grey in colour, with a semi-fluid consistency and general loss of structure. The liver was also enlarged, and showed a purplish-grey friable cut surface. Hypostatic congestion was present at the bases of both lungs.

Dr. W. W. Woods, Consultant Pathologist to the Navy, reported on sections of the brain, spleen, liver, and kidney as follows:

"In the two pieces of brain many of the capillaries contain numerous minute nodules of pigment which is negative to Perles's test for iron; this is in keeping with its being malarial pigment. Further, the general configuration of the numerous well-defined dots of pigment is strongly suggestive of malaria. Some of the pigment appears to be in red blood corpuscles, where it ought to be, but much of it seems to lie free in the lumen of the capillaries, perhaps because the corpuscles containing it are very indistinct. Also, I found it impossible to stain the bodies of the parasites themselves, in which the pigment is presumably contained; in a very few instances I thought I could see the faintly stained body of the parasite around the dot of pigment. I can only presume that this failure to demonstrate the parasites is due to post-mortem degeneration or poor fixation, or both. In the white matter of the piece of cerebrum there are numerous petechial haemorrhages, some of them obviously perivascular and some of them ring-haemorrhages; there are very few in the grey matter and a considerable number in the more heavily myelinated part of the other piece of brain, whose site I fail to recognize. In spite of the failure to show the bodies of the parasites, I think there can be no doubt but that this is a specimen of cerebral malaria.

"There is abundant pigment in the spleen and—which I think is more significant—it is abundant in the Kupffer cells in the liver and free in the sinusoids, and is negative to the test for iron. There is very little pigment in the glomeruli of the kidney. I could not see the actual parasites in these three tissues."

Commentary

Lack of knowledge of the movements of the man's ship added to the difficulty of diagnosis in this case. It was afterwards ascertained that he had been in Sierra Leone two weeks before he was taken ill. The diagnosis was reached largely by exclusion, but on reviewing the presenting symptoms and signs they do fit in well with those of other cases which have been described. The comatose state with no abnormal signs in the central nervous system, the muddy sallow complexion, the moderate leucocytosis with a raised monocyte count, are all commented on by Sandford, Crawford, and Warr (1940). In the present case one striking feature was the pin-point pupils.

Differential Diagnosis.—The differential diagnosis includes, of course, all the causes of coma, but those particularly apt to cause difficulty are:

1. **Alcoholism.** The drowsy irrational state with slurred speech found in the early stage of cerebral malaria is very suggestive of alcoholism, as has been noted by Minett and Bernfield (1937).

2. **Meningitis,** in particular the fulminating meningococcal infections, may also be simulated. Wright (1941) stresses the fact that lumbar puncture should be carried out in every case, as cerebral malaria may cause neck rigidity, and the finding of *P. falciparum* in the blood does not exclude a coincident meningitis.

3. **Cerebral haemorrhage, thrombosis, or embolism** may also be mimicked by cerebral malaria. Embolic phenomena may be produced by malarial parasites.

The conclusive proof of the diagnosis in this country is the finding of *P. falciparum* in the blood. Usually an infection severe enough to cause coma is a heavy one, and a blood slide will show numerous parasites. A few cases, in particular those with an embolic onset, may have only a light infection, and parasites in the peripheral blood may be difficult to find.

Treatment.—Treatment should not be delayed while further diagnostic procedures such as sternal puncture are carried out. If the history and physical signs are suggestive quinine should be given at once. This may be a life-saving measure, and is helpful in diagnosis if a favourable response is obtained.

The fatal outcome in this case was disappointing, particularly after the dramatic response to quinine in the first 24 hours. However, it serves to impress the fact that if treatment is to be successful it must be prompt. The delay in treating the malarial infection before the complication of coma supervened was due to the patient's own foolishness in concealing his illness: in most cases malaria should be diagnosed and treated before pernicious complications occur. In this case quinine dihydrochloride was administered solely by the intravenous route. The dosage used—i.e., 10 gr. daily—was higher than

the 5 to 7 gr. advocated by Manson-Bahr (1942). No toxic reactions were seen that could be attributed to the intravenous quinine, but care was taken to give it slowly through a hypodermic needle into the intravenous drip apparatus. Adrenaline hydrochloride, 10 min. of 1/1000 solution, was always given at the same time. Intramuscular quinine is advocated in these cases by Wright (1941), but he does not give any reason for avoiding intravenous injection. Fawcitt and Walters (1941) recommend a transfusion of reconstituted blood serum as a detoxicating and stimulant measure, and Manson-Bahr (1940) recommends blood transfusion if there has been great blood destruction. Lumbar puncture, with removal of 10 c.cm. of cerebrospinal fluid, had no effect in relieving the coma in the late stages of this case, but in view of the marked pathological lesions of the brain found at necropsy this is not surprising.

I wish to express my thanks to the Senior Medical Officer of this hospital for permission to publish the case, and to Dr. W. W. Woods, Consultant Pathologist to the Navy, for his report on the pathological sections.

