but a step to invest them with a sort of personality, nay even to take them for divine emanations fitted out with miraculous powers. The sun and the Sun-God, the moon and the Goddess of the moon blended into one. Symbol and idea were no more two but one.

Notions of this hazy and therefore intangible sort ruled human thought till far into the Middle Ages. Added to which, as the circle of the experience of nations widened, many peculiar views embracing another class of influences which although within the bounds of nature and possibility, still savoured of the supernatural. Comets, meteors, earthquakes and eruptions of burning mountains, were carefully noted and closely associated with the outbreaks of pestilential diseases. Thus although the events were natural they still retained somewhat of the mystic, the inexplicable about them. And thus also in addition to the fact of the natural phenomenon remained likewise the power of ascribing the scourges and afflictions imposed on sinful man to a peculiar and divine Providence. I need scarcely remind my readers

how popular the use of this formula is at the present day. —

Amongst the learned likewise, and quite especially among the chroniclers of great plagues there are even yet not a few who "first and foremost" incline to fall back on comets, earthquakes and such like partially unexplained occurrences, instead of busying themselves with the investigation of the proximate causes and effects on and about the persons and circumstances of their patients. This bent to explain the individual occurrence by the whole is deeply-rooted in the human mind; the circumstance that the whole may be dark does not deter them from considering this as the most preferable method, being moreover as a rule the least laborious.

Here lies the line of demarcation between ancient and modern science. Though far be it from me to positively wish to dispart isolated occurrences bounded by time and space from preceeding or simultaneous, though perhaps distant events. We simply do not start with this reflection. We are not satisfied with merely marvelling, at the fact, as for the rest, at something inconceivable, rather to be considered in relation to the whole than to be exactly explained. We prefer to make it our task to follow it up and comprehend it in the time and space in which it begins and ends. Meteors and vulcanoes, earthquakes and storms are therefore generally speaking *not* the starting point of our investigations into the causes of disease, and still less so, when the diseases appear in places remote from those, where orcanes, earthquakes or vulcanoes exercise their power to destroy. The soil on which the sickening population dwells, the air they breathe, the water and food they take, their social customs, their domestic

life, their homes, their occupations — those are the points to be studied and kept in view while seeking to probe the originating causes of a large proportion of the diseases.

I do not here pretend to say that it is *only* the *proximate* causes that are to be considered, or that appearances in the heavens have no weight in the enquiry into the origin of sickness. Even now the newspapers are filled with reports about showers of meteoric stones of an unusual kind. Storms and earthquakes, to such an extent, or in such violence and frequency have for long not so disquieted the northern portion of our globe as just this winter. Vesuvius is again active. In several places new islands have arisen from the bosom of the deep. Is all this and the famine fever in Ostpreussen a mere accidental coincidence? Are there *no* signs of some general connexion? Is not the finger of God plainly discernible in this? Far be it from me to assert that chance produces such phenomena with less or more of regularity. Contrariwise I can here very well conceive an internal bearing; however with this proviso — we are not to imagine that the afore-mentioned phenomena have an *immediate* influence on the breeding of disease. One simple consideration gives room for the possibility of a mediate connexion.

Storms are beyond doubt the results of great inequalities in the distribution of heat over the surface of the earth, and the expression of a straining after equalization in those parts of the atmosphere where inequalities in weight and tension have occurred. Great inequalities in the heat of the surface of the earth have a decided influence on the distribution of the water, on its evaporation, on the atmospheric precipitates, on the

highwater mark of rivers and lakes, wells and springs. Again both the state of the air and that of the water have an effect upon the growth and development of plants, and through them upon men and animals who derive from the vegetable kingdom a material part of their sustenance. They even exercise to a certain extent an immediate influence on the state of health among men and animals; for heat and cold, damp and drought may be in themselves causes of disease. —

In the same manner it cannot be denied that the terrestrial body itself may be affected by the unequal distribution of heat. And it is in my opinion a question of the highest importance to discover whether earthquakes and volcanic eruptions are not a consequence of the one part of the earth being disproportionately overheated and desiccated, others being at the same time in an equal degree chilled and submerged, thus giving rise to unequal contractions and expansions in the outer crust of the earth. We may even go a step further and point out that the distribution of heat over the surface of the earth depends on the amount of warmth the latter receives from the sun, and that this amount may in its turn again be determined by many other celestial occurrences, possibly even by showers of meteoric stones (asteroids), the extent of the influence of which has as yet by no means been made clear.

For myself personally the enquiry into the connexion between epidemic diseases, and celestial and terrestrial phenomena is not only admissible but positively necessary. I do not by any means consider it as a matter of indifference, that just at present, while our country is afflicted with famine fever, the greater part of those

phenomena known in former years of plague, are again present, and with more than usual force. But nothing strikes me as more remarkable than this other fact: viz. that not unfrequently do failure of crops and famine start up simultaneously in remote parts of the earth. When in 1770 the famine fever broke out in Germany, a terrible famine prevailed in East-India the result of a bad rice harvest. In Bengal, "the most fruitful land on which the sun shines", the mortality became in consequence so great, that the number of deaths was reckoned at 3 millions — a third of the entire population. While the scarcity in the northern countries of Europe was a consequence of a succession of cold wet weather, a continuous drought and heat had killed vegetation in the Indies.

