and maintain weight on a surprisingly low calorie intake. This seemed to apply specially to the elderly "hepatic" type, several of whom were able to do their housework on a diet barely sufficient—on the Aub Dubois standard—for their basal metabolic requirements. Not all the elderly cases were subjected to the full dietary régime. In some cases "restriction of bread and potato" was considered sufficient, and in one or two no dietary regulation was imposed.

Insulin.

The use of insulin in the clinic had to be modified by the two considerations of safety and expense. With regard to the first, it is obvious that some few of the patients attending such a clinic as this are quite unfitted to be allowed to administer insulin to themselves, except in cases of absolute necessity. This difficulty was in one or two cases obviated by having the injections given by the patient's own doctor, but this plan is obviously unsatisfactory, and, in general, patients of this type were treated on dietetic lines alone. The expense of insulin therapy was a bar to its use in many cases. Patients who were insured persons were, of course, able to obtain supplies free, but in other cases the supply had often to be limited, or its use entirely discontinued on the grounds of expense. Only in exceptional cases did the hospital supply insulin free of charge.

Subject to these limitations insulin was used freely. Its use was never commenced in the clinic itself, patients being always admitted to the ward if it was considered necessary. Before discharge to the clinic again, patients were made to give their own injections, and thoroughly educated in the use of the syringe, and it was surprising what unpromising patients could be educated to the routine by tactful ward sisters. No trouble was experienced with the injections. The hospital supplied syringes and needles at cost price, and issued spirit for sterilizing as required.

Dosage varied from 6 to 80 units daily, given in two doses before the two principal meals. There were no serious cases of hypoglycaemia. Patients were fully warned of the danger of the condition, and told to carry lumps of sugar in case of accident. Mild hypoglycaemic reactions, lasting a few minutes only, occurred in several patients from time to time, and were considered to be of good prognostic significance. The patients knew what was happening to them, and allowed the reaction to go on to the stage of acute discomfort, if necessary, before taking sugar. It was found that in these cases the insulin dose could be gradually reduced, being kept at each lower level in turn, till the patient complained again of hypoglycaemic reaction, before again reducing the dose (one case reduced from 40 to 8 units daily).

In Table II are given the results of insulin therapy, the standard of increased pancreatic function being reduction of insulin dosage without detriment to the blood sugar. The lack of improvement in cases in Groups II and III is probably due to the fact that no serious attempt was made to bring their blood sugar to normal, consequently "pancreatic rest" was never obtained. Of the two patients in Group I whose pancreatic function decreased, one has a surgical affection—probably tubercle—of the kidney, for which he is being admitted for surgical investigation, etc.; the other is a woman who has several times been convicted of dietary "sprees."

TABLE II.—Results of Insulin Therapy.

Group.	Number Taking Insulin.	Pancreatic Function.			Weight.		
		Increased.	Maintained.	Decreased.	Gained.	Maintained.	Lost.
I.	16	7	7	2	11	3	2
II.	1	0	1	0	1	0	0
III.	3	0	3	0	1	2	0

Conclusions.

The results of the first year's working of the clinic were considered good, and showed a marked improvement over the results obtained for the period during which such cases were treated in the general out-patient department. The

credit for this seems to be due to careful supervision acting partly as a check on the dietary régime, etc., and partly as an early warning of any trouble commencing.

The diet employed seems to have had a good effect, and its simplicity and palatability are probably largely responsible for the small number of failures to adhere to it.

Of the 44 cases in Groups I, II, and III dealt with in Table I, two—both diabetes mellitus—refused treatment after a week or so. The remaining 42 are dealt with in Table III.

TABLE III.

Group.	Improved.	Condition Maintained.	Worse.
I.	8	7	3
II.	2	11	1
III.	1	7	2

The standards by which progress has been judged in this table are: weight and blood sugar level, and in insulin cases decreased dosage required. No case has been considered "improved" or "maintained" unless the blood sugar was lowered or remained at its original level respectively. The larger number of good results in Group I is greatly due to the fact that in Groups II and III we were satisfied with maintenance of weight and blood sugar level, whilst in Group I we were much more strict, and made every effort to keep the blood sugar down and to recover pancreatic function. Of the three cases in this group who had deteriorated at the time of review, two had been convicted of dietary indiscretions on a large scale, whilst the third is the renal subject referred to in a previous paragraph.

The method of handling these cases described needed no extra staff and no elaborate biochemical work, whilst the results obtained seemed more than to compensate for the extra trouble involved. It is hoped next year to improve the department in several respects, notably in the earlier and more complete investigation of cases in Groups II and III.

My thanks are due to the honorary physicians of this hospital for allowing me to treat these cases, and for the courtesy and kindness I have always received from them; also to Dr. W. B. Roantree, late house-physician to this hospital, for his efficient and enthusiastic help.

