functions of the placenta have set off a great fluttering in the endocrine and obstetrical dovecotes. From Aberdeen to Buenos Aires they have met to compare notes in many languages. There can hardly be a better example than the published transactions of a recent colloquium held in South America and published in English by French editors, largely concerned with papers read by Japanese and American scientists.[6]

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[3] Greenwood, F C, Hunter, W M, and Klopper, A I, *British Medical Journal*, 1964, **1**, 22.
[4] Bohn, H, *Blut*, 1972, **24**, 292.
[5] Diczfalusy, E, *Acta Obstetricia et Gynecologica Scandinavica*, 1962, **41**, Suppl. 1, 45.
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New muscles for old

In the last two decades orthopaedic surgeons have gradually improved the results of their efforts to augment or restore the action of a weak or paralysed muscle by attaching it to a healthy one taken from elsewhere—choosing one that could be spared for the purpose and had a suitable action. Apart from technical failures, early problems were due either to a lack of understanding of the need to use a muscle whose action was physiologically compatible with the one it was supplementing or supplanting, or to the muscle's being too weak or too much weakened by alteration of its course. Once these requirements were understood, the applications of the principle were increased, and there was a steady growth in the number of muscles whose action could be altered, while grafts were used to lengthen tendons that were too short for their new routes. In all these cases, however, the muscle was detached at one end only.

In 1955 Schottstaedt and his colleagues[1] showed that more or less of some muscles could be moved bodily from one place to another while still retaining their normal neural and vascular pedicle—the counterpart and forerunner of the neurovascular island flap. Others have confirmed the practicability of such transpositions.[2–4] In the simplicity of the concept Seddon's contribution to the treatment of Volkmann's ischaemic contracture by excision of the infarct[5] was a brilliant application of the well-known principle that no transferred muscle should be expected to correct deformity in the presence of contracture.

Once it became possible successfully to anastomose blood vessels 1 mm or less in diameter and to repair comparably small neural bundles it also became possible to use an island flap of skin[6] or muscle[7] as a free graft with neurovascular anastomosis. Tamai and his colleagues[7] showed that the rectus femoris muscle of dogs could be autotransplanted and achieved success in almost 30 out of 40 operations.

It seems to have been left to unnamed Chinese surgeons in the research laboratory for replantation of severed limbs in Shanghai to combine all these technical and conceptual advances. They have replaced ischaemic and contracted flexor muscles in one patient's forearm by a free graft of part of pectoralis major with anastomosis of its nerves and blood vessels to those in the forearm.[8] Six months later there was evidence of functional reinnervation of the muscle, and a year after the operation the range of flexion of the fingers was such that their tips could be brought from 10 to 2·5 cm from the palm. The patient resumed work as a welder.

Though in this single case the functional value of the transplanted muscle is by no means clear, any shortcomings may owe something to the fact that the infarct was a year old. Seddon[5] pointed out the advantage of removing the infarct within a few weeks of its occurrence and thereby diminishing the amount of scarring and its effects on nearby nerves and muscle. Nevertheless, the feasibility of the operation in man has been confirmed. It is now up to those with the necessary technical resources and manual skill to explore the possibilities of this exciting application of existing methods.

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The community physician of the future

Young medical graduates are showing increasing interest in a career in the new specialty of community medicine: there are 63 registrars in post, and an intake of 30 more each year will probably be needed to fill existing and planned consultant-grade vacancies in England and Wales.

The higher qualification expected of future community physicians is the membership of the Faculty of Community Medicine. The first part is obtained by an examination in epidemiology, statistics, social policy, the social sciences, and the principles of administration and management in relation to health and social services; the second part is by thesis together with a viva designed to test the ability of the candidate to apply the content of the basic subjects to practical problems. A pass in the first part of the examination is recognised by the Joint Committee on Higher Medical Training as the level for entry to the grade of higher specialist training (senior registrar) in community medicine.

In England the London School of Hygiene, and Manchester, Liverpool, and Nottingham universities, all offer courses of basic training in community medicine associated with a post-graduate qualification. These courses are either full time or part time. The Liverpool course lasts one year and the others extend over two. Many of the doctors attending are employed by health authorities as registrars in community medicine and are seconded to the courses; others are overseas doctors seeking to prepare themselves for analogous work in their own countries.

Doctors in Britain aspiring to become community physicians may also obtain their training through one of three consortium schemes, covering the four Thames regions and East Anglia; the north of England and Northern Ireland; and the Midlands and South-western scheme, which also covers Wales. Each of these schemes provides two years' training, during which trainees are appointed registrars by one of the regional authorities concerned. During the two years trainees receive 20 weeks

of academic teaching provided in modules of two or three weeks by the contributing university departments of social and community medicine; between modules they take part in the work of the region, area, district, or academic department to which they are attached in such a way as to gain the widest possible experience of the specialty. There is, however, no obligation for trainees in community medicine to follow either of these patterns of early specialist training, and a few may successfully prepare themselves for the first part of the membership examination without full-time academic help of this type.

