

During our expedition I therefore considered it a very important object to examine closely the distribution of the "aat" in the tract of sea over which we sailed. For this purpose the sea was examined almost daily, often several times a day, by the help of a surface-net. The results of these examinations completely confirmed my previous view on this point. During the whole passage from Norway to the Færoe Islands, the sea was found everywhere filled with enormous masses of the so-called "red aat" (almost exclusively *Calanus finmarchicus*) which, as is well known, forms the food best liked by the herring, and, what deserves to be remarked, the quantity of this "aat" appears to increase with the distance from the coast, being greatest at a distance of about twenty Norwegian (140 English) miles. Besides the "red aat" we also observed farther out to sea, great quantities of another pretty blue sort of "aat" (*Pontella Patersonii*), which appears to belong more to the Atlantic Ocean, and which, to distinguish it from the other, might be called the "mackerel aat," as it probably forms the principal food of the mackerel at those seasons of the year when this fish is not in the neighbourhood of the coast. This "aat" also shows itself sometimes, particularly during great takes of herring in summer, among the "red aat" close to the coast. When we went northwards from the Færoe Islands toward Iceland, it was remarkable that the "aat" almost entirely disappeared from the sea. At the same time the sea had assumed a very different colour. While during the whole passage from Norway to the Færoe Islands it had been a deep blue, it was now [a light, dirty, greyish-green. This peculiar circumstance, for which I cannot yet account, but in which a peculiar relation of the ocean currents certainly plays a considerable part, appears to stand in close connection with the occurrence of "aat," and will be the subject of careful researches during our next expedition. I had a very convenient opportunity of observing this phenomenon from my cabin, the light of which was almost on a level with the sea. When, by the pitching of the vessel, the glass was washed over, the whole cabin was clearly illuminated with a very beautiful, intense dark blue light, and I have often, when, after my work was ended, I was taking a little rest in my cabin, been greatly delighted with this phenomenon, which so strikingly reminded me of my stay in the south the preceding winter, and my ever-memorable visit to the blue grotto at Capri. Now, on the contrary, the illumination was quite different, namely, light greenish. This colour remained constant so long as we were in the navigable water near Iceland, and the sea was everywhere, as has been stated, almost completely free from "aat." The previously-observed state of things recurred first when we, on our return voyage, approached the coast of Norway. The water resumed its beautiful blue colour, and the sea swarmed with "aat." I cannot help supposing that the conditions observed during our expedition is not always the same, as several recent accounts state that the sea about Iceland is specially rich in "aat." It appears as if the constant westerly storm, which we had to put up with during our expedition, in combination with the strong up-going current, had had a disturbing action, and forced the mass of "aat" farther in towards the Norwegian coast. If this should in fact be the case, a supposition which in the mean time with the little experience we have yet had on the point can scarcely be supported with full evidence, there may be seen in this (if the above-mentioned theory of miue with reference to the migrations of the herring be accepted) a good omen of the improvement of the spring herring fishery in the near future. That the herring is where the herring food (the "aat") is, I consider a settled point. Although we unfortunately had no opportunity of directly establishing the presence of herring by the help of our nets, there were not wanting the best signs of it at the points where the "aat" was most numerous. Not a few whales (both *sildehval*, *Physeter antiquorum*, and *staurhyrning*, *Orca gladiator*) were observed at such places, as well as large numbers of birds (chiefly kittiwakes), and, at a considerable distance from the coast at stations 75¹ and 76², there were large brown spots in the sea, like extensive sea-weed fields, but which on a closer examination were found to be enormous masses of "aat" closely packed together, on which the fulmar petrels (*procellaria glacialis*), our constant companions during our excursion, feasted to their heart's delight. That these enormous "aat" masses could not be packed together here by pure accident is evident, and that the current alone should be able to do this here far out in

the open sea I cannot believe. I am rather of opinion that the herring shoals have driven this "aat," together in the same way as may often be observed in the case of coal-fish, and that there, under these brown spots on the sea, there were enormous shoals of herring (*sildeherje*).

I am much disappointed that circumstances did not permit us to use our nets here. We might have been able in this way readily to establish the occurrence of the herring far out at sea. It is to be hoped in the mean time that in our next expedition we shall be more fortunate in the weather, and we shall then put this herring question in the first rank, the rather as we shall be then farther north or nearer the waters, which, in my opinion, are the proper home of spring herrings (*vaarsilden*) and the great herrings (*storsildens*).

