Gulstonian Lectures

ON

THE NATURE AND AFFINITIES OF TUBERCLE.

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BY

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LECTURE III.

The Leukæmic Lymphoma.

Under this head are grouped those individually enlarged glands, enlarged by simple increase in quantity of their ordinary elements, which are characteristic of the disease entitled Leukæmia by Professor Virchow, Leucocythemia by Dr. Bennett. The morbid anatomy of this complaint consists, as is well known, in a general hypertrophy of all the glands in the body, the glandular structures remaining individually perfect and harmoniously proportioned to each other. There is no inclination to death, to caseous degeneration, or to ulceration; neither do the hypertrophied parts convey ulcerative or indurative tendencies to the tissues about them; the glands remain loose and quite naturally moveable in their respective sites, but they are extra large.

The course of pathological changes is for groups of glands—those, namely, which lie in the current of the lymph-stream—derived from some one first affected gland to become involved one after another in similar error. They enlarge—indeed, they may be said to aggrandise themselves at the expense of the proper nutrition of the body—and pour the white blood-cells, the products of their elaboration, through the lymph-vessels (these remaining open and perfectly entire), into the general current of the circulation.

The blood becomes deluged with white cells and mulcted of red ones; its dyscrasia or unfitness for the nutrition of the body, and finally for the maintenance of life at all, thus follows upon the local gland mischief, of which it is the secondary consequence, not the primary cause.

The primary gland-swelling is not traceable, as in scrofula, back to any local irritation or skin-eruption, but is self-developed.

To us the point of interest is not only the circumstance of the physiology of the tumour showing its kinship to tubercle, but also because this leukæmic increase in size of minute lymphatic glands, in places where these are otherwise scarcely visible to the unaided eye, as in the pleuro-pulmonalis, the lungs, the pericardium, the kidney, the mucous membrane of the epiglottis, the larynx, the trachea, the bronchi; these hypertrophied glands, I say, actually come to resemble tubercle so closely as to have been often mistaken for it. Indeed, if the specimen be small, and have presented, apart from the clinical history of the symptoms manifested during life, the nature of these grey granular tiny nodules can only be determined by a minute microscopical examination.

But then the distinction is plainly apparent. The lymph-cells and free nuclei are all sound and per-

sistent in themselves; there is no fat degeneration, no little groups of cells dwindling down to nuclei, and from nuclei in regular progression down again to central granules; and, again, the appearances upon mucous membranes are very easily distinguishable from tubercle, for there is no ulceration present.

The Typhoid Lymphoma.

The hyperplasia of lymphoid elements which takes place in typhoid fever, in the follicles of the Peyer's patches, in the solitary follicles, in the spleen and in the mesenteric glands, and which becomes the principal local lesion pathognomonic of this particular dyscrasia, is a pathological formation which stands, as Virchow appoints it, about intermediately between the leukæmic and scrofulous lymphoma. It differs from the leukæmic tumour in the proclivity to die manifested by the cell-elements thus unnaturally multiplied, and it approaches the scrofulous gland tumour in this its peculiar instability.

Furthermore, the individual lymph-elements present a very apparent deviation from the normal type. They are lymph-cells, but evidently very abnormal ones for their site; they are more cloudy, more finely granular, and much richer in some fat emulsion content than they ought to be. Again, the hyperplasia is to the injury of the surrounding parts; a zone of inflammatory products is infiltrated into the tissues about the swollen gland, and encircles the dead useless lymph heap, itself shortly to be eliminated by a distinct process of ulceration.

The blood error precedes the local lesion; and a corresponding morbid change is impressed upon all the other glands of the body; Virchow's (*Parenchymatöse Schwellung*) gland cell-like multiplication, which varies in its degree and extent with the gravity of the original blood-poisoning. In particular epidemics too, it is found that the stress of the disease falls somewhat differently upon different organs; although in all the spleen, liver, and kidney, present entirely homologous pathological appearances.

The tendency to caseous metamorphosis in the mesenteric glands which have been the seat of typhous hyperplasia certainly shows the relationship between this disease and scrofula upon the one side; while upon the other it must be remembered that the typhomatous, just like the leukæmic gland hypertrophy, loads the circulating fluid with an undue preponderance of white blood-cells.

The typhoid lymphoma does not merely in its composition and course resemble tubercle; it affects similar parts, it leads to similar lesions, ulcerations, in the mucous membrane of the intestine, which, although most often easily distinguishable from those produced by tubercle by the direction in which they extend, lengthwise rather than encircling, still occasionally offer very difficult questions for morbid anatomists to settle.