And is not that very striking? Let us recall likewise that the succession of cold wet seasons that have now brought us distress and disease, were preceded by a famine in East-India, to master which neither the practical genius of the English nation nor her inexhaustible resources sufficed. Again it is quite to the point that while in Ostpreussen we had scarcity and dearth a consequence of falls of rain and inundations, in the subtropic countries on the other coast of the Mediterranean, Morocco, Algiers and Tunis, people were dying by thousands of starvation. That is quite intelligible.

But it is just as intelligible that we cannot meet such crises with religious observances. A wise and joint foresight is only practicable by extending the network of scientific observations. We are proud of being able to read now every morning in our papers the state of the weather in a couple of dozen of European places.

Our agricultural society think they do no small service when, after the respective seasons they can sum up the weather that a few neighbouring European countries and North-America have had for seed-time and harvest. This is but a beginning of what must be. With the co-operation of meteorology, agriculture, trade and medicine and with the aid of an increased number of stations for scientific observation over the whole face of the earth, such as Alexander von Humboldt has already instituted for a limited purpose, it will in future be possible to descry and avert the coming evils of starvation and sickness, or at least, when this is not practicable, to mitigate their effects.

To this view are opposed two others in as far as typhus is concerned at least. A few who still incline to the older notion of the celestial origin of plagues, are disposed to accuse wind and weather as principal agents. I am far from being inclined to rate their influence low, as I think I have already shown in my picture of the typhus in Upper-Silesia. And here I wish to impress the striking fact, that in simultaneous cases of dearth in wet and dry regions, only those in the wet were exposed to famine fever. In Bengal in 1770 this malady was unknown notwithstanding the widespread distress, while in North-Germany it prevailed everywhere. Now the harvests had failed in India by reason of heat and drought, and in Europe by reason of cold and wet. Here then is a point to be noted — *weather alone does not produce typhus*. Were this the case we should be very powerless to succour, for who can change the wind and weather, or protect out-door workers from their effects? Fortunately there is no “airt the wind

can blow", and no weather either which can of themselves breed typhus. That they both bear a powerful part in inducing the conditions favourable to the vivifying of typhous germs, and likewise aid the beginnings and spread of typhus itself, cannot only not be doubted but can be deduced from what has already been said. However it is one thing to aid in creating the conditions and another being the conditions themselves. This point has been discussed by me more at length in a former work. —

Another pretext rests on the contagious qualities of typhus. They are much exaggerated, though it has been so far proved that typhus, and more especially spotted fever, can be contagious and that in a very high degree. The assumption that spotted fever spreads by contagion is handy, and this explanation has been freely made use of. In the times of Thucydides many held the opinion the plague had been brought from Egypt to Athens. Both at the siege of Granada in 1490, and in 1505 in Upper-Italy, the report was rife that the plague had come over from Cyprus. In Silesia the epidemic of 1848 was suppositiously derived from Galicia, as now in Ostpreussen they pretend it has come to them from Silesia. In Galicia again it was referred back to Poland. The disposition in England to look for the beginnings of every new epidemic in Ireland is so strong, that the spotted fever is simply termed Irish fever. An observer, Popham by name, says: "Typhus pursues the Irishman to whithersoever he may transplant himself and his misery." And in fact, he not only carries the disease again and again across the ocean to the sea ports of North-America, and to the large commercial and

manufacturing districts of England and Scotland, but in his own country, their filthy dwellings swarming with inmates and vice, form an abiding harbour and homestead for epidemics from which they are ever ready to issue forth, to spread death and desolation all around.

Upon such a testimony one would be inclined to believe that spotted fever, like cholera, the plague, and the more notable eruptive diseases (small pox, scarlet fever, measles) with which in so many points it bears a resemblance, were bound to certain homes, certain never varying centres from which from time to time it radiates. Were this the sole source of the great epidemics the chief consideration would naturally then be, how to stem the current of contagion by opportunely debarring all intercourse between typhous places and their surrounding neighbourhood. —

That however is far from being the state of matters. In Upper-Silesia where they pointed to Galicia as the cradle of their calamity, it turned out on closer enquiry that the fever had been hanging about the province to some small extent long before 1848. Further the disease was not carried beyond a certain territory even although persons struck with it came as far as Liegnitz and Berlin. Breslau in constant connexion with Upper-Silesia remained quite exempt. Not till the year 1856 when the illness assumed a very mild form of epidemic in Upper-Silesia did the spotted fever come to light in Breslau maintaining ground there for several months. But the experiences of the past are too apt to be forgotten or perhaps we never get to know them at all. As long as the history of medicine is indebted for its increase to voluntary individual contributions, it will

always remain incomplete, because the greater number of medical men withhold their observations. And the Government organization of public sanitary measures is, with the exception of a few places, so backward that reliable reports on single districts or periods cannot be looked for. Hence the oft recurring mistake of the malady being regarded as something new where it has already and repeatedly prevailed. Such is the case with the Province of Ostpreussen. Stray reports about the presence of this epidemic in that province go back to the year 1836. In Danzig itself a slight epidemic prevailed in 1848. It is here as in the Russian Baltic Provinces and in Poland from whence accounts drop in at intervals.

