Papers and Originals**MEANING OF DIAGNOSTIC TERMS IN BRONCHO-PULMONARY DISEASE***

BY

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It is one of the prerequisites of clear thought that basic concepts must be clearly defined. We think too little about the meanings of the words we use in our everyday work in medicine. The more frequently we use a word and the more fundamental the concept to which it refers, the less careful we tend to be about clear definition. A poorly defined word may mislead us in many ways. In a discussion, it may be used in different senses by the discussants. They will then resemble the two women shouting abuse at each other from the windows of their respective houses, about whom the English wit, Sydney Smith, remarked that they would never agree because they were arguing from different premises. In thinking out our own problems we may start our line of thought with one idea of the meaning of a key word in our minds; if, because we have not defined it precisely, we unconsciously permit the sense in which we are using it to change during the course of our cogitations, our conclusions are unlikely to be valid.

It is remarkable that even the concept of a disease, the most basic in clinical medicine, generally remains poorly defined. In the course of clinical discussions such questions as "Is this a disease or a syndrome?" or "Is this condition a clinical entity?" are frequently raised. The motives of one who is hardy enough to ask the discussants to define exactly what they mean by "a disease," "a syndrome," and "a clinical entity" are often misunderstood. It will be felt that everyone surely knows what these words mean, and the query is likely to be regarded as an attempt to conceal ignorance of hard scientific facts behind a smoke-screen of philosophical verbiage. But I think that so many discussions of important clinical problems, especially in the field of chronic respiratory disease, are bedevilled by failure of the participants to consider the basic logic of medicine that I propose to try to find some sort of answer to this elementary question; and then to consider briefly the application of the answer to some common types of respiratory illnesses.

Definition of "a Disease"

How can we define the general concept "a disease?" In the search for a useful definition, dictionaries do not help. Their definitions are mostly tautologous, equating "a disease" with some other poorly defined concept such as "a condition" or "a process." For instance, two dictionaries which I consulted define a disease as "A definite morbid process having a characteristic train of symptoms," and "A condition of the body or of some part or organ of the body in which its functions are disturbed or deranged." These clearly are not helpful at all. If we are to improve on them we must avoid this sort of tautology; we must base our definition on observable phenomena; and we must take care not to formulate a precise definition which deviates so far from common usage that it causes even worse confusion than that which it sets out to resolve. Laennec had something useful to say on this, as on many

other topics: "Rien ne nuit plus au progrès d'une science que de détourner sans motifs suffisants les noms de leur acception reçue ou d'en créer de mauvais." "Nothing hurts the progress of a science more than to divert terms from their customary meaning without sufficient reason, or to create bad new ones."

The best approach to the problem of definition of "a disease" will be first to examine how the words we use as the names of diseases are used in practice. We will then seek to define the general concept "a disease" explicitly in such a way that the customary usages, both of the general term and of the names of individual diseases, can be made precise, and the hidden implications of these usages brought out into the light of day. The more precisely words are defined the more efficient they are as a means of expressing our knowledge, and the less use as a cloak for ignorance.

Examples of Use

First, then, let us examine a few examples of the way in which we use words as the names of diseases. I will consider four "diseases" of widely different sorts: migraine, mitral stenosis, hypothyroidism, and typhoid fever.

Migraine

"Migraine" refers to a particular sort of headache. In studying migraine we select those patients who present themselves to us complaining of this particular sort of headache, exclude those in whom we find evidence of organic disease, and then study the phenomena observed in the remainder. We have thus selected solely upon the basis of a defined symptom-complex the group of patients from the study of whom our concept of the disease "migraine" is derived. In describing this disease we shall state such observed facts as the age and sex incidence, the familial incidence, the percentages of cases in which the headache is preceded by auras of various types, or followed by vomiting, ophthalmoplegia, and other phenomena; the proportion responding to various medicaments, and so on. We shall also be able to say something in our description of the disease about the vascular mechanisms which are believed to underlie the headache; but, since our knowledge in this respect is incomplete, this forms part of the total description of the disease, and has no part in the definition. Thus it seems clear that when we refer to the disease "migraine" we are referring to the sum of the abnormalities which are found in patients suffering from a defined sort of headache. This then is an example of disease defined on a clinical-descriptive basis.

