

spection without detecting the smallest particle of scrofulous matter in them, yet if diseased action be kept up long enough, the deposit will almost certainly take place. If we look at a similar state of things in the mesentery, we may see a great number of the glands enlarged and reddened by increased vascularity; some may be as large as a horse bean, or even larger, but when cut into, no deposit may be found in them, and yet here and there we find one, it may be, not harder, nor larger, nor redder than some others in which we find the matter deposited. I conclude that the particular gland has suffered longer than those in which there is no deposit. Generally, it is in the largest and reddest gland that the deposit is found. I, therefore, hold that we have satisfactory proof that before scrofulous matter is deposited in a gland, the organ has undergone considerable change of structure; but I cannot determine whether it be a consequence of the state of the blood, or independent of any change in that fluid.

CHAPTER V.

SOURCE FROM WHENCE SCROFULOUS MATTER IS DERIVED.

THE conviction which the ancients entertained, that Scrofulous matter was thickened lymph, made it a matter of great importance to them to discover agents by which they could thin it, and purgatives and alkalies were supposed to have that power, and were largely administered. In the present day, a different opinion is entertained of the source from whence scrofulous matter is derived; but it is important that we should satisfy ourselves as far as is possible from whence it comes, because in that case we may be able to carry out, with more effect, what they desired to accomplish—the cure of the disease.

The old idea of scrofulous glands was, that the matter deposited in them was left there by the lymph, or pituita, or chyle, in its passage through them; but then it was assumed that the lymph had previously undergone change, had become gypseous, fatty and viscid; and as it had become too gross to pass through the channels in the gland, it accumulated, became concrete, and in this way the glandular tumor was formed.

The prevailing opinion in the present day is opposed to the Hippocratic notion, and for this, as for most other deposits, we are disposed to look to the blood. But before we do so, it is proper to inquire whether there be any foundation for the notion that scrofulous tumors are ever produced by thickened lymph.

In the composition of healthy lymph, there is nothing repugnant to the belief that scrofulous matter may result from the inspissation of that fluid. L'Héritier analyzed lymph taken from the thoracic duct of a man who, for thirty hours before his death, drank nothing but water. He found that it contained:

| | | | | | |
|--------------|---|---|---|---|--------|
| Water | . | . | . | . | 924.36 |
| Fibrin | . | . | . | . | 3.20 |
| Fatty matter | . | . | . | . | 5.10 |
| Albumen | . | . | . | . | 60.02 |
| Salts | . | . | . | . | 8.25 |
| Loss | . | . | . | . | 7 |

The salts were alkaline chlorides and phosphates, sulphates and carbonates, with traces of peroxide of iron.

Lymph may also undergo considerable change in its composition, and it is possible that it may then assume a state more favourable for such deposits. Hewson found that it might be much modified, made thinner or thicker, by particular modes of feeding. In some cases, the changes produced in it are owing to a change in the proportion of its natural constituents; in others, to the introduction of matters not naturally found in it. Thus, Mascagni found lymph largely mixed with blood; others have found the lymphatic vessels filled with pus.

Sömmering mentions cases in which masses of phosphate of lime were found in lymphatics. Lauth, in a case of caries, found osseous matter in the neighbouring lymphatics; similar matter has also been found in the lymphatics of the neck, the axilla, the groin, and the bronchi. But these circumstances are no proof that the deposit in cases of Scrofula is furnished by lymph.

Such changes brought about in the lymph may, however, have given rise to the opinions of the older, and even of some comparatively modern authors, that the glandular tumor is caused by the stagnation of the fluid brought to the glands by the lymphatic vessels; by the inability, in fact, of the modified lymph to pass through the glandular structure, and by its accumulation and its concretion constituting a scrofulous tumor.

