clearly of great importance that his conclusion as to the occurrence of blood infection in every case of tuberculosis should be tested. To mention one matter—if it be completely proved that living tubercle bacilli occur in the blood of practically every tuberculous patient, no matter how early or circumscribed the lesion appears to be, it is without doubt that our ideas as to the use of vaccine-therapy—tuberculin—must be considerably modified.

Using to some extent his methods, I have examined the blood in 12 cases of pulmonary tuberculosis. The method of examination is simple, and is, shortly, as follows:

Method.

The skin of the front of the forearm is thoroughly cleansed with liquid soap, alcohol, and ether. A tourniquet is applied, and, with a sterile syringe fitted with a platino-iridium needle previously flamed, about 5 c.cm. of blood are drawn from any convenient vein. The blood is at once mixed with about an equal volume of sterile citrated salt solution. The mixture is placed in a swift-running centrifuge for twenty minutes, and some of the deposit taken up on a slide to form a thick film. This is dried in an oven at 60° C., and is then placed in sterile distilled water to lake the blood. Thereafter the film is fixed and stained in the usual way.

It is important to state that every precaution is taken against risk of contamination. A new pipette and new slides, kept in strong sulphuric acid, are used in each case. The centrifuge tubes and flasks are cleansed with caustic soda, pure sulphuric acid, and sterile distilled water, and similar care is taken with the syringe.

Out of the 12 cases, 10 had distinct physical signs and had tubercle bacilli in the sputum. Adopting Turban's classification, there were of Stage I 3 cases, of Stage II 6 cases, and of Stage III 1 case. This gives a total of 10, and all these 10 showed tubercle bacilli free in the blood.

The organisms were of the long or short forms, beaded or uniformly stained, and were acid-fast rods morphologically indistinguishable from the tubercle bacillus. There seems little possibility of doubting their identity with it; seen in the sputum they would be judged absolutely diagnostic.

In each case they were few in number; no groups were seen; usually the bacillus was alone in the field, or at most two appeared together. They were found with more or less difficulty. Often only one was seen after long and laborious search over a whole slide, and in a few cases two and three and four slides had to be examined before success. In one case phagocytosis was noticed, and only in one was there evidence of mixed infection in the blood. In this a diplococcus was seen in fair numbers, and it is being further investigated.

The result of cultures from the blood of these cases and the result of the inoculation of the infected blood into animals remain to be worked out.

One of the two cases in which no amount of search could show the bacillus was a patient with very indefinite symptoms and physical signs, and altogether of doubtful diagnosis. In the other case the physical signs were marked, but repeated examination had never revealed tubercle bacilli in the sputum.

Only 4 of the 10 cases giving a positive result had any fever at the time of examination of the blood. In the other 6 the temperature was normal, and had been so for many days or weeks, all of them getting about well, and showing, in short, the usual chronic course of the disease. I state this to draw attention to the fact that they were by no means rapidly progressing acute cases, or cases of general tuberculosis.

I have to express my thanks to Dr. Henry Clarke, Honorary Superintendent of the Research Laboratory, for kind advice and help, and to the other physicians of the Liverpool Hospital for Consumption and Diseases of the Chest, for the facilities they have given me in this matter.

REFERENCE.

¹ Rosenberger, *American Journal of Medical Sciences*, February, 1909.

THE fifth International Congress of Dental Surgery will be held at Berlin from August 23rd to 28th. The work of the Congress will be distributed among twelve sections. The General Secretary is Dr. Schaeffer-Stuckert, of Frankfurt-on-Main (Kettenhofweg, 29), to whom all communications relative to the congress should be addressed. In connexion with the congress there will be an exhibition.

CHRONIC NEPHRITIS TERMINATING WITH HAEMORRHAGE FROM THE BOWEL AND PERFORATION OF THE BOWEL.

By LEONARD G. J. MACKEY, M.D., CH.B.BIRM.,

PATHOLOGIST AND PHYSICIAN TO OUT-PATIENTS AT QUEEN'S HOSPITAL BIRMINGHAM.

THE complications of chronic nephritis are numerous and for the most part well recognized, but the following case presents some unusual features, and calls attention to a dangerous complication about which very little appears to have been written:

A married woman, aged 27, was admitted into Queen's Hospital on account of profuse haemorrhage from the bowel.

She looked very pale, ill, and thin, and said she had not been really well for three years; and that since the birth of a stillborn child about a year before, she had suffered from vague pains in the epigastrium and in the lower part of the abdomen. On examination of the abdomen there was neither pain, tenderness, nor rigidity. The temperature was normal and remained within normal limits till the day of her death; the heart was hypertrophied and the second aortic sound accentuated; the pulse 112 and of high tension. The urine showed a cloud of albumen and one or two granular casts.

For the two days following admission the motions were fluid and dark with blood; after that they became light in colour, but on several occasions small dark red clots were found. The patient remained quite free from pain, the abdomen was soft and flat and nowhere tender. Feeding was limited to nutrient enemata. Bacteriological examination of the faeces revealed nothing unusual.