OUR ASTRONOMICAL COLUMN

THE SUSPECTED INTRA-MERCURIAL PLANET.—M. Leverrier, in a circular addressed to astronomers, has again directed attention to the importance of close and frequent observations of the sun's disc, on March 21, 22, and 23, but especially on the intermediate date, with the view to detect the small planet, which he assumes to have been already observed in transit on six occasions, and which there would appear to be just a possibility, may be again projected upon the face of the sun at this time. In his reasoning upon this subject, M. Leverrier adopts for the place of the node, the value he had deduced from the well-known observations of Dr. Lescarbault on March 26, 1859, but the uncertainty attaching to the result renders it impossible to pronounce definitively on the occurrence of a transit in the present month.

The six observations to which reference is made above are those of Fritsch, at Quedlinburg, October 10, 1802; Stark, at Augeburg, October 9, 1819; Decuppis, at Rome, October 2, 1839; Sidebotham, at Manchester, March 12, 1849; Lescarbault, at Orgères, March 26, 1859; Lummis, at Manchester, March 20, 1862.

Attributing these observations to the passage of a single planet across the sun's disc, he found a formula for the heliocentric longitude at any time, in which an indeterminate entered, allowing of several solutions of the problem of finding the period of revolution, and hence the mean distance of the body from the sun. Two of the solutions appear to possess equal precision in the representation of the observations; in the first, the time of revolution is found to be 33^o02 days, and the mean distance from the sun 0^o201, that of the earth being taken as unity: in the second solution the length of the revolution is 27^o96 days, and the mean distance 0^o180. Whichever period we adopt, we find from M. Leverrier's formula that the suspected planet should be in conjunction with the sun on March 22, astronomically reckoning, for the meridian of Greenwich, though to decide definitively as to the passage or other wise of a planet across the sun's disc at this time, it will be necessary to examine it not only throughout the whole of the corresponding revolution of the earth upon her axis, but owing to uncertainty in the data for prediction, during the twenty-four hours preceding and following, or as already stated, on March 21, 22, and 23.

It is difficult to understand how six observers, without, as M. Leverrier remarks, any relation with each other, nor any knowledge of the periods under discussion, can have fallen by chance upon six exact epochs of a phenomenon explicable by the motion of a single planet. Though suspicion has attached in the minds of some astronomers to one or two of the observations to which we have referred, the fact pointed out by the illustrious French astronomer does appear very strongly confirmative of their reality. At any rate, the existence or otherwise of such a body may be decided by systematic examination of the sun's disc, near the calculated epochs of conjunction, within the assumed transit-limits; but it so happens that after the present month there is very little probability of a transit

¹ Station 75, lat. 64° 47' 2"; long. 7° 13' E. from Greenwich.

² Station 76, lat. 64° 47' 4"; long. 7° 3' 6" E. from Greenwich.

taking place either at the spring or autumn node for several years, and hence the greater necessity for continuous observation of the sun at the period named.

Extensive preparation has been made on the recommendation of M. Leverrier; the Astronomer-Royal availing himself of the telegraph, has notified observers at Madras, Melbourne, Sydney, and at Wellington and Canterbury, New Zealand, and we believe intends to organise a careful watch upon the sun's disc at the Royal Observatory, Greenwich. We know that a similar scrutiny will be carried into effect in American longitudes, so that it is not probable that a planet can present itself upon the sun on this occasion without being detected. Photography will be brought into requisition at more than one station. Where it is not available in the event of a planetary body being detected, it will be necessary to determine the differences of right ascension and declination from the sun's limbs at frequent intervals as long as the object is projected upon the disc; from such observations carefully made the position of the orbit will be very approximately determined, and we should be enabled to follow up the new member of the solar system.

THE NEW OBSERVATORY AT KIEL.—Prof. Peters has issued a brief description of the new observatory just erected a little to the north of Kiel, the present head-quarters of the *Astronomische Nachrichten*. The unfavourable position of the observatory at Altona, so long directed by Prof. Schumacher, and the desire to bring the establishment into nearer relation to the university at Kiel, led to successful negotiations about twelve years since for a suitable site near the town. The buildings were commenced in 1871 and are now completed. There is a free horizon and a considerably better climate than at Altona, and no interruption from surrounding buildings.

The instruments in the new observatory include Reichenbach's meridian circle, formerly at Altona, which was so far improved by Repsold, as described in the *Astronomische Nachrichten*, that it may be considered a new instrument. The Repsold equatorial, also at Altona, is mounted in one of the smaller towers, and in another, a parallactically-mounted comet-seeker, to which is attached a 4-feet refractor, its optical axis being parallel to that of the comet-seeker. Prof. Peters explains that the refractor being provided with a high power, may be useful in deciding whether any nebulosity caught up in the seeker is a comet, or a star-cluster.