In acute tuberculosis, the ulceration of the intestine is sometimes so diffusely scattered, so widely extended, and so much on an equality of age or of probable duration, that, with no old shrunken scars to guide one by the method of their constriction, and negative or only feeble evidence from other organs, the lesions of the two diseases become by no means easy of differential diagnosis; and the clinical symptoms offered by the two complaints during life are so much alike that the occasional confounding of general tuberculosis with typhoid fever need least of all surprise those who have studied their pathological features with greatest minuteness. Lastly, the kinship of the two diseases obtains confirmation from another source; for the typhoid poisoning is most apt to kindle a dormant tuberculous

diathesis, or what is more probably a scrofulous pneumonia, into activity.

Scrofuloid Lymphomata.

Under this group are reckoned certain glandular swellings which possess in themselves something of what we term, for want of a better name, a specific nature. Now the anatomical changes included under this head are extremely various, ranging from mere temporary increase of its lymph-cells in a gland up to the gravest possible fibrous hyperplasia and amyloid degeneration. But this need not militate against the utility of the group, as a whole, for purposes of classification. I have neither time nor intention to do more than just notice them here; a volume might be written upon them. Their variety depends upon the special irritation to which they owe their origin; they comprehend all chronic and acute pathological metamorphoses which are limited to single glands or single groups of glands; as, for instance, the tonsils in tonsillitis and in the scarlatinal lymphoma; the follicles at the root of the tongue in hydrophobia; the hypertrophy with hyperplastic induration common to syphilis, which affects first the glands nearest to the seat of primary infection, and shortly all the lymph-glands of the body in greater or less degree, this varying with the malignity of the original virus and the proclivity or impressibility of the individual thus inoculated; and, finally, the fibroid indurations with so-called amyloid degeneration, as found in the spleen, liver, and kidney, and the superficial lymph-glands of the integument, speaking generally, which is found to accompany extensive bone-abscess, rachitis, and perhaps some other conditions involving peculiar malnutrition of the body.

Now all these differ from the leukæmic lymphomata by the limitation of the affection to certain parts; and they are distinct from scrofula, since they are produced by a traceable infecting poison or specific morbid stimulating cause, and because the transition of the glands thus implicated into a caseous state is quite exceptional. They are, further, not simple enlargements, in which all the gland-elements preserve their correlations, but hyperplasias of some one or other component element; and their development is to the absolute hurt, temporary or permanent, of the functions of the glands thus affected.

The kinship of this entire group to tubercle is anatomically very close; it is also easy to see a relationship in the dyscratic origin of most of these affections, in their tendency to spread by contact, and in the circumstance that so many of them directly predispose individuals to tuberculosis. They are of the same family; and can further be said to convey some taint of their own cachexia both to the form and course of the tubercle growth whose development they favour.

I am by no means alone in my belief, that there exists a clinically distinguishable form of tuberculosis induced in syphilitic and rachitic persons, which is characterised by peculiar features of rapidity in its early and chronicity in its later stages; indeed, a foundation wash is thus, as it were, laid on, which lends its predominating tone or colour to the details of the disease as subsequently worked out.

Specific constitutional disturbances—such, for example, as the influence of vaccination—must modify the entire habit of body; and there is nothing that need surprise us in the extension of this modifying influence to the course and actual anatomy of a new growth as in tubercular disease.

The Lympho-sarcomata.

These are hyperplastic glands, sarcoma lymphaticum, the old scrofulous sarcomatous glands. Their

characteristic, says Virchow (*Lib. ante cit.*, p. 729), is progressive growth, and occasionally very rapid growth, with persistence of the component elements that thus enter into and enlarge the gland; they infect neighbouring structures by direct continuity; and approximate us one step closer to cancer by their tendency to form metastasis in other organs, such as the spleen, the liver, and the lungs, following the order of greatest proclivity in the parts.

The lympho-sarcomata are grey or ash-coloured, and form roundish or very irregularly shaped masses; they attain very much larger size than scrofulous glands do, and show little proclivity to ulceration and still less to caseous degeneration, being scarcely ever metamorphosed into cheesy or cretaceous masses.

They present themselves in two different forms, the soft and the hard. The *soft* form is like the leukæmic tumour, only it does not induce leukæmia; it approximates to medullary cancer in its alveolar build, and in the cell-contents which fill its alveoli, and has hence obtained the name of sarcoma carcinomatodes. The cells under the microscope are small and round with large nuclei, and occasionally some very large ones are seen containing several nuclei in their interiors. The *hard* form consists principally of hyperplastic connective tissue; the normally fine reticulum becomes thick and dense, until the whole gland arrives at a scirrhus hardness.