Before admission she had been treated for gastric ulcer, and after admission the diagnosis of gastric or duodenal ulcer was considered, and with it the advisability of operation; but the site of the haemorrhage was uncertain and the patient seemed to be improving, so it was decided to do nothing till she had been a little longer under observation.

On the seventh day after admission she became suddenly collapsed and complained of severe abdominal pain; she rapidly developed the signs of a perforative peritonitis and died on the following day.

Necropsy.

The peritoneal cavity contained a quantity of thin, blackish, offensive fluid, which had obviously escaped from the small intestine through three perforations, which could be seen in the lower end of the ileum. The lower 6 or 7 ft. of the small intestine and the caecum were blackened with numerous haemorrhages into the wall of the gut, and on opening the bowel I found more than 100 small ulcers in the lower portion of the small intestine. The ulcers were all small, the largest being about $\frac{1}{4}$ in. in diameter, and round or oval; each ulcer seemed to have originated in a patch of haemorrhage, though there were many haemorrhages which had not ulcerated; they varied in depth, many had reached the peritoneum, and three had perforated, while others were quite shallow and involved no more than the mucous membrane. The edges of the ulcers were not raised; Peyer's patches were not prominent. The remainder of the alimentary canal appeared to be healthy.

A careful examination of the mesenteric vessels was made and a microscopical examination of the wall of the intestine, but it threw no light on the immediate cause of the haemorrhages, though it seemed clear that the ulcers were due to invasion of the haemorrhages by micro-organisms from the bowel.

The kidneys were pale, granular, and contracted, and microscopically showed all the changes of a chronic interstitial nephritis and a great degree of endarteritis of the smaller vessels.

The heart was large and showed marked hypertrophy of the left ventricle.

Quite recently a similar case came under my notice:

A man aged 28, a lead worker, was admitted into the Queen's Hospital suffering from chronic nephritis and arterio-sclerosis, and died suddenly from a cerebral haemorrhage. The autopsy revealed a marked hypertrophy of the heart and degenerated arteries, a large cerebral haemorrhage, and an advanced interstitial nephritis, but in addition the lower 6 ft. of small intestine was blackened with numerous small haemorrhages into its wall, exactly as in the previous case; and on opening the bowel I found superficial ulcers forming in many of the haemorrhagic spots; but in this case there had been no haemorrhage into the lumen of the bowel, I take it because the ulceration was not sufficiently advanced.

Thus two very similar cases, differing only in degree, have been seen within a few months of each other in the post-mortem room of a comparatively small hospital, so it is not likely that the condition is one of very great rarity, though it must be one which it is important to recognize.

Whether these two cases must be regarded as cases of haemorrhage due to increased blood pressure, or whether we must look for some change in the mesenteric vessels, or for some toxin in the part of the bowel affected, I am

not in a position to say, but one cannot help feeling that there is some connexion between the lesion in the bowel and the condition of the kidneys. With a powerful heart and diseased arteries we expect cerebral and retinal haemorrhages and epistaxis as a matter of course. Why, then, should the vessels of the stomach and intestine remain intact?

I beg to thank Dr. Douglas Stanley and Dr. Foxwell, of Queen's Hospital, for permission to publish this note concerning their cases.

ROENTGEN CINEMATOGRAPHY AND ITS IMPORTANCE IN MEDICINE.

By DR. FRANZ M. GROEDEL,
BAD-NAUHEIM.

SCIENTIFIC cinematography has two chief aims—first, to represent a series of movements on the screen; and, secondly, to analyse movements.

Roentgen cinematography has the same two aims in view. As yet, however, no positive result has been achieved. A few investigators (I may mention Macintyre, Levy-Dorn, Eykman, and Alban Köhler) have indeed succeeded, by a skilful combination of views taken at different times, in projecting certain movements of the body on the screen. Apart from the great didactic value of this combination of views no real scientific importance can be claimed for them.

The analysis of a movement is of far more importance than its pictorial reproduction. We can watch the process of the movement on the screen with tolerable distinctness, though not demonstrate it so well as by a cinematographic projection, by which everything is reproduced on an enlarged scale. In many cases, however, it is almost impossible to distinguish the various phases of the movement, owing to the well-known slowness of the human eye, or, rather, of the retina. It will not be until we come to study heart, stomach, and breathing movements by means of cinematographic views that this question will be finally cleared up.

For the production of real Roentgen cinematograms the shortest possible exposure is requisite. The way pointed out by me¹ to attain this has since been followed by several investigators, and experience has confirmed my statements. With every good inductor it is possible, by employing a primary current of sufficient strength, to produce views of the thorax with film intensifiers in $\frac{1}{10}$ to $\frac{1}{20}$ second.

