observed on most days of the year, usually appearing within an hour after ground sunrise and disappearing during the hour before sunset. On a few occasions each month echoes persist throughout the night. The maximum frequency at which echoes are received usually increases from less than 2 Mc./s. at first appearance to greater than 7.5 Mc./s. at noon and falling to less than 2 Mc./s. at disappearance. Strong *D*-echoes remain on occasions when, due to high absorption, no echoes are received from the normal daytime-occurring ionospheric regions.

As the only factor common to the five stations under discussion is that four are islands and the fifth is sited on a headland with sea on both sides, it appears possible that the effect may be peculiar to island observatories.

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Meaning of Turnover in Biochemistry

In a recent communication, Kleiber¹ criticized the 'logic' of the term 'turnover-rate' used as an index of rate of synthesis, exchange, or appearance of some material². He suggested that turnover-rate should properly refer only to the reciprocal of turnover time, that is, the fraction of a given metabolic pool renewed per unit of time.

Hevesy was among the first to investigate the quantitative aspects of isotope kinetics. He employed the term turnover-rate to denote the amount of material transferred per unit of time³. Many others have followed this usage⁴⁻⁶. An investigator may measure the rate of a metabolic process in terms of the fraction of the total metabolic pool renewed per hour; but it would be less confusing to designate this quantity by a term other than 'turnover-rate'. Kleiber¹ assumes that the use of 'turnover' in metabolic work arises from the analogy with the turnover of a wheel. However, this assumption may be unwarranted, for the early workers in the isotope field may have employed the analogy with the rapid turnover of patients in a well-organized hospital or the labour turnover-rate of an organization. This quantity may be expressed in terms of absolute turnover-rate (that is, the number of men entering or leaving the group), or as relative turnover-rate (the ratio of the absolute turnover-rate to the average working-force). Thus, there seems to be no *a priori* reason why the use of 'turnover-rate' should be restricted to the latter sense when dealing with metabolic processes. In our own work we have differentiated between (absolute) turnover-rates and fractional turnover-rates⁷. Reiner⁶ has used relative turnover-rate for the latter. Considerable confusion may be anticipated if various investigators attach different definitions to standard terms.

In recognition of the importance of a clear-cut terminology in this field, and in keeping with present-day usage, I wish to propose the following definitions:

Turnover-rate. The quantity of material turned over per unit of time.

Fractional turnover-rate. The fraction of a given pool turned over per unit of time.

Turnover-time. The time required for the turnover of an amount of material equal to the pool size; this is the reciprocal of the fractional turnover-rate.

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³ Hevesy, G., "Radioactive Indicators", 251 (Interscience Publishers, New York, 1948).

⁴ Kamen, M. D., "Radioactive Tracers in Biology", 135 (Acad. Press, New York, 1951).

⁵ Sacks, J., "Isotopic Tracers in Biochemistry and Physiology", 78 (McGraw-Hill, New York, 1953).

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Paper Chromatography of Inositol Phosphates

In the course of an examination of the organic phosphorus compounds in soils, a fraction was isolated rich in a substance resembling phytic acid, and which on hydrolysis yielded meso-inositol. Since lower phosphate esters of inositol may be present in soil, a chromatographic study has been carried out on the products obtained on partial hydrolysis of authentic phytin by acid, or by an enzyme method described by S. and T. Posternak¹.

Of the many solvent systems investigated, the best had the composition: 70 vols. methanol/30 vols. 0.5 *N* ammonium hydroxide. The hydrolysate was best applied in a small band to the paper, which had previously been washed thoroughly with dilute hydrochloric acid, water, ammonium versenate and water, in that order. Upward development was carried out at about 23° C., but the temperature was not rigidly controlled. Spots were detected by spraying with the molybdate-perchloric acid reagent of Hanes and Isherwood², and heating the papers between glass plates in an oven at 90° C. for 30 min.

Four spots were obtained from the hydrolysates, with the following *R_F* values:

	<i>R_F</i>
(1) Inositol hexaphosphate	0.06
(2) First intermediate ester(s)	0.17
(3) Second intermediate ester(s)	0.32
(4) Orthophosphate (+ probable third intermediate)	0.48

Resolution between the lowest two spots was not always absolute, depending upon the relative amounts of the two constituents present, but a clear demarcation could always be drawn between them. The spot with *R_F* value 0.17 is most likely to be the tetraphosphate, but work is being continued to establish the identity of the intermediates. There is evidence of a third intermediate, masked by the orthophosphate, and present in only very small amount even at advanced stages of hydrolysis.

Several inositol phosphates have been isolated by large-scale fractionation of phytic acid hydrolysates^{1,3,4}; but no paper chromatographic method of separation appears to have been published. The