About two months since, an equatorially mounted refractor by Steinheil of Munich, with an object-glass eight Paris inches in diameter, was added, of the performance of which Prof. Peters promises details at a future date. The meridian circle is at present employed in the observation of all stars to the ninth magnitude, within 10° from the pole, the same class of work, indeed, in which Schwed and Carrington so long occupied themselves.

The position of the new observatory at Kiel is in longitude oh. 40m. 35.5 E. of Greenwich, and latitude 54° 20' 29.7".

Besides its connection with the Kiel University, the observatory is also in relation to the Danish Marine, and contains facilities for testing the rates of chronometers at different temperatures, and a time-ball, apparently very similar to the one at our Royal Observatory, which is dropped at noon, mean time at Kiel.

65° OPHIUCHI (FL.).—Of this star Baily says, "Observed by Flamsteed on May 6, 1691, at 14h. 10m. 58s., and regularly reduced by him. . . . But no such star is now to be found. It is neither Piazzi xvii. 308, nor xvi. 251, as conjectured by that astronomer. Prof. Airy has been kind enough to look for this star, at my request, but has not been able to discover it." The place of this star, given in the British Catalogue, brought up to 1850, is—

R.A. ...	17h. 51m. 37.6s.	Precession + 3.506s.
N.P.D. ...	107° 59' 18"	,, + 0.732"

There is no star in this position in Argelander's southern zones, nor in the zones observed at Washington; neither is there any star in these zones with which it can easily be identified, on admitting any probable error of observation. Did Flamsteed observe an object of the class which we are accustomed to term "new stars?" The Chinese annals record the appearance of an extraordinary star in the year 386, which remained stationary from April to July in the same "sidereal-division" that 65 Ophiuchi would fall, and then disappeared. It may be worth while to watch any small stars near its position.

BIOLOGICAL NOTES

FLORA OF NEW GUINEA.—Letters from Sydney of January 12 state that the Italian traveller, D'Albertis, had returned there from his last trip to New Guinea, and was engaged in preparing an account of his voyage up the Fly River. His fine collection of dried plants is in the hands of Baron von Mueller at Melbourne, who is describing many of the new plants in his "Papuan Flora." Among them is a grand *Hibiscus*, which Baron von Mueller has named *Hibiscus albertisii*; its nearest affinity is with *Hibiscus tupiiflorus* of Hooker, of Guadaloupe and Dominica, in the West Indies. There is also a new *Mucuna*, which he has named *Mucuna benmetti*. D'Albertis describes this as one of the most beautiful of all the flowers seen in New Guinea; it is abundant on the banks of the Fly River, and the pendulous masses of large red blossoms cover the loftiest trees from the base to the summit and form one of the most gorgeous sights it is possible to conceive. There was also a yellow flowering species of the same genus which was rare, and only met with in the interior of New Guinea, in lat. 6° south, on the banks of the Fly River. The flowers of this species were only seen on the tops of the trees, forming a dense mass of blossoms. There was likewise another species of *Mucuna* met with, bearing blue flowers. All these and a number of other novelties will duly appear in Baron von Mueller's forthcoming part of his "Papuan Flora."

SALMO ARCTURUS.—We are informed that the Salmonoid brought home by the Arctic Expedition from Grinnell Land is a new species of Charr, described by Dr. Günther under the name of *Salmo arcturus*. It resembles in some points the Loch Killin Charr from Inverness-shire.

PROF. OVSIANNIKOFF ON THE FUNCTIONS OF THE CEREBELLUM.—In the seventh volume of the *Memoirs* of the St. Petersburg Society of Naturalists Prof. Ovsiannikoff communicates the results of experiments he has made in collaboration with M. Weliky on the physiological functions of the cerebellum. Preventing, by the tying of the carotid artery, the effusion of blood which usually accompanies the cutting out of the cerebellum, Prof. Ovsiannikoff proved by a series of experiments that the last operation does not at all paralyse the co-ordination of motion. A rabbit remained alive during two weeks after all the upper half of the cerebellum was cut out, and did not show any traces of such paralysis, nor did it lose its faculty of co-ordinating its movements after all the cerebellum was cut out, until an effusion of blood produced this result. A long series of varied experiments made by M. Ovsiannikoff on rabbits, pigeons, fishes, and frogs, confirms this result, as well as some well-known pathological cases reported by Brown-Sequard, Marc, Combetta, and others.

FAUNA OF LAKE GOKCHA.—The seventh volume of the *Memoirs* of the St. Petersburg Society of Naturalists contains interesting information, by Prof. Kessler, on Lake Gokcha, lying in the Erivan government (Caucasus), at a height of 6,419 feet. It is surrounded with mountains from 9,000 to 12,000 feet high, and occupies about 660 square miles. Altogether its average depth is from 150 to 250 feet, reaching only in one instance t