The narrower we observe, and the closer we inquire, the fact of the spotted fever being much more prevalent than is suspected meets greater confirmation. Apart from those public epidemics, as we may term famine and camp fever on account of their claim on the general sympathy and aid, there occur numberless detached cases (so-called *sporadic*) which are not unfrequently falsely treated, the medical men themselves not possessing adequate experience in that form of suffering. Since 1848 when the eyes of observation have been quickened in Germany, quite isolated cases, or small groups of cases of exanthematic typhus have been described in spots far from the abodes of the chief epidemics. Detached cases were received into the hospitals in Würzburg in 1855 and in Berlin in 1863. A somewhat larger number of cases was brought under observation in Leipsic in the winter of 1853—54 which indeed seemed traceable to the Harz-forest country, and the Erzgebirge. Since

the spring of 1867 there has been again a slight epidemic prevailing in Berlin which is not yet extinct. My observations in my departement of the Charité hospital have shown me the disease to be in a very high degree contagious. Many of the patients had obviously brought their maladies with them from other places having arrived here sick from Stettin, Magdeburg etc. Others again sickened here without its being possible to establish the fact of contact with the strangers. They were for the most part poor inhabitants from the North of the town (Berlin), the workmen's quarter. About this very time a violent epidemic, though limited in its extent prevailed in Vorpommern (Pommerania). It took first the roadside labourers, but afterwards spread further. At present the spotted fever is in Vienna.

In many of those milder epidemics, the possibility of their being first brought in and spread by neighbourly intercourse so as to form groups of cases cannot for the present be gainsayed. Investigations in this direction must for the future be much more exact, as well as the system of interrogating. I may nevertheless here adduce the authority of such medical men as live in the so-called typhus districts who express it as their conviction that alongside of transmission by contagion, there is an independent, or figuratively speaking, a *spontaneous origination of the spotted fever*, as in general there is thought to be of the enteric fever.

Let us now consider the conditions which favour the development of the typhus fever, or in the strictest sense of the word the *causes* of the disease. We must first of all call attention to the fact, that through almost every century one fundamental notion has influenced the

opinions of both medical and lay observers relative to the nature of typhous diseases, viz. that the human body becomes impregnated with some principle foreign to it and therefore injurious, which principle represents the centre point of the malady. The ancients called it *miasma* "pollution", and the condition of the human body which its reception occasioned *infectio* "pollution". In the large manual of pathology and therapeutics which I in conjunction with some eminent clinical authorities in Germany recently published, I restored this conception of the thing by classing them all in the corresponding section under the name of infectious diseases (Infectionskrankheiten).

But what is now this impure principle? And whence comes it? It used to be the custom to derive it from a sort of foulness or corruption now in the air, now in the water or in the food. Hence the term putrid fever which has so frequently been given as the generic title to the whole group of fevers here treated. The greatest stress was laid on the corruption of the air in this system. Herein a partial attempt is at least observable to discover single new and nearer references between typhus and some widespread diseased conditions of animals and plants. For instance in Posnania the simultaneous appearance of the cattle plague was thought of the last importance. This simultaneousness, however, holds good for only certain epidemics, not even for all in Slavonic countries, and not at all for Ireland. More to the point is the question of its affinity with certain diseases in the vegetable kingdom which of late years have attained to such prominence, as the grape disease, or more especially the potato disease. Botkin in Pe-

tersburg absolutely contests for the relapsing fever the possibility of its being engendered by the use of diseased potatoes.

The history of the potato contains certainly many bearings on the question that here occupies us. But the first great epidemy of the potato-disease does not fall till the year 1845, and although we cannot deny that just the great scarcity of the years 1846—48, and conditioned by it, the outbreaks of famine fever were to a very considerable extent occasioned by the failure and disease of the potato, still this does not hold good for all epidemies of spotted fever since 1845, and at all events not for those *before* 1845. Nay the spotted fever existed in Europa before a potato at all was to be seen on this side of the ocean. —

The first potatoes were introduced into Spain in 1565 by Hawkins from South-America, from whence they found their way into Italy in 1580. Here they received the name of Tartoffi or Tartoffuli from which our German word (Kartoffel) is said to be derived. Their introduction into England was without any reference to the above. Sir Walter Raleigh brought seed with him from Virginia in 1584 rearing them on his property Younghall near Cork. Thus was bestowed on Ireland this root of which it is justly said it has been at once her blessing and her bane. A new importation reached England through Francis Drake in 1585. But a very long time passed before the potato became even a common food. For many years they were merely a dainty for the highborn, and the people so obstinately refused to cultivate them, that the government thought it a duty from time to time to use coercion.

