Gulstonian Lectures

ON

THE NATURE AND AFFINITIES OF
TUBERCLE.

Delivered at the Royal College of Physicians, 1867.

BY

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LECTURE IV.

SCROFULOUS disease is rarely established all over the body at the same time; it is usual for it to waste its force, as the phrase runs, on different parts at different times.

There are three great gland-groups which, according to Virchow, are for the most part separately and independently affected—the cervical gland-system; the thoracic or bronchial gland-system; the abdominal or mesenteric gland-system.

For purposes of diagnosis, it is also advisable that we remember what Sir W. Lawrence so justly observed, that the glands of the groin are rarely, and those of the axilla are still less frequently, infarcted with scrofula.

This limitation of the disease to certain districts is due to the circumscription of the primary irritation within particular tissues, and to the extension of its influence only through particular channels. These tissues are the intercellular or submucous, and the channels are the lymph-vessels.

Thus it is that, in scrofulous subjects, a conjunctivitis, a skin-eruption upon the head, an eczema upon the external ear or on the face, leads to a peculiar chronic intumescence of the cervical glands; a catarrhal bronchitis, to a lobular pneumonia attended with similar or analogous enlargement of the bronchial glands; and an intestinal irritation quickly implicates the mesenteric glands.

It may be said that ordinary inflammations also lead to glandular enlargements. True; but, upon the subsidence of the primary inflammation, the gland-swelling abates; in scrofula, contrariwise, the glandular tumour becomes the principal seat and independent focus of action.

"The gland change consists," says Virchow (*op. ante cit.*, p. 591), "essentially in an increase of the cellular elements, and especially of the lymph-cells. These which proceed from division of pre-existing normal cells are ill-constructed from the first, and incompletely organised, not passing into free nuclei only (free nuclei are normal constituents of lymph-glands), but forming large, remarkable looking cells, that fulfil the ideal cell-shape much better than those usually found in healthy glands. This is the scrofulous cell *par excellence*, which, like the leukæmic or lymphoma cell, is originally a lymph-element; it is a tough, transparent, finely-granular round body, containing one or several moderately large nuclei, and is generally about the size, or a little larger than an ordinary lymph-cell."

Their peculiarity is their perishibility, if I may coin such a word; their inclination to degenerate through a fat metamorphosis.

An increase in quantity of such like cell-elements produces hypertrophy of the gland, and bestows a moist spongy feel upon it. The capsular vessels become much enlarged, and the gland obtains a red-

dish colour, passing into a dirty dead-looking or opaque whiteness whenever the fat change is furthest advanced. From this state of things a recovery is perfectly possible, the abnormal elements being completely resolved.

But, besides the cell-increase, a hyperplasia of the connective tissue about the follicles or sepiments of the cortical portion of the gland is apt to ensue, which outsteps the cellular hyperplasia, and leads to intense induration of the gland; the supply of blood to the capsule is then less liberal, and the second stage sets in, the whole gland becoming thick, tough, anæmic-looking, and dry, from which state it quickly transforms into a yellow, opaque, defunct, cheesy mass.

Three different courses are now open to this caseified gland.

1. Partial Re-absorption. If the blood-vessels remain entire, the greater portion of fluid belonging to the gland is slowly taken up; the cells shrink, the mass dwindles down, fatty compounds, cholestearine, etc., crystallise out in it, lime-salts are deposited, and the whole gets invested with a firm connective tissue sheath.

2. Colliquation. The cheesy mass may soften, a change likened by Virchow to a chemical dissolving, such as a thrombus, or otherwise insulated dead organic substance, can undergo anywhere in the body.

3. Inflammatory Softening. The defunct parts may excite ordinary inflammation about themselves, and pus be formed—the pus-cells proceeding out of the connective tissue by heterologous development, and being evacuated mixed with the other dead elements of the gland.

Such is the pathology of the scrofulous gland tumour, which I have described in abstract from Professor Virchow's work on *Tumours*, but sufficiently in detail for purposes of comparison.

Its development is like the typhoma; its component elements somewhat resemble tubercle, but they are not grouped after the same manner; and, again, it is a hyperplastic, as distinguished from a heteroplastic, lymphoma; an hypertrophy of a normal structure, not a new growth altogether.

I have already mentioned the three great tracts of scrofula. Now, so long as the glands of the neck, which gave the disease its name in the first instance, were thus affected, nobody disputed the fact that they had scrofulous disease before them. Chronic inflammation, glandular swelling, caseous or cretaceous metamorphosis of the gland, formation of abscess, healing by a slow process, with a tendency to break out again, and with a disposition in the disease to creep insidiously along, and to recur time after time—all this was accepted as scrofula.

