INTRODUCTION TO A DISCUSSION ON THE ETIOLOGY OF PHTHISIS.

*In the Section of Medicine at the Annual Meeting of the
British Medical Association, held in Bournemouth,
July, 1891.*

By P. H. PYE-SMITH, M.D., F.R.S.,

Physician to Guy's Hospital; President of the Section.

THE first subject for discussion in this Section is one of great importance to practitioners of medicine all over the world; for the very few regions in which phthisis is not endemic are being gradually filled up by those who seek, but do not bring, health. Particularly is the origin and the prevention of phthisis of interest in a place which, like Bournemouth, is often visited when no medical aid however skilful, and no climate however favourable, can do more than relieve what might perhaps have been prevented or cured at an earlier stage.

First, let me say (what I am sure the most experienced of my audience will agree with) that the cause of phthisis is a fit subject of discussion, because it is still unknown. We do not discuss the causes of measles, of scabies, of cirrhosis of the liver, of dropped wrist, or of a gumma, because we already know them; and I have chosen the term etiology because "a discourse about causes" includes what may be called the natural history of the disease—the conditions under which it appears.

But it may be said, Is not the cause of phthisis known? Have we not the bacillus of tubercle? and is not phthisis an infective disease like syphilis or typhus? I accept both these statements, and yet the true etiology of phthisis is not known. On what basis do they rest? What are the criteria of a pathogenic organism?

(1) There must be a specific microbe, clearly identified not only by its size, shape, and reaction to staining agents, but also by its development and propagation. Till this is ascertained, it is idle to discuss the claims of a microbe to be pathogenic.

(2) The disease must be equally definable either by its anatomical characters or by a characteristic and unvariable course, or by "breeding true."

For our present purpose, we may define phthisis as a chronic disease, with no typical limitation of its course, affecting the apices of both lungs and travelling downwards, always tuberculous, always caseating, always pneumonic, and almost always more or less fibroid, ulcerative, excavating, and destructive—but also with great capacity of healing and involution—accompanied locally by pleurisy, bronchitis, and lobular pneumonia, accompanied also by general anæmia, dyspepsia, wasting and pyrexia, with tuberculous affections of the larynx, ileum, and other organs.

(3) The microbe must be present and demonstrable in every case of the disease.

(4) It must not be present when the disease is absent.

(5) When isolated by appropriate cultivation, it must be capable, on introduction into a living organism, of reproducing—first its own progeny, and, secondly, the characteristic symptoms of the disease.

All these stringent requirements have been satisfied by the bacillus which the genius of Professor Koch discovered—would he had been content with the discovery!—and we have daily proof in practice of the justice of his statements. (At Guy's Hospital, when the announcement was made from Berlin, my late colleague, Dr. Moxon, and myself, independently examined the sputum of every case of supposed or possible phthisis that passed through our wards. After two years he had never failed to find the characteristic bacillus. I had only failed once, in what was almost certainly a case of phthisis. Once also I had found the bacillus in a patient who I believed to be suffering from chronic bronchitis only,

but I had no proof that my diagnosis was right, and it probably was not.)

Must we therefore conclude that phthisis is produced by contagion, as surely and exclusively as syphilis or measles?

Let us first remember that in some of the most typically specific and infectious diseases—as typhus and variola—no microbe has yet been found; while in others indubitably associated with a pathogenic microbe, as leprosy, lupus, and cholera, the fact of contagion is doubtful, or at least complicated by other conditions. Even if we conclude (as I believe we may) that there is no phthisis without the bacillus tuberculosis of Koch, it does not follow that it is under ordinary circumstances a contagious disease or that it can arise, except under other favouring conditions.

The fact is that in disease there must always be at least two necessary conditions—the disturbing agent and the organism to be disturbed. Intoxication with lead produces colic in every, or almost every, case; paralysis, less frequently, and epilepsy only as an exception. Intoxication with alcohol produces drunkenness in all, though with different facility and with different symptoms—delirium tremens in some and cirrhosis in others.

The variolous poison affects every one to whom it has access, unless they are protected by a previous attack or by efficient vaccination, that is by attenuated variolisation. The same is probably true of syphilis, of measles, and of plague. But it is probably not true of dysentery, of enteric fever, or of diphtheria. Children "catch things" easily, while it is almost as hard for an old man to get typhoid fever as to learn a new language. Some races seem to be permanently children in this respect, while others (like the negroes) are almost proof against malaria. Erysipelas seems to need some breach of surface in order to enter, pyæmia certainly does, and the microbe of suppuration finds no lodgment except in tissues already injured.

