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THE COMPREHENSIVE ATTACK ON PULMONARY TUBERCULOSIS*

BY

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" When good men die their goodness does not perish
But lives though they are gone,"

wrote Euripides. We have come together to-day to do honour to one of the world's benefactors, to pay a tribute to a man who was great and single-hearted, who was not content with deploring the sad lot of the consumptive but used his scientific and intellectual gifts to find a solution to the problem, and, in spite of much misunderstanding and even veiled opposition, succeeded by the very force of his character and genius.

Before turning to the ways in which the social and economic aspects of the tuberculosis problem can be approached I will devote the first part of this lecture to a consideration of certain principles which should guide the physician in the treatment of pulmonary tuberculosis. They are important and fundamental ones. They have been inherent in the practice of famous institutions, like the Brompton Hospital for Consumption and King Edward VII Sanatorium at Midhurst, for many years with great success. But I regret to add they are often either neglected or are unknown to many entrusted with the treatment of consumptives. We have not enough Professors of Tuberculosis in our universities or lecturers on that subject in our medical schools to teach the lessons of clinical experience to medical students.

Residential Treatment of the Consumptive

A considerable degree of confusion still exists as to the appropriate use of hospitals and sanatoria and their interdependence in the treatment of persons suffering from pulmonary tuberculosis. It is highly important to realize, first, that there is a great distinction between hospital and sanatorium treatment, and, secondly, that, while this distinction obtains, the two forms of treatment are complementary to one another. A patient after a period of hospital treatment may become suitable for sanatorium treatment; a patient in the course of sanatorium treatment may regress and require hospital treatment. This right use of residential treatment is so frequently ignored, with disastrous results to the patient, that it cannot too often be reiterated. Many local authorities, and even some of their medical advisers, are under the impression that all persons suffering from pulmonary tuberculosis, if diagnosed early enough, will recover with prompt sanatorium treatment. If discovered, many early cases do obtain arrest in this way, although there is a florid type of pulmonary tuberculosis that proceeds to a fatal issue however early the diagnosis and however skilled the treatment; whilst other patients under sanatorium treatment pass into the intermediate or advanced type of the disease and stand in need of hospital treatment.

But the early case is a *rara avis*, especially in a working-man who cannot afford to be one. As Varrier-Jones, with whom I often discussed this problem, wrote:

> " Hitherto few, if any, so-called ' early ' cases have been truly early, and the sooner this depressing fact obtains general recognition the sooner we shall begin to make some progress in the sphere of prophylaxis."

Great hopes are built now upon routine mass radiography for the diagnosis of the early case. Far be it from me to belittle these hopes. In skilled and expert hands the results obtained by Dudley and Fitzpatrick, by Surg. Capt. W. D. W. Brooks, and by Wing Commander Trail already testify to the success of this method in detecting previously unsuspected cases. Trail observed, in the first of these lectures, that some 25% more cases are found in the early stage of mass radiography than by the present civilian methods of diagnosis. But in the use of *x* rays for diagnosis Varrier-Jones gave a word of caution which is especially timely to-day. This is what he said:

> " When we take an *x*-ray film we are filled with wonder at the complications of nodes and shadows, not sufficiently realizing that what we are gazing at is the picture of past battles, filled-in trenches, exploded mine-craters, and the like. What we imagine we see, but do not, is the advancing army of disease. . . . We have interpreted the *x*-ray film wrongly. Instead of using it as an index of equilibrium (which as a rule is impossible) we have used it as a picture of the present battle, whereas it is but the shadow of past conflicts."

X rays, then, are a valuable adjunct, but only an adjunct, to the diagnosis of active pulmonary tuberculosis. They do not provide a rule-of-thumb diagnosis or indicate the appropriate treatment. The physician and the radiologist must work together in this matter. It should also be remembered that many extensive and intermediate cases of pulmonary tuberculosis, and even cases classed as advanced, after efficient hospital treatment, often combined with collapse therapy and surgical measures, may become suitable for sanatorium treatment and attain complete quiescence of their disease. The unfortunate heresy that all cases of pulmonary tuberculosis are suitable for sanatorium treatment is only gradually disappearing from our midst.

Tuberculosis is a protean disease. Its manifestations have to be studied in the individual patient, and that study must be based upon clinical experience. The treatment given must be adapted to the present needs of the individual patient. A stereotyped treatment which automatically puts patients with early physical signs into sanatoria and others into hospital meets with inevitable failure. No man has appreciated this teaching more than Varrier-Jones. He applied it with marked success to the treatment of patients at Papworth.

