No movement at interphalangeal or metatarso-phalangeal joints. Whirlpool bath and massage. September 1st: Swelling much decreased, all interphalangeal and metatarso-phalangeal joints move well. Range of movement at ankle 23 degrees.

4. *Fracture of Humerus*.—G. S. W. Comminuted fracture lower end of left humerus. Admitted August 9th, 1916. Wound healed, union firm, pronation and supination weak and incomplete, elbow can neither be fully extended nor fully flexed. Range of movement 30 degrees. Whirlpool, massage. September 1st: Pronation and supination complete and fairly strong. Range of movement at elbow-joint 70 degrees.

5. *Septic arthritis* of the knee; incisions. Admitted July 7th, 1916. Much periarticular thickening, fluid in joint, flexion 60 degrees. August 8th: No fluid in joint, very little periarticular thickening, flexion 120 degrees.

6. *Traumatic arthritis*, right knee. Admitted March 28th, 1916. Much periarticular swelling. X ray: "Lining" of cartilage; no bony change. Can bear no weight on knee; walks with crutches; no movement at knee-joint. Radiant heat and massage. May 25th: Very little improvement; still on crutches. Whirlpool bath and massage. July 15th: No swelling of knee; walks well with stick. Flexion at knee-joint 90 degrees.

7. *Amputation*, right arm. Admitted May 20th, 1916. Tenderness of stump; much pain in missing hand. Whirlpool bath. June 14th: No tenderness of stump; no pain in missing hand.

8. *Wound of axilla*, bruising of brachial nerves. Admitted June 13th, 1916. Much neuritic pain, referred chiefly to fingers. Partial anaesthesia, dorsum of thumb and index finger and radial side of hand and wrist. No power of extension of fingers. Elbow flexed at right angle; no power of extension beyond this point. Paralysis of supinator longus and extensors of wrists. Radiant heat followed by massage, or either alone, caused increased pain. July 3rd: Whirlpool bath at temperature of 99° F. Immediate alleviation of pain; tolerance to gentle hand massage after six treatments. August 8th: Very little pain; sensation returning; some power of flexion of fingers; supinator longus recovering; extension of wrist weak but complete. Extension of elbow to 50 degrees.

RELIEF STAINING FOR BACTERIA AND SPIROCHAETES.

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By the ordinary methods we seek to colour bacteria in films to make them the more evident on a colourless background. The excess of light that meets the eye dulls our perception of the germs, and probably often causes us to lose sight of the most minute. Instead of staining the micro-organisms, we may leave them colourless and brilliant in a coloured and less transparent background. This is done, for example, in the Indian-ink method and in Harrison's collargol method of demonstrating spirochaetes. I have devised a rapid and simple process to obtain a uniform blue field from which the unstained organisms stand out in sharp relief. The depth of colour may be varied from a pale grey to a deep blue-black, being rather deeper immediately around the edge of the organism. The whole process occupies only a few moments.

A small drop of a 2 per cent. aqueous solution of Congo red is placed on a slide, and a very small quantity of the bacterial culture, or of the exudate to be examined, is rubbed into it with the platinum wire; the drop is then spread out into a tolerably thick film either with the wire or by means of another glass slide. The film, an opaque blood red, is allowed to dry; the slide is then washed over with a 1 per cent. solution of HCl in absolute alcohol and dried in the air, or with blotting paper, although the latter is apt to tear the film. The film is then ready for examination with the oil immersion lens. It is possible to apply the process to a film which has been already spread and fixed on the slide, by spreading the Congo red gently over it, drying, and treating with acid, as described above.

Under the $\frac{1}{2}$ in. lens the background may show an extremely fine stippling, but as a rule it will be quite uniform. Either natural or artificial light may be used, but it needs to be fairly strong, especially if a thick part of the film has to be examined.

Broth and salt solutions do not form a satisfactory mixture with the Congo red, and emulsions in these fluids ought first to be thrown down in the centrifuge. Serous exudates mix readily and evenly with the dye. Blood is not so satisfactory, but, except for osmotic changes in the

red cells, useful preparations of the blood fluid, and its cellular contents may be made; the films should be spread quite thinly. Urinary deposits and faecal material may both be examined by this method; in one faecal specimen I examined, large numbers of spirochaetes of various types were present. This same material examined with the dark background condenser gave a much less satisfactory picture on account of the relatively large amount of amorphous substance, and motile bacteria crowding the field. Spirochaetes as a rule show up fairly sharply, though they have not the brilliancy that the dark background condenser gives them, and of course one has not here the opportunity of observing them in motion. Bacteria vary somewhat in their relation to the dye; mostly they are clear, sharp, and quite transparent, but a certain number of them will take up the dye and appear as ill defined, bluish-black bodies: this I have noticed chiefly in old cultures of Gram-negative organisms. Some cocci show a dark central spot, and in the case of many of the *coli*-typhoid type of bacilli a similar round dark spot is seen toward each pole, or more often a dark rod-shaped area running down the centre of the bacillus. Somewhat similar appearances may be seen with Indian-ink preparations; it is impossible to say whether they represent nuclear bodies or some irregularities of external contour which have caught and held the dye. Many bacilli show a dark central portion with colourless poles, giving the appearance that the poles, either by being club-shaped, or by being bent up, had risen above the surface of the film whilst the centre part remained buried in it.

The apparent size of an organism viewed through an opaque film naturally depends on the thickness of the film—that is to say, on whether the film is sufficiently thick to more than cover the greatest diameter of the organism. Seen through an opaque film an organism usually seems much larger than it appears in a stained preparation. It was pointed out to me by Dr. Hort that in cases of septicaemia the presence of bacteria can be easily demonstrated, even when they are only present in relatively small numbers, by taking a quantity of the infected blood in distilled water and then throwing down in the centrifuge. When the deposit is examined in a Congo red film the amorphous substances blend with the background and the bacteria are easily seen. The process is far simpler than the examination of a stained film would be in such a case. He has also used Congo-red films for the demonstration in filtrates of very minute micro-organisms near the limits of vision, films stained by ordinary methods entirely failing to reveal their presence. In work of this nature it is, of course, necessary to be certain that the distilled water used in making up the reagent is quite bacterium-free, and a control film should be prepared to show the absence of bacteria.

In conclusion, it may be claimed for this method that it has certain definite advantages over other relief staining methods, in that it can be freshly made up with bacterium-free water; and that it gives a clean and even background, which has very little tendency to form cracks and fissures. I have not been able to test its value in photomicrography, but where a clear sharp outline of the organism is required I should judge it could be used with the best of results.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

CONCURRENT MEASLES AND CHICKEN-POX.

I AM not aware of any instances of cases of this character. Certainly I have not met any such during a professional life of over forty years. My patients were two boys and two girls.

Jim commenced with an attack of measles February 1st.

John developed chicken-pox February 6th and measles February 10th, both rash and spots being well out together.

Peggy began with measles February 18th and developed chicken-pox March 3rd.

Ermin developed chicken-pox and measles February 25th, practically simultaneously.

John, Peggy, and Ermin were very distinctly ill.

John had been exposed at school to chicken-pox and Jim to measles.

London, W.

A. J. RICE-ONLEY, M.D., M.R.C.P.