Mitral Stenosis

Let us now turn to a disease of a different sort, mitral stenosis. Here we select from among those patients presenting themselves to us those whom we believe to have narrowing of their mitral valves. We may make the diagnosis clinically on the basis of indirect evidence. This is provided by phenomena which we can observe as physicians either by the use of our senses of sight, touch, and

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hearing, or with instrumental aid of various sorts. But the ultimate criterion of whether the diagnosis is correct or not is whether the morbid anatomist, or his modern equivalent the surgeon, finds that the mitral valve is narrowed when he looks at it. Thus the basis of the definition of mitral stenosis is morbid anatomical. But it is important to realize that the disease "mitral stenosis" is not simply the narrow valve. When we refer to mitral stenosis clinically we are referring to the total complex of symptoms and signs which are observed in patients with narrow mitral valves.

Hypothyroidism

Let us next consider a disease of another sort, hypothyroidism. Here we shall find that the group we are selecting consists of those patients in whom as a result of studies of various sorts we decide that the thyroid gland is producing less than normal of its specific secretion. Again we study the phenomena observed in the group of patients so defined, and the sum of the departures from normal structure and function observed in this group constitutes the disease hypothyroidism. Thus hypothyroidism is defined on the basis of a specified disorder of function. It is instructive to note the important logical and factual differences between the disease hypothyroidism so defined and the disease "myxoedema," which is defined on a clinical descriptive basis. Many patients with hypothyroidism—for example, those in whom it is secondary to pituitary disease—will not have myxoedema. Patients with generalized myxoedema will have hypothyroidism, but some with localized myxoedema will actually have overactivity of their thyroid glands. It thus seems clear that, even though it may appear superficially that there are two possible bases of definition of the same disease, the diseases defined on these two bases will not in fact be identical. I have more than once listened to discussions of clinical endocrinological problems and come to the conclusion that they were being prolonged inconclusively because one speaker was using the term "myxoedema" as referring to a clinical syndrome and the other as referring to a disorder of function.

Typhoid Fever

Finally, let us turn to what seems a much more straightforward case, that of typhoid fever. First, we must define fever on a functional basis as the sum of the abnormalities observed in patients with, and attributable to, an elevated body temperature. We can then define typhoid fever on a causal or aetiological basis, as the fever caused by the typhoid bacillus. The group we shall choose to study to elaborate the total description of this disease will be those patients in whom we conclude on acceptable evidence that fever is due to infection by the typhoid bacillus. We may note that it is only since the causative organism was isolated that it has been possible to define typhoid fever on this basis. Until this time, 80 years or so ago, typhoid fever could be defined only on a clinical-descriptive or possibly morbid-anatomical basis, as a fever characterized by certain features such as the appearance of a distinctive rash on the tenth day, ulcers in Peyer's patches in the intestine, and so on. This illustrates the important point that as knowledge advances the most useful basis of definition of a disease may change.

Definition

These four examples illustrate the wide differences in basis of definition between diseases of different sorts. In each case we can see clearly that in referring to the named

disease we are referring to the whole clinical picture presented by a group of patients selected because they present some common feature. This feature may be one of several different types. It may be simply the possession of some common clinical features. This we may call a clinical-descriptive basis of definition. It may be that they have the same anatomical abnormality. This we may call a morbid-anatomical basis of definition. It may be that they all have the same disorder of function. This we may call a physiological basis of definition. Or it may be that they are due to the same causative agent. This we may call an aetiological basis of definition.

To turn now to the formal definition of a disease as a general concept, I suggest that we can define a disease as the sum of those abnormal phenomena which are observed in a group of living organisms with disturbed structure or function, the group being defined in a stated way. In this general statement the term "a disease" can be applied to any living organism, plant or animal. If we are content to confine our attention to human medicine we can substitute for "living organism with disturbed structure or function" the simple word "patient," defining "patient" as "a human being with disturbed structure or function."

Perhaps you are looking suspiciously at the word "abnormal" in this definition. Does it perhaps introduce the idea of disease in a hidden form, and so make the definition circular? The answer to this is that the normal must first be defined. This can be done only on a statistical scale. It requires that, in respect of all the phenomena which we study in the definition and description of disease, standards must be set up by study of a large number of individuals representing a fair sample of the relevant population, but free from evident structural or functional defect or exposure to noxious agents. That this may be a matter of practical difficulty does not detract from the validity of the definition.

Disease or Syndrome?

