Even as regards the treatment of megacolon, there is much difference of opinion. In the case here related treatment was of necessity surgical: colectomy was demanded, and the result surpassed expectation.

Colostomy may be done as a first stage, but should, if possible, be followed by excision of the artificial anus with colectomy and anastomosis. Mummery advises the lumbar route for colostomy, saying that inguinal colostomy is very dangerous, as the heavy bowel tends to tear away, that a spur cannot be formed, and the obstruction is often not relieved, and that he has only found two cases in which any real benefit resulted.

Colectomy, no doubt, is a very formidable undertaking in a toxic, undernourished patient, especially in the presence of a faecal fistula; but most people would prefer to take the risk to passing adolescence and maturity in the alternative condition.

TREATMENT OF GENERAL PARALYSIS BY MALARIA.

BY

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DURING the past two years (from November, 1922, to November, 1924) 608 acute male cases have been admitted to this hospital. Most of the patients giving a history of syphilis, or showing signs and symptoms, definite or suggestive of a late specific infection, have been subjected to the diagnostic biochemical tests. The Wassermann and Sachs-Georgi tests have been applied to the blood and cerebro-spinal fluid, and the colloidal gold test to the latter. Of the two years' admissions, 89 (14.6 per cent.) have been diagnosed as suffering from general paralysis. This percentage may later prove to be greater, as many patients recently admitted have not yet been subjected to the various tests.

The youngest patient (acquired infection) was aged 27, the oldest 61. The duration of the attack before admission, as shown by change of conduct, varied from seven days to five years. As a cause of death general paralysis accounted for 44 out of 95 deaths in the two years—that is, 46.3 per cent., a remarkably high figure.

In November, 1923, the malarial treatment of general paralysis was commenced. Professor W. Yorke of the Liverpool School of Tropical Medicine kindly provided the mosquitos (*Anopheles maculipennis*) infected with an Indian strain of *Plasmodium vivax*. During the year 53 cases were treated. The infection was conveyed by the mosquito in 23 cases; by inoculation in 30 (intravenous 16, intramuscular 13, subcutaneous 1). The incubation period, measured by the appearance of parasites in the peripheral blood and the occurrence of fever, varied according to the mode of infection, thus:

	Average.	Shortest.	Longest.
Mosquito	14 days	7 days	20 days
Intravenous	7 "	4 "	19 "
Intramuscular	16 "	10 "	23 "
Subcutaneous	20 "	—	—

In two cases the incubation period following intravenous inoculation was four days.

(a) April 14th, 1924: Inoculation of 2 c.cm. of blood from donor during apyrexial period after six double tertian rigors. Pyrexia of 102° F. on afternoon of 17th; blood positive on April 18th.

(b) May 28th, 1924: Inoculation of 2 c.cm. of blood from donor after three single tertian rigors. Pyrexia of 101° F. on night of May 31st; blood positive on June 1st.

The infected patients were allowed to have rigors; ten was the number aimed at, but in thirty instances, owing to the poor general state of the patient, the malaria was cut short with quinine sulphate somewhat sooner. Thirty grains daily for three days were always given. Seven rigors was an average number. Spontaneous cure with disappear-

ance of the parasites occurred in 8 of the remaining 23 cases (34.7 per cent.) after three to nine rigors. This percentage would probably have been greater had the malaria been allowed to run a longer course in some of the other cases.

It is generally considered that large doses of the arsenical compounds are contraindicated in cerebro-spinal syphilis. Doses of 0.15 to 0.3 gram novarsenobillon were given at first; this dosage was increased, and finally 0.9 gram was given intravenously at the height of the pyrexia. Seven cases were treated with this maximum dose and no ill effects were observed. The parasites became scanty within two days, but quinine in the usual dosage was finally given to clear the blood.

When remission in the general paralysis occurred it took place at any time; in some during the period of malarial pyrexia and in others as long as six months later.

Results of the 53 Cases Treated.

1. Complete remission	7=13.2%
2. Improving both mentally and physically	9=16.9%
3. Slight mental with improved physical health	17=32.0%
4. No change mentally or physically	5=9.4%
5. Deaths from time of treatment up to one year after, including 6 who collapsed	15=28.3%

In Class 3 seven of the patients were bedridden, dull and confused, and wet and dirty in their habits; following treatment the mental condition improved slightly, but the physical change was marked. The patients put on weight, regained control of the sphincters, and were soon able to be up and about in the ward. Two patients have been in this state of partial remission for twelve months.

Relapses of the malaria have been frequent (14 up to date). Of the original 23 mosquito infections, 13 (56.5 per cent.) have relapsed, whereas of the 30 inoculated cases only one (3.3 per cent.) has relapsed. The relapses in the mosquito-infected cases have occurred at periods varying from twenty-one days to eleven months after. The usual three-day course of quinine was given, but in a number of instances two, and even three and four, further pyrexial attacks were observed.

