working on 261 sera, found that only 43 per cent. of sera giving a positive W.R. showed a positive formalin test, and that 9.5 per cent. of sera giving a negative W.R. gave a positive formalin. At the Gibraltar laboratories, working with 153 sera, I have found the following:—

No. of specimens.	W.R. ¹	Formalin test.
45	+	 +
19	+	 —
17	—	 +
72	—	 —

Irregularity of Behaviour of Formalin.

Reports from different laboratories are not consistent, testifying to the unreliability of the formalin test. The cause of this irregularity of behaviour of formalin to sera is a matter of much interest. Its importance lies in the fact that a wrong diagnosis may be made by using a test of the chemical and physical nature of which so little is known.

The following experiments were undertaken with the object of determining possible chemical conditions which might influence the test. When neutral formalin was added to white of egg (i.e., the more viscid part) a thick clot was formed by the following morning. The control remained unaffected. This result led to examining other media containing albumin and globulin. It was found that cow's blood serum and sheep's blood serum both set to a stiff gel in 18 hours after addition of formalin. The controls (without formalin) remained fluid indefinitely. The test was carried out in the original way by adding two drops of neutral formalin to 1 c.cm. of the serum. Three sheep's sera were tested, two of which were positive (stiff gel) to formalin in 18 hours. The third sheep's serum remained in a liquid condition for four days without forming a gel. It was suspected that the condition of this serum was not satisfactory for gel formation, and it was thought a gel could possibly be formed artificially. This proved to be so, as will be seen later. Using this same sheep's serum, and also human serum,² a series of tubes were put up as follows:—

1. Serum + formalin.
2. Serum made slightly acid with HCl + formalin.
3. Serum made slightly acid with acetic + formalin.
4. Serum made slightly more alkaline with {NaOH + formalin.
5. Serum made slightly more alkaline with lime-water + formalin.
6. Serum + 2 drops acetone (ketone).
7. Serum + 1 drop hydrogen peroxide + formalin.

Each separate tube was accompanied with a control containing no formalin, and the tubes examined in 18 hours. The results are as below:—

1. Liquid, no change.
2. Stiff gel formation.
3. " " "
4. Liquid, no change.
5. " " "
6. " " "
7. Liquid 18 hours—stiff gel formation 36 hours.

All controls remained fluid.

From these results it is seen that if the serum be made slightly acid to litmus a stiff gel will be formed with formalin, and no gel occurs if the alkalinity be increased. Increased alkalinity of a serum would appear to inhibit gel formation. Carrying this yet further, more of the serum (human and sheep's) was taken, and its alkalinity decreased with acetic acid; it was allowed to remain alkaline to litmus. The effect of formalin was to produce a soft gel in 20 hours and a stiff gel in 48 hours. The controls remained fluid. The formation of a gel in tube 7 would be due to the oxidation of the formaldehyde to formic acid by the hydrogen peroxide added. If these results are to be interpreted and an explanation given of the interchange of alkalis and acids in the body during life, a very complex metabolism is met, impossible of emulation in the laboratory.

Dual Nature of Acid-combining Power of Blood.

As the acid-combining power of the blood is of dual nature, due to (1) free or diffusible alkali salts, and (2) the combining power of the protein with acid, it is a matter of conjecture which is affected when acid is added in small quantities, insufficient to make the serum acid to litmus. It is known that in normal blood the degree of alkalinity fluctuates before and after a meal. In excessive exercise or deficient nitrogen in diet the alkalinity is decreased. In pathological conditions the deviation from normal in the same direction becomes marked, as in uræmia, anæmia, acidosis, &c. In conditions causing decreased alkalinity of the blood it is feasible that a sufficient decrease may be reached whereby a positive formalin test is obtained, for, as mentioned already, two sheep's sera showed positive formalin test, and the other did not.

This might explain why some human sera give a positive formalin test but negative W.R. Whatever the true explanation demands, it can be shown that weak acids like dihydrogen-sodium-phosphate (NaH_2PO_4) are effective in reducing the alkalinity of blood sufficiently to produce gel formation with formalin. This substance might well be an intermediate product in the formation of the disodium-hydrogen-phosphate found in blood, and more especially if the bases present should be insufficient to convert it.

Tube A. Human serum + NaH_2PO_4 (alkalinity decreased) + formalin.

Tube B. Human serum + NaH_2PO_4 (made neutral) + formalin.

Tube C. Human serum + NaH_2PO_4 (made acid slightly) + formalin.

Result.—Tube A, gel in 40 hours. B, gel in 30 hours. C, gel in 24 hours. Controls unaffected. Acid sodium phosphate took longer to act than was the case with stronger acids.