It is believed the first potatoes in Germany were cultivated in Bieberau in the Odenwald 1648. They did not reach Prussia till 1720; the prejudice which existed against them however, first gave way under the pressure of the great dearth of 1770—72. Seventeen hundred and seventy is generally considered as the year they were brought to France.

This short sketch will have been sufficient to prove that the potato and the typhus have no immediate connexion, though of mediate much. In less than a century this vegetable has mightily affected not only agriculture but the whole of social life in Europe. Its comparatively great productiveness renders it possible to maintain a far denser population on a certain extent of ground than could be done by the cultivation of corn alone. The potato has become, so to say, the corner stone of the existence of the "small man" in rural districts. The workmen and artisans of small towns even find in it a comparatively abundant source of nourishment. For a long time therefore the introduction of the potato appeared to be only a benefit, nay the probability was canvassed of never more knowing what famine was.

But the reverse of this innovation was too sad. We have long been aware that the potato but very insufficiently supplies the body with all the aliment requisite for its growth and maintenance. Excellent as it is taken along with a due proportion of animal food or fatty matter, its value as a main aliment is doubtful, especially for a labouring population who are restricted to the potato and its product — alcohol. It is not enough that such a people's muscular power gradually diminishes, that they become weakened in consti-

tution, and thereby contract an increased disposition to disease, but — *a single failure of the potato crop or at most a second, witnesses such a people on the threshold of starvation.*

That *was* the case in Flanders and Upper-Silesia, that *is* the case in Ireland and Ostpreussen. Properly speaking these populations are alway standing at the gates of famine — let distress come and they are helpless. The so-called “practical men” then say — the people are accustomed to it, matters are not so bad for indeed they have never been otherwise. In Silesia in 1848 they were even apprehensive the people should be spoiled by giving them flour! And if they got none, why they had — to starve! What an alternative! It is indeed “*so bad*” with these people that every intelligent and practical man should make it his task to persuade them to grow something else besides potatoes. Such a state of matters must and dare not be given as a reason for not succouring them in times of scarcity, or of giving them but lukewarm aid. It ought rather to form a weighty and powerful motive for rendering them assistance, and giving them a vigorous “lift”, before distress again overtakes them.

Potatoes are doubtless in intimate connexion with a state of famine, but we are not prepared to say that, either sound or diseased, they breed typhus. They have on the contrary done a world of good, for they have been the means of expelling other epidemics which formerly afflicted the people in years of scarcity. I shall confine myself to the mention of the raphania (ergotism), a sort of disease under which the nervous system suffered greatly, while of typhous symptoms there were none.

This affection was referable to the too abundant use of blighted corn in bread and farinaceous food. Up to 1770—72, the years of the great famine, it here and there made itself disagreeably prominent; since then it became gradually rarer in proportion as the people have grown more potatoes, and the farmers have bestowed more attention on keeping their fields clean.

The causes of scurvy are to be sought for in another set of conditions, as in the defect or too little variety in the aliment, and in the want of all vegetable food. It likewise is now almost unknown in Germany where once with every dearth it too plagued the land. It nevertheless does appear now and again in single or in groups of cases. No longer gone than last summer, among my first cases of spotted fever in the hospital, there was a half famished man far gone with scurvy. Recovering from this he was unfortunately infected with spotted fever. The Crimean war furnished us with numerous instances of scurvy as well as of war typhus, especially among the fleet, when the difficulty of procuring fresh food naturally increased the disposition to such diseases. Typhus, however, cannot like ergotism and scurvy be referred back to certain properties in the food, or deficiencies in the means of nourishment. It has rather invariably been the prevalent custom to believe that several coexisting conditions and the co-operation of several noxious principles (*Schädlichkeiten*) are indispensable in order to produce what is termed "cause of typhus." Under the head noxious principle we class: 1) *want* (bad food), 2) *overcrowding*, 3) *effluvia exhaled from excrementitious matter*.

The latest English writers have recently begun to

attempt an disentanglement of those noxious principles or elements. Murchison in particular has not scrupled to make each of them bear on one of the three forms of typhus. He derives relapsing-fever from scarcity, spotted from overcrowding, and enteric from filth — that from the common sewer. This division has something to recommend it, in as far as it brings a desirable simplicity and clearness into our views, and affords the memory convenient holds. Just for that reason, however, it must be accepted all the more cautiously, for in my opinion it is only partially correct.

Beginning with scarcity, I say, I do not consider it sufficient in itself to produce one of those phases of typhus. The history of human suffering has noted many a famine year unaccompanied by typhus. I have already repeatedly alluded to the great famine of Bengal in 1770. After Kennedy the dearth in Ireland from 1725—27 was not marked by fever. In the February of 1852 I was despatched by the Bavarian Government on a mission to the Spessart where great distress prevailed, but nowhere did I meet with the typhus fever. It may perhaps be of some interest to give a few short quotations from my then report.

