

FROM TONGKING TO CANTON.

THE paper read at the meeting of the Royal Geographical Society on Monday was on a journey from Haiphong in Tongking to Canton, overland, by Mr. A. R. Agassiz in the early part of 1890. He went by steamer from Haiphong to Phu-lang-thuong, thence to Langson and across the frontier into the Chinese province of Quang-si.

The country between Phu-lang-thuong and Langson is briefly described as follows:—First stage, to Kep: country perfectly flat and well cultivated. Second stage, to Bac-le: hilly, with numerous groves of bamboo and tropical trees. Third stage, to Than-moi: very hilly, some of the hills being well timbered. Last stage: cross mountain range, passing Thien-ho, situated at the highest point reached by the road, which is probably not less than 3000 feet above the sea-level. Langson stands in the centre of a small plain at the foot of these mountains; the French portion of the town and the citadel on the left bank of the Sung-chi-chiang river, and the native town on the right bank.

As to the Sung-chi-chiang river, its source is not exactly known, but Mr. Agassiz was assured by the officer in charge of the convoy with which he travelled that it enters Tongking from the province of Kuang-Tung. It then turns sharply to the north, passes Langson, and then flows on in the same direction to a place called That-khe, below which it is navigable for small boats. From here it takes an easterly course, and re-enters China (province of Quang-si) at Ping-erh-kuang. At Lung-chow, thirty miles farther, it unites with a river called the Kao-ping-ho, which rises in Yunnan, and crosses the northeast corner of Tongking, passing the French garrison town of Cao-bang.

At Chin-nan-kuan, after passing through a massive stone archway, Mr. Agassiz entered Chinese territory. There is a village here, but the town of Chin-nan is about two miles distant. Further on is Lung-chow, a walled city, said to contain 20,000 inhabitants. Many of the houses are of the bamboo-and-mud style of architecture; but the Yamens, and the residences of the better class of the people, are built of brick.

The only article produced in the district, that is not wholly consumed locally, is sugar, which is said to be cultivated with much success. Mr. Agassiz walked through many of the cane-fields, but could not see any cane that in point of size would compare with cane he has seen in the north of Queensland. The fields would have looked better for being trashed.

Nearly every planter possesses his own crushing machine, constructed in the following primitive way: two stout hard wood posts are placed firmly in the ground about 10 feet apart, and secured between them, at a height of 1 foot from the earth, is a plank 2 inches thick by 10 broad. On this plank, standing on their ends, and almost touching each other, with their lower axles fitted into holes bored in the plank, are two hard wood rollers, of 2 feet diameter. These rollers are connected at their upper edges by cogs, so that one cannot revolve without the other. Above them, with holes for their upper axles to fit into, is another plank, secured to the upright posts at its ends. The upper axle of one roller is longer than the other and protrudes a foot above the upper plank, with a hole bored through it, into which is fitted one end of a 15-foot pole. An ox, made fast to the other end of the pole, keeps the machinery in motion by walking round and round it, while a man, sitting on the ground, feeds the machine by placing the ends of the canes between the rollers, crushing five or six at a time. A trough beneath the machine catches the juice.

After remaining in Lung-chow for a fortnight, Mr. Agassiz started by boat for Canton on March 11, 1890.

Below Lung-chow the river is called the Tso-chiang or Left river; and is formed by the junction of the Sung-chi-chiang and Kao-ping-ho; none of which rivers are marked on any English maps of China.

Tai-ping, the only town of any size on this river, is situated on the left bank, three days' journey below Lung-chow.

On the 18th, four days after passing Tai-ping, Mr. Agassiz came to the junction of the Tso-chiang and the Yü-chiang, below which place, to its mouth near Macao, the river is called the Hsi-chiang, or West river.

The Yü-chiang, navigable up to the town of Pe-se, has long been one of the highways to the province of Yun-nan; but during the past year the opening of the Red River in Tongking has taken away much of its trade. Nan-ning, the most important

town in Western Quang-si, is favourably situated about six hours' journey below the junction of the two rivers.

