for the sake of simplicity, doubtful reactions were recorded as negative.)

Considering Tables I and II together, there is no doubt that the Schick test performed one hour before an intramuscular injection of diphtheria antitoxin, though subject to some extent to the nullifying influence of the injected antitoxin, yet possesses a high degree of reliability. It is further suggested that the test carried out two hours before the intramuscular injection of antitoxin is more reliable still, and can be accepted for practical purposes as giving a true index of the patient's state of immunity at the time the test was performed.

Cases Receiving Intravenous Serum

Fourteen patients who were considered to be proven cases of diphtheria were each Schick-tested twice, the first test one hour before, and the second immediately before, an intravenous injection of antidiphtheritic serum. Their Schick reactions are shown in Table III.

TABLE III

Time Elapsing between Schick Test and Intravenous Injection of Diphtheria Antitoxin	Number of Tests Made	Result of Test		% +
		+	-	
0 hours	14	1	13	7.14
1 hour	14	10	4	71.43

A comparison between Tables I and III reveals that the proportion of positive reactions to the test immediately before intramuscular antitoxin is about twelve times as great as the corresponding proportion in the intravenous series. The results of the tests made one hour before giving antitoxin show a similar but less striking difference. Tables I and III, therefore, illustrate in human beings the same principles which Glenny and Hopkins established in guinea-pigs in connexion with the length of time the antitoxin was delayed after carrying out the Schick test and with the route by which the antitoxin was given. There was no evidence, in the cases used in this work, that the inhibition of a positive Schick reaction depended on the number of units of antitoxin given. There was not, however, very much variation in the size of dose employed, the number of "inhibited" reactions was small, and there was considerable variation in the age and weight of the patients.

Conclusions

1. It is suggested that two hours is a sufficient interval in which to delay an intramuscular injection of antidiphtheritic serum after making a Schick test in order to get a reliable result to that test.
2. It has been demonstrated that antidiphtheritic serum is much more efficient in inhibiting a positive Schick reaction when introduced by the intravenous route than by the intramuscular.

I wish to express my thanks to Dr. A. Joe, medical superintendent of the North-Western Hospital, Hampstead, for suggesting the subject of this work, and for much helpful advice.

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The verbatim report of the twentieth annual conference of the National Association for the Prevention of Tuberculosis, held in London in June, 1934, is now published, and copies (7s. 6d., post free) may be obtained on application to the Association at Tavistock House North, Tavistock Square, London, W.C.1.

A CASE OF EVIPAN PARALYSIS

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The following case is one of widespread paralysis following the use of evipan for general anaesthesia with no pre-medication, and as we can find no similar case in the literature we think it may be worth recording.

A Chinese patient, aged 29, was admitted to the Johore Bahru General Hospital on February 5th, 1934, complaining of swelling, redness, and pain in the region of the left knee-joint of four days' duration. The surface appearance suggested a cellulocutaneous erysipelas. On February 8th operation was decided upon, and performed under evipan anaesthesia. The one gram of evipan in the usual stock ampoule was dissolved in the 10.5 c.cm. of distilled water in the other stock ampoule. Nine c.cm. of this solution was given intravenously at 11 a.m. very slowly, stopping for a few seconds after every 1/2 c.cm. and taking six minutes to introduce the total 9 c.cm. The patient began to yawn after 2 1/2 c.cm., and to snore after 4 c.cm. The operation was started at 11.10 a.m. and lasted seventeen minutes. An incision five inches long was made on the outer side of the left thigh, and a large abscess cavity was opened, evacuated of all pus, and irrigated; the abscess was found not to communicate with the knee-joint.

After the operation the patient was breathing normally and moving his eyeballs, but he did not recover full consciousness till 10.30 o'clock that night. During this long interval he made movements of the eyes, face, and limbs, and swallowing movements. His pulse was rapid (140), but had been nearly as fast before operation (134). An injection of strychnine 1/30 grain was given at 3 p.m. that day, and oxygen was then administered for half an hour because he was so long unconscious; coramine, as recommended by the manufacturers, was not available. At 10.30 p.m. he at last began to answer questions, and warm drinks were given. He was fully conscious next morning.

