TABLE I.

1. Gas-works tar.
2. Creosote oil.
3. Green oil.
4. Anthracene oil.
5. Pitch distillate.
6. Heated Californian petroleum.
7. Acetylene tar.
8. Yeast tar.
9. Muscle tar.
10. Cholesterol tar.
11. Hair tar.

If acetylene tar (No. 7) is saturated with chlorine, (a) the "Schroeter" bands are shifted about half-way towards the benzanthracene position, and (b) the carcinogenic power of the tar is very much lessened. In two comparable series of 70 mice the chlorinated tar produced 4 cancers and 4 papillomas, and the unchlorinated tar 21 cancers and 5 papillomas.

The following substances gave a diffuse spectrum covering very roughly the 4,000-4,400 region without differentiation into bands.

TABLE II.

1. Shale (blue) oil.
2. Pitch.
3. Gas-works tar (a sample made at 600°).
4. Spindle oil.
5. Refined lubricating oil.
6. Blast furnace tar.
7. Unheated Californian petroleum.

Of these, 1, 2, 3, and 4 are carcinogenic, and 5, 6, and 7 are not. The Californian petroleum, when heated to 880°, yields a strongly carcinogenic material (No. 6 in Table I). It is possible that in some or all of these cases the spectrum is confused by the presence of a number of fluorescent compounds.

The following materials gave the same spectrum as those in Table I, but have not produced cancer.

TABLE III.

1. Tetroyl propionic acid mother liquor.
2. Undistilled aluminium-chloride-treated tetralin.
3. Benzyl oleate (technical).
4. Oleic acid (technical).

Two possible explanations of this discrepancy may be suggested—namely (1) that the spectrum is given both by carcinogenic compounds and by allied compounds which are not carcinogenic, and (2) that the fluorescence test is a very much more delicate one than is the production of cancer in mice. Thus some hydrocarbons are fluorescent at dilutions of 1 in 200,000,000. One would not expect such solutions to affect the skin of a mouse. Twort has recorded papillomata in mice painted with oleic acid. Possibly heating of the oil in the process of manufacture is responsible for this effect.

Finally, to complete the list of exceptions, we must record one cancer produced by a non-fluorescent substance. One epithelioma occurred in 30 mice painted with commercial tetralin; we then painted 100 mice with pure tetralin, but obtained no more tumours.

The very frequent recurrence in cancer-producing agents of the fluorescent spectrum described suggests the possibility of the use of it for the preliminary examination of materials, such as lubricating oils, suspected of carcinogenic effect. The test on mice is, of course, necessary for conclusive proof.

All the spectroscopic work described here was carried out by I. Hieger under grants from the British Empire Cancer Campaign. We are indebted to Dr. E. de Barry Barnett for many specimens of pure hydrocarbons used for spectroscopic comparison, and to Dr. Alfred Piney for the accompanying photomicrographs.

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A CASE OF DIPHThERIAL ACUTE MYOCARDITIS STUDIED BY MEANS OF THE PORTABLE ELECTRO-CARDIOGRAPH.

BY

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In their paper in the *British Medical Journal* of January 18th, 1930, Dr. J. Strickland Goodall and Dr. T. Jenner Hoskin summarize the chief use of the electro-cardiograph as (1) diagnosis or cardio-analysis; (2) estimation of progress under treatment. The electro-cardiograms of the patient who is the subject of this short article were valuable, first, in establishing the diagnosis of acute myocarditis at a time when such could only be inferred from her symptoms in the absence of abnormal physical signs, and secondly, in giving a clear estimation of the condition of the myocardium as it became more severely affected, and then as it made a gradual but steady recovery from the acute inflammation.