Now let us turn back to the problem of questions such as "Disease or syndrome?" or "Is this a clinical entity?" to which I referred earlier. Such questions are to be regarded as requests for a statement of the basis of definition of the disease under discussion. I suppose that underlying this sort of question is the feeling that to be quite respectable a disease must be defined, or thought to be definable eventually, in aetiological terms. The foregoing discussion will have shown that definition of a disease in a variety of other ways can be precise and meaningful. A disease can be defined unequivocally, and the resulting concept used logically and constructively, even though definition is possible only on a clinical-descriptive basis. Indeed it is inevitable that this should be so at the beginning of our knowledge of a newly described disease; except perhaps in the rare instance of orphan viruses waiting for the discovery of the diseases which they cause! What we must avoid is being misled into using the name of a disease as if it referred to an active agent causing the patient to be ill. This primitive animistic misconception is very widespread. Perhaps it is rooted in the grammatical structure of Western languages, in which the names of diseases nearly always appear as if they referred to active agents. Even in the case of a disease which is defined aetiological, of course, this naive interpretation of a sentence in which the name of a disease occurs is not quite accurate.

Let us consider such a disease; for instance, tuberculosis. If we say "Smith is suffering from tuberculosis," it is all too easy to dramatize the situation to which this sentence

refers and think of Smith being attacked by the tubercle bacillus. In fact, the concept "tuberculosis" includes a great deal more than the tubercle bacillus, and the word refers to the effects of a most complicated interaction between the tubercle bacillus and the animal body. When we consider a disease which is defined on any basis other than aetiological this naive interpretation of the meaning of the sentence "Smith is suffering from disease X" is obviously erroneous. If X has been defined on a clinical-descriptive basis the sentence is simply a brief description of Smith's illness. If X has been defined on a morbid-anatomical basis, it indicates that we believe we know the sort of changes which a pathologist would find if he could look at the appropriate part of Smith's body. If X has been defined on a functional basis, the sentence states that we claim to know the specific disorder of function which underlies Smith's symptoms but makes no necessary claim to knowledge of the cause of this disordered function.

Thus we can refer to congestive heart failure without committing ourselves to any view on whether this disorder of function is due to rheumatic heart disease, to hypertension, to cardiomyopathy, to vitamin-B deficiency, to anaemia, or to a variety of other possible factors or combinations of factors. A disease which has been defined on one basis may well be diverse in respect of the others. If it has been defined on a morbid-anatomical basis the morbid anatomy is *a priori* uniform but the clinical aspects, the disorders of function, and the causes may not have the same uniformity. And similarly with the other bases of definition. This fact is frequently overlooked, perhaps unconsciously. There is a sort of feeling that a disease once defined on one basis ought to be uniform in respect of others; particularly is this the case in respect of aetiology if the disease has been defined on some other basis. Of course, we shall sometimes find that a disease defined initially on a clinical descriptive, a functional, or a morbid-anatomical basis is due to a single or one of a few related causes, and this will simplify our problems; but we have no right to expect such convenient findings.

The Shorter Oxford English Dictionary defines the word "syndrome" as "a concurrence of several symptoms in a disease; a set of such concurrent symptoms." We may thus speak of the syndrome of any disease, no matter what its basis of definition. The syndrome of a disease defined on a clinical-descriptive basis constitutes its defining characteristic. The combination of symptoms in a disease defined on any other basis may or may not be distinctive enough to constitute a recognizable syndrome. The implied antithesis of "disease or syndrome?" is in fact false, and based upon incomplete analysis of the two concepts.

Definition, Description, and Diagnostic Criteria

I will turn now to another frequent source of confusion: the distinctions between definition, description, and diagnostic criteria. A definition is a statement of the features which inclusion in the defined category implies *a priori* to be present. Complete certainty of the correctness of categorization can be obtained only by observing the defining characteristics. But clinical diagnosis is based upon probability, and in practice we often rely upon indirect evidence which makes it probable that the defining characteristics are present. Indeed, there are many diseases in which it is only rarely that the defining characteristics are directly observed. For instance, influenza must be defined as the disease caused by infection with the influenza virus. Yet it is only in the very small minority of cases

to which this diagnosis is justifiably applied that the virus will actually be isolated. We shall make the diagnosis in many instances as a result of indirect serological evidence. In the presence of an epidemic we may be perfectly justified in making it for practical purposes on a compatible clinical picture alone.

