

which had not yet been subjected to medication, and in which a febrile paroxysm had just been inaugurated. A drop of blood from the patient's finger was brought directly under the microscope, and Dr. Marchiafava soon succeeded in demonstrating to me in a most satisfactory manner the presence, in several red blood-corpuscles, of the organism referred to. I saw the amoeboid movements very distinctly, and cannot doubt that the extremely minute, transparent, and apparently structureless mass which I was looking at was, in truth, a living organism.

The space at my disposal will not permit me to review the evidence in favor of the supposed causative rôle of this blood-parasite. It is evident that further researches will be required before this can be accepted as definitely settled; but I must call attention to the fact that all of the observers mentioned testify that granules of black pigment are frequently found in the interior of the parasite (figs. 26 and 27). Pathologists have long since recognized the presence of similar pigment in the blood and in various organs as a distinguishing characteristic of malarial disease; and it has been generally agreed that this pigment has, in some way, had its origin from the haemoglobin of the red blood-corpuscles. These, by some agency, are destroyed in large numbers during a malarial paroxysm. This has been proved by actual counting of the number of corpuscles in a given quantity of blood drawn before and after the paroxysms, and is made apparent by the rapidly developed anaemia which results from malarial attacks.

Marchiafava and Celli propose to call this organism *Plasmodium malariae*. Laveran has abandoned the name first suggested by him—*Oscillaria malariae*—for the reason that it might lead to the mistaken supposition that the parasite in question belongs to the Oscillatoriaceae, a family of confervoid algae: we are therefore at liberty to accept the name suggested by Marchiafava and Celli, until such time, at least, as the life-history of the parasite has been worked out, and its proper relations determined.

Finally, we may mention that Marchiafava and Celli report several cases in which they have been successful in producing characteristic attacks of malarial fever by injecting into the circulation of persons free from such disease a small amount of blood drawn from the veins of a patient suffering from a malarial attack. In these cases the presence of the blood-parasite described was verified in the blood used for the inoculation, and subsequently in the blood of the inoculated individual when he was seized with an intermittent fever as a result of such inoculation. It is also

stated that the parasite disappeared from the blood under the influence of the administration of quinine, by which the induced malarial disease was promptly cured. GEORGE M. STERNBERG.

#### A TRADE-ROUTE BETWEEN BOLIVIA AND THE ARGENTINE REPUBLIC.

THOUAR, whose departure for a new exploration of the Pilcomayo we have already noted, announces his safe return and successful accomplishment of the work attempted. The party, comprising twenty-three men, and two officers of the Argentine army, and a volunteer, Mr. Wilfrid Gillibert, left Fotheringham on the 5th of October, and reached the locality called El Dorado, two miles above the rapids, Nov. 12. Several encounters with the Indians had previously taken place, but here the explorers came upon a perfect ant-hill of Tobas. There were over two hundred huts, and about fifteen hundred Indians, against whom a victorious combat was waged, the Toba chief falling early in the conflict. After the fight, the explorers remained in camp on the spot for six days, minutely examining the obstructions in the river, and making canoes, with which, on the 18th of November, they started down the river, reaching the Paraguay Dec. 5, after two months of great hardship. They lost one man killed, and three disabled by wounds or dysentery.

The object of the exploration was to determine the character of the obstructions to navigation reported by Major Feilberg, and therefore the possibility of using the Pilcomayo as a commercial highway between Bolivia and the Argentine Confederation. In brief, the conclusion reached by Thouar is, that the so-called rapids are not of a serious character, being composed of soft tertiary rock, easily removed, and, even as they are, not impassable; since Father Patiño ascended them with his boats in 1721, and safely reached the borders of Bolivia. The depth of the river up to this point, at low water, averages eight feet; and beyond it, nearly five feet, with a rise in flood-time of over twenty feet. There are comparatively few snags or sand-banks. The channel, in floods, is clearly marked by the lines of high trees which border it, even when the plains beyond the channel are flooded. The channel is about thirty yards wide, and the current averages two miles an hour. Steamers of two hundred tons, drawing not over two feet and a half of water, could ascend the river to the Bolivian mission of Solano at any stage of the water. On the strength of this favorable report, an international committee has been formed, composed of Bolivian and Argentine officials, engineers and capitalists,

to open the route to commerce. The boundary is to be determined, and then operations will commence at once.