Already had the years 1846 and 1847 brought bad grain harvests and a consequent dearth in the Spessart, though potatoes and fruits had turned out tolerably, while the cold damp weather of 1851 brought on a regular famine. "The failure of the potatoes was so complete, that in many places it was not considered worth the while to lift them, and the continuous rains rendered it impossible for many to lead in the corn which moreover was barely ripe. The hail had already damaged a

part, as did the autumnal rains the hay, the only thing they had to fall back on for the maintenance of their already reduced number of cattle. The pigs, the main resource of the Spessarters and their chief source of income, had to be sold without delay as the potato did not even promise sustenance for man." By the time I reached the Highlands things were looking very bad indeed. "The scarcity had reduced the means of livelihood, at all times spare and scant, to the very meagerest dimensions. Butcher's meat, at no time a general fare, was almost not to be seen; butter was rare and milk equally so. The fewest could bake bread from their own stores, for even the buckwheat was used up. Some had nothing but flour of which they prepared a soup devoid both of strength and flavour. Others had still pease, lentils or beans, the best fare under such circumstances, but they had been cultivated so sparingly that they rather formed an exception than otherwise. Many used dried and mouldy barley or in default of that withered turnips minced up, of which a coffee-like decoction was prepared and drunk, the grounds being then saved up for their midday meal. Luckily the potatoes which had been lifted diseased did not go further in the cellar. But in many places they were only half grown, extremely small and watery; many searched the field painfully for the roots forgotten in harvest or left there on purpose. Comparatively abundant and therefore much used was cabbage (Sauerkraut) and turnips."

The distress had certainly nowhere reached such a pitch as to cause deaths by starvation. But it must be confessed that the above description betokens a scarcity such as has not been exceeded in many wars notorious

for typhus epidemics, a scarcity which by its duration and extent had well produced typhus, if starvation alone could do it. What we met with amongst the people was however not typhus, but a peculiar condition of exhaustion, weakness, heaviness and torpidity of the brain, mostly devoid of all feverish excitability. This I termed the *famine-state* (*status famelicus*). A number of the cases reminded of a mild form of typhus, but nowhere had contagion been proved; the result appears to have justified me in my conclusions of its not being typhus. The establishment of soup kitchens, the distribution of bread, rice and food of like kind removed the symptoms wherever they appeared.

I lay all the more stress on those observations of mine, as the very same part of the country had on a former occasion been desolated by the war typhus or camp fever. When in the March of 1813 a French military division had been collected about Aschaffenburg having brought the spotted fever with them from Poland, a mild form of epidemy was detected. After the battles of the summer and autumn (Luetzen and Leipsic) the war hospitals became more and more filled with such cases, and now spotted fever spread over many of the localities of the Spessart, a few straggling cases occurred even as late in 1816 and 1817 as a sort of winding up.

To all appearances the strongest proofs of typhus being an effect of starvation alone, are the experiences of the Scotch doctors of the influence of a crisis in trade on the spread of the spotted fever. So it was that after the great commercial crisis in 1842 a sixth of the poor throughout all Scotland was seized with fever, the middle and higher classes being exempt. In two months there

were more cases of typhus than in the previous twelve years. In Glasgow in 1843, 32,000 fell sick or 12 per cent of the population, of which 32 per cent died. It must be premised, that between 1838—41 the price of corn had risen greatly, that in 1841 the crops had failed, but the harvest of 1842 had been excellent. Here then we have a case where with a good harvest and no scarcity of provisions the typhus breaks out and spreads. It is rather to be ascribed to a *shortness of money* preventing the poor procuring themselves proper nourishment. What besides marked this period, was an unprecedented increase of crime. We draw from this that so close a connexion does not subsist between dearth and disease as might perhaps be presumed from the usual course of things. *How* distress, *how* want arises, is no solution, — the question is, that it does arise. Murchison says: "A careful study of the epidemics of spotted fever demonstrates a close connexion between the same and periods of distress and famine. They appear in every climate, in all seasons and in all weathers."

The history of the camp fever too, teaches us to recognise the influence of want as a causative condition. In the besieged fortresses as in the tents of the besieger, disease as a rule spreads in proportion as the support is inadequate. Recently Jacquot frankly demonstrated this of the Crimean war. He concludes his remarks with these striking words: "Typhus is less the work of circumstances than of the men who influence and determine them. It is not the result of the conditions under which war is carried on, or better said, it is not war, but the men who wage it that breed the typhus." However among the blunders committed

Jacquot particularly emphasises defective nourishment, from the fact, that the losses in the English army at the commencement of the war, when the commissariat was so blameworthy, were by far greater than among the French troops; while afterwards the proportion changed, as after great exertion the English soldiers were better cared for.

The comparison of the various modern wars with each other appears to me to be especially interesting just in reference to this. The shorter wars as the Italian of 1859, and the Bohemian of 1866 must naturally be excluded, for the typhus demands a certain time to form and develop. But there can scarcely be a greater contrast than between the great wars at the beginning of the century, and the Crimean war on the one hand, and the American war of Rebellion on the other; camp fever in its most virulent aspect raging during the two former, while we miss it almost entirely in the latter. After the official reports of the members of the Medical staff of the North-American army the spotted fever occurred only at intervals, and to a limited extent, though the troops lay in great numbers and for a longer time at single places, many serious febrile symptoms exhibiting themselves. But nowhere has any nation expended so much care on the providing an army with food and all appliances for the preservation of health as did the American people in this war, every class in society vying with each other in noble emulation.

