OUR ASTRONOMICAL COLUMN.

PRIZES AT THE PARIS ACADEMY.—Among the numerous prizes presented by the Paris Academy (*Comptes Rendus*, No. 25, Dec. 18), those devoted to the science of astronomy were as follows:—M. Schulhof, the Lalande Prize, for his magnificent researches on comets; Dr. Berberich, the Valz Prize, for his well-known connection with the calculations of cometary and (minor) planetary orbits; and Prof. Langley, the Janssen Prize, for the work he has done relating to the distribution of the heat in the normal solar spectrum, and to the influence exerted on this distribution by both the solar and terrestrial atmospheres. Among the general prizes we notice that the Arago medal has been awarded to two American astronomers, Profs. Asaph Hall and Barnard. The former receives this medal as he was the discoverer of the two satellites of Mars, although on a former occasion he was the recipient of the Lalande prize for the same reason. The latter, it is needless to say, owes this honour to the fine use he made of the great 36-inch telescope of the Lick Observatory, in searching out the fifth, or, as it should be named, the first satellite of Jupiter.

THE TAIL OF COMET BROOKS (*c* 1893).—Last week, under this heading, we referred to Prof Barnard's remark that the fall of this comet had encountered some outside or obstructive medium. It is interesting, in the face of this, to look at the drawings of the great comet of 1882, and to notice the fragments and their relative positions and forms. With the drawing before us (Young's "Astronomy," 1888, p. 427) the following description is given:—"Besides this" (referring to that curious phenomenon called the *sheath*) "at different times, three or four irregular shreds of cometary matter were detected by Schmidt, of Athens, and other observers, accompanying the comet at a distance of three or four degrees when first seen, but gradually receding from it, and at the same time growing fainter. Possibly they may have been fragments of the tail which belonged to the comet before passing perihelion, or of the matter repelled from the comet when near perihelion. Since the comet, in passing the perihelion, changed the direction of its motion by nearly 180° in less than three hours, it was, of course, physically impossible that the tail it had before the perihelion passage could have made the circuit of the sun in that time. . . . Visible or invisible, the particles of the old train must have kept on their way under the combined action of the sun's gravitation and repulsion. . . ." Would not a more simple explanation in this case be that these fragments were the result of collisions near perihelion passage, for here most certainly we should expect to be in the presence of meteoritic matter in abundance, and these travelling at high speed?

THE PLANET VENUS.—This planet, which forms such a brilliant object in the evening sky, will during this month become brighter, reaching its maximum brilliancy on the 10th of January. For observers in northern latitudes its position is becoming more favourable for observation, owing to its movement northward in declination. A conjunction with the moon takes place on the 10th of January, so that about the day before and after that date these two bodies will form a striking pair.

GEOGRAPHICAL NOTES.

WITH the first of January the weekly South German geographical paper, *Das Ausland*, edited by Dr. Sigimund Günther, of Munich, and established as long ago as 1827, comes to an end, having sunk its identity by amalgamating with *Globus*, which for thirty-two years has been its North German contemporary and rival. *Globus* will continue to be published, with numerous illustrations, as heretofore, and with the additional attraction of Roman type being substituted for the old German character. It is somewhat remarkable that weekly papers of this kind, entirely devoted to geography and travel, with no political purpose, should be so thoroughly established in Germany and France, while no successful attempt has ever been made in an English-speaking country to start a similar publication.

THE Russian geologist, W. A. Obrucheff, who started in the early part of 1893 for a journey into the little known region of Ordos, lying in the great bend of the Hoang-ho, has (says *Globus*) been able to make many new observations. Leaving Tai-Yuen-fu, the farthest point reached by Richthofen in this direction, on January 18, and crossing the Hoang-ho on the ice on the 28th, he selected the route to Ning-hsia, across the south-western edge of Ordos, as the least known, with the intention of proceeding to study the mountains of Alashan and the left bank of the Hoang-ho, up to the Nan-shan range. On his way Obrucheff was able to throw some light on the hills between the plateau of Shan-si and Kansu, and the plain of Ordos, which he found to be only the denuded edge of the plateau, and in no sense a range. The portion of Ordos which he intended to cross is a blank on all maps, and the whole district in the great bend of the Hoang-ho north of the Great Wall is practically unknown territory.

THE last number of the *Verhandlungen* of the Berlin Geographical Society contains a short note on a journey to Hadramaut undertaken last year by a German explorer named Hirsch, whose experience gives some clue to the difficulties now being encountered by Mr. and Mrs. Bent. At the outset Herr Hirsch met with opposition from the British Resident at Aden, but overcoming this he reached Makalla and started for the interior, with two camels and a small party, on July 1. He ascended the Wadi Howere to the great plateau, and crossed the watershed at an elevation exceeding 6,000 feet. From the barren plateau Hirsch descended to the fruitful and populous Hadramaut valley, several of the towns of which were visited. At Terim he was very badly received, subjected to insults, and compelled to leave at very short notice, returning to Makalla through the scarcely known Wadis Bin Ali and Odym. Altogether the journey in the interior only lasted forty days, but observations of considerable value were made, which are now being prepared for publication.

