

CONJUNCTIONS OF THE PLANETS.

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The purpose of this article is to treat of only that part of the general subject of planetary configuration which relates to a comparison of the planets when they have the same right ascension; i. e., when they are on the same celestial meridian.

Six conjunctions of the planets occur during the latter half of the present year. One illustration is a plot of the orbits of the terrestrial planets, showing the positions of the earth and of the planets at each conjunction. The other shows the apparent diameters and phases magnified. In order to compare the figures, they are all drawn to the same scale. The apparent distance between the planets at each conjunction, however, cannot be represented on this scale, because the figures would be separated by a measurement which would fall beyond the limits of the drawing; but the distance seen, by the naked eye, is given in the text. The date of conjunction is Washington mean time.

CONJUNCTION OF MERCURY AND NEPTUNE.

July 23d. 0h. The distance between the planets is a little more than twice the moon's diameter, which subtends an angle of about 1/2 deg. Neptune's diameter is nearly eleven and one-half times the diameter of Mercury (= 34800/3030). At this date Neptune's distance from the earth was about thirty-one times the mean distance between the earth and the sun (= 30.9 X 92.9 million miles); while Mercury's distance was only one and one-fifth times this unit (= 1.195 X 92.9 million miles). The apparent diameter of a planet is proportioned to its true diameter, and inversely as its distance from the earth. The result of a simple computation shows that Mercury subtended a very much larger angle than Neptune.

The plot shows that the planets are morning stars, and that Mercury's phase is gibbous. In this and in the illustrations which follow, the arrow drawn with the full line shows the direction of the planet as seen from the sun; and that drawn with the dash line as it is seen from the earth. On account of the great distance to Neptune, the convergence of these visual rays is scarcely perceptible in the drawing.

CONJUNCTION OF VENUS AND JUPITER.

August 11d. 14h. Jupiter and Venus are evening stars. The former is daily receding farther from the earth, and will be in conjunction with the sun on September 17th, after which date Jupiter will be morning star. Venus presents the gibbous phase; and at the time of conjunction, the relative diameters of the planets appear as shown in the illustration. The computations for these figures are similar to those which have been explained. The great difference between the equatorial and polar diameters of Jupiter are apparent. The planets are separated by a distance equal to two-fifths of the moon's diameter.

CONJUNCTION OF MERCURY AND JUPITER.

August 24d. 19h. The planets are evening stars, and are at a distance apart equal to one and a third times the moon's diameter. Mercury shows the gibbous phase, the dark edge being opposite from that shown on July 23rd.

CONJUNCTION OF VENUS AND URANUS.

November 23d. 8h. The planets are evening stars, and may be seen a long time after sunset. Venus is rapidly approaching the earth, and as a consequence the planet's diameter is increasing. An inspection of the plot shows that a little more than one-half of the illuminated surface is visible. Venus will soon present the half-moon phase, which will be succeeded by the crescent phase, when she will be the most beautiful object in the evening sky. The planets are separated by a distance equal to about five times the moon's diameter.

CONJUNCTION OF MERCURY AND URANUS.

December 27d. 15h. The planets are evening stars. Mercury shows the same phase as that of August 24th; and since the distances from the earth are very nearly equal, the apparent diameters are equal. The diameter of Uranus is about ten and a half times that of Mercury; but its distance from the earth reduces its apparent diameter to that shown in the figure. The distance separating the planets is equal to about three and a half times the moon's diameter.

CONJUNCTION OF MARS AND SATURN.

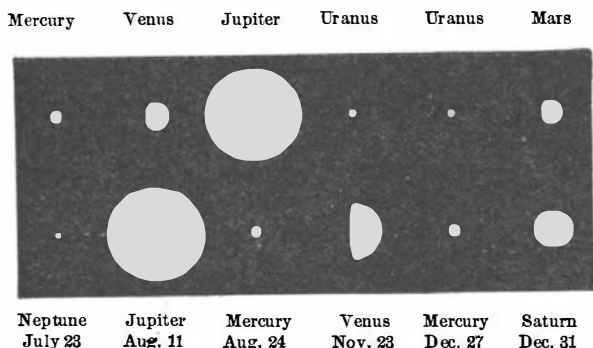
December 31d. 2h. Again the planets are evening stars. Mars shows the gibbous phase, and his distance from the earth is about equal to that between the earth and the sun. The apparent distance between

the two planets is nearly six and a half times the moon's diameter. The great difference between the equatorial and polar diameters of Saturn is very apparent. Although Jupiter's diameter is scarcely one and three-sixteenths times that of Saturn, the diameter of the latter is very much reduced on account of its greater distance from the earth.

