Maurice Davidson 1883-1967—progress in respiratory medicine since his time

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This issue of the *Postgraduate Medical Journal* is dedicated to the memory of Maurice Davidson, the centenary of whose birth occurred on August 30th 1883, in recognition of his contributions both to the Fellowship of Postgraduate Medicine and to this, its Journal. I have been asked to contribute a memoir of him and a retrospect on respiratory medicine in his time.

Maurice Davidson was the son of a Professor of Pathology. He was educated at Liverpool College, Trinity College, Oxford, and University College Hospital. He retained a deep affection for Oxford, manifested in his Fitzpatrick lectures at the Royal College of Physicians in 1952 and 1953 on the history of medicine in Oxford from the foundation of the University onwards, and in a book about his Oxford days which he entitled *Memoirs of a Golden Age*. He qualified B.M., B.Ch. in 1908, and proceeded to D.M. in 1912 with a thesis on gastric secretion in anaemia. At the beginning of the First World War, he was medical registrar at St George's Hospital. Throughout the war, he served in the R.A.M.C. in Gallipoli, Egypt and Palestine. It is difficult for those who knew him only in later life to imagine him in the rough and tumble of an active theatre of war; we remember him as a gentle, rather frail figure, dressed in the formal fashion of quarter of century earlier. Meeting him was a reminder of old-fashioned courtesy and an occasion for leisurely discourse. In 1921 he was appointed Assistant Physician to the Brompton Hospital, which became the centre of his professional life, and of which, with Frederick Rouvray, who as Secretary to the Hospital made an outstanding contribution to its development, he wrote a history, published in 1954. He maintained involvement with general medicine through appointments as Physician to the Miller General and Royal Waterloo Hospitals; he was active in the Royal Society of Medicine, serving as President of the Section of Medicine, and writing a history of the Society, published in 1955.

His principal contributions to medical literature were two monographs on lung cancer and a text-book on chest diseases. *Cancer of the Lung and other*

Intrathoracic Tumours was published in 1930. At this time the cigarette-induced epidemic of lung cancer which has been a striking feature of the epidemiology of respiratory disease in the past 60 years was starting to become evident, but was responsible for only about one-twentieth of the number of deaths it now causes annually in this country. Davidson's book must have been one of the earliest on this subject; it was followed in 1951 by *The Diagnosis and Treatment of Intrathoracic New Growths*. His text-book entitled *A Practical Manual of Diseases of the Chest* was published in 1935, and went through four editions, the last in 1954. It was thus a widely-read book, and may be taken as a reflection of accepted views and practice 50 years ago. Looking through the first edition, I now find the state of respiratory medicine depicts even more antediluvian than my recollection of the way it was in 1935. Perhaps it is fair comment that Maurice Davidson was a traditionalist, rather than an innovator, and that the book set out to describe established views and procedures; so that those of us who were then young in the specialty were more than usually to be excused for regarding it as rather old-fashioned.

Changes in the practice of medicine are due in part to changes in the epidemiological situation, which in the past 50 years have affected respiratory more than many other branches of medicine; and in part to advances in knowledge, in techniques of investigation and in therapeutic possibilities. I propose to illustrate changes in prevalence of respiratory diseases by a retrospect on the activities of the Brompton Hospital 50 years ago, and changes in medical knowledge and techniques by comparisons of contributions to this issue of this journal with what Maurice Davidson wrote on the same topics in 1935.

Changes in prevalence of respiratory diseases

I went to Brompton Hospital in 1931 as house physician, and continued in resident posts there until 1935. At this time, the greater part of the hospital's work was concerned with tuberculosis, especially

