

ing more marked every year. It seems that in a window of a "chemist shop" in Birmingham there was exhibited during the summer months a sign advertising various sodas and phosphates. The proprietor, who is quoted as "an enterprising man who is ready to try new things," has proved his fountain to be a striking success. On a hot day he sold as many as a thousand glasses of various flavors, and on other days as many as six or seven hundred glasses, and this in spite of the fact that the "doctors called and denounced the use of soda water, fearing harmful effects from the dangerous ice-cold liquid, and then took it themselves, just as they do at home." It seems that an American soda fountain syndicate has taken up the matter of these hot weather necessities in England, and a number of cities now have fountains in successful operation.

THE HEAVENS IN NOVEMBER.

BY HENRY NORRIS RUSSELL, PH.D.

The most important astronomical events of November are the annular eclipse of the sun on the 21st and the meteoric shower of the 14th.

The first of these phenomena is of little interest to Americans, since it takes place when our side of the earth is turned away from the sun. The path of annular eclipse lies chiefly in the Indian Ocean, but crosses South Africa at one end and Western Australia at the other. The duration of the annular phase is quite long, varying from five to nearly seven minutes.

There is more hope that we may see a great shower of the Leonid meteors this year; but those who, like the writer, watched in vain for them a year ago, are disposed to follow Hosea Biglow's advice, and not to prophesy unless they know. And there are several causes, any one of which, if fully operative, would prevent our seeing a conspicuous display.

In the first place, it has been shown that the orbit of that part of the meteor swarm which gave rise to the shower of 1867 has been so changed by the attraction of Jupiter and Saturn that it no longer exactly intersects that of the earth. If this change is great enough to keep even the outer parts of the meteor swarm away from the earth's orbit, there will be no more Leonid showers, unless at some future time their orbit is changed back again by some favorable planetary action. But it is by no means certain that the actual change in the orbit is as great as this.

Secondly.—The great showers of Leonids recorded in recent times were in 1799, 1833, and 1866, 1867 and 1868. Taking the middle of the last three as the main shower, the interval between showers comes out 34 years, instead of the previously supposed $33\frac{1}{4}$, and the next great shower is due in 1901, with perhaps smaller ones in 1900 and 1902.

This theory, which is due to Professor W. H. Pickering, seems to the writer of the present note to be the most probable explanation of the failure of the expected shower in 1899.

Thirdly.—Even if the shower occurs, it may be that the impressive part of it, which lasts but a few hours, may be visible only in the Eastern Hemisphere, and that we may thus miss it.

In spite of all this uncertainty, it will be well worth while to watch the sky on the nights of the 14th and 15th. For the great shower, if it does appear, will be one of the grandest of all natural phenomena, and at the same time one of sufficient rarity to make it doubly important not to lose a chance to see it.

It will be hardly worth while to start the watch before midnight, as at that hour Leo has barely risen. Unfortunately, the waning moon is in this part of the sky, and only the brighter meteors will be visible. But even so, should many of them appear, the divergence of these paths in all directions from the "radiant point" inside the sickle of Leo will be conspicuous, and will afford one of the finest natural examples of a perspective effect.

At 9 P.M. on November 15 the most brilliant part of the sky is near the eastern horizon. Just south of east is Orion. The line of his belt is almost vertical, and the still brighter stars Betelgeux (on the left) and Rigel (on the right) afford a striking contrast in color, the former being a strong red, and the latter pure white.

North of east, and also low down, is Gemini, marked by the twin stars Castor and Pollux, of nearly the first magnitude, south from which extend two lines of stars in which a little imagination sees the Twins themselves. Above Orion, Aldebaran and the Pleiades mark the position of Taurus, and to the north, over Gemini, is Capella, the brightest star of Auriga.

The great square of Pegasus is a little past the meridian. A conspicuous row of bright stars extends from its northeast corner through Andromeda and Perseus toward Auriga. The huge extent of Cetus fills most of the southeastern sky, and Aries is higher up. In the southwest the only conspicuous star is Fomalhaut. Vega and Altair are well down in the west, and Cygnus is higher up. Cassiopeia is almost above the pole, and the Dipper is opposite, skirting the northern horizon. To the right of Vega is the head of Draco, whose curving body extends for a long distance between the Great and Little Bears.