As to the general aspect of the country through which Mr. Agassiz travelled, its chief feature, and certainly a most striking characteristic, is the peculiar formation of certain hills, which, as Mr. J. G. Scott has said in his book "France and Tongking," are formed of a kind of prismatic limestone, and rise sheer out of the rice-fields to a height, in some cases, of 1000 feet. The first of these hills that Mr. Agassiz saw was a range on the southern side of the military post of Bac-le, in Tongking, after passing which he saw no more ranges, but numerous isolated hills. The mountains he crossed before entering Langson, which form the natural, although not the geographical, frontier of Tongking, are not of this formation. In the vicinity of Lung-chow, they are very plentiful, and in most cases have a peculiar turretted appearance. The river Tso-chiang passes frequently close under their perpendicular sides, and at times, when Mr. Agassiz was descending that river by boat, it required but a small effort to imagine one of these hills to be the ruin of a huge mediæval castle. Below Nan-ning, he saw no more of them, but at rare intervals.

Nan-ning is a large town, in fact, in point of population, it stands third on the list of the towns of this province.

Below Nan-ning, in some places ridges of rock stretched almost across the river, and the water, being thus partially dammed up would rush round the edge of a ridge, or through a breach in one, at a frightful rate.

At the junction of the Hung-shui-chiang and the Hsi-chiang, is situated the town of Hsun-chow.

With Hsun-Chow a traveller is likely to be disappointed, as its position induces one to expect to find a place of considerable commercial importance, which it is not. The city, surrounded by a wall, probably contains about 40,000 inhabitants; and as it is the chief town of one of the departments into which the province of Quang-si is divided, is a place of some official importance; but it has not the busy aspect of Nan-ning.

Below Hsun-chow the river is a splendid expanse of water, which might be rendered navigable to steamers by a slight expenditure of engineering skill.

In two days, after leaving Hsun-chow, Mr. Agassiz reached Wu-chow, the commercial capital of the province. This place is Canton on a reduced scale. Its houses, built, some of them, close to the water's edge; its boats, with an enormous floating population—for people here are born, live, and die in their boats; and the dress, and the general aspect of the people as they busily pass along its crowded streets, all recalled vividly to Mr. Agassiz the features with which he had formerly been familiar in the latter city.

The River Tan-chiang, on which is situated the town of Kwei-lin, the official capital of the province, here enters the Hsi-chiang, making Wu-chow a turning-point round which boats must pass when journeying between the chief towns of the two Kuangs, as the provinces of Kuang-Tung and Kuang-Hsi are frequently called. The Tan-chiang is, like so many of the rivers of China, variously named on different maps; on some it is called the Fu-ho.

Below Wu-chow the country is hilly, and the river deep to the Shao-hing gorges, through which it passes, with hills rising on either side to a height of 700 or 800 feet.

A short distance below the gorges the waters of the Hsi-chiang are augmented by the Pei-chiang, or North River; which is a very considerable stream, rising in the mountainous country on the borders of the Kuang-Tung and Kiang-Si provinces. Below this junction the Hsi-chiang begins to split up, and finds its way to the sea through many mouths. The great branch enters the ocean near the Portuguese colony of Macao, and rightly bears the name of the parent river whose first-born it is. Another branch, only second in size to the one already mentioned, is the Canton river, which enters the sea close to the historical Bogue Forts. Opposite to Canton this river divides into two branches, which lower down unite, forming the Island of Honam. The larger of these branches, called the Back Reach, was the one most used for the purposes of steam navigation; but since the time of the late Franco-Chinese troubles it has been closed by a barrier, which makes it impossible for ocean steamers to reach Canton, as the other branch, called the Front Reach, is too shallow for any but light-draught river steamers to ascend. Ocean steamers have consequently, for the past five years, been obliged to discharge their cargoes at Whampoa, twelve miles below Canton. The name "Canton

River" is by some map-makers already erroneously applied to the whole of the Hsi-chiang river. It would be as correct to call the River Ganges the "Hoogli."