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A SEVERE CASE OF HYPOGLYCAEMIA.

BY

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HYPOGLYCAEMIA is almost always preceded for a short period by highly suggestive symptoms of its onset. The following case is an exception.

H. B., aged 16, was sent into hospital on February 1st, 1927. He had been ailing for a month with loss of appetite, thirst, and loss of weight. When seen by Dr. Sydney Scott on January 22nd he complained of a nasty taste, his tongue was dirty, and throat sore, but he looked well. On January 31st he complained greatly of thirst, and the urine was found to be full of sugar. Two days later he had changed greatly for the worse; he was much emaciated, somnolent, and had air-hunger. The house reeked with the smell of acetone.

On admission he was very drowsy, the tongue dry and furred, breath heavy with acetone, body extremely emaciated and shrunken, eyeballs very soft. The urine was loaded with sugar, diacetic acid, and acetone, and the reaction was very acid. Respiration was rapid and deep, the pulse rapid, small, and feeble; the temperature was subnormal. No septic focus could be found. The onset of coma seemed imminent.

He was given 40 units of insulin hypodermically, with 40 grams of glucose and 8 grams of sodium bicarbonate by the mouth. He drank copiously of water and black coffee. The bowels were moved by an enema.

He was given 20 units of insulin with glucose and bicarbonate every two hours for the next twenty hours—in all 240 units; the urine, examined every two hours, contained much sugar; frequent blood sugar estimations could not be made. His general condition was improving, respiration was less rapid, the pulse stronger, and he was less drowsy.

Insulin was increased to 30 units and given with glucose and bicarbonate every two hours for the next twelve hours; the urine

became alkaline and after thirty-two hours' treatment was free from sugar.

Insulin was then omitted for twelve hours, but sugar reappeared; after 10 units there was still much sugar, and 30 units were then given every two and a half hours for the next twelve hours, when he again became almost sugar-free; insulin was reduced to 20 units every two hours for the next twelve hours, when he became sugar-free. The insulin was again reduced to 10 units every two hours for the next sixteen hours; in the first eight hours there was a trace of sugar, but none in the last eight hours. The continuance of insulin so frequently after the disappearance of sugar was due to a misunderstanding. At the end of seventy-eight hours he had received 730 units of insulin with glucose. He was no longer drowsy, his pulse was good, and respirations were normal. He had taken some protein food and said he felt well.

On February 4th, seventy-eight hours after admission, he had been reading the paper when he suddenly began to "look strange"; the house-surgeon, Dr. Durden Smith, found him lying on his back, his colour good, eyes closed, and pulse full and slow; he did not answer nor show any sign of consciousness. Suddenly he uttered a long cry, the face twitched, and spasms began round the mouth, spreading to the other facial muscles; there was marked nystagmus to the right. The spasms spread to the arms and finally became general, ending in complete tonus and opisthotonos. He stopped breathing, frothed at the mouth, and became very blue; the tonus then relaxed, and the pulse became feeble. Artificial respiration was resorted to and maintained for ten minutes; 2 ounces of urine were drawn off and found to be sugar-free. A sterile solution of glucose (15 grams in 100 c.cm.) was run into the median basilic vein. After this he breathed naturally and spasm ceased. He was still deeply unconscious, and 15 grams more of glucose were run in. He regained consciousness rapidly, and, when asked how he was, replied that he was all right, as if surprised at the inquiry. No further convulsions occurred. He remembered nothing of these events and denied having any premonitory symptoms whatever. Sepsis developed in the arm.

This severe condition of hypoglycaemia and its treatment, combined with the sepsis, completely upset his sugar tolerance. It took a week's careful treatment to get his urine free from sugar and ketone bodies; 10 units of insulin had usually to be given every two hours, but sometimes 30. Eventually he went out of hospital sugar-free without insulin on a diet of 9 lines of Dr. Lawrence's "line ration" scheme, gaining weight and feeling well.

The chief points of interest in this case are:

The rapid progress of the disease in the last few days before his admission, with no discoverable cause.

The hypoglycaemia, due undoubtedly to the error in administering insulin in repeated doses for so long after the urine was sugar-free, followed with dramatic suddenness by convulsions, coma, and collapse.

The rapid and effective cure of this condition by the application at once of the correct treatment.

The difficulty of establishing sugar tolerance again, which was probably in large measure due to the sepsis.

The satisfactory condition of the patient when he left the hospital.

RUPTURE OF THE HEART:

AN ANALYSIS OF EIGHTEEN CASES.*

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EMOTIONAL strain, such as anger, sorrow, or disappointment, has been known to cause rupture of the heart, but a critical analysis of the following eighteen cases reduces the exciting cause to a more material basis, for, of the eighteen cases here presented, in only four could the exciting cause be called emotional.

