BRITISH MEDICAL JOURNAL

LONDON, SATURDAY 18 FEBRUARY 1978

Hospital laboratory computing

The advent of computers was hailed as an advance that could both enhance medical practice and release skilled staff from the tedium of many repetitive and mundane tasks. Early attempts to introduce computing into medicine, however, foundered on the rocks of inexperience, mismanagement, and failure to appreciate the complexity of the tasks the computer was being asked to perform. As a result computers have acquired a poor reputation in medical circles. Nevertheless, many faults in existing practices became apparent from attempts to enshrine these practices within a computer system—a benefit that tends to be forgotten.

It remains true that many of the circumscribed functions of a hospital laboratory are potentially suitable for control by a computer system.[1] More than a decade has passed since the first attempts in Britain to devise a suitable system—yet new ones are still being developed. Why is this, and are such experiments justified?

At first sight the tasks in question seem relatively simple, and basically they are common to all clinical pathology laboratories irrespective of subdiscipline. The two main tasks are data processing—the clerical work arising from request forms and the generation of reports—and data acquisition—dealing with the output of a laboratory instrument such as a blood cell counter.

The fact that most attention seems to have been given to data acquisition[2] is a hint that data processing is the harder task. This is doubly unfortunate, for processing is in fact more important. The days when specialised hardware (central processor) and complex software (computer programs) were needed to translate the electrical signals from an instrument into an analytical result are gone: most modern instruments are equipped with a standard output that can easily be handled by the computer directly, and this trend will be accelerated by the introduction of microprocessors and cheap memory modules.

Why then has computerisation of data processing made such slow progress? The first requirement is a data base containing the set of identifying data for each patient, the requesting source, and "files" for results of tests on specimens submitted. Associated with this must be "dictionaries" for hospitals, wards, clinics, medical practitioners, types of specimen likely to be encountered, and the array of investigations, with their specific data such as the name of the test, the associated units of measurement, and any textual comments. A busy laboratory might handle 500 or more requests daily, and on each occasion the data base must be checked to find out if the patient is on file, the data verified or a file created, and the investigations (and perhaps diagnosis) entered. When the tests have been done the results have to be entered into the system and merged into the files of the correct patient, and the reports generated and then printed. An efficient modern system should allow these various procedures to occur concurrently, with on-line or off-line acquisition of data from laboratory instruments. In such a system this means that a whole range of programs are running apparently simultaneously, so that the computer requires a highly complex system of operating software and an efficient filing system.

Until recently these features were to be found only on big machines, and British laboratories that had to manage with minicomputers had to write at least the filing system. Indeed, the lack of a suitable filing system was an important factor in the ending of the DHSS three-laboratory experiment, a point made in some recent papers[3] from one of the laboratories concerned. These describe how it became possible to introduce a successful data processing system (Phoenix) once the computer manufacturer supplied a filing system. Similar results have been achieved without using manufacturers' software,[4] but even so Phoenix heralds an important event in laboratory circles—for a number of other laboratories have produced similar systems.

The importance of efficient laboratory data processing is, indeed, now being recognised[3] as the benefits to the laboratory and clinician have become apparent. Most obvious is the improved quality of service—notably legible reports, a faster turn-round of work, easy inquiry facilities, and fewer errors—but other welcome features include accessible files for looking at a related series of results or for research, both clinical and epidemiological. Such benefits are difficult to measure in financial terms, but some computerised laboratories have reduced staff or avoided the increase that otherwise would have been necessary to cope with the increasing and changing work load.

Data available to the DHSS and the Scottish Home and Health Department show that many laboratory computer developments are still in hand and others are contemplated. Now that successful systems exist and now that a number of manufacturers of minicomputers provide appropriate systems software, should not laboratories be discouraged from trying to work out their own answers? Could not more of the successful systems be installed elsewhere and supported from the original development centres? As Dryden put it:

> But from himself the Phoenix only springs;
> Self-born, begotten by the parent flame
> In which he burn'd, *another and the same.*

[1] Wootton, I D P, *British Medical Bulletin*, 1968, **24**, 219.
[2] Raymond, S, *Journal of the American Medical Association*, 1974, **228**, 591.
[3] Abson, J, Prall, A, and Wootton, I D P, *Annals of Clinical Biochemistry*, 1977, **14**, 307.
[4] Carter, N W, *Computers in the Medical Environment*, 1977, thesis for PhD, University of Dundee.

