

corrected figures the perturbations by Jupiter, Saturn, and Uranus, were recalculated. Thus the value of the semi-axis major at perihelion passage in 1790 was determined. Tischler's work, however, did not close here; he subsequently computed the planetary perturbations from 1858 to the last perihelion passage towards the end of 1871, and hence derived elements for that appearance which were found amongst his papers after his death. It may perhaps be convenient, for the sake of reference, if Tischler's orbits for the three perihelion passages at which the comet has thus far been observed, are here transcribed:—

T	1790			1858			1871		
	Jan.	30	8702	Feb.	23	5169	Nov.	30	4642
π	115	42	0	115	50	56	116	4	36
Ω	268	36	34	269	3	4	269	17	12
i	54	6	26	54	24	30	54	17	0
ϕ	55	1	4	55	12	9'9	55	11	25'6
Log. a	0	7619	723	0	7585	361	0	7601	603

The motion is direct. T is the time of perihelion passage for meridian of Greenwich; that for 1871 being the predicted time, which appears to have required a correction of + 1^d.333 nearly. ϕ is the angle of eccentricity ($e = \sin \phi$), and a the semi-axis major.

It is stated that the calculation of the perturbations of this comet to the next appearance in 1884 has been undertaken by Mr. Stone, of Washington.

FRENCH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

M. DUMAS in his presidential address made some striking remarks on the important place filled by physical science in modern times as contrasted with its former supposed inferiority to literature, philosophy, and art. "Natural science is no longer content with the contemplative attitude which sufficed for Newton and Laplace. Science is now mixed up with all the personal acts of our existence; she interferes in all measures of public interest; industry owes to her its immense prosperity; agriculture is regenerated under her fostering care; commerce is forced to take her discoveries into account; the art of war has been transformed by her; politics is bound to admit her into its councils for the government of states. How could it be otherwise? Have not mechanics, physics, chemistry, the natural sciences, become intelligent and necessary agents for the creation of wealth by labour? Have they not opened the way to all the institutions by which hygiene watches over the health of workers and the salubrity of cities? If comfort is more universal, the life of man more prolonged, wealth better distributed, houses more commodious, furniture and clothing cheaper, the soldier better armed, the finances of the State more prosperous, is it not to the sciences that all this progress is due? It is they that discover in the ground the first new materials, that show to agriculture the most suitable productions, the most efficacious manures, and the most appropriate implements; they that, inventing new processes for industry, put into its hands untiring machines, sometimes gigantic, rivalling in brute force the giants of fable, sometimes delicate, rivalling in nimbleness the hands of fairies. It is the sciences, in fine, that have given to the world the rapid means of communication by land and sea, by the aid of which man takes possession of the terrestrial globe, creating new peoples and flourishing cities where our fathers knew only of barren deserts and uninhabited regions. . . . Science follows you everywhere: breathe, there is chemistry; walk, there is mechanics; at every moment, without thinking of it, we cannot help having to do with her. Whether we wish it or not it is necessary to accept science as a companion, to possess her or to be possessed of her; if you are ignorant you are her slave, if you are

skilled she obeys you. The future belongs to science; unfortunate are the people who shut their eyes to this truth."

The work of the various sections was carried on actively throughout the week, and a fair average of good papers seem to have been read, as usual, the section devoted to the medical sciences filling a large space. In the section of Anthropology, M. Tubino read an interesting paper on the Iberian Peninsula, in which he brought out strikingly the great differences which exist between the inhabitants of the various provinces of Spain and Portugal. There is found in the Spanish races no unity of origin or of physique. There is not only dissimilarity, but also antithesis and opposition. M. Tubino endeavoured to show that the same diversity existed in the region of morals, in language, in art, and in the ideas of right and law, and that thus there is really no Spanish race and no means of establishing in the Iberian Peninsula a centralised state. An interesting discussion followed in which M. Broca, while agreeing with M. Tubino's main statements, showed that the same diversities exist in every country that are found in Spain. The only great barriers of states are geographical limits; the idea of race is a delusion and a snare, and no doubt civilisation will come to Spain as it has come to France.