But when an exactly similar process presented itself in the abdominal or thoracic tract, the variation of the locality, although marked by no essential difference whatever in the series of changes or motions, set men thinking that they had a different form of disease before them. The mesenteric gland changes that had followed directly upon a scrofulous folliculo-enteritis were attributed to tubercle; while in the thoracic tract the implication of the lungs, a gland tissue of peculiar aim, and therefore of very special structure, in scrofulous chronic inflammation, gave Louis first, then Laennec, and after him the French schools, their primary conceptions of tubercular disease, and, as Virchow and others maintain, a false idea of the constitution and essential nature of tubercle.

If, as in the neck, the scrofulous process had expended itself less upon its primary seat, and more upon the bronchial glands (which, although large, do not become proportionately enlarged), its pathology probably would have been more correctly understood.

The peculiar round millet-seed-like cast of the ultimate alveoli and finer bronchi, formed of inspissated catarrhal mucus, which shot out like an adventitious product upon gentle pressure, gave colour to the deception, by its likeness to actual tubercle of the pleura and serous surfaces; and the not infrequent occurrence of the two diseases together in the same person (for they no way exclude each other) led to this mucous cast of an air-sac—for I can call it nothing else—being thought to be the *fons et origo malorum*, the typical and primary form of tubercle. Hither came all the students to observe the process of its formation, and learn its real nature.

It was an adventitious product—it was produced by inflammation. True enough, it was the result of a local inflammatory process. It was deposited from the blood, and coagulated in the part where it was found; it softened into a cheesy mass, which hollowed from its centre, as Carswell showed it was the almost entire plugging of small bronchi which gave rise to this idea. Vomices were produced by the colliquating influence of the softened tubercles, by the death from pressure and cutting off of nutritive supplies of the interposed parts, and extended by the inflammation of surrounding tissues thus aroused. All this was sound observation, and perfectly corroborated. The disease affected the apices of the lungs by preference; and if tubercle, for which read caseous mass, was forthcoming anywhere in the body, this part of the lungs was almost certain to afford additional assurance of it. Indeed, to such importance as a means of diagnosis was this infarction of the apices elevated, that, when signs of inflammation were found in the lungs, the situation of the lesion was considered quite enough to indicate its nature and origin.

But, so far as I know, little or no explanation—certainly no satisfactory one—has been propounded to account for the affinity of tubercle, whether real or fictitious, for the apices of the lungs. The vulnerability of serous membranes for tubercle was accepted as simple fact; the vulnerability of the brain in infancy for tubercle was interpretable upon the great impressibility of this organ at this period of life (West and others); but I am not aware that any greater functional activity could be vouchsafed to the apices of the lungs than to their bases. Why chronic disease should prefer the apex and acute disease the base—for this is what it comes to when we cast out the tubercle deposit as a cause and plead *scrofula*—remained a recognised mystery; the lung was composed of the same structures throughout; there was no preponderance of one tissue in one part and of another in another. The tuberculous affections of other glands, or other solid organs, offered no analogy to assist the solution of this anomaly.

But there is an explanation of the difficulty to be found, I think, in the shape and anatomy of the lungs and in the form of the thorax.

At the apex, the quantity of lung-tissue by cubic measurement, in comparison with the wall-area by which it is surrounded, is relatively smaller than obtains at any other part of the thoracic cavity. The condition is that of a small amount of contained substance offering a comparatively large amount of surface.

Pleural adhesions must, therefore, possess a much firmer hold or grip upon the apex of the lung than elsewhere. Here they tie the parts down as with a tight-fitting cap; whereas, from the thoracic walls, they set a slight limitation only upon its free movements. They must further interfere with the passive act of expiration effected by the innate resiliency of the elastic fibre framework of the air-cells much more completely here than in other parts of the lungs;

and this for two reasons: first, because, as I have said, the adhesions must restrict the inspiratory expansion of the apex of the lung; and secondly, because, when they are old, obsolete, and contracted, bands, rather strings, the lung-substance, through which the final stretching has to be distributed, is small in quantity in comparison with what is presented in the thicker portions, wherefore in each individual air-cell the component parts must be subjected to greater strain.