Having thus, a year ago, succeeded in fulfilling this first necessary condition, I immediately proceeded to construct an apparatus for taking a series of Roentgenograms. It soon appeared that there were very considerable difficulties to be overcome, a detailed account of which in this place would lead me too far.* It will suffice here to describe in brief the main principles of my Roentgen cinematograph. A number—for example, 24—of strong drying boxes, each containing a film between two intensifiers, are gradually moved forwards by means of a slide. Immediately in front of a leaden screen supplied with a corresponding opening, against which the patient leans, the drying boxes fall through a slit into a case, which is proof against Roentgen rays. The tube is attached behind the patient. In front of the tube moves a large leaden disc, 1 cm. thick, which contains two openings diametrically opposite each other. When one of the openings is in front of the tube, the foremost plate is exposed, and when the opening is just covered the drying boxes are pushed forward and the foremost plate is then thrown off. The whole apparatus, which weighs more than $1\frac{1}{2}$ centner, is moved by means of an electric motor. It can take at least four views in a second.

If the apparatus is fixed for an exposure of $\frac{1}{10}$ to $\frac{1}{20}$ second, views of the heart in pulsation, or the diaphragm in motion, can be obtained with extremely sharp outlines. If it is fixed to $\frac{1}{10}$ second, the movements of the stomach can be distinctly reproduced. For joint movements the time of exposure varies according to whether the Roentgenogram is taken with plates or film-

intensifiers. The primary conditions will be found in the work above mentioned.

Thus we are now in a position to reproduce all the movements in the human body by means of Roentgen cinematography, to study the different phases and to analyse the movements, which the human eye itself is mostly unable to do. Much preparatory technical work has still to be done, it is true, but the way has now been cleared.

The question as to what practical use Roentgen cinematography will be to scientific research must at present remain unanswered. Certain motions, such as pulsation of the heart and the involuntary movements of the stomach, can now be examined with scientific exactitude for the first time. As regards other movements, such as breathing, we have yet to ascertain whether the views we have hitherto held were right or not. As has been repeatedly stated, the eye is not properly adapted for analysing a movement. Therefore we are perfectly justified in expecting revelations in quarters which have hitherto seemed perfectly cleared up. It is only necessary to call to mind what a revolution instantaneous photography and cinematography have produced in regard to the pictorial and plastic representation of moving objects.

We shall only be able duly to appreciate Roentgen cinematography from a practical point of view when we have studied cinematographically the changes of the movements in the interior of the body in a pathological condition. In this respect, to quote but a few examples, the study of the pathological state of breathing, the various abnormal forms of heart pulsation, the pathological changes in the movements of the stomach, etc., all afford an ample field for scientific research.

From the tests I have as yet made with this apparatus, I will here only mention that I have already succeeded in reproducing not only the movements of the joints, the stomach, and the breathing, which are comparatively easy, but also the pulsation of the heart, as I fully demonstrated before the Verein für innere Medizin in Berlin on March 1st, 1909.

REFERENCE.

¹ Groedel and Horn: Ueber Röntgenmomentaufnahmen mit den bisher gebräuchlichen Apparaten. *Muench. med. Woch.*, 1908. No. 11.

NOTES ON A CASE OF TETANIC SPASM

WITH REFERENCE TO THE DIFFERENTIAL DIAGNOSIS BETWEEN TETANUS AND STRYCHNINE POISONING.

By W. SINCLAIR STEVENSON, M.B., CH.B. EDIN.,
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THE following case illustrates very well the difficulty which is occasionally met with in the differential diagnosis of tetanus and poisoning by strychnine:

L. H., a young woman of 24, unmarried, was admitted to the Royal Berkshire Hospital on a Wednesday suffering from intermittent spasm of the face and trunk. It appeared that she was a domestic servant, though she had left her last place a fortnight before, and had since been living at home. She said that she had twice recently fallen downstairs. There was no history of any other accident. Three days previously she noticed that the muscles of her face and lower jaw began to contract spasmodically. By the following day the muscles of the face were less affected, but the jaws were firmly closed, and could not be separated. On Tuesday her back became affected, and she assumed a position of mild opisthotonos.

Condition on Admission.

When seen on Wednesday evening she was in a very weak state. The pulse was rapid and compressible. Temperature 102°. Respirations 30. The muscles of the lower jaw, neck, and back were in a state of tonic contraction, the lower jaws about $\frac{1}{2}$ in. apart, and it was impossible to separate them any wider without using undue force. The muscles of the face were unaffected, but the head was retracted in a moderate degree, and the trunk was arched backwards and was quite rigid. The abdomen remained soft and could be palpated without difficulty during the severest spasms. Her arms were affected to some extent, the elbows being firmly pressed in to the sides and the forearms flexed and supinated; the hands were flexed on the forearms. Her lower limbs were stiff and the toes inclined to point downwards; but the legs, though kept flexed as a rule, could easily be straightened. The rigidity of the legs was sufficiently marked to prevent the successful testing of the reflexes. Respiration was shallow and rapid, but regular. The spasms, as a whole, showed periods of exacerbation, but even during these the respiration, though more rapid, remained

* I gave a full description of the apparatus constructed for me by Messrs. Reiniger, Gebbert, and Schall, in Erlangen, in the *Deutsche med. Wochenschrift*, 1909, No. 10.