Some of the tin for Phoenicia may have been carried across Gaul to Marseilles from the mouth of the Loire; but the use of the Boulogne route for the Cornish tin has been generally accepted.

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The Product of the Radioactive Disintegration of Potassium.

It has been shown by numerous investigators that potassium and salts of potassium are radioactive, the activity being due to the emission of β -particles by the atoms of potassium. In accordance with the radioactive displacement law, Hahn and Rothenbach (*Phys. Zeit.*, 20, p. 194; 1919) pointed out that this β -transformation of potassium should result in the production of an isotope of calcium, without change in atomic weight. On the other hand, S. Rosseland (*Zeit. f. Phys.*, 14, p. 173; 1923) has put forward an ingenious suggestion which does not necessitate the production of a calcium isotope. Later, Hevesy and Løgstrup (*Zeit. anorg. Chem.*, 171, p. 1; 1928) showed experimentally that the radioactivity of potassium appears to be confined to the isotope of mass 41; Aston had previously shown that potassium consists of two isotopes of masses 39 and 41. If only the isotope of mass 41 is radioactive, Holmes and Lawson (*Phil. Mag.*, 2, p. 1218; 1926) worked out the half-value period of this isotope, and on the basis of this result, Hevesy and Løgstrup calculated that, if we assume the earth to have existed for 10^9 years, about 0.001 of all the potassium in the earth must have been transformed into calcium of atomic weight 41.

As a result of an examination carried out by one of us on a series of samples of microcline from Miask (Urals), a variety has been found containing 11 per cent of potassium and only 0.042 per cent of calcium. In accordance with the calculations of Hevesy and Løgstrup, there should be present in this mineral about 0.01 per cent of Ca^{41} , which has been generated from potassium during the life of the mineral, assumed to be 10^9 years. If the remainder of the calcium (0.03 per cent) were present in the mineral during its formation, and if it had the atomic weight of ordinary calcium (40.07), we have calculated that the total calcium in the above mineral should have an intermediate combining weight of 40.30.

Through the kindness of Mr. Smolianinoff, director of the Mineralogical Museum of the First Moscow State University, we have been able to obtain a quantity of this mineral microcline, from which 0.15 gm. of CaO was extracted. After careful purification by repeated precipitation as CaSO_4 and CaC_2O_4 , in quartz vessels and using carefully purified reagents, the atomic weight of the resulting calcium was determined by evaluation of the ratio $\text{CaCl}_2 : \text{CaBr}_2$, the weighings being accurate to 0.01 mgm. Two determinations yielded concordant results, 40.21 and 40.24, as compared with the calculated value of 40.30. The slight discrepancy can be explained by the loss of part of the calcium during its long sojourn in the earth's crust.

In order to examine the accuracy of this method of determining the atomic weight and the efficiency of the method of purification, ordinary calcium (Merck's 'calcium carbonate') was mixed with salts of barium, strontium, magnesium, aluminium, and iron, and then extracted and purified by the same methods as had been used for the calcium from the microcline. The atomic weight of this calcium was then determined, and the results of three experiments gave respectively, 40.06, 40.16, and 40.08, as compared with the value

40.07 of T. W. Richards. The mean of these three results is 40.10.

It is our intention to continue this investigation, and to determine accurately the atomic weight of calcium from microcline, by using a larger quantity of the material.

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WE are indebted to the Editor of NATURE for the privilege of reading the above interesting communication, which, so far as it goes, seems to indicate a calcium isotope of mass 41 as the disintegration product of potassium.

In view of the uncertainty which is likely to arise from the use of so small a quantity of material (0.15 gm. CaO), and the rather large difference (0.1 unit) between the extreme values of their three determinations with ordinary calcium, we shall look forward with interest to the results of the authors' projected work with larger quantities of material.

The suggested explanation of the discrepancy between the experimental and calculated atomic weights of calcium from microcline would surely tend to make the experimental value higher instead of lower than the calculated value. It would be predominantly 40.07 calcium that would be involved if calcium were lost during the life of the mineral.

The calculated value of the atomic weight of the calcium from microcline is necessarily far from trustworthy, as it involves not only the uncertainty of the disintegration constant of potassium, but also an undoubted error in the age assigned to the microcline. According to Backlund, the pegmatites of Miask are younger than the biotite-granite of the region and the cataclastic deformation that followed: that is to say, they are a little younger than the orogenesis of Artinskian (Lower Permian) time. Stratigraphically they are directly known to be younger than the Middle Carboniferous. As von Bubnoff has pointed out, sedimentary deposits younger than the Middle Carboniferous are not known in the East Urals, and exact time definition is therefore not practicable.

It is nevertheless clear that the age to be considered in making the atomic weight calculation should be not 10^9 years, but rather less than 2×10^8 years. Adopting the latter figure, the amount of Ca^{41} in the extracted calcium from the microcline would be only 5 per cent as against 25 per cent previously assumed. It is here tacitly assumed that the average atomic weight of ordinary calcium was the same 2×10^8 years ago as it is now. There is no means of estimating the difference, but as it is in any case quite inappreciable, it may safely be ignored. For an age 2×10^8 years the atomic weight of the microcline calcium is calculated to be almost exactly 40.1.

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ROBERT W. LAWSON.

Measurements of Noise by Means of a Tuning-fork.

IN recent work I have been assessing the loudness of certain noises by means of an audiometer of the type in which a note in a telephone earpiece over one ear is adjusted in loudness until it appears to be as loud as the noise observed by the other ear, or alternatively, is just masked by it. For general observations of everyday noise when the instrument is not at hand, I find it possible to use a tuning-fork on the same lines. The fork is struck in a standard manner, and note is made of the time which elapses before the loudness of the fork, when placed as close to the ear as possible with the flat of a prong facing the auditory meatus, falls to the loudness of the observed noise.