Lastly, for it may be urged that deposits were sometimes found in the lung-apices, with no signs of old or recent pleurisy to explain their presence—this is very rare, but still must be accounted for—how then? I am told by experienced physiologists that there is a normal difference in the size of the air-cells in different parts of the lungs, and that the sacs themselves are individually larger and more embryonal looking towards the apex. If this be so, the alveoli must afford more room for the lodgment of catarrhal mucus, and offer individually less counter-elasticity to repel this. Hence the millet-seed-like infarctions will be large and attract attention; and, upon section of the tissue, they will slip easily out of their moulds, being comparable in every respect to renal tubular casts; but real tubercle of the lungs lies interpolated in the interstitial peribronchial tissue, and is not thus easily eliminated for separate examination. Finally, the casts themselves, as Schröder Van der Kolk showed, present a converse arrangement of elements to what is observed in real tubercle: the largest cells lie in the centres of those *quasi*-bullets and the smallest at their circumferences.

But, apart from the pleurisy hypothesis, the inspiratory dilatation of the cavity of the thorax must, from the anatomy of the normal skeleton, be less perfect at the apex than at the base; for the range of movement allowed to the topmost three ribs is naturally somewhat limited; and, again, of forced expiration it must be conceded, that the ascent of the abdominal viscera cannot but exert actual pressure upon the lower lobes of the lungs, and so help to squeeze the air out of them.

The corollary to all this is that, in rachitic or otherwise deformed chests, the parts of the lungs whose movements are most limited will be found most prone to be infarcted with thick catarrhal mucus; and that, in spasmodic expiratory efforts or cough, materials blocking up the air-cells will be expelled much more readily from the bases than from the apices of the lungs.

What I therefore premise of chronic catarrh of the bronchi is, not that the pathological process is peculiar, or that the original lesion falls upon the upper parts and avoids the lower, but that it is generally diffused throughout, and that the external conditions favour a speedier and more complete resolution of the disease in one than in the other place.

I would carefully guard myself from being supposed to urge, that there is no such thing as tuberculous disease of the lungs, or to have pretended that all chronic lung-affections leading to the formation of vomices must be scrofulous, or to have said that tubercle avoids the apices.

I only plead for a patient reconsideration of the opinion, that pulmonary consumption or phthisis is always produced by tubercles; that the implication of the apices of the lungs is trustworthy proof of the tuberculous origin of an abscess. I believe, in scrofulous bronchitis and scrofulous pneumonia—that is, I believe, in chronic forms of both these complaints, such as are easily excited in particular constitutions, and which damage the lung-structures very insidiously, and are pre-eminently difficult to heal; forms

of disease which are attended by early enlargement of the bronchial glands, and their speedy metamorphosis into caseous or cretaceous masses. Lastly, I believe that, although tubercle affects the lung in the first instance indiscriminately throughout, yet that it is most prone to develop itself in any old puckered scar-tissue, if such be present anywhere in it.

In scrofulous grey hepatisation of the lung, the catarrhal process extends into the ultimate air-cells, the appearances finally attained being scarcely distinguishable from those which attend acute pneumonia; catarrhal mucus-cells and fibroplastic ovoid nuclei are mixed together and block up the alveoli; the intervascular spaces are trebled in thickness, and come to present a dense and more or less distinctly fibrillated connective tissue.

The difference between the acute and chronic pneumonia is seen in the after-stages, the softening and degeneration of the products of the inflammation. This softening in the more chronic disease so affects the frame-works of the air-cells, that the elastic tissue loses its extrusive power, and cannot expel the accumulated secretion—the secretion itself being thick and difficult of displacement.

The consideration of scrofulous disease, whether in the cervical, thoracic, or abdominal tract, from a clinical point of view, offers features which contrast almost as strongly against tuberculosis as the descriptions already given of the two builds of body. Scrofula is pre-eminently a chronic complaint. The extent of the lesions or the importance of their site can, and of course does, aggravate the symptoms of the disease; but the system at large does not sympathise very greatly with the local affections; fever, or at all events high fever, becomes, therefore, the exception rather than the rule; further, it is always secondary, never primary, fever, subsequent, not precedent, to the lesions manifested. The disease is, like the hydra, perpetually budding out fresh heads, recurring again and again times out of number; its duration is contemporaneous with the life of the individual, with the exception of a possible interval of quiescence, at the period of the establishment of puberty.

To resume, then. The scrofulous tumour differs from tubercle in its component elements, and in their mode of arrangement. The two diatheses are markedly distinct from each other. The two cachexias are as different as they can be: the one is a disease of long duration, attended by only slight sympathetic fever; the other an acute disease, febrile from the first, the acuteness of whose course is accurately commensurate with the amount of fever that attends it—this fever preceding the formation of the tubercles, and lasting throughout the tuberculating process.