with its diagnosis. Only selected patients with pulmonary tuberculosis were retained for treatment at the hospital and its sanatorium at Frimley, most of those found to be suffering from this disease being transferred elsewhere for treatment. The mainstay of this was rest and sanatorium regimen. Collapse therapy was used in those patients thought suitable for it. Physicians varied greatly in their policies in this respect, especially in the proportion of patients they regarded as suitable for artificial pneumothorax treatment, for which each 'firm' of Physician and Assistant Physician had its out-patient 'refill' clinic, whose size varied with policy. A major part of the work of the surgeons was concerned with tuberculosis. Patients treated by artificial pneumothorax might require division of adhesions to make collapse effective, and the most serious complication of pneumothorax, tuberculous empyema, might require surgical treatment, especially if it became secondarily infected. Operations to interrupt the phrenic nerve to produce relaxation of a predominantly affected lung were frequent. Patients with suitably localised chronic disease, especially with persistent cavitation, might be treated by thoracoplasty, and occasionally by other surgical procedures designed to secure relaxation of affected lung and closure of cavities. No antibacterial drugs were available: sulphonamides, the first of which was useful only against haemolytic streptococci, did not come into use until 1936, and penicillin, the first useful antibiotic, until 1944. Intrathoracic suppuration—lung abscess, infected bronchiectasis and acute and chronic empyema—were important problems. It is probable that the greatly reduced prevalence of these diseases is due to the effective treatment of acute bacterial infections by antibacterial drugs now possible, and certain that such treatment greatly reduces the proportion of patients suffering from them who require surgical treatment. In the 1930s, both medical and surgical wards at the Brompton Hospital contained many patients with these suppurative diseases; and we were all too familiar with the foetor of anaerobically-infected bronchiectasis and lung abscess, and with the ever-present hazard that patients with intrathoracic suppuration might develop metastatic cerebral abscess, for which there was virtually no possibility of effective treatment. Lobectomy by a rather crude technique had recently become feasible; by 1935 it was possible to display for the meeting of the Association of Physicians in London the first 100 lobes removed for bronchiectasis at Brompton. The large number of these operations at that time may in part have been due to interest in a new operative procedure, but the smaller number now performed is certainly due to diminution in the frequency of symptomatic bronchiectasis. Mr Peter Goldstraw informs me that lung resections for suppurative

disease of all sorts at Brompton numbered only nine in 1982. In view of the prominence of diseases due to bacterial infections 50 years ago, it is perhaps not surprising that those chronic diseases characterized by expiratory airflow limitation which now represent the greater part of the work of respiratory disease units received relatively little attention. This is reflected in Maurice Davidson's 1935 book, in which of 520 pages only 17 were allocated to asthma, 21 to bronchitis, acute and chronic, and five to emphysema, separately discussed in a chapter headed 'Conditions affecting the air in the alveoli', together with atelectasis. By contrast, 138 were devoted to pulmonary tuberculosis, and 82 to intrathoracic suppurative diseases (pleural empyema, lung abscess and gangrene, and bronchiectasis).

Changes in medical knowledge and practice

Undoubtedly, the most important therapeutic advance in the past 50 years has been the introduction of effective antibacterial therapy; the effect of this in reducing pulmonary tuberculosis and intrathoracic suppurative diseases from the major to a minor part of the work of respiratory disease units has been noted above. It is salutary to reflect that antibacterial chemotherapy, directed specifically against causal agents of diseases of known cause, is curative: it restores patients to full health and working capacity, without need for further medical care. By contrast, many more recent advances have been in the palliation of the end-stages of chronic disease, and not specifically directed against causal factors; those patients whose condition they improve remain invalids in need of long-term medical care and social support, and their success increases the demands on the resources of the health services.

The introduction of controlled or comparative randomized trials in the evaluation of therapy, leading to their general acceptance, has greatly improved clinical practice in the past 50 years. In the pre-antibiotic era, the various therapeutic measures then current for pulmonary tuberculosis were evaluated only by clinical judgment, backed by follow-up studies without valid control groups. For example it was not found possible to compare a group of patients treated by artificial pneumothorax with a similar group not so treated, since this form of treatment could be applied only to selected patients; and those physicians who used it extensively felt so sure that these patients were helped by it that they would have regarded as unethical any proposal to randomize patients thought suitable for it into groups in which the induction of pneumothorax would and would not be attempted. Even more surprising in retrospect is the story of gold treatment. Various preparations of this toxic metal were administered in

various dosages by some physicians on the basis of clinical impressions, as perusal of the relevant pages of Maurice Davidson's 1935 book shows; and this unsystematic, almost haphazard procedure continued into the second half of the 1930s, gradually coming to an end in the early 1940s, although a controlled trial by Amberson and his colleagues in 1931 showed no benefit, and all reports emphasized toxic effects. By contrast, the chemotherapy of tuberculosis, discussed by Dr Citron in this issue, has evolved from its beginning as the result of randomized comparative trials, and current regimens are based on evidence that can be critically examined rather than on the clinical impressions of individual physicians.

In retrospect, it is astonishing that 50 years ago, assessment of the respiratory function of patients about to undergo the various forms of medical and surgical collapse therapy in vogue for pulmonary tuberculosis was based on clinical judgment aided only by estimates of vital capacity, and that post-operative care was conducted without guidance from objective tests, and without the facilities for assisted ventilation which are now available. Indeed, the analysis of respiratory disability in physiological terms had scarcely entered into standard clinical practice, and was being investigated in only a few centres. Davidson's 1935 book describes spirometry in half a page, and makes no reference to any test of function in the diagnosis or management of disease. The general adoption of physiological tests as a normal part of clinical investigation and as a guide to rational treatment, and of physiological concepts as a useful basis for diagnostic categorization, represents a revolution whose magnitude can be appreciated only by those who survive from the days before it occurred. The key role of physiological concepts in current respiratory medicine is exemplified in the contributions of Dr Geddes and Dr Hetzel.