Wagner-Jauregg,¹ Mühlens,² Kirschbaum,³ and Grant and Silverston⁴ have already pointed out the infrequency of relapse in inoculated cases of malaria. The high percentage of relapses in the mosquito-infected cases is similar to the percentage of relapses in the naturally infected cases of the late war—38 to 100 per cent. of relapses following courses of quinine (Yorke and Macfie⁵). It would appear that passage through the mosquito in some way produces an infection which is more difficult to cure than the inoculated disease, though the two infections would appear to be identical as regards the type and severity of the pyrexia and the blood picture. Following the hypothesis of Yorke and Macfie, the mosquito strain, whilst reacting to quinine, in many instances soon becomes resistant to the immune body; some parasites persist, though not found in the peripheral blood, there being a state of balance. Sooner or later the balance is lost by decrease or weakening of the immune body; the parasites multiply and relapse occurs, with or without a rise of temperature according to the reaction of the host. On the other hand, the inoculation strain responds to quinine, and would appear to be completely destroyed by the immune body formed. The question still remains, however, why patients infected by the mosquito relapse so frequently as compared with those inoculated under the same conditions. In these experimental cases it would appear that the mosquito strain is more resistant, rather than that there is variation in the capacity of the host to produce immune body.

Infection followed feeding by mosquitos, or the injection of malarial blood, in all cases treated, but in two instances there was no pyrexial attack, simply the appearance of parasites in the blood. Blood infection only, without pyrexia, occurred also in a third patient who already had had an attack of inoculated malaria. The circumstances are of interest.

CASE I.

The patient had been treated with malaria in a general hospital four months previous to admission to the Mental Hospital. He had had eight to ten rigors, followed by spontaneous cure, but parasites persisted in the peripheral blood. On January 7th, 1923, when malaria treatment was considered, the blood was found to be positive. Quinine sulphate, 10 grains daily, was given

from February 15th to 29th. Infected mosquitos were fed on February 20th, and thus 60 grains were given before the infection and 90 grains after. No pyrexia followed, but the blood showed scanty parasites from March 14th for a few days, thereafter becoming negative. On April 23rd parasites again found. From April 23rd to 25th quinine sulphate, 30 grains daily, was given. On May 24th an intramuscular injection of 2 c.cm. of infected blood was given, but no infection followed, the blood remaining negative.

CASE II.

The patient gave a history of malaria previously. On August 23rd, 1924, an intramuscular injection of 2 c.cm. of infected blood was given. No pyrexia followed, but the blood became scantily positive from September 2nd to 6th; thereafter it was negative. On September 16th the patient was again inoculated intramuscularly with 2 c.cm. of infected blood. The blood became positive from September 20th to 27th, but there was no temperature. On December 7th, 9th, 12th, and 15th intramuscular injections of 1 c.cm. of adrenaline were given, and on December 10th 1 c.cm. of milk. The blood continued to be negative until December 15th, when two infected cells were found in the blood film.

CASE III.

The patient was infected with mosquitos on November 23rd, 1923; double tertian infection followed; he was allowed to have twelve rigors. Quinine sulphate, 30 grains daily, was given from December 23rd to 25th. As there had been little mental change an attempt was made to reinfect on July 20th by intramuscular injection; no temperature followed, but the blood was positive from August 1st to 4th; after that it was negative. Even here, however, the parasites appear to have become resistant to the immune body, for there was relapse with parasites in the blood from August 24th to 30th, but no temperature.

SUMMARY.

1. The malaria treatment of general paralysis is justifiable and hopeful, provided the patients are in fair physical health. The earlier the case the better the prognosis. The treatment is contraindicated where the patient is likely to have a fatty heart or where there is poor physical health. It may be added that the administration of strychnine, with digitalin or strophanthin to steady the heart, is advisable and helpful, especially during the later pyrexial attacks.

2. Relapses of malaria do occur, but practically only in mosquito-infected cases.

3. Compared with infection by the inoculation of trophozoites, it would appear that infection by the sporozoites from the mosquito produces a parasite which readily becomes resistant to the immune body, and thus relapses frequently occur.

4. A previous attack of malaria would appear to induce partial immunity; although scanty parasites appear in the peripheral blood, there is no rise of temperature.

I wish to thank Professor Warrington Yorke for providing the infected mosquitos and for his encouraging advice; Dr. G. A. Watson, pathologist to Rainhill Mental Hospital, for assistance with the biochemical tests; and Dr. F. M. Rodgers, medical superintendent of Winwick Mental Hospital, for permission to publish these notes, and for his kindly supervision and guidance.