Although I admit that the admixture of grosser particles, or of acids, alkalies, or salts, with the lymph, may possibly cause such a stagnation, may in fact determine a glandular tumor, I venture to express a strong opinion that glandular tumors are rarely thus produced. If the tumor were formed in this way, many or all of the lymphatic channels in the gland would probably be obstructed, and the progress of the lymph arrested. Now this very rarely happens in lymph canals.

In a Note to Baillie's "Morbidity Anatomy," appended by Sömmering, he stated the fact, that in scrofulous children with diseased mesenteric glands, the lymphatic vessels of the mesentery can be easily injected, the fluid passing readily through the enlarged ganglia; so also can the lymphatic ganglia themselves. Carmichael, in his Essay on the origin and nature of tuberculous and cancerous diseases, has drawn attention to the same fact; and Albers* makes a similar statement. Becker has many times injected diseased (scrofulous) lymphatic ganglia with mercury, and he has always seen the injection freely traversing the lymph channels; from whence he concludes, that in the greater part of such morbid conditions of these ganglia, the principal seat of disease, is the cellular tissue interposed between the vessels, or the parietes of the vessels themselves, but that there is no obstruction in their canals.

It has been maintained by competent authorities that the diseased condition of the mesenteric glands, known as mesenteric disease, and which we have frequent opportunities of observing, may be regarded as a fair illustration of what happens in scrofulous glands; that it is certain that such obstructions as we have described to happen in the former organs, and that the tubercle-like material found in them, in those cases, is inspissated chyle. In the state of health, the chyle meets with no obstruction in its passage through the mesenteric glands; but it is unquestionable that those glands may become so diseased, and the chyle canals may be so trepanned upon, as to cause an obstacle to its passage towards the thoracic duct; it is equally certain that the occurrence of such an obstruction is very uncommon.

And yet, concrete, cheesy, tubercle-like matter has been found in the chyle vessels of the mesenteric glands; and the chyle has been arrested between the mucous surface of the intestine and the gland, and the chyle vessel has become distended and knotted, and its contained fluid inspissated. Andral describes this state; I have seen it more than once, but during the present investigation I have not found one instance of it, or I would have given the chemical analysis and microscopical appearance of this product. Brown,† says, "that upon opening the tumefied glandules in the mesentery

* Beobachtungen für Pathologie, 2 vols. 8vo. † In his Adenochoiradelogia.

of a girl of eleven, he found a most white, milky chyle issue thence, which concreted into the form and hardness of cheese."

At the same time, then, that we admit the possibility of the glands being distended in the way referred to, and of glandular tumors being so formed, we must not lose sight of the fact, that even when those glands are found to be the seat of considerable deposits, the chyle channels usually remain perfectly pervious, and allow of the free passage through them of injected fluids, which would probably not happen if the chyle became concrete in those channels. It is upon this fact, rather than upon the microscopic and chemical analysis of this tubercle-like matter in the mesenteric glands, that I rely for proof that it is not concrete chyle. The microscope does, it is true, confirm this view of the case, by showing that the concrete matter does not present the physical characters of ordinary chyle, but the chemical composition of chyle affords nothing to militate against the hypothesis, that such matter is inspissated chyle. I think, however, that although there is nothing in the character of the deposit in the mesenteric, or subcutaneous glands, to make it impossible that such deposit may result from the chyle or lymph passing through them, as was maintained by the older writers, that glandular tumors are but very rarely formed in that way.

As a general law, it is now admitted that morbid products are derived directly from the blood; and the questions then to be resolved are these:—Has the blood previously undergone a change in its elements, the part in which the deposit is made remaining unchanged? Or, does the blood remain in a healthy condition, the part in which the deposit is made exercising a specific influence upon the blood, and determining the character of that deposit? Or, are both removed from a healthy condition before the product is deposited?

