sodium bicarbonate exerted a delaying effect. Singh and Singh (1944) found that quinine 1 in 300, pamaquin 1 in 10,000, and mepacrine 1 in 500 accentuated the haemolysis caused by serum obtained from blackwater fever cases.

In vivo, Ross (1927) found that malarial patients treated with quinine or pamaquin show initially an increased bilirubinaemia. It is highest about the first day and takes a few days to return to normal. Hughes and Shrivastava (1930) noticed a similar effect within twenty minutes of an intravenous injection of quinine.

Antimalarial drugs may therefore directly aid the haemoclastic crisis in blackwater fever.

Use of Antivenene.—Antivenene apparently helps in controlling haemolysis in blackwater fever (Singh and Singh, 1944, 1945, 1946; Tandan, personal communication). High doses prevent a second attack, and with smaller doses the haemolysis can be milder. Along with its use, mepacrine and quinine, even in full doses, were found to be safe in treating the residual malaria when necessary. Ponder's (1944) finding that the inhibitors present in tissues were not species-specific offers a probable explanation of the beneficial effect of antivenene. Its use supplies non-specific inhibitors. The dose of antivenene required would apparently depend on the balance between concentration of haemolysins and their inhibitors in the blood. Judging from clinical results and from the analogy of the action of antidiphtheritic serum, it is probable that the concentration of antivenene falls to 50% of the original in three to four days and gradually to zero in 10 to 14 days.

Summary

Two cases of blackwater fever due to proguanil are described. The role of antimalarial drugs in precipitating haemolysis and the role of antivenene in its prevention are discussed.

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A description of the Singapore Medical Plan is given in the recently published "Annual Report of the Medical Department of the Colony of Singapore" for the year 1951. The plan envisages the modernization and enlargement of all the existing hospitals, the building of a new hospital centre, the expansion of the Tan Tock Seng Hospital to an 800-bed tuberculosis centre, a modern settlement for lepers, improved facilities for the treatment of mental diseases and mental deficiency, a chain of maternity and child welfare clinics throughout rural Singapore, a modern quarantine station, and an improved school medical and dental service. The report states that the plan seeks to double the present facilities in all medical fields, and "will take us quite a long way on that road to a free service for all, so ardently desired by so many of the community."

RENAL EXCRETION OF UREA IN THE WEST AFRICAN

BY

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During the course of a metabolic investigation on apparently healthy male West Africans low rates of urea elimination were consistently encountered despite the fact that the subjects were living on an *ad lib* self-selected diet apparently adequate in protein (about 70 g. a day, one-third of which was meat) and calories. It was decided, therefore, to investigate, on a somewhat larger series of subjects, the "normal" level of urea output and the output following the oral administration of urea.

Methods

Ten male West Africans, all apparently healthy and with no history of renal disease, acted as experimental subjects. Five Europeans, resident in the unit, were also investigated simultaneously with the Africans in order to provide a comparison with European figures determined under the same climatic conditions.

The subjects reported to the laboratory at 8 a.m., after their usual morning meal, and remained until the end of the investigation either sitting at rest or lying on a bed. Urine was collected hourly for three hours, during which time no fluid was taken. At the end of this period the urine flow was regularly of the order of 1 ml. a minute. It is customary in conducting urea-concentration tests in a temperate climate to withhold fluid from the subject for a period of eight to twelve hours in order to ensure a high degree of concentration of the urine (Harrison, 1937). In a tropical environment, however, a period of three hours' water deprivation seems to lead to an adequate reduction of urine volume.

At the end of this preliminary three-hour period the bladder was emptied and collections were made every hour for a further period of three hours. At the end of the first hour 20 g. of urea dissolved in 100 ml. of water flavoured with orange squash was administered by mouth. In this way a sample of the "resting" rate of excretion was obtained, together with two-hourly samples following the administration of urea on which could be estimated the maximum concentration achieved and the total excretion during the period. The urine samples were analysed for urea by the method of Karr (1924), the final colorimetric determination being performed in the Coleman junior spectrophotometer set at a wavelength of 5,000 Å.

Results.—The results obtained are set out in the Table.

It will be observed that in the case of every parameter the European values are higher than those obtained on the African subjects and are in tolerable agreement with the commonly accepted "normal" values for the European investigated in a temperate climate. The differences between the mean values for the two groups are statistically significant ($P < 0.01$).

Discussion

The fact that the African shows a low resting rate of urea excretion might at first examination be held to be due to a low dietary protein intake. Such data as are available, however, fail to support such a suggestion; the output of urea appears to be equally low in subjects living on a diet which they themselves have to buy and in subjects living on a diet provided by the laboratory which certainly has an adequate protein content. Even when a load of urea is presented to the kidney the African fails to excrete as much as the European; the maximum concentration achieved by the African subject is at times so low as to

