Comments and Communications

Incidence of Rh_0 Negative Reactors among Chinese

In view of somewhat different results on Rh_0 testing among groups of relatively small numbers of Chinese from various parts of the country (Hao, S. H. *Chinese nat. med. J.*, 1949, 35, 101; and Pan, S. F. *Peking nat. Hist. Bull.*, 1949, 17, 223) further efforts have now been made to extend our preliminary results by examination of a larger and representative sample here in Peking. Although the local population is largely of the Northern parentage, it includes a varied proportion of people from other parts of the country. Altogether 2,324 persons attending the various clinics of the Peiping Union Medical College Hospital, as well as a number of professional donors and newborn babies, have now been examined.

The slide method (Diamond, L. K. and Abelson, M. N. *J. clin. Med.*, 1945, 30, 204) was used throughout the study, but in case of a negative reaction, the result obtained by the tube method (Wiener, A. S. *Amer. J. clin. Path.*, 1946, 16, 477) was considered as final. In the present study, only 14 of 2,324 Chinese were found to be Rh_0 negative reactors, or 0.6 percent. Incidentally, among an additional group of 67 Caucasians, 17, or 25 percent, gave negative reactions. Comparing this with the data previously published, we found our figure approached closely the average of 47 negative reactors among a total of 4,894 persons, or 0.94 percent. However, it must be mentioned that previous findings seemed to have indicated the possibility of intraracial difference in the incidence of Rh_0 negative reactors among Chinese. For instance, the incidence of Rh_0 among the Kweichow Chinese was found to be 2.9 percent, and among the Shantung Chinese, only 0.4 percent. The significance of this difference, however, must await further study of larger individual samples.

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On the Application of Harmonic Analysis to Ocean Wave Research

In a recent article (*Science*, 1949, 109, 271) it has been suggested that Wiener's generalized harmonic analysis can shed new light on ocean wave research. The writers of that paper, H. R. Seiwell and G. P. Wadsworth, assume that a storm generates a dynamic component (swell) on which is superposed a random variation due to "random motions of the water and local intermittent wind action." It is their aim to separate these components in continuous records of dynamic wave pressure, and it is claimed that they can "eliminate the objectionable a priori assumptions of Fourier series applications to geophysical time series, and obtain results of dynamic significance." However, objections can be raised against their method. It appears to us that the correlogram and the Fourier series suffer from the same difficulty, namely, that both are ill defined. The definition of the spectrum requires an infinite record, which is not available in geophysical applications; the record is in fact of limited duration and in the absence of information we are at liberty to continue it in either direction in any "reasonable" way we fancy and to each continuation there corresponds a different Fourier integral spectrum.

Mathematically, each of these gives a perfect resolution of the available information and only a physical model can make us prefer one resolution (say into discrete Fourier harmonics) to another (say the frequencies defined by the transcendental equation $k \tan k = a > 0$). These remarks are clearly applicable to the correlogram also. Nevertheless, the different resolutions have certain averages in common (Barber, N. F. and Ursell, F. *Philos. Trans. roy. Soc. Lond.*, 1948, 554) but it is clear that the introduction (which is physically reasonable) of random components into a finite record will lead to enormously greater uncertainty, and a much more detailed physical model is accordingly required to interpret the result of the analysis.

Seiwell and Wadsworth therefore make the additional assumption that the swell component consists of just one sine wave, and it is this assumption in particular that we wish to challenge. A large number of Fourier analyses of pressure records have been made at the Admiralty Research Laboratory, Teddington, England, and interpreted according to a model of the following type:

Ignore all random effects. Consider an instantaneous local impulse applied to the surface of a perfect fluid of infinite depth. Cauchy and Poisson showed over a century ago that the elevation η at a distance R from, and at time t after, the impulse is given by

$$\eta = H(R,t) \sin \left(\frac{gt^2}{4R} + \varepsilon\right),$$

where $H(R,t)$ changes much more slowly with time than the sine factor (Lamb, Sir H. *Hydrodynamics.* 6th ed. Cambridge, 1932). Over an interval corresponding to the usual 20-min wave record the pressure fluctuation would be practically a single sine wave with the frequency predicted by considerations of group velocity (Barber, N. F. and Ursell, F. *Philos. Trans. roy. Soc. Lond.*, 1948, 527) but when we consider a series of impulses distributed over a finite area and continuing over a finite time we are led naturally to the conception of a continuous spectrum, each element of which can be traced back by the group velocity method into the area of wave generation. It is known that this result is largely independent of the method of generation, provided that the area of generation is well defined and not too near the recorder. It is also clear that when a storm arises suddenly, the records will show a widening spectrum. It has been checked experimentally that it is indeed possible to separate swell from different storms