DISEASES OF THE JOINTS AND RHEUMATISM

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PREFACE

THIS book is intended for students who regret the omission from the medical curriculum of teaching in the " rheumatic diseases." I have often been asked to indicate a source of information which might partly remedy the defect.

I hope that it may also prove to be a helpful guide to those post-graduates who intend to engage in the special study and practice of this branch of medicine.

When I began work in a large clinic for rheumatic diseases, I soon realised that efficient clinical investigation was impossible without a foundation of knowledge covering the whole field of joint disorders. Patients present themselves suffering not only from the rheumatic diseases, but from almost any joint disability or somatic pain. *Orthopædic Medicine* would name more appropriately than " rheumatology " the work carried on in rheumatism clinics of to-day. No one, with a sense of his responsibility, would wish to practise in such clinics unless able to diagnose a tuberculous joint with reasonable confidence, or to detect any of the numerous conditions of joint disability which by no definition of the name can be called " rheumatic."

Interesting and helpful as were some of the monographs on rheumatism at that time, I would have welcomed more a work whose scope embraced joint disorders of both unknown and known causation. And the motive in beginning to write this manual derived from the belief that others would feel the same need.

I have presented the subject-matter in two books : the first dealing with diseases of the joints ; the second with the so-called " non-articular rheumatic diseases "—an ill-defined group of painful somatic disorders, denoted by the word " rheumatism," when used as a word of common speech.

Although many joint troubles are local manifestations of a general disease, diagnosis and treatment are largely guided by examination of the joint itself. A painful knee is a very different problem from a painful shoulder, even if caused by the same pathological process. I have therefore devoted the later chapters of Book I to a consideration of the several joints of the body, giving essential details of anatomy, describing how to examine the joint, and reviewing, from the aspect of differential diagnosis and local treatment, the disorders from which it is apt to suffer. I hope there is no undue repetition from the earlier chapters, which deal with joint disorders in more general terms.

I may be criticised by some of my colleagues for the first three chapters of Book II. Here facts are woven together by a hypothesis

not yet experimentally verified : one indeed of which the experimental testing would involve very difficult experiments. I admit to a long hesitation before presenting the subject of muscular rheumatism in this way : Michael Foster's mordant words incessantly recurring—" The man who constructs a hypothesis without supplying an adequate programme for its trial by experiment, is a burden to science and to the world ; and he who puts forward hypotheses, which by their very nature cannot be so tried, is worse, for he is a purveyor of rubbish." This outburst was absolutely right within the sphere of scientific investigation. But medicine cannot be taught by presenting fact after dreary fact, totally devoid of intrinsic interest as they are. Nothing is so wearisome as the acquisition of factual knowledge. What attracts us is the search for understanding : to find significance in facts, and their explanation. And if they are shown interrelated, even within the framework of a hypothesis which may later be disproved, they are absorbed with infinitely less mental effort.

I owe a great debt of gratitude to the late Sir Walter Langdon Brown for his patience and kindness in reading through these chapters. He did not dissuade me from publishing them as they stood.

It is related of the Venerable Bede, when the great English scholar was near his end, that his answer to those who counselled him to relax his efforts was " I don't want my boys to read a lie." With the same concern, which has guided me in all the following pages, I earnestly hope that students will clearly distinguish between accepted explanation and unverified (perhaps unverifiable) hypothesis.

I have, of course, derived great help from the writings of many authors : I hope that due acknowledgment has been made in the text. My thanks are due to the Editor of the *Practitioner* for permission to make use of my article in the journal on intervertebral disc lesions. I am greatly indebted to Dr. G. T. Calthrop for providing me with some of his finest X-ray prints for use as illustrations. For letting me have the original illustrations of their invaluable contributions to the study of joint disease, my thanks are also due to Dr. D. H. Collins, Dr. W. Goldie and Dr. Campbell Golding. And I would take this opportunity of recording the debt of gratitude I owe to my revered chief of former days in the bacteriological laboratories of St. Bartholomew's Hospital, Dr. Mervyn Gordon. He has shown the most kindly interest in this work, and has allowed me to reproduce his beautiful microphotographs of the Aschoff node, and those illustrating his own pioneer work on experimental fibrositis.

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CHAPTER I

ON CLASSIFICATION OF DISEASES OF THE JOINTS AND OF THE RHEUMATIC DISEASES

Artificial and natural classifications. Diseases considered as actual entities. What are " the rheumatic diseases " ? Classification of diseases of the joints.