In the scrofulous cachexia, the lymphatic system is highly developed and eminently irritable. The habit of body is sluggish; the reaction against local lesions appears characterised by no resentment; there seems to be no strength of purpose, no conviction of the right course of their development, or of their proper maintenance, inculcated upon the lymph-elements; a wrong impression is feebly resisted; the return to a normal equilibrium is slow; the errors that occur are set right with difficulty, and after a long lapse of time; the *vis medicatrix nature* is lacking; the recuperative powers are altogether defective.

But, in the tuberculous cachexia, the blood appears the seat of graver error. It may be—nay, often is—rich in red blood-cells. The white corpuscles are not formed in preponderating disproportion. The patient looks florid and sanguineous, although the real qua-

lity of his blood is exceedingly poor, and its unfitness for the general purposes of nutrition is much greater than could, *a priori*, have been imagined.

Evidence of this impaired condition of the blood is found in the malnutrition of the body, its leanness, the lightness of the bones, the feeble development of the muscles. Both the voluntary and involuntary muscles show actual deficiency in contractile power. The heart's action is feeble; the intestinal coils are over-readily distended by flatus; the iris is sluggish in its movements. A dilated pupil may mean *anæmia* only; but sluggish response to the influence of light indicates either muscular incapacity or nerve-insensibility. Further, as Rokitsky has noticed in acute tuberculosis, the muscles are dark-coloured and flabby, and their general parenchyma is infiltrated with serum.

The dry, rough, bran-like skins of these individuals, the feverish heat of their hands, the tendency which they evince to local congestions and slight hemorrhages from mucous surfaces, are proofs of this general cachexia, which finally culminates in the building out of heteroplastic new growths having neither aim nor object, and in parts which ought properly to present nothing of their kind.

Finally, give it what weight you choose, I attribute very great importance to it: there is the striking difference in the effects of remedies upon these two diseases. The scrofulous is certainly amenable to ameliorating influences. Good air; good food; healthy habits of life; careful treatment; the judicious use of iron and cod-liver oil; the removal of sources of irritation, or their allayment, as these arise, as speedily as possible,—all such measures are not without avail. The disease gets better, or may pass into abeyance for a time. The symptoms, at least, are curable; although the vulnerability—the faulty diathesis—is not got rid of.

The extirpation of the enlarged and useless glands, which, having ceased to be blood-factors, have become blood-poisoners, when this can be effected without danger, should be done early. The results of this plan of treatment in the hands of Langenbeck and others were certainly encouraging.

But all this is quite opposed to our experience of tubercular disease. Here we may foresee the evil afar off; but, just as with cancer, our foreknowledge helps us not one whit. Being forewarned, we are not forearmed against the storm, when this arises. To procure an euthanasia is, perhaps, the only endeavour really fulfilled by the physician.

The difficulty, however, to be met in distinguishing scrofula from tubercle, is, that scrofulous persons often become tuberculous. The two diseases are not incompatible; they exercise no excluding influence upon each other, although themselves specifically distinct. Nay, they are even points of resemblance between them, just as there are between lymph-cells and tubercle-cells, and between cancer- and epithelium-cells; but there are also features of sufficient difference to authorise us in drawing a line of demarcation between them. Nothing is easier than to perceive interresemblances; nothing more difficult than to make out titles of identity. The man who is brought low by fevers, by measles, by chronic disease, by diabetes, by scrofula itself, becomes the subject of tuberculous growths; just as the individual who has suffered with successive fibrous tumours at length develops a medullary cancer. The two diseases may be fairly called allied; they are genera of one large family—the lymphatic family of disease—and yet, clinically and pathologically, they are distinctly separate. The one is especially an acute, the other a chronic disease; the one the complaint of a lifetime; the other the sudden disturbance of a life,

induced often by some great subversive change in the conditions of climate, food, or clothing, to which an individual is subjected.

It is contrary to all our definitions, all our ideas of scrofulous disease, that a man should reach eighty years of age, and then manifest scrofula for the first time—a circumstance which must be allowed, if newly developed tubercle has been found at this period of life, as has been asserted, and if tubercle and scrofula be different manifestations of one and the same cachexia.

But my text was the nature and affinities of tubercle, and it is within these limits that I must restrict myself. It has been my object to show that tubercle is a new growth; that its nature, mode of development, clinical history, and method of metastasis (all this was discussed at much greater length in the lecture as originally delivered), appoint it to a position between cancer and the strictly lymphomatous tumours.