A REMARKABLE discovery has been announced by the Austrian Institute for Historical Research, in the form of a copy of a map by Columbus, drawn on a letter written from Jamaica in July, 1503. This, although only a rough pen-and-ink sketch, shows exactly the opinion of Columbus himself as to the part of the world he had reached, which he believed to be the east coast of Asia. The original map, drawn by Columbus and his brother Bartholomew, was presented to Frate Hieronymo, who gave the map and a description to Alexander Strozzi, a noted collector of early voyages. He is supposed to have copied the original map on the margin of the letter of Columbus, which he had bound in a volume with other documents, and this volume is now in the National Library at Florence, where the existence of the map was discovered by Dr. R. v. Wieser, the Professor of Geography at Innsbruck.

NEW FRENCH LAW FOR THE PREVENTION OF FOREST FIRES.[1]

THE wooded tract of country comprising the hill ranges of Les Maures and l'Esterel in the departments of Le Var and Les Alpes maritimes, in the south-east of France, has been annually ravaged by forest fires from time immemorial. It is stocked with conifers, *Pinus Halepensis*, and *P. Pinaster;* the cork oak, and the pubescent variety of *Quercus sessiliflora*, and there is a dense undergrowth of *Erica arborea*, the roots of which are used for briar (*bruyère*) pipes, also of *Erica scoparia*, lavender, juniper, broom, dwarf palms, wild olive, and *Arbutus*, &c. During the months of June, July, August, and September, the drought, high temperature, and the violent *mistral* wind which prevail, increase the danger from forest fires and their severity.

Owing to the great destruction of property which these fires cause, a law was enacted in 1870, to be in force for twenty years, and has given excellent results, the frequency and extent of forest fires in the region having diminished by half during the period 1870–90. This law was renewed up to the present time, in order to allow Government to draw up a permanent law on the subject. The Minister of Agriculture accordingly drafted a bill, which, after consideration by a Committee of the Chamber of Deputies, and some unimportant amendments, was passed by the legislature, and received the consent of the President of the Republic, as a law, on August 19, 1893.

The principal clauses of the Act deal with methods of prevention and extinction of fires: thus the first clause prohibits, during the dangerous season above mentioned, all fires in forests

[1] The text of this Law is given in the *Revue des Eaux et Forêts*, vol xix. part 18, for September 25, 1893.

or shrubby waste lands, or within a distance of 200 metres from their boundaries. The period during which these fires were declared illegal by the former Act of 1870, was fixed annually by the prefects, but experience has shown that it can now be fixed once for all by the law. As exceptions to this law, Clause 2 also authorises the prefects to allow charcoal-makers and other woodmen to light fires at their own risk, in case of damage arising, and subject to certain rules made by the prefects.

Among the fires prohibited during the close season is the so-called *petit feu*,[1] by which strips of undergrowth were carefully burned every six or seven years in the cork forests, to save the valuable cork oak trees from more dangerous uncontrolled fires. This system costs only 3*s*. 6*d*. an acre, as compared with £4 an acre for uprooting the dangerous undergrowth. It is evidently more hurtful to the forest than the other method, as the fire occasionally gets out of control, and, in any case, the burning diminishes the fertility of the soil.

The ninth clause directs that all landed proprietors, whose land has not been entirely cleared of all woody growth, may be compelled by an adjoining proprietor to keep a strip of land between the two estates entirely free from shrubs or conifers. The breadth of this strip will vary, according to circumstances, between 20 and 50 metres.

It is further enacted in Clause 11 that similar bare strips 20 metres broad shall be kept up along all lines of railway through a wooded area, and that these strips in adjoining property shall be kept clear at the expense of the railway companies. As it may not always be necessary to keep up these fire lines along the railways, a committee, consisting of a departmental councillor (*conseiller général*), a forest officer, and a railway engineer, shall decide when they may be omitted. All proprietors, whose woods are cut down in clearing these strips, are to obtain indemnities. This is a new provision, and called for owing to the extension of railways. The Act looks to the future in a clause exempting railway companies from this liability if they should use electric motors, or other inventions which cannot cause a forest fire.

In case any fire should break out, and it may appear advisable to light a counter fire, the two fires meeting and extinguishing one another for want of inflammable material, the local mayor, or his deputy, or failing these the most senior forest officer present, is to take charge of all measures to extinguish the fire, and no indemnity arises for woods burned under such circumstances. As in India, it is found in the south-east of France that fire is frequently caused by sportsmen, or poachers during the dry season, and the prefect is therefore authorised to delay the commencement of the shooting season until the commencement of the rains, which generally happens before the end of September.

As it is found that the construction of a network of roads greatly facilitates fire protection, by giving more value to forest produce, and rendering it possible to transport the material cleared from fire lines, and as roads serve as lines from which counter fires may be started, the State offers a subvention of 3000 francs per kilometre (£200 per mile) for roads constructed in the district, up to a total outlay of 600,000 francs (£24,000).