Granted want alone does not produce typhus, still in a great measure it prepares men to receive and develop it in their system. A population reduced and weakened by hunger offers the most favourable soil for the growth

of an epidemic even supposing it has been called forth by other causes. Nor is this to be overlooked, that in the fewest number of cases a simple withdrawal of provisions takes place; it is the resorting to all manners of substitutes, and those frequently of the very worst sort; thus introducing noxious elements into a system unable to offer resistance. Whether the decomposed state of those substitutes only partially deserving the name of food, is of force to produce typhus, I leave unanswered, as modern research has overturned many apparently incontrovertible facts of by-gone experience. In any case it is undeniable, that food received in a corrupting state is to be reckoned to one of the most preparative and promotive causes.

But what we have termed overcrowding has an immeasurably greater influence. It was first in the history of the prison fever that our attention was particularly directed to it. And at this moment it deserves our special study as at present in Ostpreussen, the prisons have again been pointed out as suspicious centres, from whence typhus spreads. One of the first writers who have called our attention to this is Lord Bacon. He ascribes the baleful influence to the prison atmosphere which is engendered when prisoners have been shut up for any length of time in close dirty rooms. He tells how dangerous it is; for in some instances during the legal proceedings judges as well as a great number of the audience were taken ill and died. Such trials received in England the significant name of the "black assizes." A whole string of them is enumerated in the period between 1522 — 1750. In the last year at the Black Assizes in the Old Baily, died four of the six

members of the judges' bank, the Lord Mayor, two judges and an Alderman, besides a large proportion of the officers of the law.

Sir John Pringle, the recorder of this tragic reminiscence, accompanied the English army in 1742—43 to Germany, afterwards to Flanders and Brabant, as physician-general, and there first became acquainted with war typhus under the phase of hospital fever. He was the first to detect and prove the identity of jail with hospital fever and to trace both to noxious effluvia corrupting the air. Since Hildenbrand in his celebrated work "On contagious typhus" went over to his view, and clearly stated that "an excess of human effluvia is alone the source of all typhous matter," it has become general, especially for spotted fever which is for the most part presumed to originate in this manner.

But here I must remark that this in my opinion is a too partial view of things. A certain disproportion of space to the number of individuals in it never fails to deteriorate the atmosphere, it may be to such a serious degree as to occasion the death of one or more individuals; but it is by no means said, that spotted fever is thereby engendered, or that death is a consequence of that fever. So much as for the present can be said, is that want of proper nourishment and above all a very high degree of uncleanness, are among the primary causes of spotted fever. The worse the ventilation and the rarer the admission of fresh air, the more rapidly is typhus miasma formed in a confined space.

Such a confined space may be a prison cell, a sick room, the hold of a ship or a casemate — the *where* is indifferent. Nay the close space may be found, where as at

a first glance one would suppose just the very reverse. An army in the field, labourers by the roadside, the population of a village — all such are apparently so constantly in the open air that one must presume all the conditions present which are requisite for the dispersion (i. e. the rendering innocuous) of the foul miasmata floating in the atmosphere. Nevertheless we find here a union of circumstances perfectly similar to those found in filthy prisons. So long as an army is on the march I admit it is not apt to breed typhus; at the most it may get it by transmission from others. But let an army encamp or go into quarters, more especially in bad weather, when the men crowd together in their tents or rooms, you have all the requisites for overcrowding. Labourers on a highroad erect themselves mud huts of the very smallest dimensions, with space for only the occupants and their tools. Just in such mud huts, burrows I should say, has spotted fever recently been bred in Vorpommern and Ostpreussen. The more inclement the weather is, the greater necessity for the labourers to seek for refuge from the wet and cold in those close damp dirty holes, and so much the more are they exposed to be seized by illness.

The same holds good of town and country dwellings. The fort or siege fever may serve as the precedent for such class of cases. To exemplify them we have one only case to adduce, the circumstances of which in all respects resemble those of a siege. In the severe winter of 1808—1809, when the most piercing cold alternated with the mildest weather, the fort Castel opposite Mayence, in itself a close dirty place, overcrowded with a quantity of stranger pioneers, who, the fortification works being interrupted on account of the cold, pined with

their numerous families in the most abject state of misery. They housed mostly in stables, casemates, or in barns, starving and vainly hoping from day to day for the works to be re-opened. At length the Rhine likewise went beyond its banks, and all the low-lying land as far as the eye could reach was under water, Castel with its bulwarks looking like a floating fortress on the great watery waste. Under these circumstances towards end of the year 1808, the typhus fever broke out among those unemployed hands. Rapidly it passed to all classes leaving not a doubt of its contagious qualities by its spreading in time to Hochheim, Russelsheim and Florisheim, all in the neighbourhood.