In the case of most morbid products, the result of diseased action is to determine the deposit of matter, the previous existence of which in the blood cannot be demonstrated; yet it has been said that tubercular matter has been observed in the circulating blood. In the case of scrofulous matter, no one but Lugol has, so far as I know, asserted the observation of its presence in the circulating mass. His statement is, that he found nodules of such mat-

ter, already formed, carried along with the blood. Supposing the observation to be correct, there is no proof that such nodules were formed in the circulating fluid. Bearing in mind that this statement is unsupported by any similar observations made by others, of even the occasional existence of scrofulous matter in the blood, the evidence that I may offer in support of the opinion, that such matter comes from the blood, may be regarded as insufficient. I certainly cannot give a demonstration of the soundness of that opinion. Still, if I show that in the state of health, the blood contains materials such as are found in scrofulous deposits, and that in particular states of the economy, those materials are increased or diminished; and if I show, that when particular materials are increased, scrofulous deposits are more frequent, and that the deposits are made in the cellular, or other structure of the organ, and not in the lymphatic channels, I submit that we shall be fully justified in assuming that scrofulous matter is a deposit from the blood.

The analysis of healthy blood, made by Marcet, Berzelius, and Lecanu, correspond so nearly, that we may assume that the elements are correctly determined; and we find them to consist of potash, soda, carbonate and phosphate of lime, albumen, fibrin, and probably gluten. These elements may be found in scrofulous matter, and therefore the notion of its being separated even from healthy blood, would not be a startling proposition to lay down. All that would be required to constitute the scrofulous matter, would be that the elements should be differently combined. But that which makes it improbable that the matter can be formed from healthy blood is, that in the state of health those deposits do not occur; it is therefore fair to infer that there must be a previous change, either in the blood, or in the organs through which the blood circulates, and in which the deposit takes place, or in both, before it can occur.

We have shown that a change takes place in the organs before the matter is deposited in them; we must now endeavour to ascertain whether there be a corresponding change in the blood also before the deposit is made. But this is not easy. When scrofulous deposits are present, it is not difficult to show, in a person thus afflicted, that the blood is changed: this I have repeatedly observ-

ed. Again, when there is no reason to believe that the scrofulous constitution is present, it may be usually shown that the blood has not undergone any similar change; but it is no less true that in some diseases marked by long-standing debility, but without any apparent scrofulous taint, the blood represents characters not unlike what are observed when the taint of Scrofula exists.

But the connecting link between the two points cannot be made evident, because, in the one case, there is no proof that the blood was altered before the deposit had taken place; in the other, the proof is wanting that Scrofula would have been developed even in those cases where the blood has been found to have undergone the alteration in question. Still, we must tender the best evidence we possess in proof, that the change does take place in the blood, before the scrofulous matter is deposited and that unless that change have occurred, scrofulous matter is not deposited.

Alimentation and disease are the two great agents by which changes are wrought in the constitution of the blood; probably in the last resort, the greatest changes are always the results of corresponding changes of food.

The observations of Andral, Gavarret, and others, show that the solid, as well as the fluid constituents of the blood, undergo considerable changes from the influence of food, as well as from that of disease; but it is not shown that the increase or diminution affects all the constituents equally. There may be, at the same time, an increase of one and a diminution of another; those constituents appear to have no mutual dependence on each other.

Enfeebling agents seem to affect, in the first instance, the proportion of red globules; it is constantly diminished, while the proportion of fibrin may be increased. And supposing food to be the agent by which the change is accomplished, the process seems simple enough. Bad food produces bad chyle, bad chyle imperfectly renews the blood, perverts its elements, diminishes, destroys, or augments its plasticity, causes the predominance of certain principles over others, and possibly so changes the composition of the blood, as to determine in it non-analogous productions.

As a general rule under prolonged abstinence, the quantity of blood diminishes, successively, during the whole time of its duration, and at last the quantity becomes so small that one only wonders how it

circulates; and in these cases, it is commonly found that the proportion of albumen increases, while that of fibrin diminishes.