We must not confuse definition with description. Once the disease has been defined, the next step, logically, is to study by all available means cases in which the defining characteristics have been established to be present. In this way we shall gradually elaborate the total description of the disease. This will include every ascertainable feature of it, including those which are of inconstant occurrence. If our experience becomes large enough we can make an estimate of the frequency of the occurrence of these inconstant features. These we shall include in the description, but there is no point in mentioning inconstant features in the definition, since there they will only tend to blur what should be precise.

From the total description so elaborated we may choose diagnostic criteria. These are those features derived from the total description of the disease which are found in practice to discriminate it best from other diseases that resemble it and may be confused with it in clinical practice. The defining characteristics may or may not be a necessary part of the diagnostic criteria. For diseases defined on a clinical-descriptive basis the defining characteristics are, of course, an essential part of the diagnostic criteria. But in diseases defined on an aetiological or morbid-anatomical basis it may be difficult clinically to demonstrate the defining characteristics unequivocally, and we may then accept diagnostic criteria which do not include the defining characteristics.

This brief discussion may indicate the need for a clear understanding of the distinction between definition, which is a statement, as brief as possible, of the characteristics by the observation of which, in principle but not always in practice, it can be decided with certainty whether any given case belongs to the defined group; description, which is a statement in summarized form of all available knowledge about the disease; and diagnostic criteria, which are those features derived from the description of the disease which have been found in practice to discriminate it best and most conveniently from other diseases with which it might be confused.

Application to Broncho-pulmonary Diseases

Now let us try to apply these ideas to some common broncho-pulmonary diseases. The confusion which has existed, and indeed still exists, in this field is well demonstrated by the large number of conferences which have met on both sides of the Atlantic to attempt to provide acceptable definitions of such common terms as chronic bronchitis, emphysema, and asthma.

Chronic Bronchitis

Chronic bronchitis is one of the most common diagnostic terms in England, yet until recently very little attention was given to any attempt to define it. Etymologically, the term "chronic bronchitis" should belong to a disease defined on a morbid-anatomical basis and denote a long-continued inflammation of the bronchi. It is true that acute inflammatory episodes punctuate the course of the disease to which this name is customarily given, but it is at least doubtful whether the underlying process is, in the usual sense, inflammatory. Charles Badham introduced the term "bronchitis" into medicine in 1808. Even at that

time he noted "a variety of chronic bronchitis in which we hardly find any constitutional symptoms"; and continued, "As we can hardly suspect inflammation, the redundant secretion depends probably on mere debility of the secreting organ." Laennec used the term "pulmonary catarrh." He did not mention the word "bronchitis" in the first edition of *L'Auscultation Médiate* in 1819. In the second, in 1826, and subsequent editions he mentioned it with the comment that he prefers the term "catarrh" to "bronchitis" which "some physicians use nowadays, because in some cases of chronic catarrh it is at least doubtful that the malady is really of the nature of inflammation.

We have not in fact advanced far beyond this to-day. We can define the malady which we call chronic bronchitis only in clinical-descriptive terms. Since the name is appropriate to a morbid-anatomical definition, this is confusing. For this reason I have been half tempted to try to revive the old-fashioned term "chronic bronchial catarrh," which I think would avoid this confusion. Let us admit, however, that the name "chronic bronchitis" is an etymological misfit and consider how we can define it. In accordance with the general principles already discussed, we should attempt to produce a definition which will cover as many as possible of the cases to which the term is in practice being applied, while excluding as clearly as possible any which can be placed more profitably into another diagnostic category. When I was faced with the difficult task of defining chronic bronchitis for a symposium of the Association of Physicians of Great Britain and Ireland in 1952 I suggested the following definition:

"Chronic bronchitis refers to the condition of those patients suffering from chronic or recurrent cough, expectoration, and effort dyspnoea in whom these symptoms are not caused by diseases of the lungs, by localized disease of the bronchi, trachea, or upper respiratory tract, or by primary cardiovascular disease."

Since then a number of events have led to the need to modify this definition and even simplify it to some extent. It was a mistake, I think, to include dyspnoea as one of the diagnostic criteria of chronic bronchitis, since in the early stage of the disease to which we customarily apply this term dyspnoea is not present. Dyspnoea belongs to the later stages. Moreover, there is now good evidence from the morbid-anatomical studies, notably of my colleague Dr. Lynne Reid, that the symptom of productive cough is caused by an increase in the number and activity of mucus-secreting cells and glands in the bronchial mucosa. Accordingly I would define chronic bronchitis as "a disease characterized by persistent cough and expectoration due to excessive mucus secretion in the bronchial mucosa." You will observe that part of the simplification of this definition has been made possible by the formal definition of a disease which we have already discussed.