In the external gland system, the sites of predilection are the cervical and axillary glands, and internally the mediastinal bronchial gland system and the thymus. The bronchial gland, lympho-sarcoma, generally extends into the lung-tissue; and that which develops itself in a persistent thymus gland very often implicates the pericardium. A case in which the lumbar and peritoneal glands were involved in this form of growth, and the aorta pressed upon, is narrated by Dr. Ogle, in the *Transactions of the Pathological Society*, vol. xi, p. 251.

Scrofula.

The old notion of a virus scrofulosum has of late years fallen into disrepute, perhaps for good reasons. It implied that a particular kind of poison was always present in the circulating fluid of scrofulous subjects; a thing which, until this had been isolated, was capable of neither proof nor disproof. (Compare Ansell, *On Tuberculosis*, p. 566.) Still this idea is retained in a phrase constantly made use of, "blood-poisonings"; and, if we allow of acute blood-poisonings, it might be argued, what right have we to reject a chronic attaintment such as is vouchsafed in this hypothesis?

The word poison might be, and indeed has been, objected to, for it admits of very different interpretations; but, by it, we take account of any agent that vitiates nutritional interchanges, or arrests, or impairs, the functions of organs essential to life; and in it we recognise something that can exist latently in living creatures, that can excite regular trains of constant symptoms, that is capable of accumulating in the system, and of being excreted from it. Surely, to such an understanding of a poison, it might be conceded, that the symptoms of scrofula are not incompatible with those manifested by the body in reaction against some particular virus; and, if the scrofulous poison could be detected and shown in a bottle like vaccine lymph, and be proved capable of inciting such regular trains of lesions, we should all acknowledge its title at once. But since the idea thus implied is at present speculative and hypothetical, the term, too, of virus is best abandoned, although the existence of a scrofulous

diathesis prior to any manifestation of scrofula must be accepted.

By the expression, scrofulous diathesis, we convey, in a concise and convenient manner, our recognition of a special habit and type of body, such as I believe is characterised by structural peculiarities of form and build. The scrofulous build of body is an outward and visible sign testifying to an inward vulnerability of that body to certain trains of local lesions; and, similarly, the tubercular cast of frame indicates a proclivity in that body to develop tubercle.

Those who have reckoned tubercle and scrofula together, as merely different expressions in disease of one and the same habit of body, found themselves compelled to adopt two types of scrofulous persons, the very antitheses of each other. The two ideal pictures, however, were so unlike, so completely opposite, that when approximate resemblances became admitted, every form and complexion common to Europeans was included, and the whole Indo-Germanic race might be entitled scrofulous.

Canstatt thus presents us two types of scrofulous persons, the torpid and the fiery. Both are powerful drawings—good observations, and true to life; but I take it that they are strictly correct, not as of two kinds of scrofula, but as descriptions of the scrofulous and tuberculous builds of body, which are as distinct as they possibly can be.

Scrofulous persons are large-framed; their bones are heavy, their heads large, their wrists and ankles thick, and their jaw-bones broad. They are big-bellied and coarse-featured. The lobes of their ears are apt to be tumid; their noses and lips often look swollen; their skins are soft and velvety, but their complexions are muddy. Their muscles are large, but feel flabby, and hang flaccid. They are torpid in mind and body, slow to think, and slow to move, being physically incapable of exertions easily endured by those who are of smaller build and look much feebler than they do.

Against this, contrast the tuberculous type—Canstatt's fiery form of scrofula. These persons are tall and thin; their weight is disproportionate to their size; their heads are small; their bones light and long; the ends of their long bones are taper; their muscles are slim and soft; their teeth are thin, long, transparent, and highly enamelled. Their hair is fine and silky; their skins are very fair, and the veins very visible. Their faces are generally oval; their features are delicately chiselled; their lips and cheeks are ruddy; their sclerotics clear blue and pearly, such as bestow a beautiful liquid appearance upon the eye. They are quick and premature in everything from earliest infancy; they cut their teeth early, and walk before other children get upon their legs. They are precocious as infants; nervous, irritable, and impatient, in childhood; and, if they attain to adult years, are distinguished as people of genius or talent, rather than as possessed of particular vigour of mind or profound judgment powers.