THE PLANETS.

Mercury is evening star until the 19th, when he passes inferior conjunction and becomes morning star. At this time he is very nearly in line between the earth and sun. In fact, if the conjunction took place but one day earlier, he would transit the sun's disk. He will be too near the sun throughout the month to be well seen with the naked eye.

Venus is morning star in Virgo, rising at about 3:30 A. M. on the 1st and 4:30 on the 30th. She is receding from the earth and growing fainter, but is still much the brightest object in the morning sky.

Mars is in Leo, not very far from the meteor radiant, and rises about midnight in the middle of the month, and is steadily brightening toward his opposition next February.

Jupiter is evening star in Scorpio, but is so low in the west at sunset that he will not be easy to see after the middle of the month.

Saturn is also evening star in Sagittarius, setting about an hour and a half later than Jupiter.

Uranus is in Scorpio near Jupiter, but too near the sun to be visible.

Neptune is in Taurus, invisible to the naked eye.

THE MOON.

Full moon occurs on the afternoon of the 6th, last quarter on that of the 13th, new moon at the time of the eclipse on the 21st, and first quarter near noon on the 29th. The moon is nearest the earth on the 5th and most remote on the 17th. She passes Neptune on the evening of the 8th, Mars at noon on the 14th, Venus on the evening of the 18th, Mercury on that of the 21st, Uranus on the night of the 22d, Jupiter near noon of the 23d, and Saturn on the afternoon of the 24th.

Princeton, October 19, 1900.

CONGRESS OF TRAMWAYS AT PARIS.

The International Congress of Tramways was held at Paris the 10th and 13th of September. It was organized under the auspices of the International Union of Tramways. A list of questions relating to the most important points, most of them to electric traction, had been previously sent to the members, and from the replies obtained, eleven papers or reports were prepared by leading specialists. These papers, with the discussions to which they gave rise, are of great value. The first paper, read by M. H. Géron, relates to the question of tariffs; the second, by M. de Pirch, shows the advantages of electric traction, being confined mainly to the subject of overhead systems. The results obtained have been an increase of traffic, lines and passengers; facility of extension; diminution of expenses and increase of profits, lowering of rates, etc. A paper read by M. Gunderloch shows the advantages and disadvantages of broad and narrow gages. The composition of central stations was an instructive paper by Messrs. Thonet and d'Hoop, treating of the installation of dynamos, engines and boilers. Compound engine, accumulators, and in some cases gas engines are recommended. Systems of current distribution is a paper read by M. Van Vloten, in which the usual direct current system is recommended for shorter lines, while for long lines accumulators may be used at the station. Accumulator traction may be used for lines of 9 to 12 miles. The polyphase system seems only adapted to railroads. M. Fischer-Dick read a paper upon the Falk rail-joint, and traction by accumulators was considered by Messrs. Broca and Jahannet, of the Paris traction companies, giving their experience and the deductions to be drawn for or against the system. The heating of cars was treated by M. de Burlet, who considered stoves, hot air, steam and electric heating, etc. Secondary railroad lines were considered by M. Ziffer. The methods of rating the power of dynamos and electric motors were treated by M. Macloskie. The question of brakes for tramways was considered by M. Monmerque, including the various forms of hand and mechanical brakes.

THE UNITED STATES NATIONAL MUSEUM.

The annual report of the condition and progress of the National Museum for the year ending June 30, 1898, is made by Charles D. Walcott, who has charge of the United States National Museum, and shows that the institution is in an excellent condition. During the fiscal year there were 441 accessions containing upward of 450,000 specimens. The total number of specimens recorded up to July 1, 1898, exceeds 4,000,000. The attendance during the year under consideration was less than during the previous year, owing probably to the war and the presidential inauguration, which caused a large influx of visitors. Since 1881, 3,972,987 persons have visited the museum. Prof. Walcott is of the opinion that the National Museum should be enlarged at once. The present building was erected with a view to giving the largest amount of space with the least outlay of money, and in this respect it may be considered a success. It is, in fact, scarcely more than a shadow of such a massive, dignified and well-finished building as should be the home of the great national collection. There is needed at once a spacious, absolutely fire-proof building, of several stories, constructed of dur-