An American Exposition in Berlin in 1910.

What promises to be a unique event in international commerce will take place under distinguished auspices in Germany's capital next year.

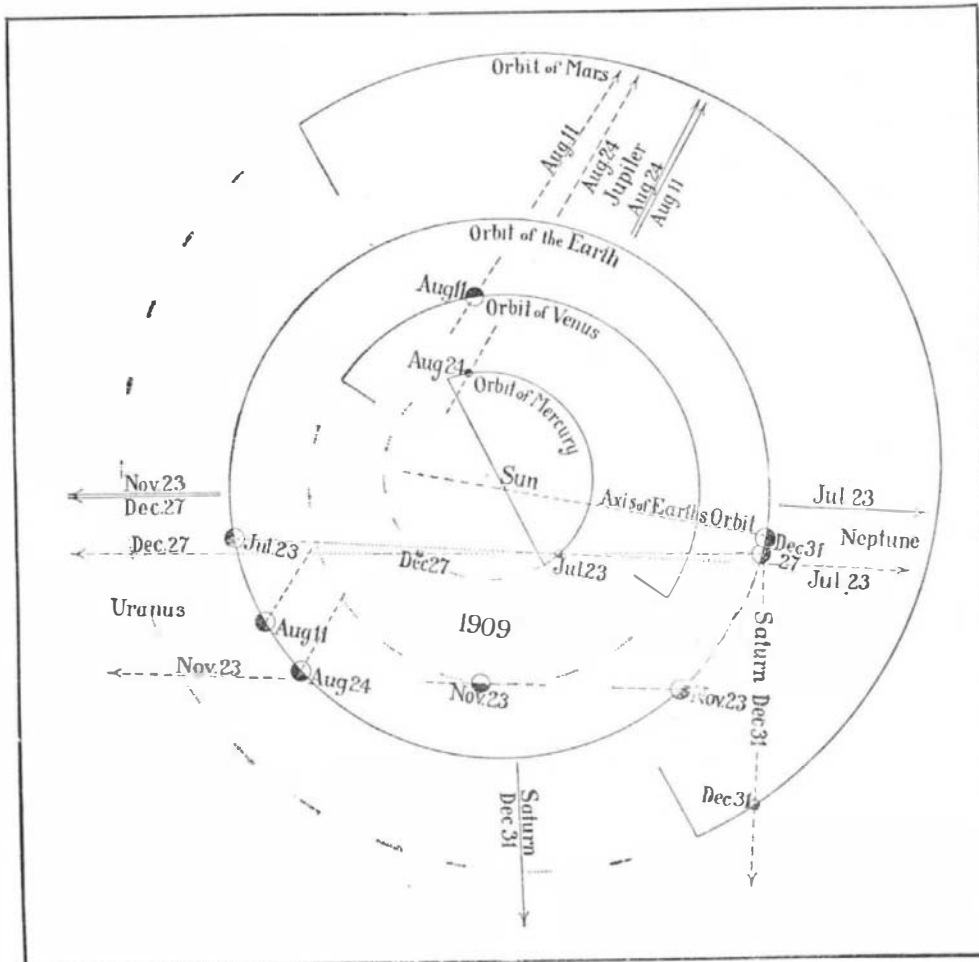
In a recently erected permanent exposition building known as the Exposition Palace near the Zoological Gardens, in the best section of Berlin, an exposition



of American products exclusively, among which tools and machinery will form an important part, will be held during the months of April, May, and June, under the patronage of Prince Henry of Prussia.

This exposition is designed to stimulate and strengthen our trade with Germany, a trade the importance of which may be gaged from the statement that Germany bought nearly \$277,000,000 worth of goods from the United States in 1908 and is America's second-best customer. Prominent men on both sides of the Atlantic will co-operate to make the undertaking a success.

