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VIRCHOW'S LEPROSY
FROM DIE KRANKHAFTEN GESCHWULSTE [1]

BY RUDOLF VIRCHOW
(*Berlin, 1863*)

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TRANSLATOR'S REMARKS

Virchow's "Leprosy" is only a part of a medical school lecture, given at the University of Berlin, which embraces several diseases that Virchow grouped together as granulation tissue growths: syphilis, lupus vulgaris, etc. It is translated without respect for literalness of wording, but with full respect to meaning and implication. Circumlocutions of the original are avoided where possible. Instead of the mid-19th century German idiom, the mid-20th century English idiom is used. An effort is made to have the translation provide the same ideas, had it been written by Virchow in 1953 in ordinary medical English.

This translation would not exist but for the merit of the original. Perhaps the most striking feature is Virchow's straightforward wish to see and understand leprosy for what it really is. He has no axe to grind, no hypothesis to promote, no theories to

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[1] Last year we were supplied by Dr. Chapman H. Binford a translation of Virchow's description of the histopathology of leprosy, which we published as correspondence (THE JOURNAL **21** (1953) 372-373). In a footnote to that item it was said that Dr. George L. Fite had more recently supplied a translation which comprises the entire chapter on leprosy in Virchow's famous book, Die Krankhaften Geschwülste, published in Berlin in 1864-1865, and never translated to English; and it was stated that this translation would appear as a reprinted historical document in an early issue. For consideration of space, it is being run in two parts—a division not made in the original and hence indicated parenthetically here. The second part is scheduled to appear in our next issue, with pictures copied from the original and supplied by Dr. Binford.

One comment on this translation that has been heard is that it is "erudite"—which it is—and that its publication would be "a distinct contribution to pathologists and leprologists," an opinion with which we also agree. We agree, further, with the translator's view of the material when he says, "This translation would not exist but for the merit of the original." It will be recalled that Virchow gave this lecture a full decade before Hansen observed the leprosy bacillus, and nearly two decades before Koch discovered the bacillus of tuberculosis.

Difficulties met in translating certain words are mentioned in the translator's remarks, which explains the use of the word "leper," which would not be allowable in an original article.—EDITOR.

build him fame. He gives credit when due, and wastes no words in futile criticism as was so verbigerously the fashion of his day.

The flavor is modern. The first-person-singulars, commonly used, reflect more an attempt to see clearly and to emphasize than the desire to give importance to personal views, and are often omitted from the translation.

A translator is often baffled to find the right word, especially when the original use stems from conceptions no longer prevalent, such as *die Reizung*, which Virchow uses to imply some excitatory or stimulary *status quo* in the background which is operative but not definable! Virchow used *lepra* and *der Aussatz* interchangeably in places. Lepra has been retained only when the implication is "leprosy as historically known," which is usually the significance of the word to him. However forceful the modern wish to avoid the word "leper," it is the only correct rendition of *der Aussätziger*.

(PART I)

There is a type of granulation tissue tumor which belongs to a disease which has disappeared from most countries today, or become most rare, namely, leprosy (*lepra arabum*) or elephantiasis (*lepra graecorum*). It has had a most confused terminology, the name *lepra* having been used quite generally from the 14th to the 19th centuries.

The expression *lepra* comes from Hippocrates, without more exact definition, always along with terms for milder skin ailments, such as *lichen, psora, alphos,* and *leuce.* The name *elephantiasis* is not found in the writings of Hippocrates, but is used in the work of a number of later writers of antiquity in a sense which leaves no doubt that the disease under present discussion was present, although perhaps not invariably so. Galen uses this term (elephantiasis) in certain connections with lepra, as though this latter were a milder form, or regressive stage, of elephantiasis. Scribonius Largus, who lived in the reign of Tiberius and of Claudius, groups lepra and psora, as well as elephantiasis, with the atrabiliary diseases, to which cancer also belongs. The only differentiations seem to be that psora and lepra involve only the skin, cancer the veins and flesh in addition, while elephantiasis attacks the whole body, as though it were a cancer universalis. Competent writers, such as Celsus and Aretaeus, adhered to the name elephantiasis, and it is a matter of despair to find that the Arabs had previously given the word lepra a rather broad meaning. In the Greek translation of the New Testament, lepers were *leproi,* while in the Old Testament, leprosy was usually carried as lepra. It is not surprising that in the Middle Ages, with several terms to choose from, lepra was selected as the generic term, while elephantiasis was used to indicate a specific form of lepra.

