placed to the side for a distance of $2\frac{1}{2}$ in. by moving the tube-holder to the point already ascertained. Another exposure is then made, and the two negatives are then developed. They are reduced to a convenient size and mounted on ground glass or opal, and when thus prepared and examined with a good stereoscope a view of the object is obtained showing the true perspective. In the diagnosis of fractures and dislocations this method is invaluable. A good negative for a suspected renal calculus should show a clear definition of the transverse processes of the vertebrae, the last two ribs, the crest of the ilium, and the outline of the kidney and the psoas muscle.

Certain conditions have given rise to fallacies, and this fact has led to the performance of an operation in several instances, when no stone was discovered. Perhaps one of the commonest causes of a fallacy is a flaw in the film of the plate, but this can be avoided by exposing two plates one on the top of the other at the same time. In this way two images are obtained, and if the same shadow shows on the two plates at exactly the same spot, and of the same shape, one can reasonably say that such a shadow is not due to a flaw in the film.

Another cause which I believe has led to at least one serious error in diagnosis was due to the shadow of a button appearing in the region of the kidney, but of course this can be easily avoided by making it a rule that all clothing should be removed from the part to be exposed.

Another possibility which might give rise to error is a mark which sometimes appears on a plate as the result of development. I have heard of at least one case where this has been mistaken for the shadow of a stone, and this only emphasizes my remark that development is a very important factor towards good results, and should be done personally.

Perhaps the most serious cause of a fallacy, and the one which offers the greatest difficulties in overcoming, is the presence of calcareous glands in the neighbourhood of the kidney and ureters. In a recent number of the BRITISH MEDICAL JOURNAL Mr. Hurry Fenwick showed several photographs which very distinctly exhibited the shadow of what appeared to be a stone in the ureter. The case was again carefully photographed, but this time with a metal catheter lying in the ureter, and when developed the negative showed that the so-called stone in the ureter lay outside the ureter and not in it. The shadow was afterwards proved to be due to calcareous glands. Some cases have been reported where the physical signs caused the impression that a stone was present, and although repeated photographs gave no evidence of a stone, an operation disclosed a small accumulation of gravel.

From my experience of actual cases I feel that I am in the position to deduce the following conclusions:

1. That the method is an extremely useful auxiliary to the ordinary methods of diagnosis.
2. That the method should be resorted to in every case of suspected stone, and that no operation should be decided upon until the case has been carefully photographed.
3. That the method entails a great responsibility and should in every case be carried out with the greatest possible care, for the patient's sake as well as for the operator's reputation, as a mistake may lead to such serious consequences.
4. That the great increase in the power of the apparatus used, and the increased knowledge of how to obtain the best results, will soon enable x-ray specialists to exclude all doubt in the interpretation of a negative.
5. That in cases where the negative shows the shadow of a stone and an operation is decided upon, the patient should be rephotographed under as nearly as possible similar conditions a day or so prior to the operation. I consider this necessary, because in one case a patient was photographed and a diagnosis of renal calculus was made. The operation took place some time afterwards, and no stone was found in the kidney. Another photograph was taken shortly after the operation, and the stone was again seen, but this time it was in the ureter. During the interval between taking the photograph and performing the operation the stone had moved downwards.
6. Lastly, I think every case should be taken stereoscopically at least once.

SURGEON-LIEUTENANT-COLONEL C. R. KILKELLY, O.M.G., M.B., late Grenadier Guards, has been appointed House Governor and Medical Superintendent of the Convalescent Home for Officers at Osborne, in place of Commander Powell, resigned. Mr. Edgar Hoffmeister, M.B., has been appointed a member of the Consulting Staff.

FURTHER REMARKS ON THE TREATMENT OF RINGWORM OF THE SCALP BY THE X RAYS.

By J. M. H. MACLEOD, M.D., M.R.C.P.,

Assistant Physician for Diseases of the Skin, Charing Cross Hospital
Physician to the Skin Department, Victoria Hospital for Children.

In a recent issue of the BRITISH MEDICAL JOURNAL (July 1st, 1905), I discussed the treatment of ringworm of the scalp by the x rays, and my remarks were based on an experience of about 60 cases so treated at Charing Cross Hospital and elsewhere. In that contribution, which was written about two months before its publication, I described the technique we employed, and pointed out wherein it was defective, the chief difficulty at that time being the measurement of the dosage sufficient to produce a defluvium of the hair without destroying the hair papillae and so preventing regrowth. For this purpose we depended almost entirely on Sabouraud and Noire's pastilles of platino-barium cyanide.

Fig. 1.—X-ray stand for the treatment of ringworm, etc.

At the time when the paper was written we were fortunate in having at the hospital two regulating tubes which under the relatively constant conditions of having a current of half a milliampère in the secondary circuit and a spark gap of about $3\frac{1}{2}$ in., and with the patient at a distance of 15 cm. from the anticathode, produced the desired effect on the scalp, with an exposure of about fifteen minutes. Unfortunately, a few

weeks later these tubes both wore out, and we had considerable difficulty in obtaining substitutes which gave as satisfactory results, for several of the tubes employed, instead of producing the defluvium in fifteen minutes, required about double that time to do so, as indicated by the pastille, or necessitated more than one exposure. If the treatment of ringworm by the x rays is to be a practical success and a real saving of time, it is necessary that a single exposure should produce a clean defluvium of the area exposed without impairing regrowth. As the effects of the x rays are cumulative, to have to give repeated exposures seems to me to subject the patient to greater risk, and certainly with the long exposure of about fifteen minutes it is unsafe to re-expose the same area for at least twenty-one days.

