make a second search for a common ground on which the Colleges may be brought to agreement. Meantime, the very general interest excited on the subject throughout the University is an encouraging sign that the just claims of Physical Science will before long be satisfied.

SEDLEY TAYLOR

## THE TRANSIT OF VENUS AND THE ANTARCTIC REGIONS

DR. NEUMAYER has recently been in London, looking after apparatus, and making arrangements, for the proposed Austrian expedition preparatory to the one to the Southern Seas for the purpose of observing the Transit of Venus in 1874. The object is one in which every English man of science will feel a warm interest. The lethargy of our own Government has been described by German astronomers and naturalists by the expressive but not complimentary term "Philistinism."

At the sitting of the Vienna Academy of Sciences on March 10th, Dr. Neumayer submitted a proposal for the preparatory arrangements for the observance of the Transit. A map of the circumpolar regions shows that the best points in the Southern Hemisphere for these observations will be the region south of the Indian Ocean, near the circumpolar district. Dr. Oppolzer has established that the most favourable localities for observing the *immersion*, both as to parallax and altitude, can be connected by a curve passing by the great gulf of Australia to the Macdonald Islands, and from these to a point situated in 36° 52′ S. latitude, 43° 23′ E. longitude. The points best adapted for observation of the *emersion* will also be found in a curve passing from the centre of the Indian Ocean to a point situated in 180° E. long., and 79° S. lat.; and from there to another point, 64° 55′ S. lat., and 244° 39′ E. long. The point of intersection of these two curves (48° 5′ S. lat., 99° 3′ E. long.) will evidently be the one most favourable for the observation of the transit in its totality. In this case, the factor of the parallax and of the altitude will be 0°·67, and 48°·0 for the immersion; and 0°·47 and 62°·5 for the emersion. The nearest station to this point will be the Macdonald Islands, situated nearly in 53° S. lat., and 12° E. long. (from Greenwich). M. Neumayer, who visited these islands in 1857, was struck with their relatively high temperature; and has ascertained, by a close examination of the tables of temperature published by the authority of the Dutch Government, that the current of Agulha must terminate near them. The summer and winter isotherms confirm these facts, and there can be no doubt that it is under the meridian of the islands of Macdonald and Kerguelen that the most favourable region must be sought for a route towards the South Pole, in the same manner as Sir James Ross followed, with the same object, a new current which set out from the shores of New Zealand. The map of the southern circumpolar regions, published by Petermann, furnishes very precise information for the equatorial limit of the floating ice, the curve showing two points of depression towards the pole; one under the meridian of Kerguelen's Land, the other under that of New Zealand. It may, however, be said that because floating icebergs have once or twice been found in a locality, these are not sufficient definitely to fix the relations of the floating ice, which depends especially on currents, and which secondary causes, such as winds, can draw into regions ordinarily free of ice. It is the frequency of the ice that must settle the limits in such cases. At the points which have been named the limit of floating ice bends back upon itself as high as 60° S. lat.; and this is an important fact for the determination of the warm currents setting from the north. The position of the limit of maximum density of sea-water, and the presence of spermaceti whales (*Physeter macrocephalus*) which, as is well known, seek in preference warm waters, on the coasts of Termination Land, permit the supposition that the current in question continues towards the South Pole as far as that land and Kemp Island. Admiral Sir John Ross also saw spermaceti whales at the approach towards South Victoria; while Wilkes, Dumont d'Urville, and Ross, only met with few and isolated individuals in the intermediate seas. M. Neumayer thinks that it will be advisable to despatch a small reconnoitring expedition without delay to these regions, and to establish a scientific station on the Macdonald Islands, the first object of which should be to determine the absolute longitude, to serve as a basis for Delisle's method. It would be occupied during the months of November, December, January, and February, with a series of meteorological observations, and with everything relating to physical geography. He proposes that, for this purpose, the Academy should make application to the Government for the fitting out of the expedition, the expense of which would amount to 35,000 florins (87,500 francs.) This has been granted, and the expedition will sail equipped for physical and natural history observations.

## THE NATURAL HISTORY OF THE ABYSSINIAN EXPEDITION*

THE Abyssinian campaign will always be an interesting little episode in history. Unlike so many of our military expeditions in bygone times, it was vigorously conceived, energetically carried out, and successfully concluded, and will, we can entertain no doubt, effectively protect us against a repetition of the outrage which led to its organisation. But even if no other advantage resulted from it, the acquirement of so much additional information, both in regard to the zoology and geology of Abyssinia, as is contained in the work before us, would in great measure reconcile all enthusiastic naturalists to the additional trifle of income-tax they have had to pay as their contribution to the expenses of the war; and to all such, we would recommend Mr. Blanford's book, as enabling them at a small outlay to recompense themselves for the annoyance they have experienced.