I would have it further remembered, that no pathological new formations can be regarded as parasitic; that nothing akin to the body is ever grafted on to it; that there exist no such things as cells pathognomonic of cancer or of tubercle; that new growths are built upon normal physiological types; that the structure nearest to tubercle (there is none exactly like it) is a lymph-gland.

Lastly, as I have endeavoured to show, the diseases of lymph-glands may be classed together as a family having certain features in common, and each and all of them some affinity, although really only a very distant relationship to tubercle. When grouped together about this, as they have been, with singular talent and profound knowledge, by Professor Virchow, we learn that the heterologous mode of its development separates this new growth from them, and allies it more closely in nature with cancerous tumour.

ON THE REPORT OF THE VENEREAL COMMISSION.

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THE Report of the Committee appointed by the Lords of the Admiralty to inquire into the best mode of treatment of the venereal disease, has at least had the good effect of clearing the subject of much that was ambiguous, theoretical, or irrelevant, and has left it open to yet further inquiry. A syphilitic virus is recognised; the disease is pronounced as specific as small-pox. But here the resemblance must cease: there is no further analogy between the two diseases; and I trust never again to see repeated those cruel experiments by which it was attempted to render the body insusceptible to the further action of the virus by repeated inoculations.

The weight of evidence went to prove that syphilis, under favouring circumstances, might be generated spontaneously. And permit me to ask, as regards this point, in what respect the history of syphilis differs from that of any other known disease? Do we know the origin of small-pox, of measles, or of scarlatina? Can we explain the nature of the cholera poison? To say that syphilis may possibly have been derived from the horse, is a purely fanciful statement, which is unworthy of any scientific work.

It being, then, established, first, that there is such a disease; and secondly, that there is a specific virus,—the Committee next proceeds to the subject

of primary sores; and here, in my opinion, is the first break-down.

Two species of sores are described; namely, first, the simple local sore, the influence of which never extends beyond the inguinal glands, but is eminently contagious, though incapable of infecting the constitution. This is the most common, and prevails over all other varieties in a ratio of about 4 to 1." secondly, the syphilitic sore, which, according to this Report, is not always indurated, as was the prevailing opinion some weeks ago, but which may be indurated throughout its entire course; or soft in its early stage, and subsequently indurated or soft throughout its entire course, but which, unlike the simple local sore, is followed by constitutional disease. The evidence, further, is conclusive that it is impossible to pronounce with certainty on the characters of a sore on its first appearance.

Now, I maintain that such conclusions as these are useless to us in a medical point of view, and may become mischievous to our patients. The theories about "induration" as characteristic of syphilis are gone. The soft syphilitic sore cannot be distinguished from the soft non-syphilitic sore, except by its progress and history. If, according to the Report, a rash come over the body, it is syphilitic; if not so, it is a simple sore. But the surgeon, who honestly entertains this belief, can only reply to his patient's anxious inquiries respecting the character of the disease, "I cannot tell you its nature until it has come to an end. If you suffer from constitutional symptoms, it is syphilitic; if not, it is non-syphilitic." The patient might reply, that he could have told the surgeon as much himself.

Such arguments remind me of those once entertained respecting the use of mercury. If the sore is cured by mercury, it is syphilitic; if not so, it is non-syphilitic.

But these arguments may become mischievous. Is there a sane surgeon living who, if his life depended on it, would undertake to guarantee to a patient, the subject of any form of venereal sore whatever, that he should be free from the occurrence of constitutional infection? Should there be any one who really attaches importance to the matter of "induration", I could speedily produce evidence to bring him to a very different opinion. That some persons suffer constitutionally, and some do not, is a matter of general notoriety; but surely all individuals are not equally susceptible of general syphilitic infection.

According to this Report, the frequency of constitutional symptoms to primary sores of all kinds should be four to one. Taking the female venereal cases which are in constant succession under my care, I should pronounce the number at least one-half; and then, many who quit the hospital apparently well, and not generally infected, suffer from secondary symptoms afterwards. So also, among the men, secondary symptoms are common; but the induration of the base of the primary sore is of rare occurrence, and is scarcely ever seen in women.

I see no reason to change my opinion from that which has been already published and expressed; namely, that there is but one venereal virus, the action of which is usually chronic, and always ulcerative. The character of the sore thus produced depends, as in any other case, on the nature of the tissue on which it acts; and, *ceteris paribus*, the same tissue presents the same kind of venereal ulcers. These ulcers are not precisely similar in the male and female; nor in the former are they always the same, inasmuch as they vary in character just as often as the tissues composing the penis vary in their intimate structure.