The Arabs, who split up leprosy into various subgroups, called one of these subgroups "elephantiasis." They also distinguished three other main forms of lepra, for which they used terms with animal analogies drawn from Greek antiquity, namely, *lepra leonina, alopecia,* and *tyrias s. theria.* Thus the *lepra* of Constantinus Africanus and of the school of Salerno was carried to the west and handed down from century to cen-

tury, until leprosy had in actuality vanished from most localities. To revert to the oldest terminology would lead to unutterable misunderstanding, as experience teaches. Writers who busy themselves with such things risk total confusion. In German literature the dangers are illustrated in the work of Rust, who introduced true elephantiasis (elephantiasis arabum), as *elephantias tuberosa,* identifying this with *lepra artuum,* while designating leprosy (elephantiasis graecorum) as *elephantiasis vulgaris,* in which he saw gross swellings of breasts, scrotum and labia. Both forms, when ulceration occurred, he grouped together as *ulcus leprosum.* If the disease is simply called as known in individual countries, or during the Middle Ages, confusion is easily avoided. In Norway *spedalskhed,* in southern countries *lebbra* or *morbus S. Lazari,* in Germany *der Aussatz,* in Holland *melaatscheid,* in England *leprosy,* in Surinam *boasi,* in India *kuschta,* and so forth. These are expressions which are not misunderstood.

Quite different from true elephantiasis or pachydermia, leprosy is a condition characterized by the presence of nodules or lumps, *lepra tuberosa* or *elephantiasis tuberosa,* which occur most frequently on those parts of the body exposed to the air, the face and hands, less often the feet, and at times anywhere on the surface of the body.

Of course, forms other than these characteristic nodular types have been known since the Middle Ages, such as the *limafallssyki* of the Icelanders, and these in late years are grouped under names such as *elephantiasis glabra, laevis,* or *anaesthetica.* In these cases, the flat surfaces of the skin show loss of sensation, even to the point of total anesthesia. Whole parts of the body may lack any kind of feeling, and gross insults, such as burns, may occur without the individual being aware of it. There are examples in which a person has singed his hands on the stove, noting nothing until smelling the burnt flesh.

In these forms, the changes are characterized by spotty losses of color of the skin, whence the name *lepra maculosa.* They are described in medical texts of the Middle Ages, and are known by Latin-American peoples by the name *morphaea,* the derivation of which is not known. In Arabic literature, two chief variants appear, the white and the black. Lack of precise definitions have created much confusion on the parts of authors who have related the *alphos* or *leuce* of the Greeks to the *baras* or *albaras* of the Arabs. According to the old master, Schielhans, morphaea among the Germans was *miselsucht.* This is the name used for the leprosy of "Poor Henry" in the famous poem of Hartman von der Aue, "Der Arme Heinrich," as well as that of Engelhard in the poem of Konrad von Würzburg.

Macular leprosy is often related to a further form, *lepra squamosa s. crustosa.* Indissoluble confusion covers this subject even today. Since the time of the famous English dermatologists, an exfoliative exanthema has been called *lepra graecorum,* which has nothing to do with leprosy, re-

quiring no consideration here. However, certain forms of morphaea which do belong in the category of leprosy may show some desquamation of the lesions. Danielssen and Boeck have shown that leprosy is often associated with a peculiar type of itching process (scabies crustosa). This scabies occurs, however, in the absence of leprosy. In teaching leprosy avoidance of *lepra squamosa* and *lepra crustosa* is indicated.