Asthma

Now let us consider asthma. Here the difficulties of definition have in my opinion been greatly increased by the insistence of some observers that the term "asthma" should be applied only to cases in which the symptoms of wheezy dyspnoea are caused by allergic factors—that is, by exposure of the patient to substances to which he is specifically hypersensitive but which are harmless to normal subjects. I will quote one definition based on this view, so that I can indicate in which respects I think it mistaken: "Bronchial asthma is an allergic condition, often hereditary, occurring at all ages and characterized by wheezing,

dyspnoea, orthopnoea, and cough. It is usually associated with rhinitis and characterized by partial obstruction of the lower air passages." What help is it to us in understanding what asthma is to be told that it is "an allergic condition?" So far as I am concerned, I have a better idea of what asthma is than I have of what an allergic condition is; so it does not help me to recognize a case of asthma when I see one to tell me that I must look for an "allergic condition." I suspect that one reason why this sort of so-called definition is advanced is the attractiveness of broad generalizations for the human mind.

In medicine we must continually be on our guard against the temptation to inflate a hypothesis based on sound observations, and valid over a limited field, into an untenable generalization. While allergic factors are undoubtedly of cardinal importance in many cases, it is certain that many other patients with the sort of variable wheezy dyspnoea to which the term asthma is customarily applied show no evidence of sensitivity to specific allergens. It seems to me, therefore, that our primary definition of asthma should make no reference to aetiology, and must be in terms of disordered function. I suggest the following: "Asthma is a disease characterized by variable dyspnoea due to widespread narrowing of peripheral airways in the lungs, and varying in severity over short periods of time either spontaneously or as the result of treatment." The essential criterion whether the patient has asthma or not will then be a disorder of function for which a simple physiological test can be applied. Any simple measure of airway obstruction can be used as the basis for this—for example, the percentage of a maximal forced expiration which is expired during a measured brief time at the beginning of expiration, or the peak expiratory flow rate. An abnormally low figure which either improves as a result of treatment or varies spontaneously from time to time confirms the diagnosis of asthma.

Having established this general definition of asthma in functional terms, we can proceed to classify it into subgroups. Where there is direct or indirect evidence that the condition is occasioned by contact with inhalant or other allergens to which the subject is specifically sensitive, we can use the term "allergic asthma" or "extrinsic asthma" with perfect clarity. There is also an important group of patients with asthma who have structurally normal lungs and in whom many of the clinical features are similar to those of allergic asthma, but who show no evidence of sensitivity to external allergens. To this group we may apply the term "intrinsic asthma." This is a most important group because of great differences between its practical management and that of extrinsic or allergic asthma, and also because it has clinical associations very different from those of allergic asthma.

Another group of patients develop wheezy dyspnoea associated with variable airway obstruction accompanying organic disease of the lungs, and in most of these there is no clear evidence that external allergic factors are important. In such cases the term asthma without qualification may properly be added to the diagnostic term indicative of the underlying disease. If it is thought that this usage might be confusing to those who are wedded to the idea of asthma as a necessarily allergic disease, then the term "secondary asthma" may be used for this latter group, but I see no logical need for it. This sort of definition of asthma primarily on a physiological basis and its subsequent classification so far as possible on an aetiological basis seems to me to resolve a large number of confusions which have surrounded the discussion of this subject.

Emphysema

Now let us consider the perhaps more difficult problem of the definition of emphysema. Here the situation has been complicated by the fact that the word "emphysema" has been used in the past as if it could be defined on a clinical-descriptive basis. While I was editor of the journal *Thorax*, I received from an Englishman who had been working in the United States a paper which included a case report about a patient who was stated to have suffered from several attacks of emphysema. This, to me, made no sense at all. The term "emphysema" indicates and was originally applied to a morbid-anatomical state, and I feel sure that it should be defined in these terms. I suggest the definition: "Emphysema is a disease characterized by increase beyond the normal in the size of air spaces distal to the terminal bronchioles." This definition requires that the normal should be defined.