Every single house may at times be likened to an overcrowded fortress. I have already adverted to the hovels of the Irish labourers as to hotbeds of fever. Any set of people occupying a space disproportioned to their number incur the danger of sickening. There is the Silesian district of Rybnick; for a course of thirteen years the number of the inhabitants had outgrown that of their dwellings, the proportion of increase being that of twenty to one. It is easily intelligible that among a rural population such a huddling together of dwellings is productive of more evil consequences in winter than in summer, when almost every one is at work out of doors; whereas in the cold season the inmates are bound to the house, every opening, as windows and doors, being kept as close shut as possible. Such a state is naturally aggravated under the pressure of want of work and food and fuel, when the whole household in fact, in a state of dull depression, are huddled together in a single room. That is obviously one of the reasons why spotted fever

so frequently breaks out in winter and in years of famine.

There is formed then a house, I may likewise say, a room miasma, as in an overcrowded hold, there is formed a ship's miasma which, however it may arise, engenders a ship's fever among crew and passengers. Thus we have a limited epidemy that we may without further scruple term a house fever or room fever. Any one entering such a space and remaining some time in it is exposed to the danger of falling sick, not exactly by contagion, for he simply sickens as any one going to a marshy district is exposed to catch marsh fever (intermittent fever). It may likewise be carried from place to place by means of clothes or other substances, not that I should exactly say by contagion in the common acceptation as from man to man.

This explains many of the contradictions relative to its contagious qualities which are understood now in a wider, now in a narrower signification. Thus also is explained, be it remarked, the close connexion between the different sorts of war fever, and the varieties of famine fever, scarcely be intelligible but for the middle connecting links here specified.

We dare not however overlook that in all those phases of distress the third point mentioned above comes into prominent consideration. The corrupt nature of spoiled provisions, the impureness of the atmosphere caused by the effluvia from human dwellings have all been insisted on, only the impurity or pollution arising from human excrement remains to be mentioned. Latterly the medical men have inclined more and more to the view that the enteric typhus, differing in some degree from the

spotted may be traced back to this source. The great strictness with which sanitary measures are enforced just in England, the great care bestowed on keeping the privies, the sewerage and drains in a clean wholesome condition, of preserving the drinking water and the water of the rivers pure — all this is the result of the conviction, that neglect of public cleanliness in towns and villages, as also in private dwelling-houses, revenges itself at no distant period on body and life. Whether we incline more to the supposition that noxious particles are diffused in the atmosphere from accumulations of human excrement, and again received into our bodies by means of our breathing organs, or whether we prefer the view, that bodies in a state of decomposition penetrate the soil and so reach the wells and the water men drink, in any and every case the point is to remove the filth, before it passes over to a state of decomposition and assumes the qualities of "typhus poison."

How nigh the notion of the presence of real poison is among a sickening population, and especially of its being in the drinking water, is shown us by the conceptions of the Middle Ages. At that time few epidemics ran their course that the suspicion of poisoning the well did not attach to some one; the fury of the populace turning first against the Jews. Epidemics and Jewish persecutions seemed by some internal law of necessity to go hand in hand — a sad instance of how the human mind even in the perfectly justifiable path of investigation can by prejudice be diverted from the true course, and end by making the innocent suffer for the guilty. Many in those our modern days incline very much to make, not the Jews, but the demo-

crats responsible for all the evil now wrought in the world! With what pleasure do we lay our own burden on the shoulders of others! No doubt the wells were poisoned but not by single malicious individuals, but by the general negligence. The criminal is not a stranger; those who raise the hue and cry are themselves, though unwittingly, their own worst enemies. Negligence and ignorance — those are the foes that must be combated, and every typhus epidemic should first of all be serviceable in disseminating common sense notions about the causes of disease, and calling upon all to promote by word and deed public and private cleanliness. Bodily diseases should be regarded as nothing short of crime, for its most fruitful source likewise, is as we all know, ignorance and negligence.

When in the year 1840 the typhus broke out in Scotland with desolating power, Alison, a clinical professor of Edinburgh, shewed that the state of the poor and the inadequate measures of government bore a chief part of the blame. He further thus expressed himself that "the occurrence of such epidemics should be an overpowering testimony to the law-giver of the wretched condition of the poor." Corrigan, an Irish medical man in a work published 1846, bearing the title: *Famine and fever as cause and effect in Ireland*, dwells at more length on the same idea. Parliament it is true had taken new steps towards the reform of the Poor Laws, the system of Workhouses had been extended; the famine of 1846, however, had proved those measures to have fallen short of the necessity. The increasing distress swelled the numbers in the Poorhouses. The overcrowding engendered the contagious epidemic which in the shortest pos-

sible time turned the workhouses into hospitals, and a mortality ensued, which weekly swept away from 3 — 400, which number rapidly increased to 2500. "Besides the Poor Tax," says von Kleinschrod, "government expended eight millions over and above to rescue the Irish population in that fatal period from starvation; but similar sacrifices with similarly fruitless results will be repeated in every future catastrophe of a similar nature, till the industrial and agricultural relations of the nations undergo a thorough transformation, and the majority of the inhabitants are raised to independent producers and thereby to that dignity of humanity which alone affords a sure guarantee against bestial debasement and the impoverishing of the masses."

