

CANALS OF MARS PHOTOGRAPHED.

Of a bird's eye view of a world some forty millions of miles away, all that we can know are contrasts in tone and color, for the real contour of the objects must be forever masked or invisible. In studying the planet Mars these contrasts in color and tone have to some astronomers assumed the form of lines, and, hence, rather fittingly or unfittingly, the name "canals" has been given to them. What are these canals? Some have suggested that they may be tracks drawn by meteorites as they have rushed along the surface; or by minor planets, which became close satellites of Mars in the earlier stages of its formation, and presently in grazing contact run round and round it. Others have supposed that they may be fissures generally following the course of great circles, and in some parts radiating from central points. These, it has been said, might be caused by the cracking of an unsupported crust left behind by a contracting interior; or, on the other hand, by the resistance of the interior to the contraction of a more rapidly cooling crust. It has even been suggested that vapors continuously rising out of such fissures may perform a part in producing the single or double appearance of the various canals. Perhaps most astronomers have been inclined to believe that the so-called canals really do not exist at all; that they are optical illusions, in a word. What is seen is attributed to eye strain. It must be confessed, however, that so many have observed the canals, and so many have drawn them, that their existence can hardly be doubted. Their straightness, their immense length, which in some cases reaches 3,000 or 4,000 miles (nearly equal to the whole diameter of the planet), and their uniform and great breadth, in different instances estimated at 30, 40, or even 60 miles, would seem to augur well for their actual existence.

Perhaps the most assiduous advocate of the existence of these various canals has been Prof. Percival Lowell. To him and to Schiaparelli we are indebted for the most minute observations of their vagaries, and Lowell likewise for the most picturesque theories of their supposed origin. Lowell sees in them a vast system of artificial irrigation. But their artificial origin can hardly be maintained, when it is considered that they traverse the polar caps, and that their counterparts are to be found in Venus, Mercury, and two of the satellites of Jupiter. That they really do exist, however, has at last been definitely proven by photography.

For a long time it has been the object of the Flagstaff Observatory, of which Prof. Lowell is the head, to photograph the enigmatic canals. Mr. Lampland, of that observatory, has at last succeeded in accomplishing the difficult task. Two obstacles have stood in the way of the attempt. In the first place, fluctuating waves sometimes prevent, sometimes favor the definition of such fine detail as that of the canals. In the second place, most photographic plates are far too slow.

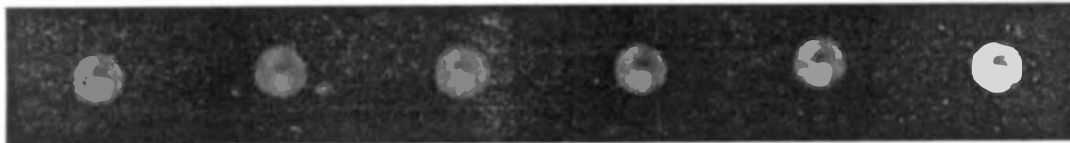
Prof. Lowell determined that the attempt should be made with a bioscope film, in which many successive pictures may be taken, in the hope of securing among them one which would show the canals. A chronophotographic apparatus was therefore devised which, excellent though it was, left much to be desired, chiefly so far as automatic motion was concerned, inasmuch as the camera had to be worked by hand. Still, by diaphragming down the objective to suit the atmospheric currents at the time of observation, the experiment succeeded. Out of the many plates secured, one is here represented, dealing with the region called Syrtis Major. Side by side with it is placed a drawing made by Prof. Lowell shortly before the camera was put on. This serves the double purpose of showing the confirmation by the photograph of the existence of the canals, and at the same time of acting as a chart. The dark triangle with its apex pointing downward is Syrtis Major; the dark area at the top, that is to the south of it, is the Mare Erythraeum. Leading off from the Mare Erythraeum to the right is the narrow dark stretch of the Mare Icarium, separating Aeria on the north from Deucalio Regio on the south. The bent line from the bottom of the Syrtis, turning sharply to the right as it goes, is the Nilosyrtis, which, continuing westward across the print, becomes the Prontonilus. Making the rest of a rhomboid with the Nilosyrtis two short

lines can be described, one issuing from near the bottom of the Syrtis on the right, the other rising from the Peboas Lucus at the end of the Nilosyrtis, to join it nearly. These are the Astaboras and the Vexillum respectively. Parallel with the second link of the Nilosyrtis and below it shows a long, dark line. This is the Casius. From its left-hand extremity can just be made out a filament, which curves round to the right to enter the Syrtis two-thirds way up on its eastern side. This is the Thoth. From the other end of the Casius proceeds the Pierius. The plate is from an enlargement of one of the original negatives on a scale of 1.8 times.

Inasmuch as such fine detail as the canals, owing to the air-waves, play bo-peep with either observer or camera, it is not that the more should appear in they turn out to ing so than could pated. And this posures could not taneous, but with twelve inches, average eight sec-



Lowell's Drawing of Martian Canals.



LAMPLAND'S PHOTOGRAPHS OF THE CANALS OF MARS.

other plates taken other canals can be made out, notably those bounding Elysium, together with the Helicon, Erebus, and the Hades.