The patient was a girl, aged 11, who was removed from the sanatorium of a boarding-school within the Brighton area, and was first electro-cardiographed on October 23rd, 1929, when I first saw her at the Brighton Borough Sanatorium in consultation with Dr. Graham-Bonnalie and Dr. C. Fraser Brockington, the resident medical officer. She was then in the twelfth day of diphtheria, and that morning had developed vomiting with precordial pain. So far as the circulatory system was concerned the only abnormality objectively was a low blood pressure (68/40 mm. of mercury). The cardiac borders and sounds were normal, and there was no interruption of rhythm. An electro-cardiogram, however,

which was taken by the Cambridge portable instrument, gave us proof of myocardial affection. All the complexes, auricular and ventricular alike, were of low voltage. The QRS waves were slurred, as well as stunted. The T wave in Leads I and II was shallow and inverted, while in Lead III the T was unidentifiable. The P waves, although small, were identifiable in all three leads, and the P-R interval was within normal limits. The heart's rate was 96.

She was electro-cardiographed again on November 8th, when she gave a record which is the most interesting of all. At that time there was clear evidence of an affected myocardium, the heart being dilated and rapid, with a canter rhythm; the blood pressure was still abnormally low, and particularly the pulse pressure:

but as this is one of a series of cases in which Dr. Brockington has made a careful study of the changes of the blood pressure, which he intends to publish, I do not propose to go further into that matter. The electro-cardiogram showed the myocarditis of the left ventricle to be so great that the patient had a right-sided preponderance. The initial ventricular complexes were so low in voltage that they measured a mere 2 mm., but the initial complex in Lead I was an S and in Lead III an R,

showing that for the time being the right ventricle was the predominating chamber. The T waves were much as before—in Leads I and II a very shallow inversion, and in Lead III hardly, if at all, identifiable.

On November 29th the electro-cardiogram had again changed. In Lead I the initial ventricular complex was a minute bizarre wave of the type met with in Lead III in a proportion of healthy subjects, but, in contrast to the previous record it contained both R and S elements. The T wave in that lead remained shallow and inverted. There was great alteration in the ventricular complexes in Leads II and III. Voltage had increased from 2 mm. to 11 mm., and there was a definite inverted T wave of ordinary type.

Further changes were noted in the electro-cardiogram of December 12th. In Lead I the small bizarre initial ventricular

complex did not descend at all below the iso-electrical level, being entirely of R type, and for the first time the T wave was easily identified as positive in character. In Lead II the T wave was less steeply inverted, while in Lead III it remained much the same.

On December 30th in Lead I there was a frank upward R wave of a voltage of 4 mm., but a wave which was slurred in its downward stroke; the T wave was still erect but its voltage had doubled. In Lead II for the first time the T wave was positive; but the T wave in Lead III remained inverted, and the curve in that lead was practically identical with that of eighteen days previously.

The patient made a clinical recovery, and a few days later left for Cornwall.

PROLAPSE OF THE RECTUM IN CHILDREN.

BY

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ONE cannot attend a children's hospital without being struck by the large number of children who suffer from prolapse of the rectum. No definite treatment is prescribed, and yet apparently these patients cease to return after some time; presumably there has been a spontaneous cure. On referring to the usual textbooks on this subject one finds first the instruction "remove the cause," and yet how seldom one finds a cause.

Etiology.

Constipation is blamed, and with it the straining at stool that is required to expel the solid motion. Diarrhoea has its advocates, on account of the irritation it produces. For a similar reason, worms, polyps, adenomata, and piles are responsible according to others; these, by producing a feeling of fullness in the rectum, would certainly tend to provoke a constant desire to defaecate. An invisible fissure and a symptomless pruritus are often blamed. When a possible cause cannot be found in the anal region recourse is made to some other part; a tight foreskin, a balanitis, or a pin-hole meatus is carefully looked for. Eventually it is said that the real cause is that there is a deficiency of fat in the ischio-rectal fossa, so that the rectum has lost its natural support. On this assumption the condition is similar to that obtained when the perinephric fat is diminished, so that as an analogy we might speak of the condition as a "movable or floating rectum."

The last so-called cause is probably the least likely of all. A close examination of a few of the cases will soon demonstrate that a prolapsus ani is not a prolapse of the anus, but at first of the mucous membrane through the anus. In the early cases the muscle wall of the rectum bears its normal relation to the ischio-rectal fat. Two definite changes exist in the average case: first, the anus is patulous—the examining finger can enter with ease and is not gripped by the sphincter as in a healthy case; and secondly, the mucous membrane has apparently lost its close grip upon the muscle wall, and instead of adhering is carried down with the motion.

