

well-defined meaning can be attached to the argument as soon as we, instead, consider the effect of a time-limited irradiation with a corresponding frequency uncertainty.

In particular it follows from such a treatment that, so far as we are concerned only with mean values of the yield of the photo-effects over energy regions wide compared with the distance of the nuclear levels, all typical resonances will be essentially the same whether the level distribution is discrete or continuous. It follows also that, contrary to an assertion in the note, the selectivity is completely 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. All such conclusions are in fact in complete harmony with a treatment on the lines of the ordinary theory of dispersion of monochromatic radiation, according to which the selective phenomena would be attributed to an abnormally large radiative transition probability to the normal state from certain energy regions.

For the clarification of these points I am indebted to discussions with Prof. Peierls and Prof. Placzek, in collaboration with whom a paper about nuclear resonance phenomena with special regard to the above-mentioned arguments is being prepared for publication in the communications of the Copenhagen Academy of Sciences.

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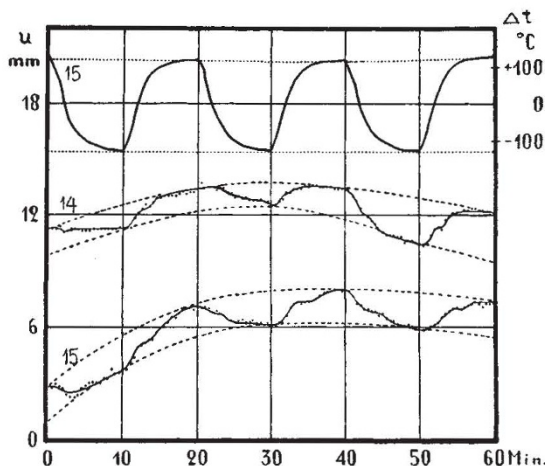
¹ Cf. Bohr, N., NATURE, 141, 326 (1938).

Effects of Gas Ions on the Benedicks Effects in Mercury

It has been proved by one of us¹ that a thermo-electric force of the first kind—now, with W. Meissner, called the first Benedicks effect—appears in asymmetrically heated homogeneous liquid mercury, with a *negative* sign. (A negative sign indicates that in the external circuit the electron current flows from the hot side of the temperature gradient to the cold one.) As for the reverse effect—the second Benedicks effect (or heat transport caused by an electric current)—it was found by us² that this effect likewise was 'negative' in pure mercury containing gas, but *positive* in degassed pure mercury—evidently due to a lowered content of gas ions, already known to influence the sign of this effect in the case of platinum³. The conclusion was drawn that likewise a change of the sign of the first Benedicks effect may be caused by a lowered gas content.

In order to test the accuracy of this conclusion, a 'strangulation vessel' of Normal-glass—giving locally a high temperature gradient—filled with carefully degassed mercury, was used. Possible sources of error were carefully considered. From eight series obtained in varying circumstances—all of them in good agreement—two are reproduced in the accompanying figure. The upper curve gives the temperature differences producing the gradient, the lower ones (two series) the corresponding galvanometer deflections (1 mm. = 1.16×10^{-9} volts). The reproducibility is seen to be fairly good. Most of the periods show an inflection point, due to the fact that the E.M.F. is proportional to the third degree of the temperature difference—this was separately proved.

The main result is, that the first Benedicks effect in mercury of highest purity is actually a positive one. The negative sign found earlier, consequently, must be due to the action of gas ions, as in the case of the second Benedicks effect.



This causes an earlier discrepancy of the periodic table to disappear: while, in its second column, zinc and cadmium have a positive Thomson effect, the following metal, mercury, has always been found to give a negative sign for the Thomson effect. For theoretical reasons, we may now conclude that the Thomson effect of pure mercury quite free from gas will be positive, causing this discrepancy to disappear.

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¹ Benedicks, C., *Ann. Phys.*, iv, 62, 185 (1920).

² Benedicks, C., and Sederholm, P., *Arkiv. f. Mat. Astr. and Fysik (Stockholm)*, A, 25, No. 22, 1-20 (1936).

³ Benedicks, C., and Borgmann, C. W., *Arkiv. f. Mat. Astr. and Fysik (Stockholm)*, B, 24, No. 10, 1-5 (1934); Benedicks, C., Borgmann, C. W., and Sederholm, P., *Arkiv. f. Mat. Astr. and Fysik (Stockholm)*, A, 25, No. 9, 1-28 (1935).

Molecular 'Rejuvenation' of Muscle Tissue

THE decomposition of creatine phosphoric acid during muscular action, and its rebuilding during rest, has been the subject of numerous detailed investigations. We were interested in the problem, if, and to what extent, creatine phosphoric acid molecules are decomposed and afterwards rebuilt, or 'rejuvenated', in the resting muscle. This problem can be easily solved by injecting labelled sodium phosphate, for example, into frogs, and determining if, and to what extent, creatine phosphoric acid extracted from the muscle of the frog becomes labelled (radioactive). Phosphorus atoms present in creatine phosphoric acid and other organic compounds do not exchange spontaneously with other phosphorus atoms present, and thus the fact that labelled creatine phosphoric acid can be isolated from the muscle is a proof that this was synthesized after the administration of labelled sodium phosphate.

The muscle was placed at once after removal in liquid air, the acid soluble components extracted with trichloroacetic acid kept at -9° , and the inorganic phosphate present in the solution precipitated as ammonium magnesium salt. The next step was the