unfortunately not good enough to go on to the corresponding (38th) order.

We are inclined to conclude that this singularity of the 34th order of palmitic and 26th of lauric acids depends upon the fact that the scattering matter is not uniformly distributed along the chain of the molecule, but contains a periodicity due to the successive CH_2 groups. The following facts seem to support this view. For twice the long spacing of palmitic acid we found 71·20 Å.U., and in the case of lauric acid, 54·45 Å.U. This means an increase per single CH_2 group of 1·045 Å.U. If we may assume this to be the mean distance of successive CH_2 groups, the double molecule of palmitic acid would be to a very high approximation 34 times this distance, and that of lauric acid 26 times.

The investigations are being continued with other chemical compounds.

Our samples of fatty acids were furnished by the kindness of Dr. Treub, chemist at the Kon. Stearine-kaarsenfabrieken at Gouda.

J. A. PRINS.
D. COSTER.

Physical Laboratory,
University, Groningen, Holland.

Transmutation Experiments.

SINCE so large a proportion of the discussion relating to the reported transmutation of mercury into gold has been carried on in the columns of NATURE, it may be of interest to communicate briefly the results of experiments which have been in progress for some time in this laboratory, fuller details of which will be published shortly.

Various experimental arrangements were employed, but in no case has it been possible to establish the production of gold from the mercury. In the earlier experiments a condensed discharge, at a peak voltage of 15,000, was passed (*a*) between tungsten electrodes immersed in a fine emulsion of mercury droplets in white paraffin oil, (*b*) between aluminium rods in an emulsion of mercury in distilled water, and (*c*) between an iron pole and a mercury surface in an atmosphere of hydrogen. Secondary currents up to 75 ma. were passed for as long as twelve hours, but with uniformly negative results.

The most decisive experiment, however, was one which was designed to reproduce as nearly as possible the electrical conditions obtaining in Miethe's experiments with the rotating mercury interrupter, while reducing to a minimum the very grave danger of contaminating the mercury by contact with foreign substances. The mercury was sealed up in an atmosphere of hydrogen in a small quartz tube attached to a shaking machine, so that an arc was formed between pure mercury poles and drawn out to extinction six or eight times per second. A 30-ampere arc at 100 volts was run for 144 hours, followed by an 18-ampere arc at 240 volts for an equal period. During the last 24 hours of this run the tube was made to function as the interrupter for an induction coil, the secondary of which maintained a condensed spark discharge in air. Only 18 gm. of mercury was employed, and this remained perfectly bright and uncontaminated to the last. It was dissolved up at once in nitric acid, without being subjected to distillation, and a direct simultaneous determination proved that 10^{-8} gm. of gold could have been detected with certainty under the conditions of the experiment. No trace of gold was found.

The most conservative calculation based on the results of Miethe (*Zeitschrift f. anorg. Ch.*, **150**, 350, 1926) leads to an expected yield of 0·11 mgm. of gold, or at least 10^4 times the quantity which could not have escaped detection had it been present. Since the electrical conditions were identical in all essential respects with those in Miethe's experiments, it seems necessary to conclude, with Haber (*Naturwissenschaften*, May 7, 1926; NATURE, May 29, 1926), that Miethe's gold was derived from the materials of his electrodes and his vessels.

The mercury used in these experiments had been twice distilled, below 200° C., at the rate of about 100 gm. per hour, in mercury stills of quite ordinary design, and in no single instance could any trace of gold be recovered from the distilled mercury. The writer shares Miethe's opinion that the contrary results of other investigators have been due to mechanical carrying over of the amalgam, rather than to a true distillation of the gold.

An attempt to prepare indium from tin, by a similar method, also failed, though the spectroscopic method of detection was so delicate that great difficulty was experienced in obtaining indium-free tin for the experiments. A further attempt to produce scandium from titanium by electronic bombardment in an X-ray bulb proved equally unsuccessful.

Experiments are in progress upon the reported transmutation of lead into thallium and mercury. Obviously, no artificial production of such a common element as mercury can be regarded as established without the greatest rigour of proof that every possible source of contamination has been eliminated. The difficulty of completely excluding mercury has been well shown by its frequent appearance in the spectrum from the tin tubes, in which it was hoped to produce indium.

MILAN W. GARRETT.

Clarendon Laboratory,
Oxford,
June 25.

The New Element of Atomic Number 61: Illinium.

IN their interesting note on the discovery of illinium (NATURE, June 5, p. 792) upon which the authors, Messrs. Harris, Yntema, and Prof. Hopkins, may be congratulated, I find the statement that "there were no theoretical grounds for supposing that eka-neodymium [sic!] might exist until Moseley's rule showed that element number 61 was still to be identified." Having devoted almost all my scientific life—since 1877—to the theoretical and practical study of the elements of the rare earths, and especially to the question regarding their position in Mendeléeff's periodic system (the object was not very popular forty-eight years ago!), one of the results of which was the decomposition of the old didymium in 1882, I arrived at the conviction that the gap between the neodymium and samarium was abnormally large. In my paper read before the Bohemian Academy and the Russian Association of Scientists in St. Petersburg in 1902, I came to the conclusion—not reached by any chemist before—that the following seven elements, possessing now the atomic numbers 43, 61, 72, 75, 85, 87, and 89, remained to be discovered. As regards element No. 61, the difference between the atomic weights of Sm − Nd = 6·1, and it is greater than that between any other two neighbouring elements. It is remarkable that it is of the same order as that between the atomic weights of Mo − Ru = 5·7, between which stands ekamanganese, and of Os − W = 6·9, between which stands dwi-manganese, recently discovered in our laboratory by Heyrovský and Dolejšek.