In view of these facts, I have been trying for the last three months to find out what degree of tension was required in the tube to give the desired effect and at the same time to improve the technique with regard to the measurement of dosage and other details. With this object the following apparatus has been constructed, and by means of it the chief difficulties have been overcome.

The electrical current is obtained from a lighting main continuous current. A "dipper" mercury break is employed and a 12-in. spark coil. Connected with the break is an instrument known as a "speed counter," which records on a dial the number of plunges of the dipper into the mercury of the break. The dial is divided into fifteen divisions, each of which are subdivided into two. Each subdivision indicates 500 plunges of the dipper into the mercury, and when the indicator has passed once round the dial 15,000 plunges, or "makes" and "breaks" of the primary current are recorded. The dipper is adjustable and is fixed so that it will plunge 1 cm. into the mercury and the speed of the break is regulated so that it will give about 1,000 plunges per minute.

A special stand to hold the tube has been made for me by Mr. Alfred Dean, to whom I am indebted for many valuable hints in its construction. The accompanying illustration (p. 619) will serve to show its structure. It consists of a wooden upright stand inside which is fitted a series of three wooden frames, in the central one of which a modification of the London Hospital Shield of lead glass is fixed to hold the tube. These frames are fitted with hinges and a pivot in such a manner that the shield can be moved in any direction required. To the opening in front of the shield lead glass cylinders of diameters varying from 11 cm. downwards are fixed. These are of such a length that when the patient's scalp is placed against the mouth of the cylinder, it will be 15 cm. distant from the anticathode. A maximum diameter of 11 cm. is chosen because beyond that the rays become blurred, and it is of primary importance to have as uniform an exposure of the whole area exposed as possible. At the junction of the shield and the cylinder a small metal disc is adapted to hold the platino-barium cyanide pastille, which can be removed at any time during the exposure to compare it with the standard tint. On the left column of the stand Dean's modification of Benoist's radiometer on a sun and planet system is fitted to ascertain the quality of the rays. Two horizontal arms are fixed towards the top of the stand, from which glass protecting screens hang down. On the left arm a Villard's soupage is placed to impede the reverse current from the tube, and on the right arm a milliampèremeter to indicate the current going through the tube. Besides the meter a lever is fixed at the angle between the right arm and the column, which works on a quadrant divided in centimetres, and adjusts the spark-gap between the two poles situated at the ends of the arms so that when the lever is moved down to say 10 cm. on the quadrant, it means that a spark-gap of 10 cm. has been interposed. These various instruments are all connected in circuit. To produce the defluvium at one sitting the following conditions are adequate: (1) a tube of such tension that the rays from it show 3 to 4 degrees of penetration as indicated by the radiometer; (2) a spark-gap of about 10 cm.; (3) a current of about two-fifths of a milliampère in the secondary circuit; and (4) about 16,000 interruptions of the primary current. Before exposing the scalp, the tube is regulated to fulfil the above conditions, and an exposure is then given, which is continued till the indicator on the speed-counter records 16,000 interruptions, the pastille being examined occasionally to avoid going beyond the required tint, and the state of the tube being kept as constant as pos-

sible during the exposure by means of the regulator and the resistances.

All this may seem to be complicated and perhaps unnecessary, but a permanent alopecia is a serious thing, and it is wise to take every precaution to avoid it. To depend entirely on the pastilles, though they have proved so reliable, does not seem to me to be advisable, as it is not inconceivable that while adjusting them they may accidentally have become damped or be otherwise altered, and give a false reaction time in consequence. Besides, by the above arrangement it is possible to prescribe so many discharges from a tube, the tension of which is kept as constantly as possible of the required degree for any special therapeutic purpose, with the amount of current passing through the tube also kept under control.

I have described this apparatus at some length, not because it professes to be anything more than an adaptation for specific purposes of several well-known appliances, but rather that others interested in the subject may improve upon it, so that in the end we may have an x -ray apparatus and a system for therapeutic purposes which will enable us to prescribe an accurate dosage of rays of a desired type, and give us a definite standard by which the results of different observers may be compared.

THE RECENT CHOLERA EPIDEMIC IN PERSIA,

1904.

By JOSEPH SCOTT, M.B., C.M.,

Medical Superintendent, Government Indo-European Telegraph Department, Teheran.

Previous Epidemics.

An epidemic occurred in Teheran in 1861, reappearing in a milder form in the summer of 1862. From the autumn of that year Teheran was free from cholera until the summer of 1867, when a very severe epidemic broke out; this is the only epidemic which is known to have come from the west by way of Tabriz. Cholera reappeared each succeeding summer until 1872; subsequently Teheran remained free, but it was occasionally reintroduced from other parts of Persia. In 1889 cholera again appeared, following the pilgrim route from Mesopotamia via Kermanshah and Hamadan, but stopped

Sketch showing how the quarantine posts of Pai-Tak, Mahidasht, and Bisutun were evaded.

The quarantine station of Kasr-i-Shirin could not be evaded, but pilgrims often forced their way through.

Quarantine posts on the roads from Kangavar to Teheran were in all probability established too late to be of any assistance in preventing the contagion from spreading.

Q. Quarantine.