Elephantiasis mutilans or *articulorum* (joint evil) is described, and distinguished by the loss or destruction of whole parts of the body, extremities being lost up to their joints. These parallel the so-called neuroparalytic inflammations. Inflammatory processes in the affected parts progress with great rapidity, producing severe mutilations. At times hands, feet, nose, eyes, and virtually any extremity may be lost, leaving only the head, trunk, and raw stumps.

The severity of this condition is emphasized by the dread with which it was regarded in the Middle Ages, there having been no disease more feared, whence destructive leprosy becomes the prototype of malignant disease, or is labelled the Great Disease. Sufferers become *grandes malades* in France and Belgium, *melaten, melatschen,* or *maltzige* in the Rhine regions, while the disease itself was the *grande maladie,* or in Germany *maltzei,* and among the Dutch *melaatscheid.* The Chinese *tay-ko,* or *hong'tai,* signifies the seriousness of the disease. In the religious conceptions of former times it was considered as the concrete manifestation of punishment by God, whence a certainly holy sort of dread attached to it. Even today in some foreign parts of the world, in China and South America, unfortunates are driven out of society, perhaps into the wilderness, or into special homes or institutions, leprosariums or leper homes. *Der Aussatz* has its etymology, not in the eruptions of the disease, but in the *separatio leprosorum.*

The period of general regression of leprosy in Europe coincided with that of the first epidemic spread of syphilis at the turn of the 15th to the 16th century. This has often led to the suggestion that syphilis, somehow or somewhere, was derived from leprosy, that syphilis is a degenerate form of leprosy, a daughter of leprosy, or a new manifestation of leprosy. This idea from the early days of syphilis was rejected by all distinguished physicians of the day, notably Leonicenus. Contemporaneous convictions were often so strong that, as Anstruc has reported, lepers defended themselves against introduction of syphilitics (pox patients) into their infirmaries, requiring construction of special hospitals for the latter (pox houses or Job hospitals). In the Meuse region, where leprosy was unknown to most physicians, the idea recurred in the form of *Holstein leprosy* as a name for syphilis. It was once and for all an erroneous diagnosis. Even today syphilis is mistaken for leprosy occasionally, and vice versa. Pruner reported both syphilitics and lepers banished in the leprosariums of Cypress, Jerusalem and Damascus. There are many localities where both diseases are prevalent. All forms of syphilis are seen,

and all forms of leprosy, without one being converted to the other, without effect of one upon the other, without even modifying one another. Syphilis and leprosy may occur together in the same individual, under which circumstances it would be equally reasonable to derive leprosy from syphilis. In the literature of the history of epidemic diseases, there are many examples of processes of syphilitic origin labelled leprosy, but careful critical consideration always differentiates endemic cases of leprosy and syphilis. Even in the Meuse area, once the character of constitutional syphilis was clarified, leprosy and syphilis were established as separate, however more closely similar to each other they may be than to other processes. The skin lesions of leprosy bear more analogy to those of lupus,[2] but the lack of any constitutional symptoms in lupus prevents identification with leprosy.

Leprosy has become rare in Europe today. It is present in certain parts of Sweden, Finland, and the Baltic provinces of Russia. In large areas of Norway, however, it is present in widely scattered form, which in a measure gives some idea of what the average situation was in the Middle Ages. In Norway alone, among a general population of nearly 2 million people (1862), there are no fewer than 2,119 lepers, and almost all of these cases are found in the thinly settled western provinces. According to the figures of 1856, in the Nord-Bergenhus district the incidence of leprosy was one per 113 inhabitants, and in some parishes as high as 1 in 71 up to 1 in 47. There are also various localities where leprosy is present along the Black Sea and the Mediterranean, in South Russia, Greece, Italy, Spain, Syria, Egypt and Portugal. The disease is chiefly found, however, in more distant countries, in Central and South America, South Africa and southern Asia. It is especially to be found in the Antilles, in Brazil, the Cape of Good Hope, the Sunda Islands (Java, Sumatra, etc.), India, and in China and Japan where it has spread most unduly. In localized areas of China outside the large cities, there are whole villages composed of such poor people. In Germany, except for cases introduced from other parts of the world, examples of the disease appear here and there without it being possible to demonstrate a relationship to any particular endemic locality, and also without evidence of transmission by inheritance, an idea recently much in the limelight.