Subject	Age (yrs.)	Height (cm.)	Weight (kg.)	Resting Excretion*	2-hr. Excretion†	Max. Conc.‡
European Subjects						
M.L.T. ..	42	185	72	0.595	3.316	3.110
N.A.B. ..	38	183	88	0.390	4.260	3.430
P.G.P. ..	33	173	62	0.517	3.800	2.940
W.S.S.L. ..	41	176	68	1.148	4.015	2.733
R.A.K. ..	28	183	*80	0.330	3.540	3.060
Mean ..	36	180	74	0.596	3.786	3.055
s.d. ..				0.291	0.334	0.228
African Subjects						
La ..	20	160	56	0.354	2.766	2.840
Sa ..	32	171	63	0.150	1.268	1.350
Go ..	26	174	54	0.240	2.780	1.780
An ..	35	156	57	0.144	2.590	1.630
Wm ..	40	156	53	0.354	2.564	1.800
Pa ..	28	170	56	0.401	2.037	1.886
Ma ..	38	148	44	0.257	2.727	2.400
Os ..	28	178	60	0.358	2.438	2.720
Jo ..	28	150	43	0.239	3.072	1.330
Ge ..	25	167	65	0.212	1.073	0.793
Mean ..	30	163	55	0.271	2.332	1.793
s.d. ..				0.091	0.634	0.611

* Grammes of urea excreted during the hour prior to the administration of urea.

† Grammes of urea excreted during the two hours following the administration of urea.

‡ The maximum concentration of urea achieved during this two-hour period expressed as grammes of urea per 100 ml. of urine.

suggest, on normal standards, a marked degree of renal impairment. More elaborate functional tests (which will be reported in full elsewhere) have, however, failed to show any abnormality in either the glomerular filtration rate or the rate of perfusion of the kidney by plasma water.

The low normal plasma urea concentration of these subjects, which is of the order of 14 mg. per 100 ml. of plasma, has been briefly reported by Phillips and Kenney (1952). This finding, together with the low urea outputs here reported, is of interest in view of the diagnostic significance attached to these values in kwashiorkor (*British Medical Journal*, 1952). It may well be that the low levels of excretion and plasma concentration reported in this condition are, in part at least, physiological and not due to pathological processes.

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Medical Memorandum

Bronchography in Children

Bronchography in children is, in general, not a simple procedure, and numerous attempts have been made to simplify the technique. Puncture of the cricothyroid membrane, intubation and injection of the iodized oil down a catheter introduced into the tube, or direct passage of a catheter into the larynx through the mouth or nose, all have the disadvantage of reducing the lumen of the larynx and interfering with adequate oxygenation.

Temple and Gray (1950) have evolved a very simple technique. They pour 20 ml. of lipiodol over the back of the tongue of the previously anaesthetized child; this method certainly has the advantage of simplicity. In the past 18 months we have obtained very good results by injecting the required amount of oil from a 10-ml. syringe into a Phillips airway placed in the mouth. If the airway is lifted forwards the distal end compresses the base of the tongue and points directly towards the larynx. This is merely an extension of the method whereby the oil is injected into the larynx, over the base of the tongue, from a syringe attached to a curved cannula, except that the airway replaces the cannula.

The technique should meet the following requirements: (1) it should be as simple as possible; (2) it should be as speedy as possible; (3) no inflammable agent should be used in the x-ray room; (4) the cough reflex should be abolished; (5) return of consciousness and the cough reflex should be rapid; and (6) the minimum quantity of lipiodol should be used. Adequate postural drainage of the affected lobes for 10 to 14 days before the examination is first carried out by a trained physiotherapist, either as an out-patient or as an in-patient.

METHOD

The child, having been tested for iodine sensitivity, is premedicated with quinalbarbitone sodium ("seconal") and atropine according to age, and is induced with nitrous oxide and oxygen, a flow of 2 litres per minute of oxygen and 4-6 litres per minute of nitrous oxide being eventually reached. Chloroform is added from the machine until stage 3 plane one (lower half) is reached, when carbon dioxide 1 litre per minute is added for a few breaths. The mask is removed and a Phillips airway inserted and tilted upwards so that its distal end compresses the base of the tongue and thus points towards the larynx. For a child of 5, 5 ml. (or more, according to age) of lipiodol is injected down the airway direct from a 10-ml. syringe. This is enough to fill the bronchial tree of one lung. The oil can be heard entering the larynx, as a gurgling sound is produced during respiration. The mask is reapplied, only nitrous oxide and oxygen being given, and the child is then turned quickly on to the side to be filled. Usually, no further posturing is required, but better filling of the anterior basic branches of the lower lobe can be obtained by sitting the child up and leaning him forward towards the appropriate side. Films are then taken, and while these are being developed the procedure is repeated if the bronchi on the other side are to be outlined. The amount of chloroform is minimal, averaging 1 drachm (3.5 ml.). The child is kept anaesthetized with nitrous oxide and oxygen only, until the films are developed; if these are satisfactory he can be allowed to regain consciousness. Screening can also be performed, but this is not essential.

Immediately after the operation the child is tilted into the head-down position, and each lung is then percussed and drained for about two to three minutes. In this way most of the injected oil is recovered. This is an important part of the technique. The total duration of the procedure is usually in the region of 15 minutes, and by the time the child leaves the x-ray department he is invariably a good colour and the reflexes have returned.

RESULTS

This technique has given very satisfactory results in our hands; any non-inflammable anaesthetic agent may be employed, but our preference for chloroform is determined by its freedom from the spasm associated with thiopentone, and the depth of anaesthesia is greater than that obtained with trichlorethylene.

The children are a good colour on return to the ward, and oxygen is very rarely required post-operatively; they are generally sitting up and taking an interest in their surroundings in one and a half to two hours after the bronchogram. It is of considerable importance that the follow-up radiographs show that the oil has almost completely disappeared from the lung fields in two to three weeks, and this is a great advantage if further bronchograms are required within a short period.

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