no reason to think that we will be unsuccessful in this type of approach or that any of us wish at present or in the foreseeable future to deviate from it. We can only say that we are happy with this arrangement. Whether this type of approach can work or is even desirable in other contexts may be a matter of interest and concern, but has not been the subject of this essay.

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Endocrinology and Metabolism

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The field of endocrinology and metabolism provides several examples of the unusual approaches we are attempting in service, education, and research.

Service
The clinical care of most patients with diabetes is provided by their family practitioner. Some innovations in such management have been made by the family practice unit at the Henderson General Hospital, particularly in setting clear objectives in treatment and recording and scoring the response (Gilbert, 1971a, b). Support for the family practitioners is provided by both general internists and endocrinologists. There are, however, some aspects of management needing still further support; these include the education of the new diabetic, the very young and the very old, patients with disturbances of behaviour and with long-term complications. To improve the care of these we have established a Diabetic Day Care Centre at McMaster University Medical Centre.

The Centre, a regional facility available to all doctors in the community, was planned by Dr W. B. Spaulding and differs in several ways from most diabetic clinics. A nurse and a secretary-receptionist are full-time staff; two
internists, a paediatrician, a psychiatrist, a dietician and a social worker are part-time staff. The key person is the nurse, who obtains most of the history and performs some of the physical examination. The acute and chronic problems are identified and a management plan is drawn up and supervised by the nurse, the physician seeing the patient occasionally. The Centre has facilities for supervising a patient throughout the day and the general availability of the telephone allows a much closer contact between the nurse and the patient at home than would be possible in Britain. Education of the patient is mainly by personal instruction, although for basic diabetic education audio-visual aids are being developed. A group of teenage diabetics meets in the evenings. When the problems resolve or become inactive, the patient is referred back to the family practitioner. Some continuing supervisory care is provided where problems persist, e.g. in children with diabetes. In this way the Diabetic Day Care Centre can give more attention to the problems of the individual patient, and provide a realistic approach to diabetes on an out-patient basis. The full-time staff makes the facility much more flexible than a fixed clinic on one or more days a week and hopefully will prevent admission to hospital for uncomplicated diabetic management.

Another service project in diabetes is the provision of staff for the diabetic clinic at Ohsweken, an Indian Reserve about 25 miles from Hamilton. The prevalence of maturity onset diabetes appears to be high although no accurate surveys have been done in this particular community. The clinic at Ohsweken is one of the four specialty clinics staffed by McMaster, the others being in paediatrics, obstetrics and gynaecology, and general surgery.

Another important aspect of diabetes is pregnancy, perhaps the only situation in which a specific outcome can be proven to depend on good diabetic control (Wright et al., 1968). A high risk ante-natal clinic has been started in the obstetric unit at the Henderson General Hospital, where the obstetrician and internist can see the patient at the same time and a close liaison is maintained with those responsible for neonatal care.

The ambulatory service needs of other endocrine and metabolic problems are met by some of the eight specialists in the subject. Each hospital has one or more internists who are interested in endocrinology and metabolism. The development of an endocrine clinic at McMaster University Medical Centre will be in addition to existing facilities and will bring together staff from different disciplines and departments. An important development will be the setting up of an area in which out-patients can be supervised. It is planned to have a nurse in charge of this area where a variety of tests can be carried out in the day. This facility will also be used by other specialties, e.g. gastroenterology. In-patient facilities for endocrinology and metabolism
are of little concern in terms of numbers of beds. Specialised metabolic ward facilities are available at Henderson General Hospital and a six-bed inpatient unit is planned at McMaster University Medical Centre.

**EDUCATION**

In the undergraduate curriculum, endocrinology is a good example of a subject that permeates the course, but also has its own specific turn. Aspects of endocrinology that occur at various times include ectopic hormone production when considering carcinoma, aldosterone in the renal and electrolyte unit, catecholamines and lipid metabolism in the cardiovascular unit, parathormone, calcitonin and calcium metabolism in the locomotor unit. In Phase III a period of six weeks is specifically devoted to endocrinology and reproduction. The major objectives in endocrinology of this unit are carbohydrate and energy metabolism, diabetes mellitus and thyroid disease, the adrenal cortex and reproductive endocrinology. The amount of time spent in endocrinology in the unit is approximately three weeks, but the subject is closely linked to reproduction through the study of adrenal, gonadal, pituitary and placental function. Study in this phase involves the relevant anatomy, physiology, pathophysiology, pharmacology and behavioural aspects. The student is responsible for organising much of his own timetable and is guided by his tutor if necessary. The approach can be by working through either the content objectives, e.g. glucose homeostasis, ketosis and the long-term complications of diabetes, or the problems and questions that have been set, e.g. a patient developing ketoacidosis. There is a strong emphasis on clinical problems to illustrate basic concepts. The resources of the unit are widespread and require considerable planning and integration. The basic content is largely covered by standard textbooks, together with slide/tape shows and video tapes. The timetable has a framework of live resource sessions which occupy approximately a quarter of the time. The subjects presented at these sessions are selected to avoid any duplication of material available in standard texts or elsewhere. In the study of diabetes, the Diabetic Day Care Centre organises two sessions: one based on small discussion groups on the socio-behavioural aspect of diabetes, each group having a patient interview; and the other a clinicopathological conference on diabetic complications. The Phase III programme includes an elective period for studying the impact of a chronic illness on an individual or a family. Up to three students are attached to the Centre at any one time and are able to follow the course of selected patients over several months. The students are encouraged to make home or school visits as appropriate and to explore the relevant community resources.
In the residency programme, endocrinology makes two particular contributions. Firstly, the second year residents are offered a three months ‘managed’ rotation in endocrinology and metabolism. During this time the resident helps manage all the patients referred to one or two endocrinologists, and has an opportunity of taking part in laboratory investigations. Secondly, the resident helps to present patients and topics for the rounds in clinical endocrinology and metabolism. In continuing education, topics in endocrinology and metabolism are selected by a number of regional hospitals and, in the last year, there have been a number of requests for discussion on diabetes. Requests for resource people are made by a number of other groups—nurses, nurse practitioners, pharmacists, medical technologists and also from a number of community organisations including local radio and television.

The creation of a useful dialogue between specialists based in separate institutions is the next task. This is a real test of the district concept. A district-wide clinical endocrinology and metabolism round is being held once monthly at each of the four institutions in turn.

**RESEARCH**
A complete catalogue of research activities in endocrinology and metabolism would mean little, but a few justify mention to indicate the range of interest. I have developed radioimmunoassays for human insulin and growth hormone and have been using them to study carbohydrate metabolism in hyperlipoproteinaemia and the response of the neonate to feeding. Dr M. A. Mishkel has long-term studies in the management of hyperlipoproteinaemia, the phospholipids of abnormal red cells and the effect of cholestyramine on biliary and faecal bile acids. Dr S. Goldstein is studying the biochemical-genetic basis of diabetes and its relationship to biological ageing. Dr C. J Toews is actively involved in research in hepatic gluconeogenesis and proteolysis.

In other departments, perhaps the most interesting development is the programme on reproductive biology in which biochemists, gynaecologists, psychiatrists and neuroscientists are working together in the study of fertility.

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