

to stress (a) examination techniques and (b) differential diagnoses, whilst the *Diploma course in Emergency Medicine* (1964)—which taken alone should be of great value to all casualty officers, medical officers in the armed forces and in other emergency units—would have to cover traumatology in the first instance, but the emergency aspects of all other fields of medicine as well.

Although the foregoing may not be the last word in respect of postgraduate training for the general practitioner and public health officer, it offers a basis on which a start could be made without further delay. A system such as the one proposed here would combine compliance with practical demands and flexibility, and would bring postgraduate training within reach of everyone working in general practice or a corresponding hospital post and in the field of public health. It would also make it possible that in future all branches of medicine meet on the same high academic level—an ideal which can be realized by nothing but hard work.

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ELECTROCARDIOGRAPHY

A report on a postgraduate study

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DURING MY SIX YEARS in this relatively remote rural practice (the nearest main hospital being 28 miles away in Ipswich), I have managed to care for almost all my patients suffering with myocardial and pulmonary infarcts, and with deep vein thromboses, without sending them away. Treatment has been carried out in the patients' homes or in Aldeburgh Cottage Hospital and has consisted of routine clinical management, and (pace the recent Danish reports) anticoagulation.

My practice had recently obtained the use of a new Philips transistor electrocardiogram. One of my partners was skilled in its use and in the interpretation of its tracings. I was less skilled; and so it was with a sense of excitement of being once again *in statu pupillari*, that I left my partners with a full-time locum, and went to work in the cardiology department at Barts. One of the best and

most constant characteristics of our profession is the ever-ready willingness to teach. Both the consultants and the registrars spent a great deal of their time teaching me, and never seemed to tire of my many questions.

There is at present amongst general practitioners a growing desire to increase their diagnostic range. This has manifested itself by a demand for, and greater use of, x-ray and pathological investigations, and the use of that valuable aid, the electrocardiogram.

As a student and as a hospital resident, I had learned a reasonable amount about electrocardiography, but much of this had atrophied in the subsequent years in practice. Every man's method of learning technique must vary. I report in fair detail how I went about re-learning my subject. The method suited me, and may be of interest to someone following in my wake. I hope so, for what my invaluable free weeks enabled me to do was to read through a large number of papers and books, and to note those which I thought would be of greatest value to a busy practitioner.

What follows is what I actually did, but in a more logical form. This would be my advice to someone relearning the subject.

Read completely through the section on diseases of the cardiovascular system in some standard textbook of medicine. Davidson (1964) does it very well.

It is perfectly possible to learn by rote (and to use one's findings as an aid to diagnosis) the various ECG patterns of the normal and the diseased heart. But basically this is a poor and uninteresting method of interpreting tracings. It is better to have a reasonable, uncomplicated knowledge of the hypotheses underlying the interpretation of eardiograms. Jan Hill's (1950) Gibson lecture is a brilliantly simplified account of the electrical background of ECG theory and practice. Also very good and easily understood is Schamroth's (1957) small book of 58 pages.

There are many books on the subject. The most lucid and useful for the general practitioner are Turner's (1963) reprint of his (1962) articles in the *Practitioner*, and Marriott's (1962) book. The latter is particularly good for arm-chair reading at the end of a hard day. It is written in a crisp, conversational style. At the end of each chapter is a brief synopsis of the salient features just discussed and a series of review tracings (without captions), for the reader's interpretation.

Armed then with a mind orientated towards the cardiovascular system, and with some knowledge of the theory and patterns of ECGs search out and sit beside a cardiologist in his outpatient clinic. What you will now learn is a sense of proportion as to the value of this aid. It may give an absolute diagnosis, or it may give no indication of serious disease. You will come to realize the diagnoses which it is justifiable for a practitioner to make, and those which will always require consultant advice.

You will realize that an electrocardiogram must be interpreted only in conjunction with careful clinical observation.

It has been said that there are too many patients limping through life maimed by the unkind cuts of the electrocardiogram. And Turner (1963) has written "As a rule, electrocardiography should not be undertaken by general practitioners". Wise men have said these things and, therefore, one will approach the use of this aid with due humility and caution. But not too much of either, or clinical emasculation will result. For, after all, there have been many patients

maintained by simpler things; the stethoscope, sphygmomanometer, thermometer, blood counts, cholesterol levels and x-ray reports. Experience and judgment are as much the hallmarks and tools of the personal, as they are of the consulting physician.

Having got so far in interpreting ECGs and correlating them with findings on actual patients, you will now consolidate your knowledge and obtain confidence in reading tracings by carefully studying a large number at one sitting.

In most large cardiology departments, somewhere between 50 and 100 ECGs will arrive daily for comment. It will be found an excellent discipline to read these before the consultant or registrar. Read them logically and note on a small sheet of paper:

- (a) Patient's name, sex and age
- (b) Very brief details of symptoms, signs, and clinical diagnosis
- (c) Medication, if any
- (d) The ten ECG features which are always examined systematically:
 1. Rhythm.
 2. Rate.
 3. P wave.
 4. P-R interval.
 5. QRS interval.
 6. QRS complex.
 7. ST segment.
 8. T wave.
 9. U wave.
 10. Q-T duration.
- (e) Your diagnosis.

Having done this, sit next to the specialist when he reads them himself. After a little experience you will take little of his time, and will gain much confidence as your degree of agreement improves.

You may find it useful homework to read and compare your diagnoses in books of typical tracings. That by Katz *et al.* (1952) is a useful volume.

At first the number of variables observed may appear confusing. To lessen this, and to save frequent recourse to your textbook, you will find it a rapid method of review and reference to cut a small 'memo' notebook about 3" x 5" in the manner of an address book and enter on the appropriate page the salient features of each variable.

Spend half a day with an ECG technician. First watching, and then under her supervision, learning the techniques of using the electrocardiogram. From her, you will learn the practical points of good contact, standardization of the instrument, electrode placement, patient position and the avoidance of interference. Using a transistor machine, it takes about ten minutes to set up, take the tracing, and repack the instrument.

Read the paper by H. C. Maingay *et al.* (1961) on their experiences with an electrocardiogram in general practice.

Summary

The long period of study which the Upjohn Fellowship enabled me to undertake was of the greatest value.

Electrocardiography is a subject which must be thoroughly studied. Used with judgment, it is a skill well within the competence of an interested general practitioner. It is a most useful aid in cardiological diagnosis.

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	M. infarct.
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