there may have been hundreds of unregistered cases. This year there have been about 7,600 attacks and 4,256 deaths.

Kashmir, with its protecting belt of mountains, lies so far from the plains of India, and has so cold a winter, that cholera is not endemic. Indeed, a special train of circumstances is almost required if the valley is to become infected. In 1888 the hundreds of camp followers of the Maharajah brought it in. I remember, on the day of his arrival, meeting four men, on the bank of the river, carrying into the city an emaciated corpse-like form, a man in the collapse stage of cholera. A few days later the disease broke out in all directions. Since then improved roads and increased facilities for travel have tended to increase the risk of periodic outbreaks. Even now the long mountain roads, crossing passes and rivers at intervals, admit of the application of quarantine. And yet, even with such favourable conditions, this has nevertheless failed absolutely.

Cholera had been prevalent in the Punjab during the summer. A traveller from the Lyallpur District was taken ill and died of cholera on the Banihal road, one of the shortest routes to Kashmir, on July 18th. About 4,000 coolies were working on a new road close by. On July 21st the disease broke out amongst these, and 200 cases occurred, of which 176 died. Probably a large number of the milder cases were concealed. The survivors fled, many of them to Kashmir, carrying, no doubt, the infection with them. Hindu pilgrims, too, on their way to the sacred cave of Amarnath, at the north-east of Kashmir, traversing the infected districts, also suffered, and acted as carriers.

After a time of anxious expectation it was announced that cases of cholera were beginning to appear at the east end of the valley, the point at which the Banihal road enters. By September 3rd, 470 cases had occurred, 35 villages were infected, and, worse still, 18 cases had appeared in the city of Srinagar, which has a population of 125,000. The disease continued to spread, and on September 12th there were 93 new cases in Srinagar, and 143 in the district around. After this there was a gradual decline in the city. The maximum in the surrounding district was reached on September 28th, when the record of new cases was 250. From this time there was a steady improvement. On October 24th there were only 40 fresh attacks in the whole valley.

Compared with the last two epidemics this one has been comparatively small. The reasons are not far to seek: (1) A good supply of pipe water has been brought to the city; (2) in the early autumn the nights begin to get quite cold owing to the altitude; (3) a great deal has been effected in the way of sanitation during the past few years.

The introduction of a supply of pure water has saved hundreds of lives in Srinagar. In spite of this, however, in some of the more crowded and insanitary quarters, the disease appeared to obtain at any rate a temporary footing.

The mortality as a whole was very constant, being about 56 per cent. The records of some districts are much higher. This may be due partly to the intensity of the poison, but is more probably owing to the concealment of non-fatal cases. As time went on there was a tendency for the attacks to assume a milder character. The cold no doubt checked the growth of the bacilli outside the body. Rain appeared to favour the spread of the disease. Continuous rain, however, which ushered in colder weather, proved very beneficial.

Prophylactic treatment with sulphuric acid is, I believe, of value in averting the disease. At the Mission Hospital all cases of chronic diarrhoea were treated in this way. Only one was attacked, and in spite of debility (due to traumatic discharging empyema, the result of a severe gunshot wound, for which he was under treatment), he made an excellent recovery.

The immense importance of early treatment with some preparation of opium cannot be too strongly insisted upon; 70 per cent. of those treated by us in this way recovered. The proportion would have been larger, but our returns included bad cases to which we were called too late. In two cases on the second day I found an appearance of spores in the bacilli after prolonged staining with carbol-fuchsin, a point of some interest, as their existence is denied by high authorities.

During the epidemic excellent work was done by Major Roberts, Acting Residency Surgeon, and by Dr. A. Mitra, the Chief Medical Officer to the Kashmir State.

QUININE HÆMOGLOBINURIA.

By A. G. WELSFORD, M.D., F.R.C.S.ENG.,
Johannesburg, South Africa, late P.M.O. of the Beira Railway.

WITH regard to the theory that the so-called blackwater fever of the tropics is a peculiar condition caused by the administration of quinine in malarious patients, few (if any) practitioners who are experienced in tropical practice believe that this is a common cause, because while they are in the habit of prescribing quinine in large doses for all varieties of the malarial fevers, they do not practically find that blackwater fever results, and they also know that blackwater fever is a strictly localised disease, and that there are some malarious districts Africa which are free from it.

It is a fact that quinine can in certain very rare cases cause hæmoglobinuria, but so rare are they that there are few observations on record. The following case is interesting as being one of these rare cases.

CASE I.

A.B., a white prospector, was admitted into the Beira Railway Hospital in June, 1899. He had been in the country nine years, and had just returned from a trip into the interior, which had lasted nine months. He was suffering from a high degree of malarial cachexia. He had had frequent slight attacks of blackwater fever during the previous three years. He rarely, if ever, took quinine. On admission he objected to take quinine, alleging that a single dose invariably made his urine black, but he eventually consented to take two 10-grain doses, which were administered at 8 A.M. and 2 P.M. At 6 P.M. the patient had a rigor; the temperature, which before was normal, rose to 105° F. with vomiting and pain. At 7 P.M. he passed 10 ounces of black urine. He improved during the night, and next morning his urine was clear, but still contained a little albumen.

Before taking the quinine the patient had been up and about, and there was therefore a possibility of the hæmoglobinuria having been due to chill. To obviate this source of error the patient, who took a most intelligent interest in his case, after his temperature had remained normal for a period of seven days was put to bed for two days. On the third day two 10-grain doses of quinine were given with the same result; the temperature rose in the evening with rigor, vomiting, and pain, and 12 ounces of black urine were passed. The following morning the urine was clear, and in two days there was no albumen.

CASE II.

A more doubtful case of quinine hæmoglobinuria occurred in the case of a man who was admitted with a somewhat severe attack of blackwater fever. This was treated without quinine and the patient recovered. Three weeks later his temperature rose to 100° F. and 10 grs. of quinine were ordered three times a day. Two days later his temperature suddenly rose to 105° F. and his urine became black and continued so for two days. As in this case the symptoms were well marked; this attack may have been a relapse.

The exact relationship between blackwater fever and malaria is not yet made out, but the symptoms of blackwater fever are so definite that the fever can be readily distinguished from the transient hæmoglobinuria which in the first-mentioned case followed the administration of quinine.

Hæmoglobinuria may be produced by several poisons, among which are potassium chlorate, carbolic acid, and arseniuretted hydrogen. It is in this category that quinine hæmoglobinuria must be placed.

Blackwater fever, if not due to a specific organism, is due to the toxin of malaria, and falls in line with the hæmoglobinuria sometimes produced by the toxins of syphilis, yellow fever, enteric, and scarlet fevers.

MEMORANDA: MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, Etc.

A FATAL CASE OF POISONING WITH ZINC SULPHATE: NECROPSY.

I WAS called to see A. C., a widow, aged 53 years, at about 5 P.M. on July 5th, 1900. She was said to have swallowed a large packet of sulphate of zinc at some time between 1 and 3 P.M. She was suffering from severe pain in the stomach and bowels, paleness of the countenance, coldness of the limbs, irregular pulse, and cold sweats, with purging, but had only vomited about a teaspoonful. I administered a large amount of carbonate of soda diluted freely with tepid water. Copious vomiting of a white fluid ensued (showing presence of carbonate of zinc). After which I directed that she should be frequently given white of egg and milk, and later on, when signs of collapse appeared, whisky with the latter. I injected