The services of M. Tifouar have been recognized by the Bolivian congress, which has voted him a gold medal, five square leagues of land, and thirty thousand francs, for the publication of his maps and reports. The Argentine government has promoted the officers of his escort, and given a month's extra pay to the private soldiers. The explorer himself will devote himself to the perfection of the methods projected for the promotion of commerce on the Pilcomayo.

#### *SURFACE-COLLECTING ON THE ALBATROSS.*

DURING the past year surface-collecting has been very successfully carried on by the fish-commission steamer Albatross, and not only have many additions been made to the surface-fauna off our coast, but, what is at least of equal importance, rare forms have been taken in numbers sufficient for detailed microscopic study.

The nets chiefly employed in this work are ten feet long and of half-inch mesh; their mouths are four feet in diameter. The outer two-thirds are lined with a fine webbing, and the end is closed by several turns of stout lashing put on with care, to protect these linings from strain. They are suspended from the swinging booms, and, five-eighths submerged, towed at the rate of two knots an hour; each net, under these conditions, straining nearly twelve thousand gallons of water per minute. They are not, of course, adapted to the capture of the smallest forms of life, for which purpose fine silk nets of much less diameter are employed.

As might be supposed, the amount of material taken in this way is large. When surface-life is at all abundant, surface-fish and the young of some bottom-fish, the mature and immature forms of crustacea, various pelagic forms of mollusca, and jelly-fish of all sizes, are represented in the average haul.

Perhaps special mention should be made of the capture of argonauts and of several species of file-fish (Balistidae). Argonauta argo has been taken a number of times clinging to gulf-weed; and a fine specimen of another species of argonaut was taken from the under surface of a jelly-fish, to which it tenaciously clung. Unsuccessful efforts have been made to bring in alive argonauts captured during the short summer cruises of the steamer from Wood's Holl, Mass.: perhaps failure was due to the change from the warm water of

the Gulf-Stream region to the cold water inshore. In an aquarium these animals swim about with a slow, undulating, rhythmic motion, sometimes holding themselves poised for a while, and then, by a sudden turn of the siphon, darting with ease in any desired direction. When swimming, the expanded and partially transparent membrane of the dorsal arm adheres so smoothly to the side of the shell, that it requires close observation in a strong light to detect the fact that it is covered.

The file-fish is found under gulf-weed, and is captured when the ship slows down for dredging or sounding. A specimen of this fish three inches and a half long, together with a piece of drift-wood covered with barnacles (Lepas), was placed in an aquarium. It immediately began to prey upon the barnacles thus: holding itself in readiness, it waited for the intended victim fully to extend its cirri, which the fish then, by a sudden onslaught, seized, and, backing swiftly away, dragged the greater portion of the animal from its shell. The attack of the fish was not always well-timed, and, failing in its purpose, its solid jaws brought up with a sharp click against the closed shell within which the coveted morsel had safely retreated.

Science has already noted the fact that the electric light is an important aid in surface-collecting. A single Edison-light bulb protected by a wire cage, and furnished on the upper side with a shade, is lowered a few inches under water by an insulated cable, which is then made fast. Light, silk bolting-cloth scoop-nets, fastened to long bamboo poles, are held in readiness above the illuminated area. The larger part of the material collected by these nets, especially in shallow water, is composed of small crustacea and worms, which the light often attracts in swarms.

At Wood's Holl, small schools of herring (Clupea) frequented the lighted area to devour the sexual form of certain worms (Nereis limbata and N. megalops). A number of specimens of this fish were taken with flies improvised to resemble these worms. The argonaut has been captured under the light, probably by accident. Squids, however, appear in numbers, apparently allured from some distance. The flying-fish often swims sluggishly towards the light, its wing-like pectoral fins more or less extended on the surface of the water, and quite motionless. If startled, it rises instantly in the air, and disappears in the darkness like a frightened bird. When taken unharmed from the scoop-net, it exhibits a wing-movement like that of the humming-bird or sphinx-moth, and seems to demonstrate its claim to true flight.

With the abundant material for close structural