extremely cautious in the use of the method. Public feeling is becoming more antagonistic, if for no other reason than the high incidence of headache after spinal analgesia. Nevertheless, the method is still widely used, particularly in those departments where the surgeons command much influence. Its advocates quote the recent study of Dripps and Vandam⁸: emanating as it does from a great school, this undoubtedly deserves close examination. Amethocaine and procaine are the drugs most commonly used, whilst lignocaine is probably the most popular drug for epidural, caudal, and nerve-block procedures. Therapeutic nerve-blocking is commonly practised. While certain centres have an international reputation in this field, it is also regarded as an important aspect of the work of the anaesthetist in private practice.

Cyclopropane has many adherents in different parts of the country. It is, however, much feared as an explosive agent, and the increasing surgical demands for diathermy act as a deterrent to its use. Trichlorethylene is little used, the reason possibly being that premedication is light by English standards, often consisting of only a small dose of a barbiturate with hyoscine or atropine. The lack of basal analgesia renders the subsequent attainment of a satisfactory level of analgesia with trichlorethylene more difficult. A further deterrent to its use is the close similarity of its actions on the myocardium to those of chloroform, a drug which has never attained great popularity in the States. Ethyl chloride is also banned from many clinics because of the tendency to produce cardiac arrest in children. Vinyl ether is the drug chiefly used before open drop ether.

A recent paper⁹ has cast grave doubts on the comparative safety of the relaxants when used under present American conditions. Many surgeons seem to have been influenced by the Bostonian pronouncements and have enjoined great caution in the use of these drugs. A critique of the paper has recently been published¹⁰; but, until a suitably controlled study has been undertaken, further controversy will only deepen emotions and will not clarify the issue. It is not insignificant, however, that many of the centres taking part in the study still enthusiastically teach the use of relaxants to their residents.

Oxygen therapy forms an important aspect of the work in an American department. Usually it is supervised by one of the staff with the assistance of residents in training and of technicians. There are many types of apparatus on the market for administering high concentrations of oxygen, for assisting coughing, and for resuscitation. Many hospitals have oxygen piped throughout the hospital from a liquid oxygen tank. Besides the saving in man-power required for hauling cylinders, the basic cost of the gas is reduced to about a third. Humidifiers of various types are almost the rule, and proprietary mucolytic detergents are often added to break down crusts in the bronchial tree.

Research

A word must be said about research. Most departments in their early years adhered to Waters's dictum of clinical anaesthesia first, teaching second, and research third and last. However, many departments now boast very generous research facilities. There is still an acute shortage of trained research workers, though many have migrated from such associated fields as pharmacology, biochemistry, and physiology. Residents are encouraged to take an active interest in research programmes as part of their training. In some centres, indeed, they may spend an extra year on a research project. Local and national meetings have special sessions for the presentation of this work. As a training in critical analysis and as an insight into research methods these activities are invaluable.

Conclusion

To sum up: one may say that the anaesthetist in America is still fighting an uphill battle for recognition. He has little say in the clinical management of patients, and in

some cases is not allowed to advise on the premedication or even the choice of anaesthetic which the surgeon orders him to administer. As a result the general standard of clinical anaesthesia is probably lower than in this country. But the theoretical teaching in the best centres is of a distinctly high standard, and, combined with the research undertaken in these centres, is doing much to achieve recognition for the younger generation of anaesthetists. The present intense interest in progress is reflected in the vast attendances at congresses and at the meetings of the many thriving local societies. Such enthusiasm for the subject, when disciplined by a training in critical thought, can lead to great strides being made in the future. Until anaesthesia follows the lead given by other branches of medicine and develops methods of measurement of comparable accuracy, it will not reach full maturity. It is in the attempt to produce such methods that America is ahead of us. The utilization of such methods on a clinical scale will surely eventually replace the meagre clinical signs upon which we at present rely.

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Medical Memoranda

Rupture of Rectus Abdominis in Tetanus

Actual case reports on rupture of the rectus abdominis muscle caused by tetanic spasm are difficult to find. A search through the library of the Royal Society of Medicine discloses several oblique references to the degenerative changes produced in muscle by infectious diseases, including tetanus, but no recorded case of rupture of this muscle as such could be discovered more recent than 1829. In that year Baron Larrey reported a case which had occurred in a soldier from a line regiment wounded by gunshot in the right hip. Treatment had consisted in plunging the patient into cold baths. His spasms became worse, and subterfuge and force were required to immerse him. Suddenly the patient developed a swelling like a hen's egg close to the white line above the umbilicus. The rigidity of tetanus was present in all the muscles at necropsy. The swelling was due to a blood clot between portions of the right rectus abdominis, which was ruptured through the whole thickness of the muscle.

CASE REPORT

A man aged 62 was sent to the County Infirmary, Louth, on June 14, 1955, as a suspected case of acute appendicitis. His illness began three days previously with pain on deglutition and in the jaws, with slight lower abdominal pain. The symptoms grew worse, particularly the abdominal pain on the day before admission. On the day of admission he had suffered from severe colicky abdominal pain accentuated in spasms which caused him to roll about. The pain was principally in the suprapubic region and did not radiate to the back. There had been no vomiting, nausea, or anorexia. He had had no bowel action or (he said) passage of flatus during three days. Later, after admission, he said the pain on swallowing and in the jaws had gone.

About 10 days before admission the patient, who is a blacksmith, had struck the ring-finger of the left hand with a hammer.