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CONGENITAL NYSTAGMUS.

BY

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THE occurrence of congenital nystagmus is sufficiently uncommon to justify the record of a series of cases in a single family in which the condition appears to be hereditary.

A woman, aged 55 years, recently consulted me about her eyesight. She had marked nystagmus of the lateral movement type, without rotary movements of the eyeballs or spasm of the eyelids. Her optic discs were pale, but beyond a moderate degree of presbyopia there was no visual defect. The woman volunteered the information that her father and grandmother (both of whom she remembered well) had always suffered from a similar condition. The patient had six children—five daughters and one son. Of these children, the son suffered from marked nystagmus, but with the exception of one of the daughters (who suffered from slight nystagmus) the female children showed no trace of the condition. The son married recently, and his young

daughter has nystagmus. Hence it can be seen that in five generations of this family nystagmus makes its appearance, and is transmitted through both male and female members of the family. I cannot recall any instance of an abnormal condition transmitted so definitely both by male and female. In haemophilia, and in the muscular dystrophies, transmission of these diseases is through the female to the male, the female very rarely suffering from the condition.

Some points of general practical interest also arise in this connexion. Some time ago a coal-miner suffering from nystagmus endeavoured to establish a claim for compensation on the ground that his nystagmus was due to his occupation. It was subsequently discovered, however, that at an early age the patient had been seen by the surgeon who was now examining him for compensation. The surgeon's notes showed that the patient had suffered from nystagmus, which had manifested itself at an early age, before he entered a coal-mine. Hence the claim for compensation failed.

During the recruiting days of 1916 one of the male members of the family whose history I have outlined was called up by the army authorities for examination as to his fitness for service. The examiner noticed that the man had nystagmus, so in view of the man's statement that he was a coal-miner he told him that he was unfit for service. A careful examination, however, would easily have excluded miner's nystagmus, for apart from the movements of the eyeballs and slight nodding spasm there were no other signs to justify this diagnosis.

Memoranda :

MEDICAL, SURGICAL, OBSTETRICAL.

GREEN TEETH FOLLOWING PROLONGED
JAUNDICE IN INFANCY.

THE occurrence of green teeth following jaundice in infancy is so rare that the following case is worth recording.

History.

Caroline F. is now 2 years and 4 months old. She was born at full term after a normal labour. The mother, now 39 years old, enjoyed good health during the pregnancy and had no illnesses or fevers of any kind; she has had no miscarriages. The father is 44 years old, and is well. There are three brothers (aged 24, 18, and 14), and three sisters (aged 20, 8, and 4), alive and well; none of these children showed jaundice at any time. One sister (the third child) died when a week old; it suffered from imperforate anus, which apparently could not be relieved; it was not jaundiced. There is nothing else noteworthy in the family history.

C. F. was born jaundiced—"as yellow as a duck's foot" the mother said; the skin of the whole body and limbs was coloured yellow, and so were the sclerotics. The jaundice continued to be intense and quite constant for three months, then it became gradually less, but it had not entirely disappeared until the child was 7 months old. All this time the child was "fairly well in itself." The motions (two or three a day) were green, loose, and slimy for six months. The child for six months was given a grey powder each day. All that the mother can tell about the urine is that it stained the clothes a deep yellow for several months. The umbilical area was "septic" for three weeks after separation of the cord. At birth the child weighed 5½ lb., and it regularly increased in weight, so that at 8 weeks it weighed 8½ lb., at 24 weeks 13 lb., and at 1 year 21 lb. It was never at the breast, but was fed on cow's milk (diluted suitably) until it was 9 months old, and thereafter there were the usual additions to its dietary.

With the exception of the prolonged jaundice and "a slight bronchitis every time she cut a tooth," the child has had no illnesses of any kind. The first tooth, a lower incisor, was cut at 9 months, and teeth appeared regularly after that in this order: lower central incisors, lower lateral incisors, upper central incisors, upper lateral incisors, first molars, then, at 2 years, the lower canines, and lastly the upper canines (not yet fully erupted). The first tooth "came in green," and all the others have done the same.

Condition on Examination.

The child is well developed and well nourished, and weighs 28 lb. There is some rickety thickening of the bones about the wrists and ankles; otherwise the chest and limbs are well formed. Nothing abnormal was found on examination of lungs, heart, nervous system, or abdomen. The spleen is not palpable. The liver edge can just be felt at the costal margin. The urine and stools are normal. No jaundice is now present. Mentally the child is normal. The Wassermann reaction is negative.

I am indebted to Dr. Crombie, dental surgeon to the hospital, for the following report on the teeth: "The temporary teeth are stained green, to the extent of the whole of the crown of the central incisors, about three-quarters