The scrofulous diathesis may be recognised at the outset as a preternatural vulnerability to certain forms of chronic inflammation; the tuberculous, as a special proclivity to one particular form of disease. The first evidence of established tubercle is the presence of a primary tubercle new growth; the first evidence of established scrofula is some glandular enlargement—the scrofulous tumour which has followed upon some slight irritation of the skin, or some local ulceration.

Now, the anatomy of the primary eczema, or otorrhœa, or ophthalmia, of the scrofulous subject, differs in no respect from similar affections, as these occur to the non-scrofulous. Sir W. Lawrence, discussing scrofula in his *Lectures*, acknowledges this in

these terms. "There is," he says, "an insensible transition from common to scrofulous disease, and hence the diagnosis is often somewhat uncertain. The ordinary processes are merely modified; the inflammation, instead of being acute, is chronic, and leads to glandular swellings and suppuration by a slow smouldering process."

Three things, however, render both the primary lesion and the secondary gland-swelling of scrofula peculiar: first, the facility with which the mischief is aroused; secondly, the size and extent which it attains; thirdly, the chronicity or sub-inflammatory character of the whole after-process. Abernethy, and after him Lloyd, attributed the scrofulous diathesis to some original error in the chylipoietic organs. Now, dyspepsia is doubtless as characteristic a feature of this habit of body as are those form or build attributes which I have already specified. The scrofulous diathesis, like that of tubercle, syphilis, and cancer, is the disposition of body which favours the development of the disease. It may descend as an heirloom by inheritance, or may be acquired as the consequence of one or more unfavourable conditions of life. This predisposition may be strongly or feebly marked, and is expressed by such form or build attributes of body as have been already noticed; but it is for many reasons advisable that we should regard it only as a more or less combustible train built into the very fabric of a man's frame, to whose ignition or development some spark or exciting cause is essential. Now, the predisposition may be very great, but yet, if every exciting cause be avoided, the actual symptoms of the disease, the established cachexia, need not, or may only very feebly, manifest itself; and, on the other hand, although the predisposition be infinitesimally small, the subject may be exposed to exciting causes numerous and prolonged enough to evoke even this into active being.

The age at which symptoms of scrofula may show themselves extends certainly over the largest half of a man's life. From the time of weaning up to that of the declension of the generative functions is the wide range allowed by many authors; but we must remember that a great deal of hereditary syphilis and tuberculosis is comprehended in the statistical tables that have been compiled.

Niemeyer (*Pathol. u. Ther.*, B. ii, s. 743) thus enumerates the principal circumstances which, in his opinion, favour the production of scrofula: 1. Manifest scrofulous disease in one or both parents at the time of procreation, or in the mother throughout the period of pregnancy; 2. A taint, not scrofulous in kind, in the health of one or both parents, such as their being afflicted with cancer, syphilis, tubercle, or marsh-miasm; 3. Too close intermarriages.

It is impossible for me, out of the scanty data I possess, to apportion their exact value to his observations. All my own experience inclines me to look upon scrofula as a distinct disease, with regularly recurring trains of local lesions of its own, and such as manifest themselves only in consequence of an inherited or acquired scrofulous taint. In this particular, it is no way different from tubercle, cancer, syphilis, or leprosy. Certain particular conditions produce all these complaints. What these conditions are we at present only know in part; and certain structural changes which we are studying more exactly, and certain clinical symptoms with which we are slowly gaining better acquaintance, indicate their existence.

Lastly, two or more of them may occur together in the same individual, and thus render our recognition of them difficult, although altering in no degree their essentially separate natures. Unhealthy pa-

rents do not invariably beget unhealthy children; still their tendency to do so, and further to reproduce in their offspring the same diseases as they themselves were afflicted with, is a law as indisputable as that great one of like producing like, which is illustrated by the inheritance of feature, form, and character, of handwritings, of moods of thought, of methods of combined muscular movements, such as bestow similar expressions of countenance.