Modern scientific knowledge of leprosy dates from the work of Danielssen and Boeck on Norwegian *spedalskhed*. This splendid monograph illustrates graphically the principal changes. Pictures of earlier times have only subordinate scientific interest. The portrait of the holy Elizabeth by Holbein the Younger, painted in 1516, which I discovered in the gallery at Munich several years ago, illustrates leprosy as it existed in Germany, as well as syphilis. Renewal of interest in old paintings from various countries has helped to identify leprosy of former

[2] Lupus vulgaris, always, with Virchow.

days more satisfactorily than is possible from bare descriptions.

One factor in the etiology of leprosy has long been established. This is hereditary transmission, or, preferably, the predisposition thereto, since the disease is rarely congenitally present, developing only in later years. This predisposition can be shown through numerous examples with precision in any leprous community. It is so clear cut, and so well established as a factor, that all possible means have been employed to prevent propagation of those with leprosy. Marriage has been forbidden, and castration has been practiced among males. Such ideas prevail at the present time in Norway, where the great frequency of the inheritance factor was shown by Danielssen and Boeck, and by Conradi. Increasing spread of the disease in Norway has demanded more and more public care, which has become most difficult. As a result, the medical authorities and most bishops declared in favor of forbidding marriage. A bill along these lines just failed of passage in the Norwegian legislature in 1854. The strong opposition and spirited disputes engendered among Norwegian physicians paved the way to new and more vigorous investigation of the disease. I was invited by the Norwegian government to visit the endemic areas and investigate the nature of the disease.

I undertook this trip in the summer of 1859, and although I had the opportunity of seeing hundreds of lepers and of collecting all the data possible concerning the nature of the local lesions, none the less the conclusion was reached nevertheless that any judgment on the question of etiology, even from the best material under study, would be properly reached only if comparative studies of greater range from various leprous territories in the world were added. With this purpose in mind I appealed for an investigation of leprosy, which has in fact borne many fruits. Yet from the material at hand a final conclusion as to the cause of leprosy has not been reached.

One obvious detail concerning inheritance consists of the accepted fact of the frequency of the presence of leprosy in particular families, wherever leprosy is found. The most recent researches of Bidenkap have confirmed this in the Norwegian material. The genealogic registers of leprous families assembled by him show hereditary transmission to the fourth generation. Yet, as already mentioned, it is a matter of inheritance of a predisposition, not of the disease itself, which Bidenkap never saw at a younger age than in two two-year-old children, and one three years of age; more often it appears for the first time in later decades. Judging from this, it will never be possible to get around the necessity for searching for special causal circumstances. Environment has already been described as an important influence in the cause of the disease. If it is true, as is said in Norway, that leprosy has disappeared from families which have emigrated to North America, then this must have a most significant meaning in regards to etiology. Guyon reports the case of a leprous family which settled in France after coming from the tropics, in

which the leprosy became totally quiescent. The significant historical fact that leprosy was once generally spread, but now is almost vanished without a trace from the largest part of European nations, shows that the disease cannot be explained except on the basis of some special cause. The idea of inheritance is inadequate. The studies of Höegh and Bidenkap agree that in the Norwegian cases of leprosy, direct lineal passage is demonstrable only in one-fourth, and van Someren found only two examples of parental leprosy among 31 cases in Madras.

In earlier times, in addition to inheritance, another and much more effective cause of leprosy was accepted, namely, inoculation. This view reigns today in almost all non-European leprous countries, and many physicians who deny the contagiousness of current European forms of leprosy still acknowledge the possibility in a former period. This produces the strange doctrine that leprosy originally was introduced into various countries by inoculation, maintaining its presence thereafter by inheritance.