Nevertheless, the university courses, and in particular the MSc courses at the London School of Hygiene and Manchester University, already have great experience in training community pnysicians. The new university and consortium schemes are now beginning to overcome their teething problems and should soon be making their contribution. A broad indication of the content of training and experience during the three years of higher specialist training (senior registrar) is set out in the second report of the Joint Committee on Higher Medical Training. Senior registrar posts in two regions in England have now been approved by the JCHMT, and a number of other applications are being considered.

Though experience is still short, it seems that doctors who have fulfilled only the minimum requirement of the Faculty of Community Medicine of one year's postregistration clinical experience before entering early specialist training may be at a disadvantage compared with those who have spent a longer time in clinical posts. A period in general practice seems valuable, as does possession of some proof of ability through a higher qualification such as MRCP or MRCGP.

Awareness during anaesthesia

Thirty-four years after the introduction of curare into clinical anaesthesia reports of patients being awake yet paralysed during surgery continue to appear. The principal occasions when consciousness may supervene are associated with those procedures which demand a very light level of general anaesthesia.

For example, during general anaesthesia for obstetric delivery any drug which depresses maternal respiration or circulation may have an adverse effect on fetal mortality. However, a technique using unsupplemented nitrous oxide and oxygen and paralysis for the maintenance of anaesthesia has produced[1] an incidence of some degree of awareness as high as 25%, and the use of premedicants with amnesic properties, such as hyoscine, makes little difference. Subsequently, the addition of low concentrations of volatile anaesthetic agents has decreased this incidence. Moir[2] used light halothane anaesthesia and paralysis and claimed that this abolished awareness yet led to an improvement of the status of the infant at birth. On the other hand, Crawford[3] reported an incidence of awareness of 6·25% using trichlorethylene and 1·85% with methoxyflurane. Clearly the combination of nitrous oxide and oxygen alone is insufficient to produce the desired level of unconsciousness in obstetric patients, and if general anaesthesia is required it must be supplemented by some additional agent (volatile or intravenous) capable of producing unconsciousness with minimal effects on the fetus. Fortunately, the increasing popularity of epidural anaesthesia has lessened the size of the problem.

Cardiopulmonary bypass operations present a similar challenge for the anaesthetist. Most anaesthetic agents depress myocardial activity in proportion to the dose. In many instances the oxygenator may alter the plasma concentration of the anaesthetic agent quite rapidly, especially if volatile agents are used. Some patients have been reported to suffer severe anxiety states with repeated nightmares in the days after their operation.[4] Recently Blacher[5] in the United States has described a traumatic neurotic syndrome in these patients characterised by nightmares, irritability, and preoccupation with death. Four out of five of the patients described had recently undergone cardiac surgery. Blacher stressed that the patients were unsure if they really had been awake during surgery and were relieved of their symptoms when their suspicions were confirmed. Again this unacceptable incidence of awareness can be eliminated only by using either intravenous agents to supplement anaesthesia or by improving the efficiency of the control of anaesthetic vapours in the oxygenator.

Other instances of awareness are fortunately sporadic and are usually due to faulty technique such as the nitrous oxide cylinder running out in the very lightly anaesthetised patient. Clearly it would be helpful to anaesthetists if a simple and reliable apparatus were available to detect the presence of awareness; but the interpretation of electroencephalography and of sensory-evoked cortical responses has proved unreliable, even in expert hands.[6] Observation of the well-known clinical signs of anaesthesia which has become too light has also proved unsatisfactory, for the reflex phenomena on which the signs rely can be abolished by agents without any anaesthetic potency.

The benefits to the patient of light anaesthesia in combination with the muscle relaxants are undisputed, but the anaesthetist bears a moral responsibility to the patient to ensure that awareness does not occur. Until some simple and suitable monitoring apparatus is available this problem can be eliminated only by very careful attention to technique.

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Chemotherapeutic routes in meningitis

To a great extent the ease with which meningitis may be treated depends on the route by which the selected antibiotic has to be administered. Intravenous or intramuscular injection is the choice for benzyl-penicillin and ampicillin, since these reach adequate concentrations in the cerebrospinal fluid when the meninges are acutely inflamed. Relapse may, however, occur as inflammation subsides in *Haemophilus influenzae* infections treated with ampicillin, with the paradoxical result that clinical improvement may demand increased dosage or even a change of treatment. When the antibiotic indicated is chloramphenicol the problem is at its simplest, since this drug attains higher concentrations in the cerebrospinal fluid relative to those in