

compared directly should be developed at as nearly the same time after exposure as possible.

A Possible Hydrogen Isotope of Mass 2.—There is some evidence from atomic weight determinations that hydrogen should have isotopes of masses 2 and 3. If they exist, it can be shown from thermodynamical reasoning that molecules of the types H^2H^2 and H^2H^3 should concentrate relative to the common H^1H^1 molecules in residues from the evaporation of hydrogen near the triple point, whilst it is known from simple spectroscopic theory that the heavier atoms would have a displaced Balmer spectrum. Work undertaken on these considerations is reported by H. C. Urey, F. G. Brickwedde, and G. M. Murphy in the last issue of the *Bulletin of the American Physical Society* for 1931. The atom H^3 has not been detected, but it has been found that the lines $\text{H}\beta$, $\text{H}\gamma$, and $\text{H}\delta$ are accompanied by weaker lines which agree within the experimental error of 0.01 Å. with the positions calculated for an isotope of mass 2. The reputed isotope lines have the same width as the main lines and are definitely more intense with the treated material, although they are present when ordinary hydrogen is used.

Chromium Plating.—The chromium plating now so much used to prevent tarnishing of metal fittings of all kinds has been found to be slightly porous and not to afford sufficient protection against corrosion of the base metal, such as steel, on which it is deposited. It has been necessary to deposit copper or nickel on the base metal before the chromium is applied, and the Bureau of Standards, in co-operation with the American Electroplaters' Society and the American Society for Testing Materials, has been investigating the possibility of producing less porous deposits and so reducing the thickness of the copper or nickel protection necessary. The results are summarised in a paper by Messrs. W. Blum, W. P. Barrows, and A. Brenner in the October issue of the *Journal of Research* of the Bureau. Both the porosity and the cracking of the chromium deposit increase rapidly in the first twenty-four hours and more slowly for several weeks at room temperatures. Heating for a short time to 200° C. increases the ultimate cracking. A slight increase in the chromic acid and of the ratio CrO_3 to SO_4 in the depositing tank, an increase of

temperature of the tank to 55° or 65° C. and a decrease of current density, all decrease the porosity of the deposit.

Purification of Radon.—G. H. Henderson, in the *Canadian Journal of Research*, p. 466, describes a simple apparatus for the purification of radon for radium therapy, which differs in some respects from the ordinary practice. Potassium hydroxide is used to remove carbon dioxide and most of the water, and since phosphorus pentoxide is dispensed with, only one Toepler pump and fewer valves and stopcocks are necessary. The impurities are removed by sparking and the excess of hydrogen is allowed to escape through an electrically heated palladium tube. The apparatus, which was designed by W. G. Moran, has been in use in the Victoria General Hospital, Halifax, for three years with very satisfactory results. The radon is readily concentrated to 100 millicuries per cubic millimetre, the actual purification taking from two to five minutes. The amount of radium in solution in the apparatus is 200 mgm., but there seems no reason why it should not work equally well with larger quantities.

Vitamin B and Phytase.—Since Teru-Uchi has shown that experimental beri-beri of pigeons (avitaminosis B) is caused by the action of a toxic substance, orizotoxin, extractable from polished rice, and Iwata has found that lysocitin, a substance formed from lecithin by the action of certain enzymes, occurs in polished rice, the possibility of a relationship between lysocitin and orizotoxin arises. A series of experiments made by Cuboni and described in the *Rendiconti of the Reale Istituto Lombardo di Scienze e Lettere* (vol. 64, parts 11-15, 1931) shows that all the symptoms of beri-beri may be reproduced in chickens by injections of orizotoxin, whereas injection of lysocitin has no such effect. Various analogies in behaviour between phytase—which, as Belfanti and Contardi showed, prevents and cures beri-beri—and vitamin B are pointed out, and the conclusion is drawn that these two substances are certainly closely related and probably identical. Further similarity between phytase and vitamin B is revealed by experiments—described in the same issue—carried out by Arnaudi, who finds that the growth of yeast and certain other micro-organisms is accelerated in the same way by the two substances.

Astronomical Topics.

The Orbit of 61 Cygni.—This well-known double star has always attracted much attention from the wide distance between the components and the large proper motion; it was for the latter reason that Bessel selected it for parallax tests with the Königsberg heliometer, obtaining the first reliable stellar distance. Though it is such a near neighbour, the period is so long that its determination has baffled many investigators. In fact, at the end of the last century some American astronomers denied that it was a binary at all. However, Mr. T. Lewis, in his memoir on the Struve double stars, gave a diagram on a large scale of the observations up to 1900, which exhibited the curvature of the path in a palpable manner. At an even earlier date Dr. Peters had published an orbit in *Astr. Nach.*, with a period of nearly eight hundred years.

Mr. Fletcher read a paper on this star at the January meeting of the Royal Astronomical Society. He considers the binary character absolutely established, and anticipates that the period would be found to lie between 700 years and 1000 years, agreeing with the estimate of Peters. In the discussion, Dr. Jackson pointed out that the uncertainty in the period

does not introduce much error into the determination of the masses, as this depends in the main on the curvature of the arc over which the observations extend. Mr. Fletcher also considered the observations of radial velocity of the components, but as the difference between them is small, they do not add much to the accuracy of the orbit-determination.

Possible Early Observation of the Bieliid Meteors.—*Pop. Astr.* for December contains a translation by Willard J. Fisher of an article by W. Klinkerfues that appeared in *Göttinger Nachrichten*, April 3, 1873. It is evidently very little known among astronomers. It establishes with great probability, on the basis of a record by Theophanes, that Biela's comet and the accompanying meteors were both observed at Byzantium in the year A.D. 524. It is noted that the record mentions both comet and meteors together, so that a connexion between them was suspected even then. Klinkerfues also concluded that the comet observed in China in November A.D. 1162 was Biela's. In both the years mentioned the comet, if correctly identified, would have been near the earth, so that its visibility with the naked eye is not improbable.