The astronomical importance of this feat of photographing the canals can hardly be overestimated. A hot controversy may now be considered definitely settled—a controversy in which most of the eminent astronomers of the world have taken part, either in absolutely denying the existence of Martian canals, or in advocating not only their existence, but also in regarding them as evidences of life on a neighboring world.

THE PYGMIES OF THE CONGO.

As the great searchlight of modern investigation and exploration illumines the dark and unknown portions of the great world which we inhabit, adding day by day to human knowledge and experience, those half-recognized wonders and mysteries, magnified in the eyes of our forbears by tradition and folklore, lose that very characteristic of the mysterious, and each falls into its allotted place in the ranks of the development of the kingdoms, animal, vegetable, and mineral, in the onward march of Nature. And so we often find in the mythology of all races, frequently of the widest

or elves, is general in all folklore. For years we have been aware of the actual existence of a race of pygmies in the interior of Africa. And now, authorities on the subject have expressed the belief that in this little-known race of black dwarfs, hidden to-day in the fastnesses of the tropical forests of the Congo, but in past centuries probably far more common and widespread, we may have the origin of the dwarfs of tradition. Sir Harry Johnston, the well-known English explorer, made famous by his classic discovery of the okapi and by his researches among the ape-like little black people, is of this opinion.

Roughly speaking, the great forests wherein the pygmies are found cover the entire Congo River basin, while other vast but partially isolated patches seem to indicate that once the entire continent south of the tropic of Cancer may have been one vast forest varying only through climatic conditions. This was, beyond doubt, an important factor in the history of the races of man and animals, a refuge, a barrier, and a deflector in the tremendous incursions and migrations that took place in the prehistoric ages. During the Pliocene invasions, the great herbivores apparently did not penetrate into the forests, but stayed in regions opener and more favorable to their mode of existence,

while the great carnivores, which preyed upon the former, naturally did not wander far from the food supply. This left the mighty forest as a refuge for the more timid and defenseless mamma's and the anthropoid apes.

These were driven from western Asia and Europe by their offshoot, man, and the latter appears to have been the only creature able successfully to contend with the giant ancestors of our present-day gorillas, chimpanzees, and orang-outangs. The anthropoid apes were soon followed by the earliest type of humanity which entered the Dark Continent, and these too, urged on by the pressure of superior tribes, were gradually forced into the great forests.

The human type, in all probability, first emerged from the ape in southeastern Asia, possibly in India. The higher types forced the negro from the continent in an eastward direction, across the intervening islands, as far as Australia, and westward into Africa. Even to-day, ape-like negroes are found in the gloomy forests, who are doubtless direct descendants of these early types of man, who probably closely resembled their simian ancestors. They are found on the eastern border of the Congo woodland and in other portions of the Congo basin, and the attention of scientists was first called to them by Johnston, Grogan, and Sharpe. They are often dirty-yellowish brown in color and covered with a fine down. Their faces are fairly hairy, with great prognathism, and retreating chins, while in general they are unintelligent and timid, having little tribal cohesion and usually living upon the fringes of higher tribes. Among the latter, individual types of the lower order crop out now and then, indicating that the two were, to a certain extent, merged in past ages.

Whence the pygmies came or where they originated is unknown to us. In the hieroglyphic records of the Egyptians and other ancient people are accounts that prove conclusively that the dwarfs existed in Africa at that time. However, from native traditions gathered by Schweinfurth, Junger, and other travelers, it appears that the little people occupied land as far north as the western Nile watershed, and were driven thence by invasions of larger blacks. To-day they are confined to the Congo forests and to such portions of these as extend toward the Nile watershed and into Cameroon and French Gaboon. There seems to be some connection between the pygmies and the bushmen of South Africa, and if this is true, it gives color to the theory of

the former wider occupancy of the continent by the dwarfs. Traces of pygmies have been found in Europe, and while there is no absolute proof of a prehistoric, universal, dwarf people, there is some ground for belief in the truth of this, and the acceptance of this theory furnishes us with an explanation for the general occurrence of the mythological dwarfs in human folklore.

The personal appearance, characteristics, and traits of the Congo pygmies seem to give support to this belief. Small, ape-like, elfish creatures, furtive and mischievous, they closely parallel the brownies and goblins of our fairy tales. They live in the dense tangled forests in absolute savagery, and while they exhibit many ape-like features in their bodies, they

divergence, analogous tales and traditions which were formerly believed, either to rest upon a supernatural basis or to have taken birth only within the undeveloped mind of early man, but which, to-day, we know to have arisen from actual physical causes, and which, stripped of the garnishing given them by the centuries, have been explained and traced back to their origins by scientific research.

In Africa, the Dark Continent, a name for the imaginative to conjure with, have been found many of these explanations of mythological traditions. And it now appears that another, one of the commonest of all, has been deprived of its supernatural possibility as the result of African exploration. The belief in the former existence of fairy-like races of dwarfs, goblins,



A GROUP OF CONGO PYGMIES TRAVELING FROM AFRICA TO EUROPE.