In the Botanical Section Prof. Lanessan explained the results of his organogenic and histologic researches on the foliar appendages of the *Rubiaceae*. Prof. Haeckel spoke of some facts relative to the structure of the glands of some plants called carnivorous. The glands described by Darwin as dissolving and absorbing, are found on the inferior face of *Pinguicula vulgaris* and of *Nuphar pumilum*, where they are unicellular. The cells of these glands present the phenomenon of protoplasmic aggregation under the influence of slight solutions of ammoniacal salts (one-half per cent.). The same facts are presented in the glandular hairs of *Petunia*, *Spartmannia*, and *Pelargonium*, which dissolve flesh after hypersecretion of the glands. He regards the phenomenon of protoplasmic aggregation as characteristic of absorption, and thinks that there will, perhaps, be room for distinguishing physiological aggregation from the morbid aggregation produced under larger doses of reagents. M. Merget explained the result of his researches in the production of phenomena of gaseous synthesis in vegetables.

An excursion was made on Tuesday morning to the top of the Puy-de-Dôme, in which most of the distinguished members of the Association, several ladies, and a number of English men of science took part. An excellent banquet was provided in a small valley at a short distance from the top. Eleven hundred guests had been invited by the Council-General; eight hundred were present. Many healths were proposed and speeches made.

The construction of the observatory cost 225,000 francs, and 100,000 more are required for the completion of the work, although it is in working order. The expenses have been sustained by the department, and the instruments have been constructed by the government. The house of the keeper and director is a massive building situated at a small distance from the top, and partly protected by rocks. Three lightning conductors have been adapted to it. The observatory is a tower standing on a platform, the communication between which and the house is by a well-staircase seventeen metres deep, and a tunnel thirty-five metres long. On the top of the tower is a movable platform. The view is magnificent, but special precautions will be required in constructing an anemometer which will be able to bear the pressure of the storms. It will be a self-registering one.

The concluding sitting of the session took place at the Hotel de Ville on Friday last, under the presidency of M. Dumas. M. Kuhlman was nominated vice-president for 1877 and president for 1878; M. Perier vice-secretary-

general for 1877 and secretary-general for 1878. The city for the meeting in 1878 has not been officially determined upon, but the intention of the committee is unanimously to propose Versailles or Paris, in order to take advantage of the interest created by the Universal Exposition.

The 1877 meeting will take place at Havre under the presidency of Dr. Broca, the celebrated anthropologist; M. De Lairain, the agricultural chemist, will be the general secretary.

The recommendations to Government have been few but interesting. The section of Mathematics asked the Government to give Commandant Perier and his fellow-workers the sum sufficient for continuing their present work of triangulating France. On Monday, the 21st, a lecture was delivered by M. Perier at the theatre on the geological work executed under his direction by staff officers, and the determination of the longitude of Puy-de-Dôme by electricity. The work is proceeding at the present time, and a temporary astronomical observatory has been established side by side with the meteorological one for that purpose.

The meteorological section asked government to organise a general issue of agricultural warnings (which M. Leverrier is preparing to do), to establish a national institute of meteorology, and to assist General Nansouty in the establishment of an observatory on the Pic du Midi, at an altitude exceeding by 3,000 feet the Puy-de-Dôme.

The "encouragements" to scientific workers are not determined by the General Meeting, but by the Council, according to the wants which may be made known from time to time during the year, and a report of the manner in which the money has been spent is presented yearly at the inaugural session of the Association.

NORDENSKIÖLD'S EXPEDITION TO JENISEJ, 1876.

THE following plan of the expedition to the mouth of the Jenisej, fitted out by Messrs. Oscar Dickson, of Gothenburg, and Alexander Sibiriakoff, of St. Petersburg, has been published in the *Göteborgs Handels Tidning* :—

As it was desirable that the inquiries into the natural history of middle and north Siberia, and specially of the Jenisej valley should be recommenced during an earlier part of the year, a number of the members of the expedition were obliged, in the month of April, to travel by land *via* St. Petersburg, Moscow, Jekaterineburg, &c., to the town of Jeniseisk, thence to proceed down the river by boat to its mouth. For naturalists who had before made themselves familiar with the animal and plant world of northern Scandinavia, such a boat journey offered an excellent opportunity for comparative studies of the natural history of Siberia and Scandinavia, which will not only be of great moment for a knowledge of the flora and fauna both of Russia, and specially of Siberia and of Scandinavia, but also, as I have before pointed out, of true practical value in judging of the fitness of middle Siberia for cultivation. The land expedition is also entrusted with the task of carrying out the soundings necessary for ascertaining whether the Jenisej is navigable, and other hydrographical work, and specially of examining the navigable waters in the lower course of the Jenisej between Dudino and Mesenkin, in order to be able, on the arrival of the vessel at the last-named place, near the mouth of Jenisej, to pilot it to its proper destination, Dudino. I have given the leadership of this division of the expedition to Zoology-Docent H. J. Théel, from Upsala. Besides him there take part in it two botanists, Rector M. Brenner, from Helsingfors, and Docent H. W. Arnell, from Upsala, and two zoologists, Dr. J. Sahlberg, from Helsingfors, and Dr. F. Trybom, from Upsala.