It is now generally accepted that expiratory airflow limitation, persistent or variable, is a useful basis for diagnostic categorization. Dr Geddes describes rules for the management of patients disabled by chronic airflow limitation without feeling the need to mention chronic bronchitis or emphysema. These are the only headings in Davidson's book under which such patients might have been included. Similarly, the possibility that simple measurements related to expiratory airflow resistance, such as the peak expiratory flow-rate, might be found important in the diagnosis of asthma and in assessment of its severity and response to treatment, emphasized by Dr Hetzel, was virtually unsuspected in 1935. In therapy, the only sympathomimetic bronchodilators then available were adrenaline and ephedrine, and corticosteroids were unknown. Adrenaline was first used by subcutaneous injection in asthma about 1900, and this had become a standard procedure for acute episodes.

Some physicians used adrenaline by inhalation from a nebulizer, but its value was limited by the non-selectivity of the sympathomimetic effect and by the rapid deterioration of adrenaline in solution. Ephedrine, active by mouth but slower in onset of action, was similarly limited by non-selectivity. Isoprenaline, the first β -selective sympathomimetic, came into use from 1940 onwards, but it was not until 15 or more years later that the β_2 -selective agents, now the mainstay of bronchodilator therapy, were introduced. Similarly, it was not until the middle 1950s that corticosteroids were at all widely used in the management of asthma, and 10 years later before they began to be used by inhalation. Theophylline, and its derivatives, such as aminophylline, were available and used, especially intravenously for acute episodes, in the 1930s; and it is interesting that although they are still widely used, argument about their place in the treatment of asthma continues.

In lung cancer, the most striking change in the past 50 years has been the enormous increase in its incidence, and the most important advance in knowledge the now incontrovertible evidence that this increase is due to the preceding spread of the cigarette-smoking habit. Dr Spiro notes that the number of deaths among men is now falling, and that this can be accounted for in large part by diminution in cigarette-smoking among men in recent decades. It is depressing that among women the number of deaths is still rising, correlating with the continuing trend towards increased smoking among women. There is no prospect of significant reduction in mortality either by more effective therapy or screening procedures leading to earlier diagnosis; and this makes difficulty and delay in persuading the public generally to take heed of the most important discovery in preventive medicine in our time doubly frustrating. Differences between small-cell and other histological types of carcinoma in response to surgery and radiotherapy and in prognosis have long been evident. The results of surgical treatment, available for only a proportion of patients, and giving its best results in those with squamous-cell tumours, have changed little in the past 30 years and there is little evidence that any hitherto devised scheme of adjuvant radiotherapy, chemotherapy or immunotherapy improves them. The susceptibility of small-cell carcinoma to radiotherapy and to cytotoxic drugs provides a means of short-term palliation in many patients, and the search for combination therapy that may be more effective and lead to more long-term remissions continues; and recognition that small-cell carcinoma is diverse in cell biology holds promise that more selective treatment of different cell-types may lead to better results.

Two recent additions to investigatory procedures—fibreoptic bronchoscopy and computed tomography

are discussed by Drs Dhillon and Collins and by Dr Strickland. In 1935, only the rigid bronchoscope was available, and it was used principally in the diagnosis of malignant disease. Maurice Davidson's book mentions its therapeutic use in lung abscess to aspirate pus and improve drainage. The best comment I remember on this procedure was made by a young man whose chronic lung abscess was being treated by periodic bronchoscopic aspiration under local anaesthetic, which, with the rigid instrument, was a fairly formidable procedure for the patient. On being told at the end of one of these sessions that 2 ounces of pus has been aspirated, he exclaimed, 'But I cough up 5 ounces every day by myself!'. The introduction of the fiberoptic instrument has greatly increased the range of clinical and investigatory applications of bronchoscopy, both because it can be performed under local anaesthetic with levels of discomfort acceptable to most patients, and because it brings more of the bronchial tree into view. The diagnosis of malignant disease remains prominent among its uses; the possibility of safe transbronchial forceps biopsy of the lung extends its uses to the diagnosis of diffuse lung disease; and broncho-alveolar lavage through the fiberoptic bronchoscope has made important contributions to the cellular immunology of the lung.

Conventional tomography did not enter in general use until shortly after the publication of Davidson's book. The technology that made possible the development of computed tomography in 1969 was then undreamt of. The applications of computed tomography to the thorax are still being explored, as Dr Strickland emphasizes. It is already evident that its potential contribution far exceeds that of conventional tomography, and indeed is of a different order, but unfortunately at very much greater cost.