Deductions and Conclusion.

When serum forms a gel with formalin it is due to the direct action of the reagent upon serum albumin or serum globulin, or both, and not due to any action upon the toxins of *Sp. pallidum* direct. It is probable that acid-protein produces a gel with formalin and alkali-protein does not. If formalin forms a gel of human serum it is an indication of decreased alkalinity of that serum, but does not decide the cause of the decreased alkalinity. The evidence obtained from the foregoing experiments is, in my opinion, sufficiently adverse to regard the formalin test for syphilis with much reserve.

A NOTE ON LUMINAL.

By W. JOHNSON, M.D. LOND.,

ASSISTANT PHYSICIAN, ROYAL SOUTHERN HOSPITAL, LIVERPOOL,
AND ROYAL LIVERPOOL CHILDREN'S HOSPITAL.

SOME years have elapsed since luminal was first recommended as a drug useful in epilepsy.¹ The object of this note is to draw attention to its value and to recommend its use to a much greater extent than appears to be the case at the present time. My experience with luminal in the treatment of epileptics extends over the last two years. I began using it for those cases—so well-known in the out-patient department—where drugs had been used for several years and the patient has wandered from hospital to hospital without any improvement in the condition being obtained. The result proved so surprising that I commenced prescribing it and noting results in all varieties of "fits." The beneficial effect of the drug has seemed to be extraordinarily wide.

Pharmacologically, luminal is closely allied to veronal, one of the ethyl groups of this latter drug being replaced by a phenyl group; the full chemical name is phenyl-ethyl-barbituric acid. The dose given is 1½ to 5 gr. It is insoluble in water, but is easily suspended in a mucilaginous mixture, and in this form is readily taken without unpleasant effects.

¹ Method described by Colonel L. W. Harrison, D.S.O., R.A.M.C., as used at Rochester Row Military Hospital.

² Wassermann and formalin negative.

¹ Hauptmann: Münchener medizinische Wochenschrift, 1912.

(a) In the first place, those cases of idiopathic epilepsy which show little or no response to treatment with potassium bromide, together with those cases in which potassium bromide has reduced the fits to a certain level (which then remains stationary), luminal $\frac{1}{2}$ gr. added to the bromide mixture has in nearly every case resulted in an immediate lessening in the number as well as in the severity of the attacks. I am not as yet prepared to dogmatise, but it has seemed as if the minor attacks have yielded somewhat more readily than major epilepsy. To give one instance—that of a boy aged 10 years, who was having 20 to 30 attacks of petit mal daily, in whom, within one week, the attacks were reduced to three or four a day. These were typical petit mal seizures; one occurred in front of me whilst I was interrogating the mother. The eyelids suddenly began to blink rapidly and the boy to sway on his feet. The eyes were then strongly turned to the left and momentary unconsciousness occurred. In a few seconds the boy recovered, and although slightly dazed was able immediately to answer a question which I put to him. The mother's own expression on the occasion of the second visit was that the improvement was "miraculous." He had previously been treated for years, presumably with bromide. In other cases slower improvement has occurred, and in these it has been my practice to increase the dose by $\frac{1}{4}$ gr. weekly if necessary, up to a maximum dose of 2 gr. three times a day. I have never had occasion to give larger doses than this for epilepsy, although, as will be mentioned later, larger doses may be given. In the majority of my cases $\frac{3}{4}$ gr. combined with potassium bromide 10 gr., given three times a day, has proved adequate.

(b) The next cases which were tried belonged to the large group of fits associated with organic cerebral lesions. Four cases of cerebral diplegia in children—where the fits were not controlled by bromide—all showed immediate improvement. The attacks have not entirely ceased, but as they are becoming progressively less, one hopes in time that they will be completely controlled. In this connexion I might mention that the drug has not produced any untoward effect on the patient's mental state. The mothers, in fact, state that the children are brighter—a condition to be expected, however, merely from the lessening of the fits. In children of two years the initial dose has been $\frac{1}{8}$ gr. t.d.s. In one case of congenital syphilis—a girl of 11 years—with severe scarring round the mouth, definite improvement in the fits and mental condition has also occurred. Obstinate fits associated with infantile hemiplegia have also responded satisfactorily.

In my series of cases, which number about 25, I have definite absence of improvement in two cases only—both, I think, cases of idiopathic epilepsy, one a child of 3 years and the other a man of 28. The former, however, is said to have sustained a severe fall on the back of the occiput prior to his attacks, and it is possible there may be some local cortical trauma. Whether traumatic epilepsy will prove to be rather less amenable to the drug than the idiopathic form must be left for future observation. With doses above 2 gr. three times a day untoward effects have occasionally occurred. The patient has become "peculiar," and a form of mental excitement going on to mania may result unless the drug is withdrawn.