It was not until February 17th that the assistant surgeon in charge of the case noticed there was severe paralysis. The patient had in the meantime been gravely ill owing to his septic condition, and had not himself called attention to his paralysis; when questioned, he stated that it had been gradually coming on since the date of his operation, but had not been present before. On detailed examination there was flaccid paralysis of the trunk, so that the patient could not move himself in bed, of both lower limbs, and of the distal portion of the upper limbs. There was bilateral ankle-drop and wrist-drop. The knee-jerks, ankle-jerks, and biceps-jerks were absent; the plantar responses were flexor, and abdominal cutaneous reflexes present. There was no loss of control of the sphincters. Sensibility to touch and pain was diminished below the knees, but not affected in the upper limbs. Kahn test of the blood and of the cerebro-spinal fluid was negative.

General wasting of many muscles followed, with consequent loss of weight; by April the weight was down to 89 lb., but, unfortunately, it had not been taken earlier. On June 23rd, when recovery was almost complete, it was 100 lb. The septic condition of the leg gradually cleared up, although for several days after the operation it was spreading; the wound was healed by the middle of April, and all inflammation had then disappeared. There had been considerable pyrexia before the operation, but there was none after, except a temperature of 100° F. on the day following and a rise to a 100° on March 9th and 10th, which yielded at once to quinine. High fever occurred on April 22nd, with painful enlarged spleen and the appearance of blood and mucus in the stools; this subsided with quinine treatment in a week, and was probably malarial, though no parasites were found in the blood; there were no causative organisms in the stools.

For the paralysis the patient received massage, rhythmically interrupted sinusoidal current, and a general tonic of iron and strychnine; flexion and extension of wrists and feet

against resistance; and application of simple apparatus to prevent contractures. The paralysis gradually improved, and he was able to sit up by early April, and to walk slowly by the middle of May. By the middle of June his power was practically normal and his sensation tests also, but his tendon reflexes were still negative, and he still had very slight left-sided foot-drop.

Commentary

The manufacturers claim that no serious late consequences of evipan administration have been recorded, and in truth we have seen none in the literature we have consulted, though we have noticed one or two cases of early, though evanescent, toxic effects. The manufacturers quote authorities such as Ernst,¹ Specht,² and a committee of the Medical Research Council in London as warm advocates of evipan; Holtermann and Baetzer³ declare it to be safe; Jarman and Abel⁴ consider that the full dose is safe, though they mention low blood pressure as a contraindication. The patient in our case was admittedly very ill and emaciated before operation, but it is in just such cases that the manufacturers recommend full doses.

Willcox and others⁵ report peripheral neuritis as one of the late toxic manifestations of the barbiturates, of which evipan is one, the chemical formula being *n*-methyl-C-cyclo-hexenyl-methyl barbituric acid; Willcox mentions toxic states as greatly enhancing the susceptibility of patients to the barbiturates, and this appears to be borne out by our case.

The patient was demonstrated at a meeting of the Southern Division of the Malaya Branch of the British Medical Association on April 26th, 1934, and it was suggested that the case was one of acute beri-beri, but the prolonged unconsciousness after the injection and the great loss of power in the trunk muscles were against such an explanation. We think it was an undoubted case of late paralysis due to evipan administration, and that the lesson to be learnt is that great caution needs to be taken regarding dosage in patients already toxic.

We are indebted to the Acting Principal Medical Officer, Johore, for permission to publish this case.