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Medical Memoranda

Suppurative Mastoiditis in an Infant

I have been much impressed by Mr. P. W. Leathart's paper entitled "A Common Cause of Diarrhoea, Vomiting, and Dehydration in Infants" (Aug. 7, p. 168). It struck me as having been based on sound reasoning and wide experience in a field apparently little recognized, but one of considerable importance. Although parenteral infection is universally known to be an important cause of "D. and V." in infants, only too often it gives place to the diagnosis of gastro-enteritis after the more easily detectable and better-known sites of infection have been excluded. I would like to cite the case of an infant recently admitted to the Southend General Hospital. Besides being a practical example of the point made above, this case tests the truth of most of the criteria laid down by Mr. Leathart for enabling a diagnosis of suppurative mastoiditis to be reached in the ward instead of in the post-mortem room. It is to be regretted that the diagnosis suspected in this patient had to be confirmed in the latter situation instead of on the operating-table. It may be hoped, however, that the lesson learned has helped to offset a fatal end-result.

HISTORY OF CASE

The baby was first seen on July 27, 1943, with a history of vomiting after feeds since birth. Apart from rapid delivery, the previous history was negative. His birth weight was 6½ lb. and he was breast-fed. Stools were "loose" but otherwise normal. Examination revealed a healthy infant, weighing 7 lb. 14 oz. No abdominal mass was felt, nor was peristalsis seen. He was admitted for observation and weaning, and was discharged a fortnight later, having gained 1 lb. and having been taking five milk feeds daily without vomiting.

He was readmitted on Oct. 30, aged 4½ months. The mother stated that for one week he had vomited after every feed, that he "pumped it up," and that much clot was present in the vomit. As previously, examination was entirely negative. He looked a healthy, well-developed infant, and weighed 12 lb. 14 oz. He fed eagerly, even greedily, and was given boiled water and chloral before feeds. Vomiting was completely controlled after five days, while weight was gained after a small initial drop. During this time the stools remained normal in frequency and colour. Nov. 6: Weight 13 lb. 1 oz., feeding well but greedily. Nov. 11: Pyrexia (100° F.) noted; stools, though not frequent, were green, and vomiting occurred once; general condition good. From this time onward a remittent temperature to 102.4° was maintained; stools were frequent, green, and offensive (up to 7 in 24 hours), with occasional vomiting. The infant looked pale, but lay quietly and showed no signs of dehydration. Glucose-saline was given by mouth combined with a course of succinyl-sulphathiazole.

Meanwhile investigations were carried out. Radiographs of chest, examinations, and culture of the urine were negative. Blood examination showed Hb 84%, W.B.C. 13,600, with 59% polymorphs. Culture of stools revealed no pathogenic organisms, except on the second occasion, three days before death, when a few colonies of *B. proteus* were found.

Nov. 18.—In spite of treatment, which included restriction of everything by mouth to boiled water, glucose-saline, and amino-acids (in the form of casein hydrolysate), a slow subcutaneous normal-saline drip, and two courses of succinyl-sulphathiazole, the little patient was obviously going downhill. On examination he lay quietly, with the head persistently turned to the left, so that a bald patch formed over the left parieto-occipital region. He was irritable, and any examination caused him to cry, but light pressure over either mastoid was not especially resented. The right ear was noted to be pushed forward as compared with the left, but the surrounding skin was neither red nor oedematous.

Three observers, including a surgeon, who examined the drums, pronounced them normal. At no time was any discharge seen. The glands in the right posterior triangle were found to be palpable, in contrast to the left, but were not greatly enlarged or tender. The diagnosis of bilateral suppurative mastoiditis was considered, but the paucity of localizing signs did not seem to merit surgical intervention. Conservative treatment was continued. The patient went steadily downhill, and died on Nov. 25.

Necropsy revealed extensive bilateral suppurative mastoiditis, more marked on the right side. The alimentary tract, apart from distension of the small intestine, appeared normal. There was no injection of the mucous membrane or prominence of Peyer's patches. The lungs were congested and oedematous. The meninges and superficial cerebral vessels showed considerable congestion. Dehydration was not a prominent feature.

COMMENTARY

It is felt that had bilateral mastoidectomy been undertaken the infant's life would probably have been saved. The reasons for making this statement and the salient features of the case may thus be summarized: (1) A healthy infant who is a greedy feeder vomits as a result of the latter. Vomiting takes place in the horizontal position, and this, plus the manner of feeding, invites entrance of vomit and milk into the Eustachian tubes. (2) For no apparent reason remittent pyrexia, diarrhoea, and vomiting make their appearance. (3) Investigations prove negative, and there is no response to treatment, including chemotherapy. (4) A bald patch forms on the left side, while the right ear is pressed forward as compared with the left, and the glands in the right posterior triangle are found to be enlarged. (5) A steady downhill course ensues, ending fatally, with post-mortem findings of extensive bilateral suppurative mastoiditis.