On examination tetanus was borne in mind because of the history of dysphagia and pain in the jaws. The patient's

features appeared in a fixed grimace suggestive of risus sardonicus. The nail of the left ring-finger was black. The abdomen was very tender and rigid, particularly below the umbilicus. The maximum tenderness was in the left iliac fossa. The patient was more comfortable sitting up than lying down. The abdominal rigidity was tonic in character. The liver dullness was not lost, rectal examination was negative, and at this time there were no tetanic spasms. No lump was palpable in the abdominal wall. The abdominal rigidity was hard and of the kind found in cases of perforated viscera.

Operation.—Under general anaesthesia (Dr. Kalappa) the abdomen was opened on the rather diffident diagnosis of a leaking diverticular abscess. A lower right paramedian incision was made and oedema and discoloration of the rectus sheath were seen. When the rectus sheath was incised blood clot was encountered and a 2-in. (5-cm.) gap involving three-quarters of the width of the right rectus was found. The blood came from the torn right inferior epigastric artery. The findings revived the diagnosis of tetanus, and 100,000 units of serum was at once given, half intravenously and half intramuscularly. The nail was removed from the left ring-finger by an assistant. The peritoneal cavity was opened. Nothing abnormal was found in the abdomen; the appendix was removed, and the abdomen was closed without any attempt to suture the ruptured muscle belly.

On return to the ward the patient had a laryngeal spasm which passed off. Later in the day he had typical tetanic spasms affecting many parts of the body and causing opisthotonos and twitchings (Mr. D. Wightman).

Later in the day the left index finger was amputated under a local analgesic. The finger was sent for bacteriological examination, but in error it had been already placed in formalin and so no positive result for tetanus could be expected. Histological examination of the finger showed a small area of chronic infection in the skin (Dr. F. Hampson).

On the next day he was much better and the spasms ceased. He had no serum beyond the 100,000 units given in the theatre; he had from time to time doses of paraldehyde or "omnophon," and a course of penicillin was maintained for 12 days. Serum calcium was 10.3 mg. per 100 ml.

He continued to full recovery. No weakness arose in the torn rectus abdominis. He was discharged from hospital on the fifteenth day, and after a course of rehabilitation he was finally discharged from follow-up on August 16.

COMMENT

After recovery it was observed that the patient wore something of a grin as part of his normal expression. It was difficult to be sure after the lapse of time whether any actual risus from tetanic contraction had ever been superimposed on his normal expression.

At the first examination one might have attached more significance to the relief obtained by the patient on sitting up. In that position the recti would tend towards relaxation and less pain. More pain would have resulted from diverticular abscess.

When the patient was seen at home by Dr. J. P. Collinson the maximum pain and tenderness were in the right iliac fossa. On admission the maximum pain and tenderness were in the left iliac fossa. It is thought that the rupture of the right rectus took place on the way to hospital. It is reasonable to think that the muscle after rupture would be under less tension than before, whereas the unruptured left rectus would be under greater tension and so be more painful and tender.

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Assessment of a New Haemagglutination Test for Rheumatoid Arthritis

An accurate test has long been sought for the diagnosis of early rheumatoid arthritis. The Rose differential sheep-cell agglutination test discovers only approximately 75% of known cases and is accompanied by approximately 10% false-positive results. An increased sensitivity with fewer false-positive reactions has been reported by Ziff *et al.* (1954).

Serum from the suspected case was inactivated at 56° C. for half an hour to remove complement. Two separate absorptions at 37° C. each for one hour were then carried out with unsensitized sheep cells to remove heterophil antibody. The euglobulin in the serum was then precipitated by dialysis at pH 6 at 4° C. for two days, and this fraction titrated against sheep cells sensitized with haemolytic immune body to the last tube showing naked-eye agglutination.

Recently, in an attempt to assess the increased efficiency of this modification, tests were made of 23 normal sera and sera from 27 cases of rheumatoid arthritis being treated in the physical medicine department of the London Hospital. All these patients had classical symptoms of long duration, but, clinically, were still active. In each case the methods used were the standard test of Rose *et al.* (1948) and the modified test of Ziff *et al.*

The results are shown in Tables I, II, and III. As will be seen, in the cases where the diagnosis is clinically without doubt the difference in the tests is negligible. The main improvement appears to be a reduction in the number of

TABLE I.—Overall Results

	Rose Test	Modified Test
Correct results	36 (72%)	40 (80%)
False positive	6 (12%)	1 (2%)
„ negative	8 (16%)	9 (18%)

TABLE II.—Known Rheumatoid Arthritis (27 cases)

	Rose Test	Modified Test
Correct results	19	18
False negative	8	9

TABLE III.—Normal Cases (23 cases)

	Rose Test	Modified Test
Correct results	17	22
False positive	6	1

false positives. These latter figures agree with those published by Ziff *et al.*, who reduced the percentage of false positives from 13 to 2. However, the modified form has rendered this test far more complex and outside the scope of the average routine clinical laboratory. A result with the new test takes approximately three to four days to produce, whereas with the original examination a result can be given the following day.

From our results in a small series of cases we feel that the improvement in accuracy is not commensurate with the increased complexity of carrying out the test.

We did not carry out the second stage of Ziff's test—that is, the test for inhibition, by the euglobulin fraction, of the agglutinating titre of serum from a known case of rheumatoid arthritis.

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