The author left Bombay for Abyssinia in December 1867, and did not return till the following September, after an absence of nine months and a half, eight of which were spent in Africa. Upon the whole, he appears to have enjoyed unusual advantages in the collection of objects of natural history. He has collected no less than 1,700 specimens of Vertebrata, representing 350 species, besides about 3,500 of Mollusca and Articulata, representing about 500 species. The work is divided into three parts: the first being a personal narrative, the second devoted to the Geology, and the third to the Zoology of the regions traversed.

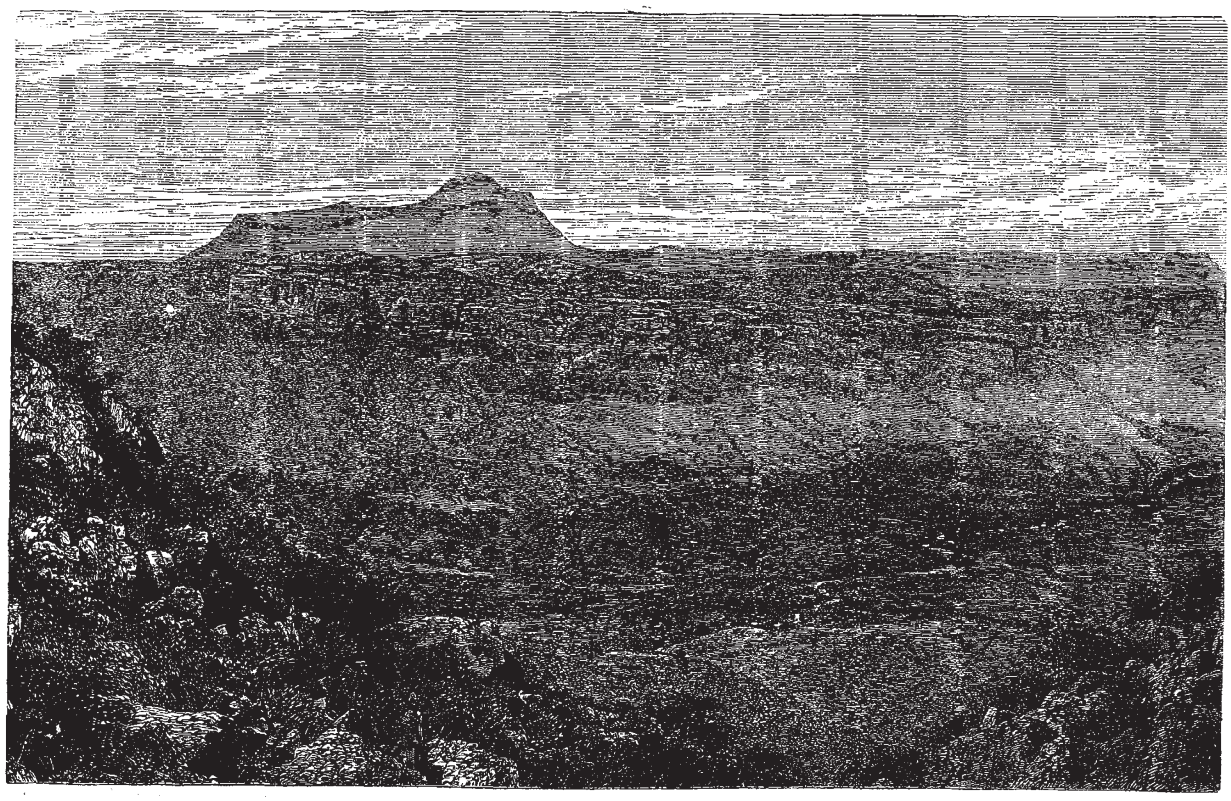
On arriving at Malkatto, in Annesley Bay, he at once set to work to collect specimens. In the vicinity he found larks, chats, shrikes, wagtails, white-breasted crows, kites, and vultures, constituting the commonest land birds, whilst on the shore there were abundance of gulls, pelicans, terns, ring-plovers, curlews, egrets, stints, and sand-pipers, with a little green bee-eater, which frequented the mangroves. Further inland, amongst the thorny acacia trees, he obtained a lovely little Nectarinia, the long-tailed robin, a weaver bird (*Hyphantornis galbula*), and two species of Avadavats (*Pytelia citerior* and *Estrelda rhodopyga*). Amongst the Mammais were hyænas, jackals, gazelles, hares, and Jerboa mice, which, finding unwonted supplies of food in the commissariat stores, increased and multiplied until the ground around the huts and tents was riddled with their holes. The only common reptiles were

* "Observations on the Geology and Zoology of Abyssinia made during the progress of the British Expedition to that country in 1867-68." By W. T. Blanford, F.G.S., late geologist to the Abyssinian Expedition, with illustrations and geological map. (London, Macmillan and Co., 1870.)

a small lizard (a kind of *Acanthodactylus*), and a very venomous little viperine snake (*Echis arenicola*). After the lapse of a few days, he started for the interior, and soon reached Hadoda. On waking the next morning, he saw a large troop of dogfaced baboons (*Cynocephalus hamadryas*), hunting for corn that had been dropped where the horses had been picketed. In the early part of January he was sent forward to examine the water supply, which proved to be abundant, and was obtained in places where there was no running water, by means of Norton's American pumps, and subsequently by an improved kind of chain pump (Brasyer's).