(c) Finally, larger doses of the drug may be used in the attempt to influence certain forms of mid-brain tremor. I have used it in cases of paralysis agitans and in the rhythmical tremor following lethargic encephalitis—but as yet with no very pronounced benefit. I remember, however, a case shown recently by Dr. A. Feiling, where 6 gr. were being given three times a day with good effect, but I have not as yet given anything approaching this dose. An investigation of the value of luminal in the treatment of the severer forms of chorea is at present being undertaken.

In conclusion, it would appear that in this drug we have a valuable therapeutic agent worthy of a place amongst the dozen or so drugs which form the stand-by of the physician.

A CASE OF AUTO-SUGGESTION BLINDNESS.

By KENNETH CAMPBELL, M.B. EDIN.,
F.R.C.S. ENG.,

CONSULTING SURGEON, WESTERN OPHTHALMIC HOSPITAL;
OPHTHALMIC SPECIALIST, SOUTHERN COMMAND.

AN obsession may be defined as the translation of an idea into a reality; "a false creation proceeding from the heat-oppressed brain," as Shakespeare puts it. The old conception of the term was that of being possessed by some evil demon, or influenced by some wicked spell. History abounds with numerous instances of people becoming blind, deaf, dumb, &c., through sheer fright. The effect of fancy on the mind is well illustrated in the old story of the man, who, after reading a page full of symptoms exclaimed "I've got that disease," and on turning over the leaf, was amazed to find the symptoms described to be those of pregnancy. The experience of Sir Isaac Newton is another example. In a letter (dated from Cambridge, June 30th, 1691) to his friend, the philosopher Locke, he explains how, after gazing for a short time at the reflection of the sun from a looking-glass, he was harassed for several months afterwards whenever his thoughts reverted to the subject by the resurgence of the same subjective picture, and how he had the greatest difficulty in ridding himself of its repeated recurrence.

A man aged 20, of good physique and quite rational in every way, gave the following history: While at work on electric wires a sudden spark was generated; this seemed to "strike his eyes," and at once he became so blind that everything "appeared as in a fog," and he was obliged to get someone to lead him about. On examination the eyes proved to be undamaged; centric and eccentric vision were lost, and perception of light only retained. The pupillary reactions were preserved, thus showing that the retina were not rendered anaesthetic by the bright light. Uræmic amblyopia could be ruled out, as there was no albuminuria, the arteries were soft and the blood pressure normal. He was admitted into hospital, and to check his statements, a careful watch was kept on his movements. The nurse in charge, an old hand in detecting malingerers, reported that in broad daylight he would run up against such obvious things as a table, door-post, pillar-box, &c., often severely hurting himself. I was much impressed by one thing in particular, which was his fixed idea that his sight was irrevocably lost. I interviewed the father, who was naturally very anxious about his son's condition, and elicited that the patient was an only child (and this we know "makes three fools") and that the mother was in the habit of writing her boy daily letters of condolence and sympathy.

Arguing on these data—viz., the patient's distress at the thought of permanently losing his sight, the devoted mother's daily letters of sympathy, and the absence of organic damage—I came to the conclusion that the whole trouble was purely fanciful, and I adopted the following treatment. I assured him that his vision would come back, and repeated this emphatically daily, going on the principle described in Humpty Dumpty's poem, "I said it very loud and clear, I went and shouted in his ear." In addition, at my suggestion, the tone of his mother's letters was altered to the more hopeful and reassuring order.

By these means the vision began to improve, continuing to do so daily; after the lapse of a month the sight was quite restored.

NORFOLK AND NORWICH EYE INFIRMARY.—The centenary of this hospital was celebrated on July 11th. On behalf of the medical staff, the Lady Mayoress of Norwich presented to the hospital portraits of its three founders, Dr. L. Evans, Mr. Robert Hull, and Mr. T. Martineau, jun. Mr. F. Eaton, chairman of the committee of the infirmary, in acknowledging this gift and a present of linen from the Lady Mayoress, spoke of the plan whereby the infirmary would in the future become more closely associated with the Norfolk and Norwich Hospital, while maintaining its separate identity. Mr. S. H. Burton, representing the medical staff, recalled the creditable history of the institution, and the Lord Mayor and the Sheriff of Norwich congratulated the infirmary staff and committee on the excellent work in the past and prospects of usefulness in the future.