The imperfect accomplishment of the functions of depuration, as is observed in the Berlin Report,* is also a principal cause of morbid states of the blood; any change in the exhalation of carbonic acid gas, or aqueous vapour, in the quantity of sensible and insensible perspiration in the urinary and other secretions, produces alteration in the characters of the blood; and if the materials for those several products be left to accumulate in the blood, they act as poisons; it must be evident, therefore, that any material interruption of those functions, if not compensated for, or supplied by some other, must necessarily induce a change, not only in the quantity or quality of the materials of the blood, but also in its vitality.

To show how far surrounding circumstances, by inducing Anæmia, may alter the natural condition of the blood, I may state, after Andral and Gavarret, that in 1000 parts of healthy venous blood, we may find:—3.0 fibrin, 127.0 globules, 80. solid matter of serum, 790. water; while in Anæmia its state has been found so changed as to yield: 1.2 fibrin, 36.0 globules, 80 solid matter of serum, 881.8 water. Here the diminution of globules and the increase of water is very striking, so also is the decrease of fibrin.

Baumes stated, that in scrofulous patients the different constituents of the blood are less intimately mixed than in healthy persons, the union of the molecules being feebler than in the state of health. Thouvenel observed the same state, and conceived that it was owing to an excess of acrimony. Denis also alludes to it, but he refers it to an excess of alkalies. Supposing acrimony to mean acidity, it is certain that both alkaline and acid principles are capable of producing important changes in the constitution of the blood.

Dubois (d'Amiens) also observed the diffidence and imperfect coagulability of the blood in scrofulous persons; he also pointed out a change produced in the form of the globules; he found them "lenticular, the central depression, or spot, being extended beyond its natural limits, and so defined that they looked like wheels," "many of them being also deformed, notched, or otherwise irregular."

I have examined the blood in sixty-seven instances of Scrofula,

* See Appendix.

and although I have almost always observed a considerable deviation from the condition of healthy blood, the changes have not presented sufficient uniformity to induce me to regard any particular condition as specially characteristic of Scrofula; the changes are such as seem to belong to a tolerably extensive group of affections, all, it is true, being connected with disordered nutrition and debility.

In almost every case, the coagulum was relatively small, the serous menstruum large, the clot was usually very soft, almost diffluent; in a few instances only it was tolerably firm. In almost all cases, the proportion of globules was considerably under the healthy standard. The fibrin had not usually undergone much change; in a few cases it exceeded, in many more it was below the healthy standard. In most instances there was a considerable increase in the proportion of albumen; in almost every instance the proportion of salts was found to exceed the healthy standard; in some instances it was nearly doubled. At one time I thought I had clearly made out, that the proportion of chloride of sodium was deficient, and certainly in many cases it was so; but in many other cases that deficiency was not evident. If succeeding observations should establish a frequent co-existence, it might be well to carry out Russell's salt-water plan in the treatment of the disease; he conceived it to be efficacious. It may be, that salt water so used acts as a stimulant of the whole economy, increasing plastic energy, and thus improving the vigour of the system.

In some cases I have observed, under the microscope, as did F. Dubois, that the colouring matter adhered loosely to the globule, and that a certain portion of it seemed to be dissolved in the serum, but I do not, with him, regard this as an ordinary character of the blood in such cases. I have usually met with this peculiarity when the blood has been drawn many hours, and I have been more disposed to regard it as a consequence of a disposition to early decomposition than as a proof of any vital change. M. Dubois has always, in such cases, observed the spheroidal and the lenticular globules. He conceived that the lenticular globules were changed in form, some appearing as if perforated like wheels, others irregular or notched. Although I have observed similar appearances in the blood of scrofulous persons, I have also observed such appearances in the blood of persons who did not suffer

from Scrofula; in fact, in many of those diseases in which anæmia is a distinguishing feature; and I am not, therefore, in a condition to point out any particular state of the blood which is certainly characteristic of Scrofula; but it is certain that if we examine the blood when the marks of Scrofula are evident, its altered condition is also evident; but I know no particular condition of the blood which clearly marks the existence of Scrofula. However the occurrence of similar changes, at the same time, in different regions of the body; seems to point to some other than a local agent, as producing the change in the organ in which the deposit is made—and that agent the blood.