Selection of Patients for Different Forms of Treatment

From an examination of a number of patients suffering from pulmonary tuberculosis the physician finds that they can be relegated to the following categories:

At the time the disease is recognized a certain proportion of patients are suitable for sanatorium treatment forthwith (i.e., in the strict and limited sense previously mentioned). A second, and larger, proportion of patients will require a period of initial treatment either in a tuberculosis hospital or in the nursing block of a sanatorium before they are suitable for strict sanatorium treatment involving occupational therapy. The rest of febrile patients should be " absolute," not only in name but in practice. A third proportion of patients are suitable for treatment in a tuberculosis hospital. Some of them are unlikely to derive benefit in the future from strict sanatorium treatment; but after collapse therapy or surgical treatment—e.g., thoracoplasty—many will have their lives

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prolonged and be able to work under sheltered conditions. In the remaining group of patients the disease at the time of examination is too advanced and extensive for sanatorium treatment; palliative treatment, either in the tuberculosis hospital or at home, is required.

In most cases it is desirable to keep the patient for a week or so in an observation ward before deciding on the form of treatment most suitable for his individual case.

The principles which guide the physician in the treatment of pulmonary tuberculosis may be summarized as follows:

1. The diagnosis of pulmonary tuberculosis at the earliest possible stage, as well as the careful examination, including *x*-ray, of all contacts, especially adolescents and young adults.
2. A proper selection of patients for sanatorium treatment.
3. Full co-ordination between the tuberculosis officer or medical practitioner and the medical superintendent of the hospital-sanatorium.
4. Correct co-ordination of hospital and sanatorium treatment.
5. Study of the individual patient.
6. A proper hospital and sanatorium regime.
7. Prolonged duration of stay in the sanatorium.
8. The goal to be aimed at is the discharge of the patient with the disease quiescent and in a fit condition to resume an occupation.

To these principles should be added the maintenance of the ex-sanatorium patient, in whom the disease has become quiescent, under medical supervision for at least five years, the injunction to seek medical advice at the first symptom of renewed ill-health, residence in a village settlement, or, if this is impracticable, suitable after-care provision by the local authority.

If these principles were generally practised throughout the country the sanatorium results of every local authority would be as favourable as those already obtained in the sanatoria of the more progressive authorities.

The Principles of Papworth

I have dwelt at some length on the principles of right treatment because they are inseparable from the work of him whom we honour to-day. Efficient treatment of the consumptive is the core of Papworth. This medical aspect of the village settlement is too often overshadowed by its industrial triumphs. Yet the two aspects are inseparable. As Varrier-Jones said:

> "Papworth has proved quite definitely that when the teaching of the medical profession as to tuberculosis can be put into operation the results are exactly those which were anticipated. The progress of disease can be 'arrested' and the condition of 'arrest' can be almost indefinitely prolonged."

We know that with efficient modern treatment, in favourable cases, the consumptive can obtain arrest of his disease and eventually return to play his part in the workaday world. There are many men and women to-day doing useful work who have at one time suffered from active pulmonary tuberculosis. In their case the conditions were favourable, and they survived the critical five years that follow arrest of the disease. But this satisfactory condition of affairs does not obtain with the vast majority of "arrested" patients who return as damaged lives to compete with healthy labour. "The economic world will not support an unearning unit." The consumptive man's resistance power breaks down under the strain. Often he has given hostages to fortune and has to support a wife and family. Even as the working-man cannot afford to become an early case of tuberculosis, so in the same way he struggles to carry on when the strain of occupation has caused a recrudescence of his disease. Then, inevitably, he is forced to give up the struggle. But when he comes once more under medical treatment the tubercle bacillus has made headway and there is far less chance of recovery.

As tuberculosis officer in Cambridge at the beginning of the last war, Varrier-Jones pondered on these disheartening results and sought a solution. He found it in the scheme which he started at Bourn in 1916. It began in a small way. On the site a few shelters were erected and the patients installed. In the house resided a matron, a nurse, and a cook. Before Varrier-Jones died in 1941 he saw this nucleus develop into a great institution at Papworth with 1,000 acres of land, administrative blocks, hospital blocks provided with every facility for modern treatment, a large sanatorium section, laboratories and research institute, a village settlement of nearly two hundred cottages, hostels for men and women, and factories fully equipped with labour-saving machinery and operated on mass-production lines. This means an incentive in life to the patient and an economic future.

Here, then, at Papworth is embodied the secret of successful treatment of tuberculosis. Of primary importance is the fact that the consumptive remains under continuous supervision—medical, psychological, and social. He passes through the stages of hospital and sanatorium treatment and is provided with occupation suited to his state of health. When afebrile he works at a trade, for which he receives the trade union rate of wages. He resides in a hostel or, if married, in the village settlement with his wife and family. If at any time his health relapses he is sure of prompt and expert treatment in the institution.