As I have pointed out in discussing the general definition of a disease, this can be done only on a statistical scale. It requires the examination of large numbers of undiseased lungs at various age-groups in order that the normal range of size at different ages can be defined. This, however, does not make any difference to the validity of the definition, which is a statement of the means by which certainty might be reached in principle, given sufficient facilities for study. Some have objected to a purely morbid-anatomical definition of emphysema on the grounds that the correlation of emphysema so defined with clinical, physiological, and other features determinable during life is complex and uncertain, so that confident diagnosis during life may not always, indeed may rarely, be possible. But this is a situation with which the clinician has become entirely familiar in other contexts. If I make a clinical diagnosis of emphysema I know that I may be proved wrong by the morbid anatomist, just as I may if I make a diagnosis of atherosclerosis of the aorta.

Some physiologists may not have been quite so well reconciled to this lack of certainty, and because of this some of them have in the past suggested a physiological definition of emphysema, for instance, in terms of permanent increase in residual volume, or irreversible airway obstruction. But this procedure would place morbid anatomists in a very confused position: for what would they do if, as I suspect they would, they found changes of the type which at present they call "emphysema" in a patient in whom the pattern of disturbed function defined by the physiologists as emphysema had not been found? So far as I can see, an early consequence of a physiological or even a clinical definition of emphysema would be the need to coin a new term by which the anatomists could refer to what they now call emphysema. It seems a much better procedure that the patterns of disturbed function should be defined independently in physiological terms, and that these patterns should then be correlated with morbid-anatomical features, including emphysema. This sort of procedure is adopted every day in the field of cardiology, where we can quite naturally speak of patterns of disturbed function—for instance, congestive heart failure or left ventricular failure—without being thought to be making any reference whatever to the morbid-anatomical basis of these functional changes.

"Pink Puffer" and "Blue Bloater"

It would be very helpful if we could reach general agreement on some terms that could be used to refer to syndromes of disturbed respiratory function, defined on a

physiological basis and recognizable with a reasonable degree of probability by methods available to the clinician. I have already suggested that we should define asthma on such a basis. Similarly we can speak of irreversible peripheral airway obstruction. We know this to be present in some cases of emphysema, but it may also occur without emphysema. We can speak of alveolar hypoventilation, which we know to be present in the late stages of some cases of chronic pulmonary disease of the chronic bronchitis group. Our poverty in acceptable and scientifically defined terms by which to refer to functional respiratory disorders is illustrated by the rather jocular use of the terms "pink puffer" and "blue bloater," which have crept into current usage in some centres in England to refer to two common sorts of patient with respiratory insufficiency.*

The "blue bloaters" are most characteristically those who have started with long-continued chronic bronchitis punctuated by recurrent inflammatory episodes. After many years these episodes are accompanied by alveolar hypoventilation with cyanosis, carbon-dioxide retention with associated disorders of consciousness often made worse by oxygen, and oedema and raised jugular venous pressure. With appropriate treatment they may survive several of the episodes of oedema to which the term "bloater" refers. In such patients, emphysema may not be a prominent feature at necropsy, although during life severe airway obstruction is found.

The "pink puffer," considerably less frequent in England, is the type of patient who starts with progressive dyspnoea on exertion, usually in middle age, without a preceding history of chronic bronchitis. He has over-distended lungs, often curiously silent to auscultation. In spite of a much-reduced ventilatory capacity with considerable irreversible airway obstruction and greatly increased residual capacity, he nevertheless manages to maintain a minute-volume above that of a normal subject at rest, and so keeps his PCO_2 down to normal levels until very shortly before the end of his disease. Moreover, he develops right ventricular failure, if at all, only terminally, very rarely making a useful functional recovery once oedema has appeared. Such patients may confidently be expected to show severe emphysema at necropsy.

The difference between these two groups is quite striking. Perhaps when we have defined more precisely the functional disorders which they display we shall elaborate a terminology which sounds more respectable and scientific, but I doubt whether it will be more apt and descriptive than "blue bloater" and "pink puffer."

Consequences of the Proposed Definitions

If we accept the proposed definitions of these three common diseases we must realize that the terms by which we refer to them have quite different implications. In using the term "chronic bronchitis" we are simply giving a brief statement of the leading symptoms of the disease; if we use the term "asthma" we are referring to a disorder of function; and if we use the term "emphysema" we are referring to a morbid-anatomical state. A clear recognition of these implications enables us to speak intelligibly of the interrelations between these common conditions. We know that chronic bronchitis after many years leads to permanent anatomical changes in the lungs, and we are learning much

*A little research into recent history leads me to the conclusion that these two terms originated in the Medical Unit at St. Thomas's Hospital, where Professor A. C. Dornhorst, now at St. George's Hospital, pointed out to students the distinction between those patients with chronic respiratory difficulty who were "pink and puffing" and those who were "blue and bloated."

