

satisfactory alternative reagent, namely *p*-xenylcarbimide, the compounds of which, $C_6H_5 \cdot C_6H_4 \cdot NH \cdot CO_2R$, are considerably less fusible than the corresponding phenylcarbimides, so that phenols which yield only oils with phenylcarbimide provide crystalline *p*-xenyl derivatives and, in addition, solubility relationships are modified. The paper includes a table of melting points of *p*-xenylcarbimides and phenylcarbimides, in which compounds formed from several alcohols and phenols appear.

Syntheses of Ethyl Alcohol.—In a paper in the June number of the *Proceedings of the Royal Society*, on ethyl alcohol as a product of high-pressure syntheses, G. T. Morgan and R. Taylor, after reviewing briefly the conflicting results which have been reported in attempts to prepare this substance from carbon monoxide and hydrogen interacting in the presence of catalysts, describe some new experiments which they have performed yielding positive results. The catalyst most used was prepared from cobalt nitrate and zinc permanganate, and the synthesis carried out at 400° and 200 atmospheres, about 75 c.c. of a composite liquid product being obtained per hour. From about four litres of this, the alcohol was separated and identified conclusively by a number of physical and chemical tests. Two acetals have also been separated from the crude products of the catalysis and identified, the more volatile one being ethylidene dimethyl

ether, and the less volatile one propylidene dimethyl ether. Six other catalysts are described, each of which was found to induce the formation of appreciable quantities of ethyl alcohol.

Molecular Weight Determinations.—Rast, in 1922, suggested (without reference to the earlier work of Jouniaux in 1912) the use of fused camphor as a cryoscopic solvent, the novelty claimed being that the molecular depression of freezing point for this substance was so large that ordinary melting-point apparatus could be adapted to a micro-method for the determination of molecular weight. The value of the molecular depression constant for camphor was calculated as 400 by Rast from some results on the melting points of mixtures of salol and camphor obtained by Caille, whereas Jouniaux had obtained the higher value 498 from a study of a number of cooling curves of pure substances dissolved in camphor. In the May number of the *Journal of the Chemical Society*, Le Fèvre and Webb show that Caille's results appear to be erroneous, and that the higher value of the constant is to be preferred. They also show that bornyl chloride is a suitable cryoscopic solvent, having the very high constant of about 500. It has a lower melting point than camphor, and is less volatile. The results given are somewhat erratic and great accuracy is not claimed for them, but the method appears to be capable of development.

Astronomical Topics.

Encke's Comet.—Telegrams from Profs. Shapley and Strömgen report the detection of this comet by Mr. Bobone at Cordoba (Argentina), on June 21, at 22 h. 23.2 m. U.T. in R.A. 7 h. 35 m. 24 s., N. Decl. 8° 22'. The R.A. is 56 s. less and the Decl. 44' less than the values predicted by Matkiewicz; this implies that the time of perihelion is about 18 hours earlier than the predicted value, which was June 3.85 U.T. For most comets this would not be regarded as an unreasonable amount, but this comet has been so carefully studied ever since 1819 that the predictions are usually accurate to an hour. It is too large to be due to Mercury, though a little of it may be due to that planet, if Matkiewicz did not allow for its effect; it was not very far from the comet at the last perihelion passage. Possibly the accelerative effect, which was noted in the last century, but which had nearly died out, has revived again. This is the first detection of a comet for ten months; the cometary nature of the object reported by Prof. Nakamura last November is doubtful.

Calendar Reform.—A Circular from the International Fixed Calendar League reports that the preparatory committee on calendar reform at Geneva has completed its report, which will soon be issued; it will form the basis of discussion at the international conference on the subject, which has been convened by the League of Nations to meet on Oct. 26. Nearly all the schemes of reform include the suggestion that one day in each year (two in leap years) should lie outside the sequence of weekdays, so that every year should begin with the same weekday. There is widespread opposition to this plan, and it is scarcely likely to obtain the support necessary for its universal adoption. The schemes for making the lengths of the months follow a more orderly plan are less controversial; but the reformers are fairly equally divided between the 12-months and 13-months division of the year. The advantage of the latter is the equality of all the months, except for the one extra day. Its chief drawback is that it does not divide into quarters. But it has been pointed out

that the case would not be much worse than the present 'quarter-days', which do not all fall on the same day of the month. The discussions next October are likely to be lively.

Improvement in Time-Recording.—The great improvement in clocks, effected by Shortt, calls for a similar improvement in chronographs. Those in general use are limited to hundredths of a second. A paper by Alfred L. Loomis in *M.N.R.A.S.* for March gives a description of a very accurate form of chronograph. A broad sheet of paper is made to advance at a uniform speed past a comb of 100 teeth. The records on the paper are made by electric sparks from these teeth; the teeth are in electric connexion with a disc having 100 teeth, which rotates 10 times per second, so that each tooth corresponds to one-thousandth of a second. The results enable very accurate clock determinations to be made. These show that the maximum clock rate is attained when the pressure in the clock case is between 15 mm. and 25 mm. of mercury. Lowering the pressure from 15 mm. to 1 mm. caused the clock to lose a second a day; this unexpected result is due to the longer swing that occurs with low pressure. A paper immediately following this, by Prof. E. Brown and D. Brouwer, gives an analysis of the clock records extending over several months. The most interesting result is the detection of a small effect due to the moon. The theoretical amplitude is shown to be 0.000153 second, the period being half a lunar day. This is the direct action of the moon on the pendulum, but there are also indirect effects due to the change in the earth's attraction arising from tidal deformation. The analysis of the clock readings gave amplitudes varying from 0.000106 s. to 0.000150 s.; they are, therefore, of the right order for lunar effects. It is hoped that continuation of the observations, using four Shortt clocks, will make it possible to detect changes in the rate of the earth's rotation. The irregularities in the apparent motion of the moon and planets give grounds for believing that such changes occur.