Treatment.

As regards treatment, one first looks for a possible cause, and this in the majority of cases is non-existent. Many of the patients are fine, rosy-cheeked, sturdy children; they have regular bowels, have lost no fat recently, and are free from worms, polyps, etc. Having treated the mythical cause, something must be done for the child while he is actually at stool. In some cases the motion is passed in the squatting position, or on the side, and between times the buttocks are held together with strapping. Judging from the fact that patients thus treated stop attending eventually, we must conclude that this method is satisfactory and that in time a cure does result from it; but during that time considerable pain and discomfort must be endured.

I have written this short note with the object of advocating treatment by the injection of absolute alcohol. I have adopted this method in about fifty cases, and cure has followed in all of them. In nine cases out of ten this result has been brought about by one injection; in resistant cases a second injection has invariably been effective. The treatment is not new, but is, I think, insufficiently appre-

ciated; the technique is so simple and the result so good that it is worth trying. The injection of the alcohol stimulates the anus to contract and at the same time produces a fibrosis and adhesion between mucous membrane and muscle.

The procedure is as follows: Without any previous treatment to the bowel the patient is given a general anaesthetic and placed in the lithotomy position. The surgeon places his left index finger in the rectum, and using a 1 c.cm. glass syringe with a fine Record needle, $1\frac{1}{2}$ inches long, he passes the needle through the muco-cutaneous junction along the interval between the mucous membrane and the muscle coat. The injection is made as the needle is withdrawn. Four injections are given at one sitting—in front, at the back, and at each side—the total amount of alcohol used being 1 c.cm.—in other words, $\frac{1}{4}$ c.cm. at each of the four points. The operation can be completed in five minutes. The buttocks are then strapped for one day, and the bowels are opened in twenty-four to thirty-six hours. The advantages of this method are that the condition is cured immediately in 90 per cent. of the cases at one sitting, and although the discomfort is greater for twenty-four hours, there is not the summation of pain that the child would otherwise suffer.

In conclusion, prolapse of the rectum is a common and distressing complaint, spontaneously curable in most cases, but reacting readily to a simple minor operation which will save weeks and months of discomfort. A modified technique has been very successful in adults, using novocain instead of a general anaesthetic for the operation itself, and giving some 40 per cent. antipyrin to diminish after-pain.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

PATENT BRANCHIAL CLEFT.

(With Special Plate.)

THE case of W. R. C., aged 24 years, presenting a certain feature of interest, appears worth reporting.

This man presented himself with a sinus situated 1 inch above the sternal insertion of the right sterno-mastoid muscle and at its anterior border, which discharged a clear fluid. At the orifice were situated three minute hairs. On injection of the "sinus" with iodoform emulsion the patient complained of sickly sensations in his throat, when examination of the fauces revealed the emulsion lying in the right supra-tonsillar fossa. X-ray photographs confirmed the extent of the fistula. In the photographs there appear vague shadows at the level of the disc between the 5th and 6th cervical bodies, suggesting lateral prolongations from the main fistula. It has been impossible to confirm these.

It is significant that the man first became aware of his condition following a right-sided quinsy, when the "pimple" commenced to discharge what was then a yellow fluid.

ANTHONY H. G. JOHNS, M.A., M.B., B.Ch.,
F.R.C.S. Ed.

Penzance.

CONGENITAL DYSTROPHY OF THE NAILS.

(With Special Plate.)

As congenital dystrophy of the nails is comparatively uncommon I thought the following case should be placed on record.

A healthy girl, aged 16 years, was sent to see me with reference to the condition of her finger-nails. Her occupation was that of a domestic, and she said the condition had been present as long as she could remember, but recently the nails worried her by their look and interfered with her work. On examination there was a distinct horny ridge in the mid-line of the dorsum on the nail plates of the middle two digits of both hands, as well as a similar condition of the index finger of the left hand. At the bases of the affected nails the peri-ungual tissue was raised, but there was no sign of any tenderness. From