The pass which was selected for the road to the Abyssinian highlands commences at Komayli, situated on the verge of the coast plain, and extends to Senafé, a distance of about fifty miles. At Undul Wells, which is 3,400 feet above the sea, the subtropical fauna was entered, containing some of the animals peculiar to the Abyssinian highlands. Amongst these may be mentioned the *Corvus affinis*, a king crow, a noisy yellow-billed hornbill, a crateropus, a large partridge, and a very handsome bee-eater. A small plain covered with bush jungle, and partly with an aloe-like plant, was haunted with wart-hogs, hyænas, and Beni Israel. At a height of 5,000 feet, the splendid Abyssinian Plantain-eater (*Turacus leucotis*) appeared with a handsome francolin. Senafé itself, at the head of the pass, is 9,050 feet above the sea-level. Here he found the Hyrax, Ichneumon, Klipspringer, and Koodoo.

The drawing shows the Hamas Valley west of Senafé. The lofty hill in the distance is Hasheyat, or, as it is spelt in the excellent geological map which accompanies the work, Kishyat-hill, composed of columnar trachyte, and therefore of volcanic origin. The terrace on the opposite side of the valley is sandstone, while the bottom of the valley lies on metamorphic rocks. The picturesque character of the scenery of this region is here well shown. Leaving Senafé, the road traverses a plain of slaty metamorphic rocks, and presents few points of interest till the valley of Guna Guna is reached, where the scenery becomes very grand, and increases in beauty near Fokada, close to which there is a fine hill of columnar trachyte; and where the road winds round the western side of this, the view over the valley to the westward, exhibited in our second illustration, is one of unusual interest and beauty. The valleys, as usual, are deeply cut into the metamorphics; the flat hill-tops are of sandstone. To the southward, above the sandstone-bed, rise the terraced trap hills of the Harat range, and in the far distance are the strangely-shaped hummocks of the Adowa mountains.



VIEW OF THE HAMAS VALLEY, WEST OF SENAFE

Starting rom Fokada, our traveller, following the track of the army, passed through Adigrat; "a considerable town, with a fine church containing some remarkable mural paintings, in which Scriptural scenes are portrayed as they might have appeared, perhaps, had the scene been Abyssinia and the actors Abyssinians; just as the Italian painters of the Middle Ages introduced the costumes of Italy and the great buildings of Florence and Sienna in the representation of events which occurred in Palestine."

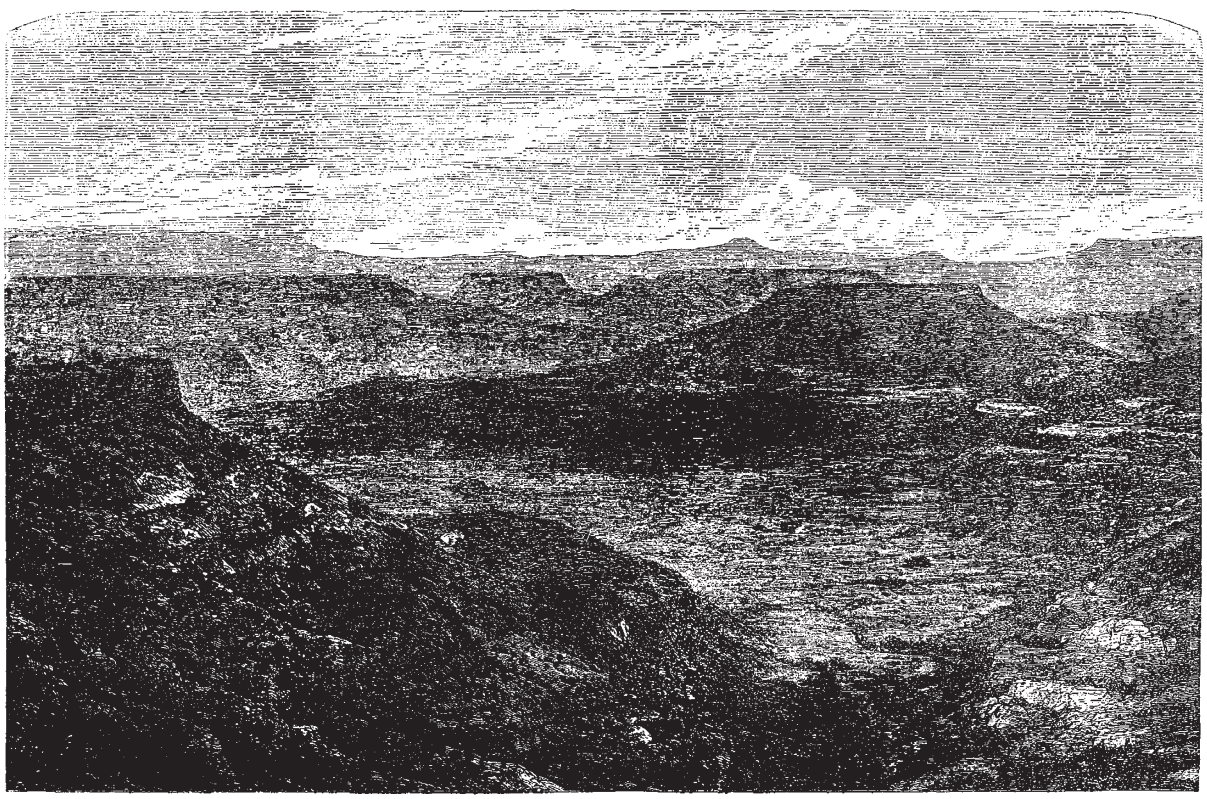
We need not follow Mr. Blanford's progress step by step, as the several camping-grounds are already known to the public through Markham's Abyssinian Expedition, and the correspondent of the *Illustrated London News*.

