dysfunction, and recent infection. Pregnant and nursing mothers were also excluded.

The apparatus used for the dark-adaptation test was that described by Yudkin (1941b), with the addition of a means of stabilizing the voltage. The procedure was as follows:

Method.—Each subject was generally examined as indicated above, and the test explained and demonstrated. They were put into the dark-room at 10-minute intervals. Before entering the dark-room no subject had been in the hospital less than half an hour, to safeguard against the effects of exposure to previous high brightnesses (Craig and Vernon, 1942). At the end of the first subject's 30 minutes' dark-adaptation time the test was made, and so on with the remainder at 10-minute intervals. By this arrangement the intervals between subjects entering the dark-room and being tested were balanced so that all were dark-adapted for 30 minutes. The test object (arrow) was first shown at a brightness which could be seen fairly easily, and the brightness decreased until the threshold reading was obtained. The test was then continued to 40 minutes. As under the conditions of the test the expected difference between the readings at 30 minutes' and 40 minutes' dark-adaptation time is not more than 0.1 μlog unit, subjects showing greater amounts than this were re-tested. In addition all readings of 3.83 μlog units and over were confirmed. The threshold measurements of brightness seen at 30 minutes' dark-adaptation time expressed as $\log \mu\text{log}$ were those taken.

The measurement of dark-adaptation by means of such "final" threshold measurements, while not yielding the same amount of information as can be obtained by a "full" test, is nevertheless the most useful single measurement which can be taken (Yudkin and Robertson, 1943), since it has been shown that the threshold measurements at 30 minutes' dark-adaptation time are always affected if dark-adaptation has been impaired through lack of vitamin A. The results are shown in Table II.

TABLE II

	Total No.	Threshold Reached, $\log \mu\text{log}$, at 30 minutes, D.A. Time							Mean Threshold $\log \mu\text{log}$
		3.40	3.53	3.72	3.84	3.93	4.01	4.14	
Skin cases	103	8	45	32	10	2	5	1	3.679
Controls	101	8	36	39	14	1	2	1	3.683

Comment

There is thus no significant difference between the mean threshold values of the two groups. The values obtained seem to be rather high (cf. Yudkin, 1941c), although these absolute values should be accepted with some reserve, as the standardization of the instrument has not been checked for some time.

Two cases of particular interest appeared in the skin group—one a case of Darier's disease and the other a case of pityriasis rubra pilaris; the latter, which has been fully reported elsewhere (Porter and Godding, 1945), responded to vitamin A therapy, and good correlation was established with the dark-adaptation results. The former will be discussed along with other cases of Darier's disease in a further paper.

Summary

A dark-adaptation test revealed no significant difference between a group of skin cases and a group of controls.

It is highly probable that with the safeguards applied the results indicated a similarity in vitamin A nutritional status between the two groups.

We have to acknowledge with thanks the co-operation of the board of management and administrative staff of the Royal Dental Hospital in providing the facilities which enabled us to carry out the tests on the control group; and to thank the Crookes Laboratories for the loan of the dark-adaptation apparatus and for generous supplies of vitamin A.

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Medical Memoranda

Tubercle Bacilli and Urea

In the *Journal* of May 16, 1942 (p. 609), I recorded in a short paper the bactericidal action of urea in saturated solution on an equal volume of a strong suspension of human tubercle bacilli in distilled water—the resulting mixture containing, of course, a half-saturated solution of urea. In July, 1944, I had the pleasure of receiving a letter from Dr. R. M. Humphreys, late senior physician, Sudan Medical Service, stating that he and his assistant, Dr. Abdel Halim of the Khartoum Civil Hospital, had had good results in treating a local civilian with (a) dry powdered urea on the skin ulcerations resulting from infection of the needle-tracks from a tuberculous pyopneumothorax, and (b) the use of a half-saturated urea solution as a replacement fluid in the same patient. The ulcers healed quickly under the urea powder, and the fluid, after eight removals, washings-out with sterile saline, and replacement with 300 c.cm. of half-saturated urea solution, became at last completely sterile for tubercle bacilli. It is to be noted, too, that the washings of the first fluid introduced, though found to contain many acid-fast bacilli, were sterile from the point of view of culture.

This communication recorded such favourable results and seemed so much what I had expected that I decided to make a few more experiments with urea; these are here set forth:

Three cultures—human, bovine, and avian—were obtained from the National Collection of Type Cultures, and subcultures were put up with saturated urea solution, the method being identical with that previously described. In the course of a month all three exposed to the saturated urea solution remained apparently sterile. There was a growth of tubercle bacilli on the "second dilution" capsules, except in the case of bovine tubercle, and in all lesser concentrations. The controls, of course, grew well. At a subsequent subculture from the apparently sterile capsule of human tubercle bacilli a very small growth was obtained—a fact which led to a further trial with the use of a more carefully saturated urea solution. On this further trial the saturated solution + t.b. was typically negative for tubercle bacilli both on the original capsule and on subculture.

It would seem that strains of tubercle bacilli vary somewhat in their sensitivity to urea. It may be added that the fluids containing saturated urea and t.b. and the controls containing only t.b. were inoculated into guinea-pigs and that *neither* animal developed tuberculosis. This is curious, as the "control" was positive and should have killed. The strain is being further investigated.

With the assistance of Major Elliott, chemist at the R.A.M.C. College Laboratories, and Cpl. Johnson, R.A.M.C., I made the following further observations: (1) Saturation point is reached with approximately 92.3 g. of urea to 100 c.cm. of distilled water at 19° C. (2) Saturated urea has a pH of about 6.8 (brom-cresol-purple). (3) The mould *Penicillium notatum*, suspended in saturated urea, was apparently unaffected. (Control in saline.) (4) A suspension of tubercle bacilli in half-saturated urea solution was divided into two parts. Half was subjected to dialysis, half not, and the two were compared after 48 hours. The result was: undialysed portion, 55.2 g. of urea per 100 c.cm.; dialysed portion, 0.013 g. of urea per 100 c.cm.

It would appear, then, that a strong suspension of tubercle bacilli, killed by 48 hours' contact with a saturated solution of urea, can be freed of urea by dialysis and retained as a dead bacterial suspension for any purpose required.

My thanks are due to Dr. R. St. John Brooks of the National Collection of Type Cultures; to Col. F. S. Irvine, C.M.G., D.S.O., commandant of the R.A.M.C. College; to Lieut.-Col. W. R. M. Drew, Professor of Tropical Medicine; and to Major W. A. Young, Major Elliott, and Cpl. R. I. Johnson, R.A.M.C., for invaluable help.

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Recurrent Ectopic Gestation on the Same Side as Previous Salpingectomy

The case reported here may be found to be of interest not only because of its rarity but also because, if the possibility of recurrence is recognized, the chances of this unfortunate accident occurring may be lessened at the first operation.

CASE HISTORY

The patient, a woman aged 35, her occupation at the time being welding, was admitted to Tilbury Hospital on April 3, 1944, complaining of lower abdominal pain. The time of onset had been 4 days before; the pain had later become less severe, but on the day of admission had returned with increased intensity. The date