It is, perhaps, already known through the newspapers that these gentlemen have arrived at Jeniseisk, and commenced the intended boat journey from that place to the mouth of the river.

For the main division of the expedition, which is to make its way by sea to Jenisej, I have chartered the steamer *Ymer*, of Gothenburg. The *Ymer* is a strong freight vessel, built of oak, of the first class in Veritas, of 400 tons burden, fully rigged with sails, and having a steam-engine of 45 horse-power.

This part of the expedition is accompanied, besides the undersigned, by Docent F. Kjellman and Dr. A. Stuxberg, both members of the expedition of 1875; the former also of that which wintered in Mussel Bay in 1872-3.

The expedition now departing in the *Ymer* is not, as will be seen from the above, a commercial enterprise, but a scientific expedition, whose main object is to survey the navigable waters between Obi-Jenisej and northern Norway. But the Russian government having in the most accommodating way removed the obstacles which threatened to arise to the bringing in of goods to those regions where naturally no custom-house officers are to be found, I have considered that I ought, in order thereby practically to open the new commercial route, to take with me a small quantity of goods suitable for north Siberia, for the most part sent as samples by Swedish manufacturers, and, if opportunity offers, I shall also endeavour to obtain return cargo from Siberia to Europe.

During May, June, and the greater part of July, it is not possible to count on finding open water east of Novaya Zemlya, and it was therefore unnecessary for the *Ymer* to leave Sweden sooner than the beginning of July, the calculation being that she would enter the Kara Sea in the end of the month or the beginning of August. If all goes well the vessel ought in that case to be in a few days at Mesenkin, where a meeting has been fixed with Dr. Théel's party. If there be sufficient depth of water the voyage is to be continued to Dudino, where the cargo will be discharged and a new one taken on board.

By the end of August the *Ymer* ought to be again clear to return the way she came, possibly with some short excursion towards the north-east in order as far as possible without coming among ice to examine the sea between the mouth of the Jenisej and Cape Tschelusckin. In the latter half of September I count on being again in Norway. A. E. NORDENSKIÖLD

NOTES

THERE is little to add in reference to the arrangements for the Glasgow meeting of the British Association to the information we published some weeks since (vol. xiv., p. 170). Everything has evidently been done by the local secretaries and committee to render the meeting a success so far as they are concerned. The class-rooms at the University, where the sections, with one exception—the Geographical—will be accommodated, have been for some time in the hands of workmen, and the necessary alterations will be completed in good time. The lower hall of the museum, which is situated a little to the east of the north or main entrance of the university, will be fitted up as the reception-room, and in connection with this will be the post and telegraph offices, general inquiry office, a stall for the disposal of newspapers and scientific literature. In this portion of the building there will also be located the offices and rooms of the local committee, and a ladies' retiring-room. Adjoining the reception-room will be the ticket-office, and from this will be the entrance to the refreshment-room. The sections will be distributed over the university, and the local committee contemplate issuing a diagram of the building, showing the class-rooms allotted to each department and their situation. The arrangements have been carried out so that the committee-rooms will adjoin all the sections. At the Queen's Rooms the arrangements are well forward for the accommodation of the Geographical Section.

MOST of the time of the International Congress of Orientalists which meets at St. Petersburg during the first ten days of September will be devoted to researches connected with Russian Asia. Of the four *séances* claimed for Asiatic Russia, we learn from the *Times* the first will belong to Eastern and Western Siberia, the second to Central Asia, so far as it is under Russian sway, together with the independent principalities of Ouzbekistan; in the third will be treated Caucasia, with the Crimea, and the other countries of European Russia which are inhabited by Asiatics; in the fourth, Trans-Caucasia (Georgia and Armenia, according to their ancient limits). In the three following *séances* the Congress will concern itself with the rest of Asia in three