

A HAPPY idea, very ingeniously carried out, is the Pharmaceutical or Medico-Botanical Map, of the World, produced by Mr. George Barber, of Liverpool. In a very clearly printed and carefully-coloured map we are shown at a glance the *habitats* of all the medicinal plants and drugs in general use, as well as the mean annual temperature of the countries whence they are obtained. The map is published by Simpkin, Marshall, and Co.

M. E. LIPPMANN has communicated to the *Annales Industrielles* an account of the operations for sinking the Artesian Well at La Chapelle. The engineers employed by the authorities of the city of Paris to execute this great work, are MM. Degosée, Laurent, and Co. When completed, this well will supply water to one of the most populous quarters of Paris. It is intended that the well shall not only strike the water-bearing stratum—at a depth of about 2,000 feet—into which the great well at Passy penetrates, but shall extend through the stratum to a total depth of 2,950 feet. In this way, other water-bearing layers will be intersected. The work was at first commenced by the ordinary method of sinking a masonry shaft 2 metres (6ft. 3in.) in diameter to a depth of 445 feet through the tertiary strata which lie above the chalk. Many difficulties presented themselves, chiefly due to the looseness of the earth through which the excavation penetrated, and to the insufficient pumping-power. After two years of persistent labour, it was decided to try another system. At this period the shaft had reached a depth of 113 feet; new boring machinery driven by steam power was now set up, and until the present time the work has proceeded most satisfactorily.

ASTRONOMY

Prizes for the Discovery of Comets

THE following circular has been issued by the Imperial Academy of Sciences at Vienna:—

For several years past there have been remarkably few discoveries of new comets. The cause of this fact, which seems inconsistent with that of the wider distribution of telescopes suitable for such discoveries, may be due to the special attention that has been given to the small planets. It is, however, much to be regretted that there has been such slight increase in our knowledge of the comets, in view of the recently established connection between the shooting stars and the comets. It is exceedingly desirable that we should know more than two or three hundred out of the many thousands of comets which undoubtedly belong to our system, especially as most of those which we know move in parabolic orbits. Were our knowledge of comets more complete we should surely know of more meteor streams and comets belonging one to the other. Mindful of Herr Schumacher's words "it is natural that astronomers intrusted with the administration of a well furnished observatory should have no time left for sweeping the sky so minutely and so perseveringly as is necessary for discovering these faint bodies, whilst, on the contrary, it seems certain that to the many amateur astronomers who have less extensive means of observation hardly any more useful kind of activity could be recommended," the Imperial Academy of Sciences at Vienna is induced to propose for the discovery of comets during the three years from May 31, 1869, to May 31, 1872 eight prizes annually, consisting, as the receiver may choose, of a gold medal, or of twenty Austrian ducats representing its value in money.

The award of these prizes will be subject to the following regulations:—

1. The prize will be given only for the first eight comets discovered in each of the three years named, and only for such comets as are telescopic at time of discovery, that is, invisible to the naked eye. The comet must not have been before seen by another observer, and must be one whose appearance could not be predicted with certainty.

2. The discovery must be communicated immediately and without waiting for further observations, to the Imperial Academy of Sciences, by telegraph if practicable; and otherwise by the earliest post. The Academy undertakes to transmit the news immediately to other observatories.

3. The time and place of discovery with the plan and course

of the comet must be given as exactly as possible with the first notice. This first notice is to be supplemented by such later observations as may be made.

4. If the discovery should be confirmed by other observers, the prize will not be awarded unless the observations of the discoverer suffice for the determination of the orbit.

5. The prizes will be awarded in the general meeting of the Academy held at the end of May of each year. In case the first notice of a discovery arrives between the 1st of January and the end of May, the final award of the prize will be deferred till the general meeting in May in the following year.

6. Application for the prize must be made to the Academy within five months from the time of the arrival of the first notice. Later applications will not be considered.

7. The Imperial Academy will procure the decision of the permanent astronomers of the Observatory at Vienna as to the fulfilment of the conditions in Nos. 1, 3, and 4.

The New Planet (109)

In the *Astronomische Nachrichten*, 1779-80, there is a long and important article on Piazzi's observations by M. Argelander; also the approximate place of this planet, discovered by Prof. Peters of Clinton, New York.

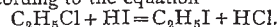
The following elements of the Planet are by Prof. Peters, and are considered by him to be nearly accurate. We print in a parallel column the elements for the same planet as furnished by Prof. Axel Möller, of Lund. The latter are calculated from observations taken at Clinton on Oct. 13th, Leipzig Nov. 8th, and Lund Nov. 26th, 1869:—

Epoch 1869,	Oct.	0 ^o 0 Berlin mean time.
$M_0 = 337^{\circ} 1' 3.35''$		$350^{\circ} 53' 28.6''$
$\pi = 55^{\circ} 53' 48.0''$		
$\Omega = 4^{\circ} 51' 45.4''$		$4^{\circ} 57' 30''$
$i = 7^{\circ} 56' 56.55''$		$8^{\circ} 3' 57.8''$
$\phi = 17^{\circ} 25' 14.13''$		$17^{\circ} 27' 51.0''$
$\mu = 809^{\circ} 580$		$800^{\circ} 476$
$\log a = 0.4278314.$		

CHEMISTRY

Transformation of Chlorinated into Iodated Compounds

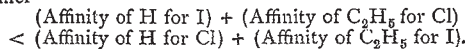
AD. LIEBEN has made important experiments on this kind of transformation. Ethyl chloride, mixed in a sealed tube with three or four times its weight of strong hydriodic acid, sp. gr. 1.9, and heated for five hours to 130°, is almost wholly converted into ethyl iodide, according to the equation—



In like manner ethylated ethyl chloride (butyl chloride), and amyl chloride are converted by strong hydriodic acid into the corresponding iodides, without formation of secondary products.

Ethyl-chlorinated ethyl oxide $C_2H_5(C_2H_5)Cl$ is converted, C_2H_5 O is converted, by an excess of strong hydriodic acid, chiefly into ethyl iodide, and ethylated ethyl iodide (butyl iodide); but there are also some secondary products formed, viz. butyl chloride, alcohols, and a substance having a carbonaceous aspect, the quantity of these secondary products increasing as the hydriodic acid is less concentrated and present in smaller quantity.

To determine whether the action of hydriodic acid is a simple double decomposition or a case of the action of masses, the converse reaction was tried by heating ethyl iodide with a considerable excess of hydrochloric acid in a sealed tube to 130°. A small quantity of ethyl-chloride was thereby obtained, together with hydriodic acid and free iodine, showing that the inverse of the first-described reaction does really take place; but the quantity of ethyl chloride, which it yields, is very small, even when the action is continued for 50 hours. The result of the two supplementary experiments, namely, the decomposition of ethyl chloride by hydrogen iodide, and of ethyl iodide by hydrogen chloride, may be represented, though somewhat crudely, in the following manner—



The decomposition of ethyl chloride, and its homologues by the action of hydriodic acid, is analogous to the decomposition of silver iodide by the same reagent.

As an example of the action of hydriodic acid on organic chlorides of other series, chloroform $CHCl_3$ was introduced, together with 11 times its weight of hydriodic acid of sp. gr. 1.9,