

Preparation of Radio-Element $^{32}_{15}\text{P}$ by Means of an Electric Field

I WISH to correct slightly my recent letter in NATURE¹ on this subject. The number of neutrons emitted by a radium plus beryllium neutron source has been accurately measured (C. J. Bakker² and other observers) and found to be $(2.1 \pm 0.2) \times 10^4$ neutrons per sec. per mC. radium. The source of 120 mgm. used in our experiments emitted during nine days about 1.96×10^{12} neutrons. If each neutron transformed an atom of sulphur into radio-phosphorus (ideal case certainly not realized) we should obtain 1.96×10^{12} atoms of $^{32}_{15}\text{P}$ weighing about 10^{-10} gm. Hence the coloration and the increase in weight of 3.7 mgm. of the electrode in our experiment cannot be due to the radio-phosphorus.

Nevertheless, as is shown by our experiments on the photographic action of the electrodes³ and the measurements with the Geiger-Müller counter, practically all the activity is collected on the electrodes.

Spectroscopic and chemical experiments are proceeding in order to determine the cause of the coloration and increase of weight of the electrodes.

Note added in Proof. After sending the above correcting letter, Prof. F. A. Paneth (London), M. Goldsmith (Paris) and Dr. J. Tandberg (Stockholm) wrote pointing out that, in connexion with the number of kicks per minute observed, we obtain a quantity of radio-phosphorus weighing less than 10^{-11} gm. I had myself made a similar calculation, but have not mentioned it above in order not to occupy further space needlessly.

J. GOVAERTS.

Laboratory of Radioactivity,
Institute of Physical Chemistry,
University of Liège.
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¹ Govaerts, J., NATURE, 141, 871 (1938).

² Bakker, C. J., Physica, 4, 723 (1937).

³ Groven, Ch., Govaerts, J., Guéhen, G., NATURE, 141, 916 (1938).

Points from Foregoing Letters

New values for the 'packing fraction' of atoms of titanium (mass 48), chromium (mass 52), nickel (mass 58) and bromine (mass 79 and 81) are given by Dr. F. W. Aston, as calculated from mass spectrographic measurements on doublets (electrically charged atoms and groups of atoms having the same mass/charge ratio). A knowledge of the packing fraction is necessary in calculating energy changes involved in atomic transmutations.

Clarifying and commenting on some of the statements on resonance and nuclear photo-effects, dealt with in a previous note, Prof. N. Bohr points out that in the case of strictly monochromatic radiation one cannot separate the initial excitation of a certain mode of oscillation from its subsequent quenching due to coupling; also the selectivity is independent of the ratio between the chances of the re-emission of the whole energy as a single radiation quantum in the initial and in the subsequent stage of the excitation process.

A temperature gradient in liquid mercury has been shown to give an electromotive force, the current flowing in the external circuit from the hot to the cold side (first "Benedicks effect"). Further experiments by Prof. C. Benedicks and P. Sederholm show that when the mercury is purified and freed from gas the e.m.f. changes sign. The author suggests that the known anomalous behaviour of mercury, which gives a negative sign for the Thomson effect, might also disappear if suitably purified mercury were used.

By injecting labelled radioactive sodium phosphate into frogs and afterwards determining how much of the labelled phosphorus is combined as creatine phosphoric acid, Prof. G. Hevesy and O. Rebbe find that, in the course of a day, practically all molecules of creatine phosphoric acid in the muscle are broken up and 'rejuvenated'. The phosphatide molecules in the blood of the dog, on the other hand, were found to take up only a small amount of labelled phosphorus during 24 hours, indicating a low rate of rejuvenation.

Messrs. Craxford and Gatty and Lord Rothschild discuss the theory of adsorption potentials and some

recent work of Ehrensward and Sillén on this subject. From the results obtained by the latter, the authors conclude that the early stages of a diffusion gradient in oil-water interphases may confine the diffusion to the first one or two molecular layers of the oil phase.

D. F. Cheesman, A. King and Dr. J. N. Sugden report that certain inorganic salts, such as potassium iodide, while increasing the interfacial tension, have the property of stabilizing the emulsion of water in amyl alcohol.

Tests have been carried out by C. J. Briejer to determine the insecticidal effect of methallyl chloride in a gaseous condition. This material proved to be efficacious for combating insects both in stores and in the soil.

Dr. A. Wood is applying to the International Committee for Zoological Nomenclature for a suspension of the priority rules, which would enable the specific name *pecten* Linn. to be retained for the Silurian brachiopod which Linnæus probably had before him, rather than it should be applied to *Pterinopecten papyraceus* from the coal measures, which was figured by Lister and cited by Linnæus.

The blood of the rabbit, horse, and also of normal human beings, is found by C. Wetzler-Ligeti and Dr. B. P. Wiesner to contain a positive 'restropic' substance, that is, to increase the activity of the reticulo-endothelial system, as measured by the 'Congo-red index'. The blood of human patients suffering from cancer was found to be either inactive or more generally to have a lower Congo-red index.

Prof. D. C. Harrison states that while he does not doubt the existence of the enzyme 'indophenol oxidase' (also known as cytochrome oxidase), as postulated by Keilin and Hartree, this alone does not explain all the experimental facts observed; for example, the production of a positive indophenol reaction on adding hypoxanthine to liver suspension in the presence of cyanide, which inhibits the activity of the indophenol oxidase. To explain satisfactorily the indophenol reaction of the cell oxidations Harrison postulates an additional secondary oxidation by hydrogen peroxide, of a similar mechanism.