THE ST. PETERSBURG ACADEMY OF SCIENCE.

WE have before us the yearly Report of the St. Petersburg Academy of Science, drawn up by its new secretary, Prof. A. A. Strauch; it is full of interest, as it gives a careful analysis of the scientific work done by the Academy. After having mentioned the losses sustained by the Academy, and the new members elected, Prof. Strauch passes in review the scientific institutions connected with the Academy. The Pulkova Observatory is now under the directorship of the Moscow Professor, Th. Bredichin, well-known for his researches into the structure of comets; the Physical Observatory, under H. Wilde, has added to its former weather warnings a system of warnings of snowstorms, which are sent to the Russian railways. A new laboratory for researches into the physiology and anatomy of plants has been opened; while the remarkable ethnographical and anthropological collections of the Academy (which contain the collections brought in by Krusenstern, Lütke, Junker, Miklukho-Maclay, Polyakoff, and so on), have been lodged in a separate museum, now opened to the public. Rich collections, especially zoological, from Caucasia, Turkestan, and Mongolia, were received during the past year. Among the recent acquisitions of the library, Mr. Friedland's collection of Hebrew printed works, old and new, some of which are very rare, is especially valuable.

As to the scientific work done during the last year, the following are especially worthy of notice.

In mathematics, Prof. Ishmenetsky, continuing his researches into the functions of Bernoulli, has shown the use which may be made of them to explain the geometrical meaning of Euler's formula for the approximate calculation of surfaces limited by curves; Prof. Markoff's work on the transformations of slowly convergent series into rapidly converging ones, and M. Bortkevitch's researches into the average duration of life in Russia, are also valuable contributions.

In astronomy, Prof. Backlund, besides geodetical work in the north of Russia, continued his calculations of the ephemerides of Encke's comet, which will reappear this year.

In physics, O. D. Chwolson's work upon the conductivity of metals at various temperatures is mentioned.

In meteorology, we find, besides a review of the already known publications of the Central Physical Observatory, special reference to H. Wilde's memoirs on a new (very practical) instrument of his own invention for measuring magnetical inclination, as also on his anemograph, registering pluviometer, and atmograph.

In chemistry, Prof. N. Beketoff continued his work upon the physical and chemical properties of caesium and its oxides.

In geology, Dr. Rogon published an interesting work upon the Ganoid fishes of the Upper Silurian deposits of Oesel, as also on the Jurassic fishes of Ust-Balei in East Siberia. The six species discovered in these last deposits are intermediate forms between the Mesozoic Ganoids and the *Teleostei*. M. Tschersky's work is especially interesting: taking advantage of more than 2500 specimens (70 species) of fossil Mammalia discovered in Northern Siberia, he prepared a most elaborate monograph on Post-Pliocene Mammalia, which contains, first, a full account of what is already known about the Quaternary mammals in Siberia, a description of the Post-Pliocene formations of Siberia generally, and their mammalian fauna, with incidental remarks upon the fauna of the caves, and, finally, a very good systematic description of 25 Post-Pliocene mammals.

In botany, the work of Prof. Maximowicz on the flora of Tibet is prominent. This flora is of high antiquity, and consists, besides its own endogenous species, of immigrants from both the Himalayas and the mountains of Mongolia. Many of those immigrants have already evolved into distinct species. Later immigrants came from China, and, later on, the Tibet flora was completed by our familiar northern plants. The orographical division of Tibet into a plateau in the west, and Alpine tracts in the East holds good for the flora as well. As to the flora of Mongolia, it is an impoverished continuation of the flora of South Siberia. Prof. Famintsyn continued his researches into the symbiosis of Algae with Infusoria. The green grains often seen in several Infusoria proved to be Algae having a nucleus, chromatophores, and covered with a jelly-like

envelope; their structure is identical with that of monocellular Algae, and they multiply within Infusoria by partition. But they are incapable of an independent life, and die out soon after the death of the Infusorium they have lived in. Further research is now being carried on to ascertain in what conditions they might live independently.