Papworth and the Prevention of Tuberculosis

Hitherto we have considered the work at Papworth from the curative and remedial standpoints. Varrier-Jones proved that tuberculosis colonies also play an important part in prevention of the disease. Let me quote his own words on the subject:

> "The fatal 'mass' dose, so common yet so unnecessary, need not occur in village settlement conditions. So far it has been avoided at Papworth. Our experience in this respect seems to show that a village settlement can cut the vicious circle of infection which spreads the disease all through whole families. What does this imply? If anything, it means that here we have a means of reducing tuberculosis to the incidence level of smallpox, and it means that, in the long run, it is far cheaper to establish a family in a settlement than to send each of its members, one after another, from sanatoria to their homes to spread infection. There is a mass of evidence to prove this. On the other hand, patients discharged to a village settlement need not spread infection. These facts alone justify village settlements on humane as well as financial grounds, but it is most difficult to make people understand and admit this."

Varrier-Jones had the question of contact examination in mind from the beginning of his project. He was quick to realize that in the village settlement he had a unique opportunity for studying this problem. The settlers and their families could be kept under continuous medical observation. *X* rays and laboratory technique were available to supplement the findings of the expert clinician.

The organized work began as far back as 1921. Under Sir Pendrill's direction it was entrusted to Dr. L. B. Stott. In my visits to Papworth I have been able to see the progress of this work, at which Dr. Stott laboured with unremitting zeal and energy over a period of many years. Before his death Varrier-Jones arranged that Dr. Brieger should examine and collate the vast material which Dr. Stott had prepared. I must not anticipate the detailed results of this prolonged investigation, which are shortly to be published. Preliminary communications have appeared, and it has already been stated that none of the children born in Papworth village (and some have now come of age) has, while a member of the community, contracted tuberculosis of the lungs, glands, bones, or joints or, indeed, in any known clinical form. There has been no case of tuberculous meningitis. Those who have left the settlement to seek education or employment elsewhere are all free from the disease. The *x*-ray findings indicate that an appreciable proportion of the children have been infected by tuberculosis, like the rest of us. If the hypothesis of reactivation of a tuberculous infection contracted in childhood be accepted, it cannot be said that none of these children will develop pulmonary tuberculosis in after-life or that they may not be exposed to superinfection. Nevertheless, not a few of the children have passed through the susceptible stage of adolescence without showing signs or symptoms of pulmonary tuberculosis, and it is not improbable that this resistance to disease may be maintained throughout life. Adequate food supply, instruction in dietetic values, assured employment with no risk of unemployment after breakdown, freedom from anxiety, proper housing, and hygienic precautions help to account for these remarkable results. Alone, without the many other beneficial features which I have described, they would justify the principles of the village settlement.

Rehabilitation of the Consumptive after the War

At the end of the war we shall be faced, as we were in the last war, by a still greater incidence of pulmonary tuberculosis and an increase in the foci of infection. The approximate mortality figures are as follows: In 1939 the deaths from pulmonary tuberculosis in England and Wales were 22,000 (war conditions prevailed in only a little over three months of that year). In both 1940 and 1941 the deaths had risen to 24,000. Fortunately, in 1942 they dropped to 21,000, a decline which, it will be noted, has coincided with a lull in enemy bombing attacks on this country. Notifications of pulmonary tuberculosis, as is well known, form an imperfect guide to the incidence of the disease, as so many cases are reduplicated. It has been estimated from the latest available figures that the numbers of the adult population suffering from pulmonary tuberculosis in Great Britain at Dec. 31, 1938, was nearly 140,000. Of this total about 70,000 were classified as being able to return to ordinary employment, while about 20,000—most of whom were undergoing treatment in hospitals and sanatoria—were regarded as unlikely ever to return to any form of employment. In the remaining 50,000 the disease had been arrested or had become quiescent, and there was good prospect of achieving full recovery provided that special measures of rehabilitation were made available.* These are pre-war figures; wartime conditions have intensified the problem, and the number to be dealt with in the post-war period will show a considerable increase. Since the onset of war some advance has been made by the inclusion, under the Ministry of Labour's Scheme for Training and Resettlement of Disabled Persons, of quiescent and sputum-negative cases of tuberculosis in which the individuals are reintroduced into whole-time employment under ordinary industrial conditions (Ministry of Health Circular 2576, Feb., 1942). This, however, fails to meet the needs of those ex-patients for whom a slow and graduated resumption of work under medical supervision is required.