The remaining three contributions concern diseases not mentioned in Maurice Davidson's book, but now of major interest in respiratory medicine. Professor Turner-Warwick discusses the current state of knowledge of pathogenetic mechanisms leading to diffuse pulmonary alveolar fibrosis, and the implications for prognosis and response to corticosteroids. This is an entirely new field since 1935, when fibrosis of the lung was generally regarded as always the consequence of either infection of one sort or another, or mineral dust inhalation. I can recall patients whom I saw at that time with widespread pulmonary fibrosis which, *faute de mieux*, I categorized as probably post-infective, but in retrospect recognize as almost certainly properly categorized as cryptogenic fibrosing alveolitis.

Similarly, cystic fibrosis, the manifestations of which in adults Dr Hodson discusses, was not recognized in children until after 1935, and did not become a problem in adults until the late 1950s. By

then, prognosis for affected children had been improved by more effective treatment, especially the control of infection by antibacterial drugs, so that some were surviving into adult life; and greater diagnostic awareness had led to the detection of a few cases with a later onset of symptoms. In the early 1950s, I recognized a few cases developing symptoms in late childhood and diagnosed for the first time in adolescence; and around 1960, Dr Norman started referring to me at Brompton patients whom he had treated at Great Ormond Street and who had survived to young adult life.

Sarcoidosis, on which Dr James writes, was so little recognized as of importance in respiratory medicine 50 years ago that it was not mentioned in Maurice Davidson's book, although Boeck in a series of papers between his description of multiple benign sarcoids of the skin in 1899 and the year before his death in 1917 had drawn attention to the frequent involvement of the lungs, and Schaumann from 1914 onwards had emphasized the occurrence of cases in which changes in the lungs and other internal organs having a histological pattern similar to that of sarcoids of the skin were present without changes in the skin. Undoubtedly, patients with pulmonary sarcoidosis in the 1930s were diagnosed either as sputum-negative chronic pulmonary tuberculosis or as lung fibrosis of unknown cause, I recall one such patient discharged from Brompton Hospital in 1933 with a diagnosis of non-progressive fibrosis of the lungs; I saw her again 30 years later, when the diagnosis of sarcoidosis in its late hyalinized stage was made by lung biopsy and later confirmed at necropsy.

The future

As Karl Popper has argued so cogently, there can be no prediction of the course of human history by any rational method; and certainly many of the important developments in respiratory medicine outlined above could not have been foreseen as probable 50 years ago. Extrapolation of recent trends to the immediate future is of course of some use as a pragmatic indicator, but the unexpected can confound all prediction. Although there was a theoretical possibility in 1935 that effective antibacterial agents might be developed, no-one could forecast whether this would be realized, and if so, when; and certainly it would have been absurdly optimistic to expect that within two decades first sulphonamides and then antibiotics active against a wide range of pathogenic bacteria would be developed, virtually eliminating deaths from acute haemolytic streptococcal infections, notably puerperal sepsis, and from pneumococcal pneumonia, both of which had caused large numbers of deaths in previously healthy individuals,

and reducing tuberculosis from a major cause of death and disability, both in children and in adults, to a much less frequent, usually easily treatable condition.

In the light of this experience, I am disinclined to make any but the most general comments about future trends. It would be pleasant to think that in 50 years' time, it will be possible to look back on a similar diminution in mortality from those respiratory diseases that now cause the greatest numbers of deaths, those characterized by expiratory airflow limitation and lung cancer. But these diseases differ, in a respect highly relevant to this prospect, from those which have come under control in my life-time. The principal causal factor in them, cigarette-smoking, can be dealt with only by avoidance. No known measure can prevent the development of either of them in a susceptible smoker, and it seems very unlikely that any medicament that will protect the continuing smoker from the dangers of persistent airflow limitation, bronchial catarrh, and cancer will be developed. The only way in which mortality from them can be reduced is prevention by the elimination

of cigarette-smoking as a socially acceptable habit. Although doctors have the obvious duty of reminding their patients and others, especially those with influence on social policy, constantly of these facts, responsibility for general publicity and other measures aimed at maximizing rational response to them does not seem to me to be a specifically medical one.

Finally, the viability of the National Health Service, or of any other system of medical care, depends upon the development of preventive measures, diminishing the number of people who need medical care, and curative treatment, returning those who do to full health without the need for further medical care; and is threatened by increasing commitment to the palliation of end-stage irreversible disease. Research into ways of alleviating chronic disease must continue, because relief of suffering must remain a major concern; but it should take second place to the study of the earlier stages of disease, aetiology and pathogenesis, which may lead to the possibility of prevention and of curative treatment.