It is reasonable therefore to expect in the case of phthisis that, admitting the necessary invasion of the specific bacillus, there should be predisposing causes to favour its reception without which it is perhaps powerless; and this is in full accordance with the vast experience accumulated since medicine was first studied. Otherwise why do not we all have phthisis, or at least those who frequent consumption hospitals, or hotels where all the inmates are phthisical patients brought together to be cured?

It is still as true as when Hippocrates taught, that consumption chiefly attacks those between 18 and 35; it is still true that phthisis is often hereditary; it is still true that it often "begins in a neglected cold"—just as the tuberculous nature of caries or of caseous lymph glands is not incompatible with the clinical facts of chronic disease of bones and joints depending on injury, and of swollen glands originating in disease of the mucous surfaces from which they draw their lymph.

We may then, I submit, discuss the etiology of phthisis, first as to the origin, transmission, and reception of the constant microbe; and secondly, as to the conditions which make its entrance effectual.

(1) Experiments have proved that tuberculosis may be produced by inoculation of a pure cultivation of the microbe under the skin, or into the great lymph space of the peritoneum; also that the contagium may be injected as spray or dust into the trachea, or be administered in food, with success. In human beings, there is every reason to believe that the most frequent vehicle of the contagium is dried-up sputum, and that it is carried in the respiratory air to the stomata of the air vesicles. As a liquid, it may also be conveyed in milk from tuberculous cows to the alimentary canal, and perhaps in other ways; and, as a solid, in the flesh of tuberculous animals. But why are the latter methods so rare, except in the case of children? Why do we not meet with infection through open sores or wounds, as in the case of pyæmia? Why is not lupus generalised? What again determines whether the contagion shall be taken up from the lymph spaces and conveyed to the lympharia, or absorbed by the veins and carried into the general circulation?

(2) What are the conditions that make the access of the bacillus dangerous? They may be divided for convenience into local and general—or, if you please, constitutional; but probably the latter are only effective in so far as they modify

the nutrition, circulation, or function of the lungs or other organ to which the microbe gains access. The purely local conditions may be thus suggested for discussion:—

(1) Pulmonary catarrh—not bronchitis affecting the tubes lined with ciliated epithelium, but the form of “pneumonia” which affects the intralobular passages and ultimately the air sacs; not lobar and fibrinous, but lobular and catarrhal inflammation. How far is this condition a necessary antecedent? Does phthisis ever follow hepatitis, or bronchitis, or emphysema? What relation is there between pleurisy and phthisis? Does phthisis ever begin without preliminary catarrh—that is, do the bacilli themselves, mechanically or by their chemical products, act as irritants on a healthy lung and produce the soil suitable to their future growth? Is the pulmonary catarrh which follows measles more apt to end in phthisis than any other? or that which is often a sequela of whooping-cough? Again, are the various forms of pneumoconiosis—potters’, miners’, grinders’, ironworkers’ phthisis—all of them tuberculous? If so, must we assume that when pulmonary catarrh is severe and protracted it always becomes the seat of tuberculous affection—in other words, is the bacillus of tubercle practically ubiquitous in cities and workshops? Does the influence of cold damp dwellings and undrained soil—which the late Dr. Bowditch in New England and Dr. Buchanan in our own country have demonstrated—depend on the frequency of pulmonary catarrh to which these conditions give rise?

What shall we say of cases of phthisis following traumatic or idiopathic hæmorrhage? Does a healthy lung ever bleed? and does pulmonary hæmorrhage lead to catarrhal pneumonia, tuberculous infection, and caseous degeneration and ulceration? or is hæmoptysis only the first symptom, and never the first event, in a case of pulmonary phthisis? If hæmoptysis is a cause of phthisis, why does not tuberculous disease supervene on hæmorrhage from the lungs of cardiac origin? Does a wound of the lungs or injury to the chest lead to phthisis, whether by causing hæmorrhage or inflammation? Was this the explanation of the classical instance recorded by Herodotus (lib. vii, cap. 88), or was the fall and the subsequent phthisis a mere coincidence? Do the bacilli act as mechanical irritants or do they poison the tissues with their excreta? in either case, do they set up pulmonary catarrh or do they find it?

Of general predisposition, can we justly regard either anæmia, starvation, drink, or bad ventilation, syphilis, or diabetes, as causes of phthisis; or may we explain their action as either favouring lung catarrh, or providing ready access of abundant bacilli to catarrhal lungs?