In zoology, the chief work of the Academy consisted in the publication of the zoological results of Prjevalsky's expeditions. Two fascicules have now been issued containing the description of the Rodents, by E. A. Bichner, and the description of the families of *Silviidae*, *Timeliidae*, and *Accentoridae*, by Th. Pleske. The chief interest of the latter fascicule is in the new genus of birds, *Lophobasilus*, which appears to be a connecting-link between the *Sylvia* and the *Regulus*. S. M. Hertenstein described some new fishes from the Russian Pacific coast, and E. A. Bichner made a preliminary review of a small but very interesting zoological collection brought in by MM. Potanin and Berezovsky from the Chinese province of Kansu, and now lodged at Irkutsk. Th. Pleske issued the fourth fascicule of his "Ornithographia Rossica," which contains the description of ten Russian species of *Acrocephalus*.

In anatomy and physiology, Prof. Owsianikow continued his researches into the striation of some nerves, and Dr. Tarenetski described forty-four Aino skulls from the island of Saghalien. The author is inclined to admit that they belong to a race quite different from the Mongolian.

In ethnography the Report mentions the following works:—Dr. Bilenstein has terminated an important work upon the geographical distribution of the Letts, now and in the thirteenth century, in Courland and Livonia. In view of the capital interest of this work, it will be published by the Academy separately, with an atlas of maps. Prof. W. Radloff has published a *facsimile* of a most important document, the "Kudatku-bilik," which is the oldest representative of the Uigur language, and has, for Turkish dialects, almost the same importance as Ostromir's Gospel has for the Slavonian languages. To complete the historical and linguistic materials which will be associated with this publication, M. Radloff consulted the Eastern manuscripts of the British Museum, and is now preparing a general work upon the subject. In connection with the above, Prof. Eitling, of Strasburg, prepared for the Academy a table of Uigur, Mongol, and Mantschu alphabets, which shows that they originated from the Syrian alphabet. The likeness between Syrian and Uigur letters also permits us to guess the sounds which separate letters had in the Uigur language. Prof. Wasiliev's notes on his journey to West Siberia are also worthy of note. The learned Professor is now preparing a work on the geography of Tibet, as well as the second volume of his great work on Buddhism. Finally, M. Katanoff (of Sagai origin) visited, last year, Northern China and Turkestan, and collected a good many interesting materials relative to the Tartars, and especially the now rapidly disappearing Soyotes. His collection of tales, songs, Shaman prayers, &c., is remarkably interesting, the more so, as all has been written down in the Soyote language (with Radloff's Turkish alphabet), and transcribed for print, on the spot, among the Sagais, who speak the Soyote language correctly. P. K.

A METHOD OF DETERMINING SPECIFIC GRAVITY.

THE specific gravity of a single Foraminifer, such as a Globigerina, of the scales from a butterfly's wing, or of a drop of its blood, might seem a difficult task to ascertain, as indeed by the ordinary gravimetical methods it would be plainly impossible. Yet nothing can be easier, given the following method. And to conduce to brevity we shall describe its application in a particular case, say to the spicules of the common shore sponge (*Halichondria panicea*). A quantity of one of the well-known heavy fluids, such as cadmium-boro-tungstate, or potassium-mercury-iodide solution, or methylene iodide, is diluted down to a density of about 2.25 (which is known to be above that of the spicules), and introduced into a small glass tube, about one-quarter of an inch in diameter, and with two opposite flattened faces. This is cemented by one of its flat faces to an ordinary microscope slide, the axis of the tube being set at right angles to the length of the slide.¹ The tube being about half-filled with heavy fluid, water (or in the case of methylene iodide,

¹ See Proc. Roy. Dublin Soc., vol. iv. p. 374, 1885, and Journ. R. Micr. Soc., vol. v. p. 579.