The results of the following analyses are unexpected, for certainly the emotions of everyday life provide by far the greatest strains to which the cardio-vascular system is subjected.

Many years ago a man presented himself for treatment in the out-patient department of a hospital in London complaining of shortness of breath and pain in the chest on exertion. A physician, after a somewhat lengthy examination, electrified his audience by saying that he thought the man had an aneurysm of the left ventricle; this was long before the days of *x* rays. Treatment was

prescribed, and the man was leaving the hospital when at the front gate he suddenly collapsed. At the necropsy a tear in the left ventricle was found, secondary to a gummatous infiltration.

A male guinea-pig had been kept for some months in a small cage in a room by itself. One day an attendant placed the cage in another laboratory near a cage containing a female guinea-pig; the male appeared overcome by excitement, gave a chirp and fell over dead. The heart was found to have ruptured.

An old lady had a small dog, which she took for a walk. The dog strayed into the road, and the old lady became exceedingly worried, but finally rescued it. She felt faint and ill with excitement, but walked home; she complained of pain in her chest, went to bed, and declined any dinner. Next day she did not appear for breakfast, and was found lying dead on the floor. Her heart was found to have ruptured, and there were several tears in the ventricular wall, containing clot; she had apparently lived for some hours after the rupture.

A man who had spent the evening at his club, where he appeared to be in his usual health, went out into the cold air and started to walk home. He suddenly collapsed, became cold and pale, and practically pulseless. He was taken home, and his doctor, on arrival, thought the man was dying, and said that the case looked "like a ruptured extrauterine"; he considered the man so nearly dead that he did not think anything could be done for him. Next day, however, the man was much better, and steadily improved. On examination the cardiac dullness was found to be increased, the heart sounds were exceedingly feeble—almost inaudible—and the base of one lung was dull. The man admitted that he had had a cough for some days before, and had been short of breath. I came to the conclusion that he had an effusion into the pleura, and possibly into the pericardium. It was fully realized at the time that this theory of pleurisy did not explain the sudden collapse in the street, and the question of a ruptured aneurysm was considered. The pleura was tapped, and about a quart of blood-stained fluid was withdrawn; the heart sounds were still distant and the base of the lungs dull, but the man seemed easier. The following day the pleura was again full; the man, however, was improving, so nothing further was done. He appeared to progress for over a fortnight, when, on sitting up and attempting to sing, he fell back dead. He was found to have a small tear in the upper part of the left ventricle, close to the aorta; this had allowed blood to leak into the pericardium, and also into the pleura.

In this series of cases, encountered during a period of many years, there are points of special interest.

The first case shows the accuracy with which a diagnosis could be made by a careful, painstaking, and skilful physician.

The case (of the guinea-pig) appears particularly interesting because it suggests the possibility of the rupture of a healthy heart, at any rate in an animal out of condition and under a violent emotional strain.

The last two cases are of interest because they show that rupture may be associated with pain, and that it may be possible for people to live for a considerable time after an extensive rupture has actually occurred.

The following short histories, with the *post-mortem* findings, relate to a further series of fourteen cases with which we have come in contact.

A man, aged 75, had malaria in South Africa in 1903. One morning in January, 1924, he had breakfast in bed and slept afterwards. Shortly after noon he was found fully dressed lying dead on the floor. The heart weighed 17½ oz., and was soft, pale, and fatty. There was a tear 1½ in. long in the anterior wall of the left ventricle. The aorta was markedly atheromatous and the coronary arteries were calcified.

A woman, aged 74, gave a history of "heart trouble" for fifteen months. She had once "collapsed" while shopping, and about two months later she collapsed again and had to sit on the stairs all night (alone in the house). She was seen, apparently well, in bed one afternoon, but was found dead in bed the same night, lying in a natural position with the clothes undisturbed. The heart muscle was dotted with fibrous patches. At the apex of the right ventricle the wall was very thin and there was a deposit of *ante-mortem* clot. The wall had ruptured in this position. The coronary arteries were calcified.

A man, aged 71, previously in good health, contracted a cold and at times during the following three weeks suffered from giddiness without fainting, and from bronchitis during the last week. He had breakfast one morning, felt much better, and said he would go for a walk; while walking through the yard he staggered and fell. There was a heart tear in the posterior wall of the left ventricle. The coronaries were calcified and almost obliterated. The muscle was stippled with white patches.

A clerk, aged 59, who had been fairly healthy a few days before his death, complained of acute pains in the chest and back. On the day of his death he worked without complaint; about 5.30 p.m. he went to the lavatory and was found there dead about ten minutes later, huddled on floor, face downwards. The heart was not enlarged; there was a ragged tear in the anterior wall of

* A demonstration of specimens from this series of cases was given at the Annual Meeting at Nottingham on July 23rd, 1926.