Hazards of hang gliding

Flying a hang glider may well leave those who do it at a loss for words to describe their feelings. How often is some ecstatic experience described as just like flying—and hang gliding is the real experience that others have in dreams or their imagination. There is, however, another side to the picture. This week we report experience from Austria, where Margreiter and Lugger (p 400) have recorded 75 accidents and six deaths in four years (which they take to be less than the true figures). How dangerous, in fact, is this new sport?

In most European countries accident statistics have been hard to come by. Here in Britain many hang-glider accidents are not reported as such. Worries about insurance have prompted some of the reticence (though in fact insurance companies take a reasonable attitude); another reason has been the ridicule and even open hostility found in some casualty departments. Football injuries are honourable, but hang-glider ones tend to be seen as resulting from dangerous lunacy.

For the past eighteen months, however, the British Hang Gliding Association has had an organisation for investigating accidents. Between 1975 and 1977 membership of the association rose rapidly and is now 3500, with probably over twice that number of people actually flying—there are about 6000 gliders in Britain. Only 75 accidents have been reported in the years 1975-6, suggesting a rate far lower than in the Tyrol, where there are fewer gliders.

The Austrian report suggests that air currents were an important factor in the accidents, but human errors were identified in most cases; and the authors recommend various measures to reduce the risk. In Britain, too, the main cause seems to be lack of care and experience, though nowadays nearly all beginners are properly trained.

Injuries to the arms and legs accounted for two-thirds of the total of 75 British accidents, with only six head injuries. Even so, since 1972, when hang gliding started in Great Britain, there have been 13 deaths. The risk of flying a hang glider seems to be much the same as that of riding a motor cycle—given differences in the temperament of the people concerned, the weather, and the "terrain."

Is enough being done to control this rapidly growing sport? The Civil Aviation Authority, which casts a benevolent eye on hang-glider pilots, does not favour licences, preferring that the BHGA should control its own members. Crash helmets are mandatory in training and when flying in competitions, and are worn by almost all pilots all the time, though the association does not envisage legal compulsion at present. Third-party insurance of £500 000 is automatic on joining the association; personal insurance may be obtained at about £10 per £10 000 per year, or with a small loading on personal policies.

The manufacturers of hang gliders in Great Britain all belong to a voluntary organisation that sets agreed standards approved by the Civil Aviation Authority. No manufacturer will sell a glider to a pilot who has not gained the elementary certificate, which requires 15 properly controlled flights. Second-hand and home-made gliders are required to be inspected by the club safety officer and registered with the British Hang Gliding Association. Nevertheless, much of the effort by local authorities in Great Britain is to prevent hang gliders from flying, rather than to encourage the use of favourable sites. The Adur District Council at Shoreham has just made a bylaw banning hang gliding at Mill Hill, which is the safest and best site in a south-west wind for 100 miles. Hang-glider pilots claim that this may well result in accidents occurring on less favourable hills. As in other matters, there are conflicting interests and views within the community: the important issue is that the benefits and risks to all sections should be exposed and properly debated.

Certainly hang gliding is a dangerous sport. It requires great skill and care; but, as Winston churchill said after he had been knocked down by a taxi in New York: "Live dangerously, take things as they come, dread nought, all will be well."

Future of general practice in the EEC

The renaissance of general practice in the past two decades has been more rapid in some parts of the world than in others. Here in Britain the process has been continuous, evolving through the development of postgraduate training to the point at which only the regulations are lacking for the NHS (Vocational Training) Act to ensure that all principals in general practice shall have been through a three-year vocational training programme or its equivalent. While Britain was a pioneer in this rebirth of general practice, we were not alone in establishing it as a discipline in its own right, as is clear from the development of colleges, faculties, and academies of general practice in so many parts of the world. Indeed, though vocational training is not yet compulsory for general practice in the NHS, it has been required in the Netherlands since 1973 for doctors practising in social security schemes.

Most of the early discussion on the training of general practitioners and the part they play in the provision of health care has been at national conferences. More recently there have been multinational discussions, and the European Union of General Practitioners (UEMO) celebrated its tenth anniversary last month with a two-day symposium organised with the Commission of the European Economic Community on the future of general practice in the EEC. Coming as it did soon after the first meeting of ministers of health of the EEC in December, it was appropriate that the symposium was opened by Madame Simone Veil, minister of health and social affairs for France. She had no doubt that there was an essential role for general practice in the EEC, and she was concerned that only some 20-30% of young French doctors became GPs, in large part because of the glamour and scientific attractions which had hitherto been uniquely the province of the specialties. Her commission of inquiry had agreed that