I SHALL first define my terms. What is classification ? What is a disease, and what are diseases of joints ? *And what are the rheumatic diseases ?*

Artificial and natural classifications

Diseases are often grouped under headings found useful for statistics. In text-books they may be found arranged under presenting symptoms, to help the memory, and to be an aid in the practical work of diagnosis. We make such lists for a special purpose, and they are therefore called by logicians *artificial classifications*.

They are but mentioned here to clarify the notion of *natural classification*, a very different device. In a sense we do not make natural classifications ; we merely acquire the knowledge from which, if it be complete enough, they make themselves. They are concise statements of knowledge already accumulated, in a form devised by Aristotle.

Logical division

Aristotle was the first to show that analysis of the essence of things led to the procedure of natural or *scientific* classification. The essential attributes of a thing make it what it is ; without them it would not be the same thing. We would agree that a streptococcus would still be essentially a streptococcus even if it lost its pathogenicity or became Gram negative : what then are the attributes which constitute its essence ?

It is an elusive concept. Its pursuit always ends by our *selecting* attributes which we agree, perhaps for the moment only, to regard as the essence of the thing. Our *definitions* attempt to be a statement of these selected attributes.

But what makes one definition better than another : what sort of

attributes seem to us to mark most appropriately the essence of anything ? A streptococcus is well defined as " a spherical micro-organism, which multiplies by division in one plane of space only." This is a good definition, because, as the old logicians put it, it is definition *per genus et differentiam*.

We have made from the many attributes of a streptococcus a selection which includes the general kind of thing a streptococcus is : " a spherical micro-organism." This is the generic part of the definition ; but there are many things of the same general kind which are not streptococci, and to mark them off we have to add the attribute which is the *differentia*, namely " which multiplies by division in one plane of space only."

This analysis of a definition into genus and differentia is called *logical division*. Natural classification follows, for it is simply a grouping together of those things which have the same genus. Our problem, then, is to define diseases in this way, if we can, and the rest follows.

Of theoretical interest only, it may be objected : this precision is quite unattainable in medicine. We are not in the happy position of the chemists, who can give the genus and differentia of their entities with mathematical exactitude. Common salt is sodium chloride : and the sodium salts fall into their groups without any of the agonising to which we are accustomed.

Does this mean that we must abandon all attempts at scientific classification in medicine ? Do we approve the implied derision with which Garrison records (1) " Sauvages (Nosologia Methodica, 1768) endeavoured to classify diseases as if they were specimens in natural history, subdividing them into ten classes, with as many as 295 genera, and 2,400 species." ?

Not entirely. Consider that although chemical compounds are comparatively simple entities, chemists still must *select* from their numerous properties what they agree to regard as essential attributes. They are probably able to get very near to the Aristotelian idea of essence, but it is conceivable that definition by molecular composition may one day be superseded. The only difference between us is that from our meagre data about diseases we must perforce select characters which are probably far removed from the true essence of the disease : that our definitions will certainly be superseded, and that our classifications are transient. But a natural classification of some sort must result from an effort to get as close as we can to the essential nature of disease processes ; and as a method of study it has its uses. Things alike in one important respect will be seen grouped together ; and things alike in one respect are often alike in another.

(1) GARRISON (1917). " An Introduction to the History of Medicine." Saunders.

Diseases considered as actual entities

But there is another, and graver, objection to the use of scientific classification in medicine. It comes from those critics who say that diseases are not actual entities, akin to inorganic kinds and living species, and are therefore not classifiable : asserting with Trousseau—" Il n'y a pas de maladies ; il n'y a que des malades."

This view I believe to be mistaken. The error seems to derive from an obsession with nineteenth-century physics, and the idea that nothing could have real existence unless it were a physical thing ; something, that is, which has position in time and space, and can be apprehended by the senses and measured.

Modern physics finds the realities of the universe in its processes. The concrete thing of the nineteenth century has vanished ; matter when analysed sufficiently far disappears into events and processes. A real entity is the unity of a process. Thus A. N. Whitehead (2) writes " Nature is a structure of evolving processes. The reality is the process " ; and Bertrand Russell (3) " We must think of a string of events, connected together by certain causal connections, and having enough unity to deserve a single name. We then begin to imagine that the single name denotes a single thing."

Any process which can be seen to be a unity, which has a characteristic evolving pattern, is a real entity ; and no better example could be given than those processes which we call diseases.

In repeated instances the same concurrence of conditions (C) appears in a previously healthy organism, and is of necessity followed by the same process (D), a complex evolving pattern of causally inter-related events, which is manifest by disturbance of physiological function. Such a process has a form and individuality by which it can be distinguished from similar processes. This is the essential nature of a disease, which it is therefore right to regard as an actual entity ; and as an entity it has genus and differentia, and is therefore subject to scientific classification.