It appears that since 1870, 479,000 francs (£19,160) have been spent by the State on new roads in the State forests of the Esterel. The penalties attached to the breach of the first clause of this law are one to five days' imprisonment, or fine of 20 to 500 francs, and both fine and imprisonment can be inflicted, so that magistrates can make the penalty proportional to the gravity of the offence, and all police, forest guards, whether belonging to the State or to private properties, are directed to carry out the law by reporting offences, their written statements being received as evidence in cases which may arise. If the railway companies do not clear the fire lines along the railways, these lines will be cleared at their expense by the French Forest Department.

Although much land which might otherwise be planted is wasted in England owing to heather fires, and not only is a large area of pine forest destroyed annually by fire, but also the increase of destructive pine beetles is thus greatly favoured, there is little hope of our Legislature interfering; but the matter is more serious in North America, and along the Northern Pacific Railway about 1000 miles of treeless country exists, where the forests have been destroyed by fires, whilst the immensely valuable pitch-pine forests of the Southern States are rapidly disappearing from the same cause.

Matters have been dealt with in British India much more prudently, and regulations against forest fires have been enacted for the last twenty years at least in all the provinces under our control, and also to a certain extent within the native States. As a result of these regulations, and the careful management of the Indian Forest Department, 23,144 square miles of State forest in India were protected from fire in 1891 at a cost of 9 rupees per square mile, and this in addition to large areas of evergreen forest where no danger from forest fires exists.

W. R. FISHER.

[1] *Vide* "A Forest Tour in Provence and the Cevennes," by Colonel Bailey, R.E., in Transactions of the Botanical Society of Edinburgh, vol. xvi. part 3, 1886.

PRIZE SUBJECTS OF THE PARIS ACADEMY OF SCIENCES.

THE following are the subjects for which prizes will be awarded by the Paris Academy in the years 1894, 1895, 1896, and 1898:—

1894. *Grand Prix for Mathematical Sciences*—The developmen, of an important point in connection with the deformation of surfaces. *Prix Bordin*—The study of problems in analytical mechanics admitting of algebraic integrals with regard to velocities, and especially quadratic integrals. *Prix Francoeur*—Discoveries or useful works on the progress of pure and applied mathematical sciences. *Prix Poncelet*—To the author of the most useful work on the progress of pure and applied mathematical sciences. *Extraordinary Prize of six thousand francs*—For any work tending to increase the efficacy of French naval forces. *Prix Montyon*—Mechanics. *Prix Plumey*—To the author of an improvement of steam engines or any other invention which promotes the advance of steam navigation. *Prix Dalmont*—To the engineer of bridges and highways who presents the best work to the Academy. *Prix Lalande*—Astronomy. *Prix Damoiseau*—Improvement of the method of calculating the perturbations of minor planets so as to give their positions within a few minutes of arc for an interval of fifty years; also the construction of tables which allow the principal parts of the perturbations to be rapidly determined. *Prix Valz*—Astronomy. *Prix Janssen*—Astronomical physics. *Prix Montyon*—Statistics. *Prix Jecker*—Organic chemistry. *Prix Vaillant*—Study of the physical and chemical causes determining the existence of rotatory power in transparent bodies, especially from the experimental point of view. *Prix Desmazières*—To the author of the most useful work on all or part of the cryptogams. *Prix Montagne*—To the authors of important works having for their subject the anatomy, physiology, development, or description of the lower cryptogams. *Prix Thore*—Awarded alternately to works on the cellular cryptogams of Europe, and to researches on the habits or anatomy of a species of European insect. *Prix Savigny*—To young zoological explorers. *Prix da Gama Machado*—On the coloured parts of the integumentary system of animals, and on the fertilising matter of living things. *Prix Montyon*—Medicine and surgery. *Prix Breant*—For a means of curing Asiatic cholera. *Prix Godard*—The anatomy, physiology, and pathology of genito-urinary organs. *Prix Parkin*—Researches on the curative effects of carbon in its various forms, and more especially in the gaseous form of carbon dioxide, in cholera, different kinds of fever, and other ailments. *Prix Barbier*—For a useful discovery in surgery, medicine, pharmacy, or botany in connection with the art of healing. *Prix Lallemand*—For the recompensation or encouragement of works relating to the nervous system, accepting the widest meaning of these words. *Prix Bellion*—To the writers of works or discoverers of facts of special importance to the health of human beings or the improvement of mankind. *Prix Mège*—For the completion of Dr. Mège's essay on the causes that have retarded or favoured the progress of medicine. *Prix Montyon*—Experimental physiology. *Prix Pourat*—On the influence exercised by the pancreas and suprarenal capsules on the nervous system, and reciprocally, on the influence that the nervous system exercises on these glands, studied especially from a physiological point of view. *Prix Gay*—The study of subterranean waters; their origin, direction, the strata they traverse, their composition, and the animal and vegetable life that live in them. *Prix Montyon*—Unhealthy occupations. *Prix Cuvier*—For the most remarkable work on the animal kingdom, or on