These expressions show that the proper life-time of the mesotron increases rapidly with decreasing mass mv, the numerical values for several cases being summarized in the accompanying table.

	mv	100 m	125 m	160 m	200 m
τ_0	Case (i)	10^{-6}	$0{\cdot}4\times10^{-6}$	$1{\cdot}2\times10^{-6}$	$0{\cdot}5\times10^{-7}$ sec.
	Case (ii)	$0{\cdot}2\times10^{-6}$	$0{\cdot}8\times10^{-6}$	$0{\cdot}2\times10^{-7}$	$0{\cdot}1\times10^{-7}$ sec.

Thus the theoretical life-time is always a little too short to account for the cosmic ray phenomena. However, the discrepancy between theory and experiment diminishes if we take a value of mv nearer $100m$ than $200m$, and μ_1 large compared with λ_1 [10].

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[2] Yukawa, Sakata and Taketani, *Proc. Phys.-Math. Soc. Japan*, **20**, 319 (1938). Yukawa, Sakata, Kobayasi and Taketani, *ibid.*, 993. The latter will be referred to as IV.
[3] IV, § 6.
[4] Blackett, *Phys. Rev.*, **54**, 973 (1938); NATURE, **142**, 992 (1938). Rossi, NATURE, **142**, 993 (1938). Ehrenfest and Freon, *C.R.*, **207**, 853 (1938). Johnson and Pomerantz, *Phys. Rev.*, **55**, 104 (1939). Clay, Jonker and Wiersma, *Physica*, **6**, 174 (1939).
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[6] Kemmer, *Proc. Camb. Phil. Soc.*, **34**, 354 (1938). See further, IV, § 2.
[7] Sachs and Goeppert-Mayer, *Phys. Rev.*, **53**, 991 (1938). Wilson, *Proc. Camb. Phil. Soc.*, **34**, 365 (1938).
[8] IV, § 5.
[9] Bethe and Critchfield, *Phys. Rev.*, **54**, 248 (1938).
[10] According to Breit and Knipp (*Phys. Rev.*, **54**, 652; 1938), the K-electron capture of ^{7}Be can be explained satisfactorily only if the condition $\lambda_1 < \mu_1$ is fulfilled. See further, Bethe and Critchfield, *loc. cit.*

Diffraction of a Current of Chemical Molecules

A CURRENT of particles of mass m and velocity v, that is, de Broglie wave-length,

$$\lambda = \frac{h}{mv},$$

will be scattered at incidence on a diffraction grating; in the case of a line grating and of a normal incidence, the scattering will take place in such directions δ_μ that

$$\sin\delta_\mu = \mu\frac{h}{mva},$$

a being the grating constant.

Two currents of particles having masses m and m', respectively, and the same velocity v, will be scattered in directions

$$\sin\delta_\mu = \mu\frac{h}{mva} \quad \text{or} \quad \sin\delta'_{\mu'} = \mu'\frac{h}{m'va}. \qquad (1)$$

Let us assume that the particles m and m' are combined in pairs. When the bond is a strong one, the scattering of the pairs will probably take place in accordance with the limit value formula

$$\sin\delta''_{\mu''} = \mu''\frac{h}{(m+m')va}. \qquad (2)$$

We do not know in what manner the passage from case (1) to case (2) is effected. Now if we consider that work can be produced at the diffraction process, and that with very weak bonds we have to do still with case (1) for reasons of continuity, we can presume that these weak bonds will be broken by the grating.

From this it seems evident that weak chemical bonds ought to be capable of being broken up by the process of diffraction.

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Presence of Less Common Elements in Rocks

ONE of the latest patterns of the Hilger spectrometer has just been installed in the Chemistry Department of this College, and a systematic search for certain of the less common elements, more particularly the rare earths, in various rocks has been initiated. Incidentally, the spectral lines of nickel have been detected from dark green inclusions in various calcites, notably those from Cannington Park, near Bridgwater, and from Weston-super-Mare. The presence of the element was confirmed by the glyoxime test.

The Cannington Park calcite, given us by Mr. H. E. Balch, curator of the Wells Museum, proved particularly interesting. The nickel appeared to be present as carbonate, possibly as zaratite, along with copper carbonates, malachite and azurite. The characteristic spectral lines of vanadium were also detected and the existence of both elements confirmed chemically. Several other elements appear to be present also, and these we are endeavouring to confirm chemically.

The nickel in the Weston calcite was associated with silica, possibly as garnierite or genthite.

Incidentally, tellurium was similarly detected in the insoluble residue left after digesting sulphur from Krisuvik, Iceland, with carbon disulphide. Its presence was confirmed by reduction and recognition of its characteristic appearance under the microscope.

The problem of the distribution of the less common elements in our rocks and soils is one of great interest; when further data have been accumulated, it may well become one of extreme importance.

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'Intraglobular' Reaction in Protein Solutions

IN a letter[1] dealing with my hypothesis of 'intraglobular' reactions, Gralén and Svedberg state that the sedimentation constant of the product of the reaction of egg albumin with glycine ethyl ester measured by them remained practically the same as that of ordinary egg albumin, whereas the diffusion constant decreased to an extent corresponding to a 65 per cent increase of the volume of albumin globules. They believe that these results contradict the hypothesis of the existence of 'intraglobular' reactions.

Careful examination of Gralén and Svedberg's experimental results appears to me, however, to lend the best support to my hypothesis as well as to Wrinch's theory, although in my papers the necessary calculations have not been completed.