about the nature of these changes and the ways in which they develop. Among these changes emphysema may or may not be prominent. Indeed, as I have just mentioned, some patients who after many years of chronic bronchitis develop severe respiratory insufficiency with alveolar hypoventilation may be found to have very little emphysema. At present I think the best diagnostic term we can use for this group of patients is "chronic bronchitis with ventilatory failure." On the other hand, some patients with chronic bronchitis develop radiological and physiological changes which justify the clinician in concluding that emphysema is likely to have developed; and this conclusion can be summarized in the diagnosis "chronic bronchitis and emphysema."

The term "primary emphysema" may be applicable to the condition of a few patients. By this I mean that all the evidence available suggests that the anatomical change in the lungs, emphysema, was the first thing to appear. Such patients may later develop chronic hypersecretion in their bronchi, and they may then be said to be suffering from emphysema and chronic bronchitis. Similarly, the term "asthma" is simply a statement of a functional disorder which can be detected by physiological methods. If we wish to refer to asthma having a specific basis in allergic hypersensitivity we can use the term "allergic asthma." If a patient, after many years of chronic bronchitis or as an

accompaniment to symptoms which we believe to be due to emphysema, develops paroxysmal dyspnoea due to variable airway obstruction, we can properly say that he also has asthma; and the use of the term "asthma" in this connexion should not imply anything about aetiology.

Conclusion

In this talk I have tried to indicate the importance of clear definition of the basic terms used in medicine, the names of diseases. Many disagreements in discussions in medicine arise from failure to perceive that statements expressed in sentences in which the names of diseases occur must be translated into simple factual terms before they can be discussed intelligibly. This logical component in medical discussions is generally neglected. For this reason I have examined the manner in which the concepts both of a disease in general and of individual diseases are reached, and have tried to formulate a procedure by which this may be placed on a logical basis. And, finally, I have briefly considered the application of this procedure to some common problems in respiratory disease.

This lecture develops and extends the ideas I advanced in opening the Ciba Foundation Guest Symposium on the Definition and Classification of Emphysema in September, 1958 (*Lancet*, 1959, 1, 323).

AETIOLOGICAL FACTORS IN ABRUPTIO PLACENTAE*

BY

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PART I.—EPIDEMIOLOGY

Edward Rigby, physician, magistrate, and cultivator of mangel-wurzels, was, in 1776, the first person to distinguish between the "unavoidable" haemorrhage associated with placenta praevia and other "accidental" causes of ante-partum haemorrhage. Since that time it has been common practice to group together all accidental haemorrhages irrespective of their origin. This broad classification, while of some value in relation to clinical management, is unsatisfactory for scientific study, since the sites and causes of ante-partum haemorrhage differ widely. This communication is concerned only with haemorrhage due to abruptio placentae, or premature separation of the whole or part of a placenta implanted on the body of the uterus. Such cases constitute rather more than one-third of all cases of ante-partum haemorrhage and approximately one-half of cases of accidental haemorrhage.

The investigation reported here was undertaken to elucidate the significance of some of the clinical features of abruptio placentae and subsequently to correlate the findings with certain experimental evidence, with particular relation to folic-acid deficiency.

Material

This first series covers 23,043 consecutive deliveries occurring during the period 1952–8 in Mill Road Maternity Hospital, which serves a predominantly lower-class urban community. The figures derived from this material were used to assess the incidence of ante-partum haemorrhage from various causes and to study the clinical features of abruptio placentae. By comparing these results with those

for the total hospital population during the same period it is possible to obtain an assessment of the relative significance of individual factors.

Incidence of Abruptio Placentae

Of the 23,043 patients, 644 suffered from ante-partum haemorrhage—an incidence of 2.79% (Fig. 1). Abruptio

FIG. 1.—Incidence and causes of ante-partum haemorrhage in 23,043 deliveries.

placentae occurred in 247 cases (1.07%) and accounted for 38.3% of all cases of ante-partum haemorrhage. Abruptio placentae was defined as haemorrhage due to premature separation of a normally situated placenta. Cases of marginal haemorrhage without obvious separation of cotyledons were not included. In 64 cases the clinical picture and severity of the symptoms made the diagnosis of abruptio placentae obvious at the time of admission to hospital. In a further 183 cases the diagnosis was established by subsequent inspection of the placenta and

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