Diseases and component syndromes

Processes of the same general type may however arise as a component part of a larger process, or under conditions which include some which have been brought about by the evolution of an antecedent process. Thus synovitis may be a component of a chronic arthritis, and paraplegia may be secondary to an antecedent tuberculosis of the spine.

These subordinate processes, whose relevant conditions as a rule may

(2) WHITEHEAD (1938). " Science and the Modern World." Cambridge University Press.

(3) BERTRAND RUSSELL (1941). " An Outline of Philosophy." George Allen and Unwin.

be provided by several disease processes, are called " secondary diseases," " syndromes," or " sequelae." They are of two categories : (1) component parts of disease processes, (2) complications consequent on disease processes under some new condition *x*.

To say " *a disease is a process manifest by disturbed physiological function* " would not be enough, for syndromes and sequelae would be included : to differentiate them we must add " *whose evolution implies an invariab e set of etiological antecedents*."

The relation of a specific disease to its relevant conditions is C implies D, and D implies C. This is an essential part of the scientific causal relation. " Cause " as used in common speech is often no more than A conditionally implies B—" chill causes rheumatism," " strychnine causes death," and so on. A disease is the " cause " of the complicating syndrome (S) in the same sense ; the relation being D conditioned by *x* implies S, but not necessarily that S implies D conditioned by *x*.

To distinguish clearly between diseases and syndromes is an essential beginning to any attempt to make a scientific classification of disorders. The importance of it lies in this, that syndromes are not classifiable with diseases. I could not introduce into a scientific grouping of diseases something which is not a disease. The yellowness of a buttercup might perhaps be classified with other colours, but not with the ranunculaceae. A classification can be made of diseases of joints, but there are several disorders of joints, which not being diseases in the sense of our definition, cannot be included : I mean troubles like a toxic joint reaction, a hæmarthrosis, a Baker cyst, a Charcot joint, or a secondary osteo-arthritis. All we can do with these fragments, in an attempt to classify joint *disorders*, is to enumerate them and refer them to their parent entities, which may or may not be diseases of joints.

What are " the rheumatic diseases " ?

The name " rheumatic diseases " was proposed not many years ago as a substitute for " rheumatism," to mean what rheumatism then meant. If you ask what it means, of those who use it, you will receive a guarded answer. But we must know, and what we want to know particularly is this : does " rheumatic " have a generic significance, or merely denote a number of affections as essentially unrelated as the intestinal flora ?

Since the time of the earliest medical writers, the name " rheumatism" has never implied any sharply defined clinical concept. Hippocrates used it synonymously with catarrh (κατὰ, ῥέω), to denote any disorder then thought to be caused by an " acrid humour," generated in the brain and flowing into various parts of the body. Later, catarrh was reserved for mucous membrane affections, and rheumatism stood for the remaining defluxions. Then Ballonius (1538–1616)—Guillaume de

Baillou, a French physician whose " Liber de Rheumatismo " (4) was published posthumously in 1642—still thinking in terms of defluxions, limited the meaning of the rheumatic flux to a painful affection of muscles and joints. Rheumatism retained this sense for the next hundred years.

By the end of the eighteenth century " flux " was giving place to " chill " as the cause of these painful maladies. Rheumatism was caused by catching cold and, by a fallacious reasoning not unknown in medicine, any painful disorder which followed " chill " was rheumatism. " Visceral rheumatism " stood for all that the modern layman means by " internal chill." It was a useful word to the busy practitioner of 1800.

The nineteenth century saw the development of morbid anatomy, and diseases were differentiated on a sounder basis. Visceral disorders, diseases of bone, neuralgias, and other maladies disappeared from the class. Senator wrote in von Ziemssen's " Cyclopædia of the Practice of Medicine " (1877) : " There still remained a group of articular and muscular affections for which morbid anatomy had failed to discover any adequate explanation. . . . For this group of maladies the term rheumatism has been retained up to the present time. It thus includes '*all painful affections of the joints and muscles, with their tendons and fasciae, which are either due to chill, or to causes which cannot be ascertained and are therefore assumed to be atmospheric.*' " And again, " Its limits have been gradually narrowed year by year : gout, arthritis deformans, the articular neuroses and other forms of neuralgia, the painful affections of the muscles depending on toxic and infective processes, have been successively withdrawn. *We may fairly anticipate that the pathological residue which is still comprised under the head of ' rheumatism ' will continue to undergo the same process of differentiation.*"

The stubbornly enduring word is with us still. Judging from this review of its origin and subsequent history, it clearly does not belong to a scientific nomenclature : such names and terms must keep their original meaning, or the foundations of the science would crumble. Although a name of clinical nomenclature it is clearly, like so many others, in the same category as words of common speech, whose usage legitimately changes with the passage of time. In defining a word of common speech it is not open to anyone to say what meaning the word should have, selecting and trying to enforce a special meaning of his own. All that he may do is to ascertain the meaning the word actually has.