able materials, well lighted, modern in equipment and on such a plan that it may be added to as occasion demands in the future. A site for such a building is already owned by the government, and only the new structure needs to be provided. The galleries just completed have added 16,000 square feet of floor space, which will help to a certain extent to relieve the crowded condition of the exhibition halls and courts below. As an illustration of the present conditions, and the necessity for more room, the anthropological collection may be cited. If the material now in possession of the government in this department should be properly placed on exhibition, it would occupy the entire space of the present museum building.

In the present structure there is a great deficiency in laboratory facilities. Curators and assistants are hampered for want of room in which to lay out, arrange, classify, mount, and label specimens. There should also be rooms in which students could bring together and compare various series of objects, and have at hand books and scientific apparatus. The quarters for storage in the present museum building are also entirely inadequate. What is needed is a series of spacious fireproof basements for the less perishable objects and equally spacious dry lofts and rooms for those collections and stores which require protection from dampness. The present museum building was built with the cheapest materials and under the cheapest system of construction, so that it gives the appearance of a temporary structure and tends to cheapen the effect of really good cases and the very valuable collections which they contain.

The head curators, curators, assistant curators and aids constituting the scientific staff of the National Museum number in all sixty-three persons and of these only twenty-six are compensated, the remainder serving gratuitously, being for the most part connected with other Bureaus of the Government. Mr. Walcott says truly that the system of honorary curatorship, while admirable within restricted limits, is a disadvantage when carried to the present extent. Such a system has a disintegrating effect upon the organization, as the men are not entirely at the command of administrative officers, and are not obliged to serve at definite hours or under the ordinary restrictions of paid curators. The number of honorary officers should be reduced by the substitution of a larger number of salaried officers.

The National Museum has at present no regular fund for the acquisition of collections, and can only make purchases from a contingent fund, which rarely exceeds \$3,000 or \$4,000. For this reason, every year valuable collections which should be in the hands of the government are sold abroad or to municipal museums, or pass into the hands of private citizens. The American Museum of Natural History annually expends \$60,000 for the increase of its collections, and the Field Columbian Museum, in Chicago, has spent for collections during the last five years \$419,000.

The floor space is far less than the American Museum of Natural History. The space on the ground floor is 140,625 square feet, and that in the gallery 16,000 square feet, and the exhibition space is 96,000 square feet. The total cost of the building was \$315,400. The American Museum of Natural History, on the other hand, has 294,000 square feet of floor space, of which 196,000 is given up to exhibition space. The total cost of the American Museum to date, including the completion of the new wings, is \$3,559,470, and the income for the present year is approximately \$185,000. The National Museum requires buildings which will give at least 300,000 square feet of increased accommodation at once, which with the present museum space, which could be devoted to the Department of Anthropology, would make in all 400,000 square feet. With suitable buildings provided, the immediate development of the National Museum into one of the great museums of the world may be looked for.

HOW RUSSIA CORNERS SUGAR.

In an interesting article on this subject a writer in a recent *Fortnightly Review* says that each year the Minister of Finance fixes the amount of sugar which shall be produced in the empire and sets the price at which it shall be sold. The average domestic consumption is about 1,000,000,000 pounds. This is announced as the legal limit of production which shall be put upon the market during the year. In addition to this, it is allowed to manufacture 180,000,000 pounds more, which is placed in storage. The 1,000,000,000 pounds, as it is sold, pays an excise tax of $2\frac{1}{2}$ cents a pound. If at any time through increased demand sugar becomes worth more than the price fixed by the government, the 180,000,000 pounds in reserve are allowed to reach the market free of excise duty. If this does not supply the market at the legal price, the government itself will buy from foreign countries enough sugar to supply the need for a bear influence upon the price. This has been done by Russia twice during the past ten years. This system, of course, precludes any export business in sugar, but the Russian government does not believe that the exporting of sugar from Russia can be made profitable or advisable, so it does not encourage it.