It has been shown, that both lymph and chyle, in their natural state, do contain materials such as are found in scrofulous matter; but it has also been made probable that scrofulous glands are not the result of any deposit from either of those fluids. It has further been shown that the blood is the only fluid from which scrofulous matter is probably derived; that the blood itself undergoes most important changes in its composition, and that the more important of the ordinary secreted fluids, such as the urine, the milk, and others, become changed also, when those changes happen in the blood, and that there is a co-existence, at the least, between an altered condition of the blood and the development of Scrofula. Whether that change in the condition of the blood which is demonstrable when the existence of Scrofula is evident, and which can also be demonstrated when the existence of the disease in the constitution may be presumed, though the local manifestation is wanting, does really stand to Scrofula in the relation of cause, I cannot, as I have already said, conclusively prove, though I believe that it does. And although the evidence in support of that conclusion be strong, I admit my inability to afford a demonstration of the correctness of the opinion I entertain, that the scrofulous matter is derived directly from the blood. Supposing that opinion to be warranted, it may be asked, whether the materials from which the scrofulous product results have gone far towards elaboration before they leave the blood-vessels, or whether any elaboration be afterwards effected. This is a question upon which we can only speculate; but it is certainly difficult to understand how the necessary, abnormal action, that causes the deposit, can be developed in so many regions of the body,

and often in so many different tissues, almost at the same moment of time, as we find in tuberculous diseases, unless something more than a local action was at work to determine the deposit.

But having come to this point, we must now stop. We cannot prove whether the process under which the deposit occurs be one of secretion or excretion—whether it occurs in virtue of some peculiar action developed in part, and causing a new combination between the constituents of healthy blood—or whether it is owing to the blood having undergone the change before it has ceased to circulate, becoming overcharged with albumen and salts, and ready, when the ordinary excreting organs do not carry them off, to deposit them anywhere, and wholly independent of local action. However, so much may, I think, be fairly assumed, that the blood is changed before the deposit is made, that the accumulation of certain morbid materials in the blood constitutes what is known as the scrofulous diathesis or constitution, and that their deposition in the subcutaneous lymphatic glands constitutes what we know as Scrofula.

CHAPTER VI.

ARE PULMONARY TUBERCLE, OR PHTHISIS, AND SCROFULA IN THEIR NATURE IDENTICAL?

In the chapter which contains our definition of Scrofula, we have restricted the term to a condition of the system, manifested, particularly, by certain deposits in the subcutaneous lymphatic ganglia. Although that view of Scrofula excluded Pulmonary Phthisis from any necessary connection with our subject, the commonly received opinion of their identity is so strong, that I do not feel justified in passing it by without consideration. In its narrowest shape, the question is this, are tubercular disease of the lung, and scrofulous disease of the subcutaneous glands, identical in all other respects than in the seat of the deposit? The prevailing opinion certainly favours that belief; which rests on the following grounds, namely: that the deposit itself and the circumstances under which it occurs are said to be identical, and that Phthisis is only a more advanced stage in the development of Scrofula. It is unnecessary to refer to the names of those who advocate that opinion, but it is incumbent upon me to consider the reasons which have been adduced in its support.

As Roche* has clearly stated the case in favour of this alleged identity, I shall simply adduce the reasons which he has given in support of the opinion. He maintains that Phthisis and Scrofula are in their nature perfectly identical, the only difference being, as he states, in the seat of the deposit; that the same temperament and the same peculiarities of age and sex, predispose persons to contract both those diseases; that they offer the same anatomical lesions; that

* Dictionnaire de Medecine et Chirurgie pratique, Art. Phthisie 15 vols. 8vo. Paris, 1835—1842.