From my own attempts to determine the modern clinical usage of the name, I believe that for many clinicians it has a meaning much the same as that stated by Senator. They would define it as meaning " painful

(4) GULIEMUS BALLONIUS. " Book on Rheumatism." English translation from German text (1940). *Brit. J. Rheum.*, 2, 140.

disorders of the locomotor system for which there is no adequate explanation."

But others, I believe, feel that some of these unexplained painful somatic disorders have so much in common clinically that we must postulate an essential relation between them even though we cannot name it : that there is a common generic feature to be called " rheumatic " although they cannot state exactly what this common attribute is.

In considering scientific classification let us take this view first. It is no more than saying " the rheumatic diseases " may be a generic name, but we cannot state definitely that it is so. In this case the matter ends there, in that no scientific classification is possible. For this is a universally accepted form of statement of knowledge, not of speculation. If anyone presents us with what purports to be a scientific classification of the rheumatic diseases, he must either state the nature of the generic feature called " rheumatic," or be convicted of intellectual fraud. For he is presenting a speculation in the guise of accepted fact.

We are, however, in no better case with the other usage of the name. For if " the rheumatic diseases " denotes a class of essentially unrelated disorders, no scientific classification is possible within this single framework. The intestinal flora could not be scientifically classified as such : the Gram positive cocci would have to appear with other members of the group coccaceae, the spore-bearing bacilli and the coliform bacilli with widely separated groups. The constituent members of a class of this sort must, for classification, be put back in their natural groups from which they have been artificially taken. So must the rheumatic diseases be sorted out and classified with the groups to which they naturally belong.

It is unlikely that the Royal College of Physicians' classification of 1934 was intended to be more than an enumeration and an artificial grouping of those disorders which, by common consent in 1934, were deemed to be " rheumatic diseases." According to this the disorders to be included are—

1. Rheumatic Fever.
2. Acute Gout.
3. Chronic Arthritis — rheumatoid type.
   osteo-arthritic type.
4. The non-articular Rheumatic Affections.

For scientific classification the group must be broken up ; and the " rheumatic joint diseases " must appear with the natural group, the diseases of joints. There are many excellent practical reasons why " the rheumatic diseases " should be retained as a class name ; but we are concerned at the moment only with scientific procedure in the investigation of these diseases by the method of natural classification.

CLASSIFICATION OF DISEASES OF JOINTS

The type disease and its logical division

The whole complex pattern of a disease process has a constant form, faithfully reproduced in repeated instances. It may be called the *type disease*. Variations, referable to age, sex, physique and other partially realised inconstant factors may occur, but they do not obscure its individuality of form, on whose characters definition and classification must be based.

As a rule the form of a type disease is revealed by disturbance of structure and function of one system more than any other, and in such case it is usual and logical to speak of a disease of that system ; even though every system of the body may be affected in some degree. It is correct, therefore, to speak of diseases of joints, and to attempt their classification.

An etiological basis of division ?

It is difficult to see anything except a complete statement of the etiological conditions which would serve well to mark the essence of a disease of joints. But to attempt an etiological classification would leave too many diseases unclassified.

A clinical basis of division ?

Try selecting from all the clinical data we have about rheumatoid arthritis. What, for instance, could we take as the *generic* part of the process—that which it has in common with other similar diseases ? " Symmetrical polyarthritis ? " But we know it to be not always absolutely symmetrical and we are not absolutely certain that a monarticular arthritis cannot be rheumatoid arthritis. And I doubt if we could feel confident about any other selection from clinical data, that it could be taken to mark the essence of the disease process.

A pathological basis of division ?

It will be agreed that the essence of a disease process cannot be defined solely by the morbid tissue changes which appear during its evolution. But may they be selected as the *genus* of the disease process ?

This seems the most appropriate selection at present. The generic part of rheumatoid arthritis, for example, might be taken to be those morbid tissue changes which we shall describe later and call " the rheumatoid type of joint inflammation." Probably there are several distinct disease processes, all of them showing this histo-pathological change. And we shall still have to select differentiae to distinguish them.

These distinguishing marks can, at the moment, only be found among clinical data. In the rheumatoid group we are not quite certain that