The exposition commends itself particularly because of the fact that there will be no drudgery connected with it for the exhibitors. The space rental will include all incidentals, such as the decoration of the booths, foundations for the exhibits and carpeting, janitor service, the storing of the packing material, protec-



CONJUNCTIONS OF THE PLANETS IN 1909.

tion, insurance, etc. The large steamship companies have granted substantial freight reductions, and exhibits will be admitted into Germany free of customs duty.

Some of the most prominent manufacturers in the United States are signatories to an invitation to participate in the exposition. For the exhibitors' convenience an office has been established in the Hudson Terminal Building, New York city.

The "Parahyba," the sixth of the ten destroyers ordered by the Brazilian government from Yarrow & Co., Limited, of Scotstoun, ran an official full-speed trial a few days ago on the Skelmorlie mile. She attained a speed of 27.29 knots.

Poisonous Honey.

BY PROF. KARL SAJO.

Illness, and even death, are sometimes caused by eating natural honey, free from all adulterations. The writer is not aware that any fatal cases of poisoning have occurred in Europe. They are reported exclusively from America and Asia. Almost all cases are caused by the use of honey derived from the flowers of plants of the Alpine rose and heath families (*Rhodoraceae* and *Ericaceae*). The matter is somewhat puzzling, because cases of severe poisoning are very rare. For example, the American cases, which are attributed to *Kalmia angustifolia* and *K. latifolia*, are only two in number, although these plants are common in America. Even in Europe, illness is sometimes produced by eating honey. I have myself witnessed several mild cases, one of which appears to throw some light upon the subject. Some children, who were watching their teacher cleaning honeycomb, asked him the nature of the dark and acrid paste with which some of the cells were filled. The teacher explained that this was bee bread. The children asked if it was fit to eat, and the teacher carelessly answered, "yes." The children ate the bee bread freely, despite its unpleasant taste, and all became extremely ill.

The reader doubtless knows that bees fill certain cells partly with pollen, which is necessary food for the development of the young bees, as it contains albumenoids, while honey contains only carbohydrates. This pollen is known as bee bread. It is usually stored in certain special groups of cells, which can be easily separated from the honey cells. Sometimes, however, the bee keeper, to his disgust, finds in the honeycomb, intermingled with the honey cells, many cells which contain pollen. Often the lower part of a cell is filled with pollen, and the upper part with honey. In the case above cited, the poisoning was evidently due to the pollen, for persons who ate the honey from which the bee bread had been removed experienced no ill effects. I know, from personal experience, that the eating of honeycomb which contains bee bread often produces unpleasant symptoms and loss of appetite.

Several possibilities suggest themselves. The pollen may be naturally poisonous, for many pollen grains contain toxins, as was proved by Prof. Dunbar in his investigation of the cause of hay fever. It is possible, also, that the pollen stored in the cells may become decomposed, and thus produce disease germs and poisonous substances. If the bees wish to preserve their stores of pollen, which are not usually protected by large additions of honey, they are obliged to add large quantities of a secretion containing formic acid, and it is not impossible that, in this operation, large doses of the alkaline poison of their stings may also be added.

In view of these facts, it appears probable that the cases of poisoning attributed to honey are really caused by pollen. If this is true, the frequency of such cases should be diminished by modern methods of bee-keeping, in which a compartment of the hive is reserved exclusively for honey, and the bee bread is almost entirely deposited in cells attached to the broodcomb, in another compartment. Furthermore, honey is now seldom pressed from the comb, but is almost entirely extracted by centrifugal separators, in which the semi-liquid honey flows out of the cells, leaving the more solid bee bread behind. In the case of honey in the comb, the presence of bee bread cells is easily detected by inspection or by the taste, and a little care in removing them will prevent any evil consequences.—Translated from Prometheus.

Washable Water-Color Paint.

Washable painting in water colors can be executed by mixing the pigments with plaster, a fusible salt, a suitable glaze, and an acidulated solution of gelatine. The paste thus formed is applied like paint and, after it is dry, is hardened by heating the painted objects. The following proportions and method are recommended:

Ten parts of glue are dissolved in 100 parts of hot water containing a little acetic or other acid. After this solution has cooled it is rubbed up with 5 parts of plaster, 5 parts of soda, potash or borax, 30 parts of lead oxide or zinc white, and the necessary quantity of the water color pigment desired. The coating, when dry, is heated by means of an alcohol or other smokeless flame. The finished coating resembles enamel. It is not affected by rain or heat and may be lacquered without difficulty.