Varrier-Jones's pioneer work was partly inspired by the needs of tuberculous ex-Service men in the war of 1914–18, and in the present war the same problem arises. It is more and more becoming recognized that he found the true solution. The Medical Research Council's Committee on Tuberculosis in Wartime issued a report in 1942, which refers to the fact that the Papworth and Preston Hall village settlements have demonstrated one possible solution of the industrial problem provided by the chronic active case of pulmonary tuberculosis. The important Interdepartmental Committee's Report on the Rehabilitation and Resettlement of Disabled Persons devotes special attention to pulmonary tuberculosis, and states:

> "Perhaps the most complete type of care for the tuberculous person and his family is the combination of sanatorium and hospital treatment with a village settlement."

In accordance with the recommendations of the Medical Research Council's Committee the Government has recently provided special maintenance allowances for patients suffering from pulmonary tuberculosis (Memo 266T of the Ministry of Health, April, 1943). This enables these affected persons to give up work for a while and receive treatment. The allowances apply to everyone undergoing approved treatment. They are administered by tuberculosis authorities as part of local health services, and comprise "maintenance allowances" based on a standard scale and without any test as to means, to which can be added, at the discretion of the authority, extra grants or special payments towards commitments. For the first time official recognition is given to the fact, so often urged by Varrier-Jones, that economic circumstances again and again prevent the consumptive worker from seeking residential treatment for his disease.

Now village settlements are few and, in my experience, local authorities are reluctant to embark upon them, although the Nottinghamshire County Council, which established the Sherwood Village Settlement in 1936, is a notable exception. In 1919–20 Varrier-Jones, the late Dr. Nathan Raw, M.P., and I constituted a small Departmental Committee which explored the question of establishing village settlements for ex-Service men throughout England and Wales. In the end it was considered better to develop the existing settlements at Papworth and Preston Hall than to provide new organizations. It is extremely probable that a committee of this character to-day would reach a similar conclusion.

In 1936 Varrier-Jones advocated the setting-up of a national board in order to co-ordinate the planning of a national rehabilitation scheme. This was endorsed by the late Lord Willingdon and the Joint Tuberculosis Council. The Medical Research Council Committee now favours the establishment of such a board. In view of the demands which will assuredly be made for village settlements and rehabilitation of the tuberculous ex-Service man at the end of the war, this board's work and direction seem to be urgently required.

Conclusion

In this lecture I have endeavoured to describe the great contribution which Pendrill Varrier-Jones made towards combating tuberculosis, and its comprehensive character. In the brief time at my disposal I have been able to give only an outline of the many agencies which he employed. I have not told, for instance, how he arranged for the psychological treatment of certain of his patients. Indeed, different phases of this pioneer work pursued untiringly for many years would supply a wealth of material for many lectures. He faced much opposition; he crossed swords with those who preferred the ways of routine and established tradition. In the end he triumphed and had the satisfaction of knowing that his principles were sound—for, contrary to common belief, he had the humility of the true scientist in all his investigations—and that they had stood the tests of time and experience and were becoming generally accepted.

"Unto each man his handiwork, unto each his crown,
The just Fate gives;
Whoso takes the world's life on him and his own lays down,
He dying so, lives."

* * * * *

"Seeing death has no part in him any more, no power
Upon his head;
He has bought his eternity with a little hour,
And is not dead."

So Pendrill Varrier-Jones took upon him the consumptive's burden and made it easier to bear. He died too early, but his works do flourish and follow him.

NOTE.—The quoted passages from Sir Pendrill Varrier-Jones's published papers in this lecture are taken by kind permission of Mr. Peter Fraser, Sir Pendrill's literary executor, from *Papers of a Pioneer, Sir Pendrill Varrier-Jones*, collected by Peter Fraser, London, 1943. The quotation from Swinburne's *Super Flumina Babylonis* is by permission of Messrs. William Heinemann.

* Report of Interdepartmental Committee on the Rehabilitation and Resettlement of Disabled Persons. Cmd. 6415, 1943, p. 11.

ACCELERATION OF CO-ORDINATED MUSCULAR EFFORT BY NICOTINAMIDE

PRELIMINARY REPORT TO THE MEDICAL RESEARCH COUNCIL*

BY

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This report summarizes the results obtained from a series of experiments undertaken to demonstrate by means of a selected test the effect, if any, of certain vitamins on the physical efficiency and the fatigability of healthy young adults. Increased resistance to fatigue, or increased muscular ability, as a result of the addition of certain vitamins, especially B_1, to the diet has been reported by a number of observers. Others have failed to show, either in brief extreme exercise or in prolonged severe exercise and semi-starvation, indications of any effect of the vitamin supplementation to the U.S. Army rations on muscular ability, endurance, resistance to fatigue, or recovery from exhaustion. The present series of experiments, extending from April to December, 1942, tend to show that the addition of certain vitamins to the normal diet of healthy young men generally results in varying degrees of increased efficiency in carrying out a fairly severe test involving

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