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- ³ Holtermann and Baetzer: *Deut. med. Woch.*, 1933, No. 2, and *Lancet*, 1933, i, 648.
- ⁴ Jarman and Abel: *Lancet*, 1934, i, 511.
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Two intensive post-graduate courses have been arranged by the American Medical Association of Vienna for the six weeks beginning February 18th, 1935. These courses will provide a general survey of the newest methods and principles in the fields of gynaecology and obstetrics and of ear, nose, and throat, approximately 150 hours of lectures and clinical instruction being devoted to each of these specialties. The cost of the entire course, inclusive of life membership fee to the association, will be 900 Austrian schillings (about S. 5.20 for one dollar or S. 2.615 for £1). This is to be paid in the form of two instalments, the first of which, 200 schillings, should accompany registration, and the balance paid upon beginning the work. Applications must reach Vienna not later than January 1st, and if the minimum number of six physicians is not reached by January 15th the registering members will be notified and their deposits returned. Intensive courses of like nature and at the same cost may be arranged at any time for a minimum of seven participants in any of the specialties. All instruction is in the English language, and given by leading Viennese teachers. Further information may be had from the American Medical Association of Vienna, Alserstrasse 9, Vienna, Austria.

Clinical Memoranda

GLUCOSE-INSULIN THERAPY AND VASOVAGAL ATTACKS

The syncopal attacks described by Sir William Gowers and called by him "vasovagal" have the following signs and symptoms. The attacks begin suddenly with a sense of oppression in the stomach or chest and difficulty in breathing. There is usually precordial pain—acute in some cases, a discomfort only in others—and accompanying this is a sensation of impending death "so intense that no recollection of its falsity in preceding attacks prevents the conviction of its present reality." There is no impairment of consciousness, but often a slowing of the mental processes. The vasomotor disturbance shows itself by symmetrical coldness of the extremities, tingling, and numbness. The pulse becomes small and may be almost impalpable, and the blood pressure falls. Shivering is common, and may amount to a definite rigor. All these symptoms were present in the following case.

CASE RECORD

The patient, a woman of 58, had suffered from constant attacks of asthma for eight years, for which she had been treated in a variety of ways. In October, 1933, her myocardial condition seemed poor, and her blood pressure was low, though an electrocardiogram and a radiogram of the chest showed no signs of abnormality. She was exceedingly thin, and with a view to improving the general and myocardial nutrition ten units of insulin with two tablespoonfuls of glucose was given twice a day, as considerable improvement by this means of treatment in heart diseases has been reported from various sources (notably by Shirley Smith, *British Medical Journal*, April 22nd, 1933).

A very marked improvement in the incidence of the asthmatic attacks occurred, until in a short time she was entirely free from asthma. After a fortnight's freedom from symptoms she suddenly had a typical vasovagal attack, which within a few days was followed by a succession of such attacks, occurring so frequently that her life was despaired of. It was decided to discontinue the insulin-glucose treatment, and four-hourly injections of atropine 1/120 grain were substituted, and oxygen and adrenaline given at the times of the actual attacks. Within thirty-six hours of the commencement of these measures the syncopal attacks ceased, and she has not had one since, but the asthma promptly returned.

DISCUSSION

As, presumably, some disturbance of the sugar metabolism was the starting-point of these attacks, as soon as the patient was sufficiently recovered blood sugar estimations were done, and it was found that she had a permanently low concentration of sugar in the blood, the highest point to which it rose after a carbohydrate meal being 0.89 mg. per 100 c.cm.

Dr. Cammidge, in an article in the *British Medical Journal* of May 3rd, 1930, drew attention to the existence of chronic hypoglycaemia, not as a rare curiosity, but as a state of frequent practical importance, and in four of the cases to which he referred convulsive attacks occurred which were preventable by glucose administration.

In the case in question large doses of glucose (without insulin), together with 5-minim doses of the tincture of belladonna three times a day, have, to all appearances, prevented any further vasovagal attacks and checked the asthma. As in the previous eight years of this patient's history neither belladonna nor any other treatment attempted had had any effect on her asthma, and as she had had no vasovagal attacks before the insulin was given, the case seems to have a definite bearing on the problem of the relation of Gowers's syndrome to asthma and of both to hypoglycaemia, and appears to show that there may be some connexion between these conditions.