I wish to thank Dr. R. Sleigh Johnson for his permission to publish this case.

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Sulphathiazole Insufflations as a Treatment of Gonococcal Vaginitis

Under present war conditions any method which promises well in the treatment of gonococcal lesions in the female should be made known without the customary prolonged and exhaustive private investigation. No claims are made, no conclusions or apologies offered, and no recriminations will be necessary if yet another treatment eventually proves ineffective.

There is nothing new about the treatment of gonococcal lesions in the female by sulphapyridine, sulphathiazole, and allied preparations as given orally. The results are not well known, but in many instances are disappointing. The chronic cases seem particularly resistant. The insufflation of "picragol" powder into the vagina for trichomonad infestations has been established, and is widely known. The combination of insufflation with sulphathiazole powder does not seem to have been suggested to date. My own experience with sulphathiazole insufflations in the gynaecological out-patient department of Sir Patrick Dun's Hospital, Dublin, in cases of chronic and subacute gonococcal vaginitis and endocervicitis, has been so dramatic that I draw attention to it so that others may, if they approve, put the plan to the test.

The treatment consists of the bi-weekly insufflation of 5 to 7 g. of powdered sulphathiazole with a "picragol" insufflation apparatus and following the directions for its use. No oral chemotherapy or other treatment has been employed at the same time. In brief, the cases treated have been those of the troublesome subacute and chronic proved gonococcal variety which have defied every usual remedy. In each case three insufflations, as described, have caused almost complete cessation of all discharge and soreness. Such slight discharge as may then still be present is clear and would be regarded as normal but for the previous knowledge of the case.

This result seems too good to be true, and may be so. The truth or otherwise of the early results can be readily and simply put to the test. The principles on which the treatment, if successful, would depend are well known and need no explanation here.

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Reviews

MEDICAL MYCOLOGY

An Introduction to Medical Mycology. By George M. Lewis, M.D., and Mary E. Hopper, M.S. Second edition. (Pp. 342. \$6.50.) Chicago: The Year Book Publishers Inc. 1943.

In these days of authorized economy standards it is refreshing to meet with a volume in which the American skill in book production is allowed to have its head. The second edition of Lewis and Hopper's *Medical Mycology* is well up to the usual transatlantic level. We are glad that, in spite of the seriousness of the times which weighed upon the authors when considering republication, they have seen their way to producing this delightful volume and to embellishing it with two excellent coloured plates, which are a novel feature. As is customary in new editions, expansion has taken place and a few gaps in the original work have now been filled up.

It is beyond question that medical mycology grows in importance from year to year, and especially for the dermatologist. Perhaps the problem of greatest practical moment in the whole subject is that of epidermophytosis of the feet, popularly known as "athlete's foot." This no doubt is quite common, but during the last few years it has become fashionable to diagnose almost every inflammatory condition of the skin of the toes and sole under this label without any pathological proof, either from microscopical examination of fresh tissue or from cultural tests, of the presence of the epidermophyton. For this reason vast numbers of cases of simple dermatitis in these regions have been aggravated by the use of strong fungicides. We are glad to find that Drs. Lewis and Hopper are strongly of opinion that the diagnosis of epidermophytosis should never be made without laboratory confirmation. The same remarks apply, with even more force, to the secondary eruptions which sometimes occur in conjunction with epidermophytosis and which are known as dermatophytids or trichophytids. They say that these are diagnosed much too often. The chapter on epidermophytosis deserves careful study by all practitioners, especially perhaps by those, like the medical officers of the Forces, who have charge of large numbers of people living together in camps or institutions.

A new disease, which did not receive notice in the first edition, is histoplasmosis. This is a rare but usually fatal disease that occurs in Central America, characterized by hepatosplenomegaly, and is interesting because clinically it resembles leishmaniasis. Histoplasmosis is also noteworthy because it appears to be only the second example of a fungoid infection which does not primarily affect the skin; the first one to be differentiated was the *Cryptococcus histolyticus*, which affects the nervous system. The recommendation made above, that medical men in general should study the chapter on athlete's foot, applies really in equal measure to the whole of this excellent volume.

GENETICS OF THE MOUSE

The Genetics of the Mouse. By Hans Grüneberg, Dr. Phil., Dr. Med. (Pp. 412; illustrated. 30s.) Cambridge: University Press. 1943.

In the field of genetics it is difficult to draw a line between pure and applied research. Small, cheap, rapidly reproducing animals present manifest advantages, and for many purposes must be the standard material of the investigator. But discoveries relating to larger animals may be no less fundamental, and research on any species, variety, or breed may on occasion contribute to the advancement of the subject as a whole. Man himself is not excluded. For example, more is known about geographical variations in the distribution of the blood-group genes than is known in the case of any other genes, whether plant or animal.

In this admirable book Dr. Grüneberg points out that, though the mouse is the best-investigated mammal, the omission of all results obtained from it would hardly affect the textbooks as