pre-erythrocytic development of the parasites takes place in the parenchymal cells of the liver with the production of merozoites which invade the erythrocytes to establish the blood infection. At the same time strong evidence has been adduced to suggest that this developmental cycle in the liver persists after the establishment of the erythrocytic infection, may even exist without the latter, is relatively unaffected by the immunity response of the host, and is the probable source of relapses of the disease.

BIBLIOGRAPHY

- Angelini, G. (1947). *Riv. Parasitt.*, **8**, 5.
 Fairley, N. H. (1945). *Trans. R. Soc. trop. Med. Hyg.*, **38**, 311.
 — (1947). *Ibid.*, **40**, 621.
 Huff, C. G., and Coulston, F. (1944). *J. infect. Dis.*, **75**, 231.
 James, S. P., and Tate, P. (1938). *Parasitology*, **30**, 128.
 Mudrow, L. (1940). *Arch. Schiffs- u. Tropenhyg.*, **44**, 257.
 Shortt, H. E., Fairley, N. H., Covell, G., Shute, P. G., and Garnham, P. C. C. (1949). *British Medical Journal*, **2**, 1006.
 — Garnham, P. C. C., Covell, G., and Shute, P. G. (1948). *Ibid.*, **1**, 547.
 — Menon, K. P., and Iyer, P. V. S. (1940). *Indian J. med. Res.*, **28**, 273.

petechiae were present in the corpus callosum. The clinical story and post-mortem appearances are consistent with the diagnosis of atropine poisoning.

COMMENT

An analysis of the ointment showed that it contained 0.8% of atropine alkaloid, and the analyst stated that at least seven-eighths of the original quantity of the ointment dispensed was sent to him for analysis. Approximately $\frac{1}{2}$ gr. (32 mg.) of ointment was picked up on the glass rod at each application. The total quantity administered, therefore, was approximately 3 gr. (0.2 g.), containing 1.6 mg. of alkaloid. The possibility that the child may have swallowed some of the ointment was considered, but almost all the ointment originally dispensed was accounted for.

Morton (1939) reported nine cases of atropine poisoning, two of which were fatal. In the first case six drops of 1% atropine solution were dropped into an injured eye, and after operation 1.5 g. of 1% atropine ointment was placed on the dressing next to the eye. Death occurred fourteen hours later. The total amount of atropine administered was 18.1 mg. In the second fatal case the pupils of both eyes were dilated with 1% atropine solution. Death occurred in under twenty-four hours and the total amount of atropine administered was 2 mg.

Hughes (1938) recorded a case, not fatal, in which 1% atropine ointment was smeared into both eyes twice daily for three days. On the third day the child was reported to be ill with a temperature, and the skin was flushed and very dry to the touch. Morphine and pilocarpine were given and recovery was uneventful.

My thanks are due to Dr. M. Sadiq for permission to publish this case and to Dr. H. G. Close for the pathological report.

W. E. HEATH, M.B., B.S., D.O.

REFERENCES

- Hughes, C. A. (1938). *Trans. Ophthalm. Soc. U.K.*, **58**, 444.
 Morton, H. G. (1939). *J. Pediat.*, **14**, 755.

Medical Memoranda

Death from Atropine Poisoning

The following rare case is interesting enough to be placed on record.

CASE REPORT

A boy aged 2 years 9 months was brought to hospital on May 20, 1950, for the treatment of an alternating convergent squint which his mother had noticed five months previously. Atropine ointment 1% was prescribed and approximately 90 gr. (6 g.) was dispensed. The mother was given a glass rod with printed instructions about the method of administration.

The ointment was first used on May 23, when two applications were given, the first in the afternoon and the second in the evening. The mother stated that the application was made by first dipping the rod into the ointment, and that the amount applied was quite small. Next morning the child was not well and the parents called in their doctor, but a further application of the ointment was given. On the morning of May 25 the child had no breakfast, and at 9.15 a.m. he had a fit (tonic and clonic contractions) and was semiconscious afterwards. At 11 a.m. he had another fit, and was admitted to All Saints' Hospital, Chatham, at 2.20 p.m. under the care of Dr. Sadiq.

On admission his temperature was 97° F. (36.1° C.), pulse 120, and respirations 32. He was a well-nourished child. He had sordes on his lips; petechiae, mainly on the left side of the trunk; dilated pupils, not reacting to light; and slight opisthotonus. The cerebrospinal fluid was normal in every way. There was no growth of organisms from a throat swab. The white blood cells numbered 28,000 per c.mm. (polymorphs 72%, lymphocytes 23%, monocytes 5%). The blood sugar at 4 p.m. on the 25th was 30 mg. per 100 ml. Next day he had petechial haemorrhages on his neck, upper chest, elbows, and forearms, and a papular rash on his legs. His blood pressure was 130/60. His voice was hoarse; he cried without shedding tears and was restless. The blood urea was 60 mg. per 100 ml. He died at 9.45 p.m.

Post-mortem Examination.—This was carried out at 3.30 p.m. on May 27 by Dr. H. G. Close. The body was that of a well-nourished male child of stated age. The eyes were sunken and the pupils dilated. Bruises were found on the tip of the right iliac crest and below the left ankle. The air passages and lungs were dry. Several petechiae were present on the anterior aspect of the heart (weight 3 oz.—85 g.). There was a very small vegetation on the mitral valve. The thymus weighed 1 oz. (28 g.), the spleen 2 oz. (57 g.), and the lungs 9 oz. (255 g.). The liver (18 oz.—510 g.) was very pale, with several petechiae on the surface; microscopically, extensive fatty changes were seen. No gross abnormality was found in the kidneys (3 oz.—85 g.). The brain (44 oz.—1.25 kg.) was mushy, soft, and tore easily, and

Neurological Complication After Combined Diphtheria and Pertussis Immunization

The occurrence of severe complications after an injection of pertussis vaccine is rare enough to merit record.

CASE REPORT

A girl aged 1 year was admitted to hospital on July 17, 1948, with left hemiplegia. She had been a healthy infant. There was no family or personal history of convulsions or allergy. Injections of diphtheria A.P.T. on May 9 and 19 had caused no apparent untoward effect. An injection of pertussis vaccine on June 17 similarly had caused no ill effect. On July 15 a mixture of alum-precipitated pertussis vaccine and diphtheria A.P.T. had been injected, and a few hours later she is said to have been quieter than usual, but by bedtime (about 17½ hours later) had become her usual self again. Early next morning she had been found in a fit with twitching of the face and both limbs on the left side, and 2½ gr. (0.16 g.) of phenobarbitone had been given. Shortly afterwards a state of semi-coma had ensued, lasting several hours, and later a left hemiplegia had developed.

On admission the child was very irritable, her temperature was 102° F. (38.9° C.). Physically she was well nourished. She had a left hemiplegia with little movement of the upper limb and none of the lower. The reflexes of the upper limb were absent, the knee-jerks were present and equal, but the left ankle-jerk was absent. The right plantar response was flexor but the left was indefinite. The abdominal reflexes were absent. There was no detectable involvement of the cranial nerves and the fundi oculorum were normal. The pyrexia subsided in two days.