This agrees exactly with the tradition of the lay writer who is accustomed to tell of leprosy being imported from the Orient through the Crusades and borne from place to place. The suggestion is unacceptable, since information from reliable historic sources is convincing that leprosy was already present in western countries for centuries before the Crusades began.

If importation took place, it must have happened in very early times; yet what is even more improbable is the contagiousness of leprosy, an idea more and more abandoned. No example of importation of the disease into a leprosy-free country has been observed in modern times, in spite of the fact that occasional cases come to England, France and Germany, etc., from the East and West Indies, South Russia and other places. Although there are isolated cases of individuals acquiring leprosy, no clear-cut case of transmission has been seen under the circumstance in which persons have been in close contact with cases of leprosy over long periods of years, such as is the case in hospitals when attendants have lived 20 to 30 years in contact with patients without transmission resulting.

Nevertheless, immigrants to leprous countries not too infrequently acquire the disease. Older writers attribute it to coitus, cohabitation, or inoculation. In Norway, Holmsen has collected observations which indicate the formation of specific disease areas in single homesteads, in which healthy newcomers were attacked. Single new cases following immigration were found by Bidenkap, in which no other unfavorable circumstances could be shown. Such observations lead to the emphatic conclusion that these cases must, at least in part, be explained on some other basis than inheritance. On the whole they are so rare as to be avoided in discussion of the primary etiology.

Difficulties with other questions of etiology are so great that no agreement on them can be reported. The climates of leprous countries are very variable, and only one consistent condition obtains, namely, the extraordinary frequency of the disease at the sea coast and along the banks of large rivers. Although this may be a distribution according to climatic influences, it may also be that dietetic factors rather than climatic are responsible, as long argued, especially the use of bad types of fish, or spoiled fish. This idea is attacked with such determination by the climaticists as to lead to the qualified remark that historic and geographic factors harmonize with the suggestion of poor dietary conditions. The general use of fish diets is found commonly with endemic leprosy. This is not without exception, to be sure, since as a rule other dietary inadequacies may also be blamed, and it would be contrary to observation to consider it as established that the same injurious substance is to be found in fish and in these other foods. More exact examination of these contrary opinions would lead too far, and in conclusion of the chapter on etiology I can only say that, according to my knowledge, it is not at the present time certain what the determinant causal factor of the disease is.

Danielssen and Boeck were inclined to turn back to the old humoral pathologic conception of a dyscrasia, not as an atrabilia, but as an increase of albuminate in the blood, followed by local depositions. Thus the local involvements consist predominantly of exudative products. Kjerulf doubted this, and my anatomic studies of the skin lesions made in Christiania, Bergen and Holde lead to the finding that they are essentially neoplastic rather than exudative in nature. On the basis of my researches, Danielssen changed his views on the point, and it can no longer be maintained that the local lesions are due to deposition of dyscrasic materials. The assumption of a hereditary dyscrasia without local lesions appears grossly arbitrary.

On the other hand, the early symptoms, fever, rheumatic pains, weariness, apathy, and chilliness, often of years duration, do indicate a generalized disturbance, and the development of numerous local growths presupposes the presence of an abnormal background. Because internal organs may also be involved in such growths, I do not mean to diverge from the idea of dyscrasia to the point of denying the presence in the blood of harmful substances. However, this is not to be considered a constant or permanent state of affairs, and its source is most readily explained on the basis of dietetic disturbances. The development of the skin lesions is most difficult to interpret on the basis of a predetermined hereditary tendency of the tissues, or as a result of out-spoken environmental conditions, such as atmospheric changes. Danielssen gave full consideration to these various causal factors, but has given my views on the question of alimentary difficulties too little weight. Of course it is

correct to find significance in the bad living conditions, the cold climate, storm and rains prevalent in Norway, yet such are to be found also in areas from which leprosy has wholly vanished. As far as atmospheric conditions are concerned, I have found not a few people with leprosy in Norway who, according to their own testimony, were very little exposed to the elements. Representation on these points must remain hypothetical; let us turn to the lesions themselves.

(*To be concluded.*)