He describes the scenery as being almost everywhere strikingly beautiful; now bold and romantic—now resembling the undulating character of western England.

Near Bethor (not far from Magdala) they came suddenly on the brink of the mighty chasm in which the Jitta river runs, describing which he says,—

"Of all the grand scenery met with in Abyssinia, none equalled this wonderful gorge. It is 3,500 feet deep, and looks scarcely a mile across. The sides are extremely steep, and in places nearly perpendicular. The horizontal beds on both sides appear to correspond exactly. Half-way down there is a well-marked terrace, evidently formed by the same bed on both sides of the river. At the bottom of the ravine ran a beautifully clear stream in a pebbly bed." He entertains no doubt that this gorge has been formed by the river.

Magdala fell on the 16th April, and the retreat was so hasty that Mr. Blanford's opportunities of procuring specimens became much limited, especially as Lord Napier seized one of our men. Mockler fired off his rifle to frighten away the beast, which rushed roaring past our tent. On enquiry we were horrified to find that an Abyssinian servant of Jesse's had been killed while asleep, and no alarm had been created until the animal attempted to drag away the body. The unfortunate man had two large tooth-holes in his throat, and must have been either so seized that he was unable to cry out, or else, as is probable, his neck was broken. The assailant was doubtless a leopard, very probably the same small animal which had scratched my servant the night before. We had a low thorn fence round three sides of our camp, and the camels occupied the open side—the usual plan in this part of Africa—but we had no fires, a most necessary precaution, and one we never neglected after this sad lesson."



VIEW OF THE PLATEAUX AND VALLEYS WEST OF FOKADA

would allow no expeditions into the interior. Meeting, however, at Senafé, on the return journey, with Mr. Jesse, the Zoological Society's naturalist, who had been detained by illness and want of transport, they organised, with Lieut. Mockler, a trip to the Bogos territory, about 100 miles N.W. of Massowah, the details of which form the most interesting part of the work.

At Ailat they found a hot spring, the water with a temperature of 140° F., and perfectly tasteless. Here they had a tragical adventure with a leopard, the details of which are thus given :—"On the early morning of the 29th June, one of my servants rising before daybreak, was scratched in the face by some wild animal which had come into the camp. The track resembled that of a large cat. We thought nothing of this at the time, but on the following night we were all aroused by an outcry and shouting, and an alarm was given that a lion had

Subsequently the adventurers had some fine sport with rhinoceroses.

In regard to the Geology of Abyssinia, the various rocks observed in ascending order were : 1, Metamorphic rocks ; 2, Adigrat Sandstones ; 3, Antalo limestones ; 4, Trappean series, including the Magdala and the Ashangi group ; 5, the Aden series of Volcanic rocks bordering the Red Sea ; and 6, Recent formations—soils of the highlands, coral islands of the Red Sea, and alluvial deposits near the coast.

We need scarcely add that the Zoological portion is carefully drawn up, whilst the plates, which include illustrations of the *Hirundo æthiopica*, *Phylloscopus abyssinicus*, *Ruticula fuscicaudata*, *Pratincola semitorquata*, *Alauda prætermissa*, *Crithagra flavivertex*, and some fossils and horns, are admirably coloured, and very expressive.