We too are now in the position of making like sacrifices. Let us in passing recall to mind, that in these twenty years very moderate progress indeed has been made in the insight how to deal with such subversions of the masses. I believed I had done at that time all that could be done to make the connexion between disease and the political and social organization of the people clear. I wrote then: "History has more than once shown that the destinies of great kingdoms were influenced by the sanitary condition of the nation or army; and it cannot any longer be doubted that the history of epidemic diseases must form an inseparable part of the history of human civilization. Epidemics are like gigantic finger-posts indicating to the statesman of higher aim, such an interruption has occurred in the development of his people, as even a negligent cabinet dare not overlook." At that time I entertained greater hopes than I do now, that statesmen of a nobler stamp would again get

possession of the rudder of state. But behold! Ireland is still to this very day the land of famine fever and emigration; and as Ostpreussen at present, so is many another member of our native country in the helpless condition of being by the failure of one or two harvests reduced to a state of starvation. Unfortunately the experiences of twenty years have received but too true a confirmation by what an English medical man of standing, William Davidson, has said: "Although our philanthropists are exceedingly active as long as an epidemic lasts, still as soon as it abates they relax in their efforts, sinking into a state of comparative indifference, and the poor into their former habits, into filth and excess."

How often must it be thundered forth, that typhus is one of those diseases which in the greatest number of cases might have been avoided. Is there any difference between it and the plague which in former centuries swept over Europe in a rapid succession of epidemics? And the plague has not only disappeared out of Europe, but even out of its cradle-land Egypt, after having made it her abode for nine centuries. It did not use to be in Egypt either. During the times of the last Pharaohs, the 194 years of the Persian occupation, the 305 of Alexander's and the Ptolemies', the whole period of the Roman possession, in short so long as a good police and a certain continuity of culture existed, not a word was heard of the plague in Egypt. Nature has in no way altered her ways; "the regular succession of the seasons", says Hecker, "exists without a variation, ever since the Nile first precipitated itself from the Abyssinian mountains into the plain below. But", he goes on to say, "the Egypt of to-day is no longer the splendid

country of the Pharaohs and Ptolemies, famed for her fertility and the health of her children. It is ruled by avaricious and cruel barbarians. Slavery and brute force which succumb to the elements, have taken the place of the intelligent practice of art and of persevering industry that could sway nature."

It is about thirty years ago since this was written. Since then the plague has ceased to be the standing scourge of that country, while on the other hand there are no corresponding changes in nature or the weather to serve as an explanation. A species of national government has been established which has even made some approaches to a constitutional form — a government which has at least shown it comprehends that the well being of a people is a necessary condition to a healthy financial condition; for if your farmer has to pay high taxes, why then he must be enabled to do so. Agriculture is improving, the canals repairing, nay the steam-carriage rolls along its iron path to the very foot of the pyramids. It is the new-born civilization that has driven the plague from her old haunts.

When in the year 1848 I published my pamphlet on the typhus in Silesia, this happy turn in affairs had not yet become a matter of undoubted fact. I nevertheless considered myself justified in drawing the following conclusions on typhus fever from the ancient history of the plague. "The logical answer to the question, how to obviate similar catastrophes as we had in Silesia is simple and easy — higher culture, greater liberty and prosperity! Do we not see every where around us, that national diseases allow of being traced back to defects in our social system? Let them talk as much as they

will about this or that variation in the weather, about grand cosmical changes along with phrases of a like description — all those causes can never of themselves produce an epidemic, but they can foster it, when by reason of mischievous social arrangements men have for a longer or shorter time lived in an abnormal state.”

Famine fever, however, possesses this advantage over her compeers, more particularly camp fever or war typhus — to express myself more generally — viz. it belongs in a higher degree to the *avoidable* diseases. The vicissitudes of war may at times embarrass the very best military administration, rendering it impossible for them to feed, quarter and do for an army with such forethought as to ward off all danger of sickness. But a district or a province which falls a prey to famine fever is only paying with pestilence for a long series of blunders. How many of those blunders the victims and the sufferers have themselves committed, how many the authorities, must be judged separately in every separate case. But as we have already proved, carelessness and ignorance are at bottom somewhere, else timely and adequate measures must have been taken either by the people or the authorities. However lasting assistance for the future is alone possible, when thoughtful and selfacting men voluntarily combine in sufficient numbers to set on foot general sanitary measures in every parish and district. —

Let us hope that this so dearly bought experience will not be lost upon us, or as so often before, be rendered futile. May this season of heavy trial we are now called on to pass through impress our people with the lasting consciousness that they dare not weary in the labour

of peace, without which liberty and culture — the two stipulations for the general welfare and prosperity — cannot be made ours! A famine fever is a penalty which the people have incurred themselves through negligence and ignorance.