How shall we meet the undoubted fact of hereditary consumption? Is it not more frequent than the chance incidence of a very common malady will explain? How many cases may be due to direct contagion, as from mother to child, or from one child to another? How many can be fairly attributed to common habitation, trade, food, or habits? In strictly hereditary cases, is it special susceptibility to the poisonous products of bacilli, or tendency to pulmonary catarrh, or vulnerability of the tissues generally which is transmitted?

What is the true relation of pregnancy and childbearing to consumption? Is phthisis ever congenital; and, if not, at what age may it first appear? Again, are we to look on the very important symptoms of derangement of the digestive organs—the not infrequent initial vomiting, the early dyspepsia, anæmia and wasting, which often precede the cough and physical signs of pulmonary disease—as due, like the pyrexia of phthisis, to the effects of bacillary infection, or are they in any cases to be regarded as predisposing causes?

To pass rapidly on to another group of concurrent conditions of phthisis, is the traditional phthisinoid chest the precursor of future or the effect of present disease of the lungs? The same question applies to the *ungues adunci*, and to the general build or *habitus* of the body which has been supposed to denote the tuberculous predisposition or diathesis. Does curvature of the spine or rickets lead to phthisis? Does caries of the bones or tuberculous disease of the joints or lymph glands, or lupus, or leprosy, and if so, how and under what conditions? What are the facts as to liability of the two sexes and of different ages? and do they throw any light on the etiology of

phthisis? What are the facts of geographical distribution, and how do they affect the theories of contagion, of pulmonary inflammation, and of general vulnerability? What animals are most liable to tuberculous disease of the lungs, and to what causes may we ascribe the almost complete freedom of some and the equally marked proclivity of others?

Lastly, we may inquire whether there are any natural prophylactics of phthisis: ventilation, cold, heat, particular kinds of food, or special diseases, such as gout, cancer, and valvular disease of the heart?

In leaving the discussion of this subject to the Section, I will venture to recommend that we may best help each other and the Association by keeping strictly to the etiological aspects of pulmonary phthisis, excluding the important considerations of pathology, prophylaxis, and treatment, which will arise from the conclusions at which we may arrive; and that the subject which has been assigned for discussion may be regarded from the threefold aspect I have indicated: the invasion of the bacillus and its action on the tissues, the predisposing causes in the lung itself, and the predisposing causes in the organism.

[The continuation of the Discussion will be found at page 846.]

THE USE OF DRUGS IN THE TREATMENT OF EARLY PHTHISIS.

Read in the Section of Medicine at the Annual Meeting of the British Medical Association held in Bournemouth, July, 1891.

By J. C. THOROWGOOD, M.D., F.R.C.P.,
Senior Physician to the City of London Hospital for Diseases of the Chest, Victoria Park.

THE discovery of the tubercle bacillus, and the way in which it appears to be associated with the progress of the more serious forms of tuberculous disease, has tended to cast drug treatment rather into the background. The ancient treatment of phthisis pulmonalis by demulcent drinks, such as infusion of comfrey or of mullein, and by such remedies as paregoric tincture and oxymel of squills we now regard with feelings allied to pity, and think we have made some progress in drug healing. We look with more respect on the tar water treatment of consumption highly commended in 1744, and Sir A. Crichton's treatment of the disease by continuous inhalation of the vapour of boiling tar mixed with carbonate of potash to neutralise the acetic acid is a method often advantageously pursued in the present day.

In hospital practice, especially among out-patients, one is compelled to do the utmost one can with drugs. The patients are poor, often hard worked, and they cannot obtain the advantages in the way of change of air and rest that fall to the lot of the more affluent classes. In the poorer classes phthisis is often brought about by some neglected inflammatory mischief in the first instance, such as bronchitis, pleuritis, and sometimes pneumonia. In such cases drug treatment has a good chance to distinguish itself, and it is to cases of this kind that I would specially draw attention, as from such my experience has been largely drawn.

A brief reference to two patients in Victoria Park Hospital some years ago will guide as to the line I wish to take, and will be suggestive to any who may make remarks on this paper. One day I found two new cases in the four-bedded ward, both young men. One came from Bethnal Green with a history of long winter cough and bronchitis, signs of consolidation at one apex. The other, a youth, who carried his story in his face—cough, with progressive emaciation coming on gradually from no known cause, slight hæmoptysis, high temperature, and rapid breaking down in the upper part of one lung, came from a high and dry part of Oxfordshire, a district that I well know. I remarked to my assistants that the first case would leave the hospital and return to Bethnal Green much relieved. The case of the other patient would not be reached by drugs but would go from bad to worse; and so it proved, for he died in the hospital.

Let me place before you another case in which from the first I felt sure medicine would prove useless. A young lady, aged 17, living in Scotland with every comfort around her,