Whether scrofula can be acquired when it has no hereditary taint or structural debility to fasten upon, the possibility of its absolute acquisition is not so easy a question to answer. But, for our purpose, it is enough when we know that unfavourable conditions of life, bad or insufficient food, foul air, and overcrowding, if they do not actually engender scrofula, can kindle its tinder and fan its smouldering flame. And, again, any fever or accidental hurt, which injures the health, can develop the same latent constitutional vulnerability. If asked what is the reason of this preternatural vulnerability in scrofula, we can really only answer, something imperfect in the body. The humoralists localise this imperfection in the fluids; the neuropathologists, in the nerve-system. The cellular pathologist discards neither the humoral nor the neural view of the question. He says, "For me, the blood also is a tissue composed of cells and intercellular substance; only the intercellular substance is fluid. Doubtless this tissue may suffer changes which render it unfit to fulfil its functions at all times equally well. And so, too, of the nerves and nerve-centres; these, through defective function or structural error, may so influence the digestive organs as to render these incapable of forming healthy chyle, or of converting this chyle into blood, or of elaborating this blood into tissue. But the primary error, the first causes which you fall back upon in both your propositions, is not demonstrable, and merely shifts the difficulties, of which it offers no real solution, further backwards and more into the dark. They are plausible hypotheses, created, like the atomic theory, to meet a certain array of facts, but not equally happy in answering the purpose. Now, on my part, I offer you only what you can see for yourselves—a distinct abnormality—something wrong developed or out of place in the part wherein it is found. As to the fundamental cause of this error, I can only appoint this in some structural weakness in the cell or tissue that first presents it. In scrofula, this particular weakness of construction appears to reside in the lymphatic apparatus, and to consist in the vulnerability of this to impressions or irritations from without. But you may ask, and very fairly ask, What do I mean by vulnerability?"

Habit has been called the memory of the body; and there are habits of right in the perfect adjustment of supply to demand implied by perfect nutrition, which more long continued performance becomes as it were a guarantee for. That which has been performed well for a long time is all the more likely to continue to be well performed.

But while the body is building, growing—a process (and this is a most important point) never carried on after foetal life with equal activity everywhere—there is a disturbing agent ever at work. One or other part is not only being maintained at the expense of the nutritive fluid; it is also being further developed and perfected. It remains, I think, easy to see that just this weight in excess of perfect counterpoise becomes an item of possible misapplication; it is the extra strain upon the memorial instincts of the body, which cannot at all times and under all conditions be equally well supported. This explains the vulnerability of infancy

and childhood to all disease. Again, organs which are at one time being actively used, and at another only passively nourished, pass through great and rapid variations of state; this renders them vulnerable. Now, the lymphatic system appears the vulnerable part in scrofula. The lymph-glands and their vascular prolongations are so far weakly constructed that they get thrown out of gear more easily than they ought. This is that structural debility whose existence I plead for, and which has been long since allowed by so many medical authors, under the insufficiently precise expression of a scrofulous taint.

ON THE ELECTROLYTIC TREATMENT OF TUMOURS AND OTHER SURGICAL DISEASES.*

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THAT cysts may be successfully treated in the same manner, is shown by the following.

4. *Case of Hydatids in the Muscles of a Horse: Operation: Cure.* On November 22th, 1866, Mr. T. Mavor, of Park Street, Grosvenor Square, begged me to see a horse, eight years old, which had a large hydatid tumour in the muscles of the left hip. It had been treated by acupuncture and lancing, and had become somewhat smaller in consequence of the suppuration established in the cysts. There were several abscesses still discharging.

Needles connected with ten cells of the battery were introduced into several parts of the tumour, and the operation repeated on December 3rd. From the time the galvanism was first applied, the tumour shrank rapidly, and the horse is now recovered. At no time was there any inflammation, suppuration, or sloughing, from the electrolytic applications; the only symptom observed being that of shrinking.

I have no doubt that the same result would be obtained in hydatids of the human liver—an affection for which a safe and quick mode of treatment is still sadly wanting.

Let me add that, although small tumours are more readily removed than large ones, the mere size of a tumour is no impediment to the electrolytic treatment. Large tumours take a longer time to remove than small ones; but the efficacy of the operative proceeding is the same, whatever may be the conformation of the growth. Pediculated tumours are, for obvious reasons, more readily removable than those with a broad base.

A larger experience than I command at present will be necessary to decide the question, whether the electrolytic treatment will supersede the other methods of treating cancer. In consequence of the extreme hardness of scirrhus, the destruction of that form of cancer by electrolysis requires a much longer time than that of the soft medullary form. The method, however, may be usefully applied in every variety of cancer; and it seems to be of little consequence whether or not the tumour adheres to the bones—a circumstance which often renders removal by the knife difficult or impossible. I believe that, in this most terrible disease, the electrolytic method will be found generally useful, not merely by removing the present tumours, but also by so modifying the nutrition of the parts concerned that no relapse is likely to take place there; and, if com-

* Concluded from page 540 of JOURNAL for May 11th.