which case at least one coefficient, according to Dr. Ryd, must be five times its probable error before it can be regarded as likely to be real.

The brochure is divided into two sections, the first dealing generally with such routine problems as the computation of the mean error, smoothing and adjustment of observational data, and harmonic analysis, with an additional chapter on secondary minima and maxima in the annual variation of the temperature, in which the author deals with the proverbial "Ice-men" of May 11, 12, and 13, and exposes the weakness of Dove's supposed proof of the reality of this legendary phenomenon. The second part deals fully with "mechanical" adjustment, factors of variation, and suggestions on the choice of adjusting formulæ, of which several are given, and a longer chapter is devoted to the working out of four concrete examples, viz, the hourly inequality of air temperature, Greenwich, 1849 to 1868; and of pressure, Greenwich, 1854 to 1873; the annual inequality of pressure, Batavia, 1876 to 1905; and the annual variation of temperature, Copenhagen, 1875 to 1910, the last being a case of partial data—only three observations at fixed hours of the day, instead of the full set.

Dr. Ryd reminds the reader that when data such as July air temperature for 20 years are entered in rows for days and in columns for years, they can not be analyzed similarly in both directions, inasmuch as the successive days are not independent, while the columns are. He also discusses at some length the "order" to which harmonic analysis, if used for adjustment, should be pushed, with hints for saving labor; but on the whole he prefers the "mechanical" adjustment with a suitable formula in the majority of cases, and thinks this method less liable to introduce new errors into a problem.

RELATION BETWEEN BAROMETRIC PRESSURE AND THE WATER LEVEL IN A WELL AT KEW OBSERVATORY.

By E. G. BILHAM.

[Presented to the Royal Society, London, Nov. 15, 1917.]

(*Reprinted from* Nature, London, Nov. 22, 1917, 100: 239.)

The water level shows a well-marked response to changes of barometric pressure at all times of the year. Under similar conditions a given increase of pressure, δp, will depress the water level in the well by an amount δu, which is proportional to δp. The value of $\delta u/\delta p$ varies with the mean level of the water, but is always negative. The validity of the equation $\delta u = a.\delta p$ was established between limits given by $dp/dt > 0.5$ mb./hr., and the value of a was determined in the case of three groups of months representing high, intermediate, and low levels. The sensitiveness of the water level to pressure was found to increase rapidly with the height of the water, the value of a for a height of 360 cm. above mean sealevel being four times as great as for a height of 200 cm. The change of sensitiveness appears to be entirely due to the change in the condition of the soil. The average value of a is 1.1 mm./mb. There appears to be no lag in the response of the well to changes of pressure, and under favorable conditions the most rapid fluctuations of pressure are shown on the water level trace.

In the original of this paper Mr. Bilham has worked out in mathematical detail careful observations similar to the more general ones discussed by the undersigned in the REVIEW for February, 1916, p. 75–76.—C. A., jr.

PHENOMENA CONNECTED WITH TURBULENCE IN THE LOWER ATMOSPHERE.

By G. I. TAYLOR.

[Presented to the Royal Society, London, Nov. 15, 1917.]

(*Reprinted from* Nature, London, Nov. 22, 1917, 100: 239.)

In a previous paper by the author it was shown theoretically that a connection should exist between the rate at which heat is conveyed into the atmosphere by means of eddies, and the amount of retardation of the velocity of the lower layers of the atmosphere behind the gradient velocity due to the friction of the ground. In the present paper the amount of the turbulence over Paris is calculated from temperature observations taken on the Eiffel Tower. It is shown that the amount is the same as that calculated from observations of the change in direction of the wind between the bottom and top of the Eiffel Tower due to the friction of the ground. The daily variation in wind velocity which depends on the daily variation in turbulence is next discussed, and it is shown that the chief characteristics of the observed phenomena of daily variation are explained, both qualitatively and, so far as is possible, quantitatively by the author's equations.

SWISS SOCIETY OF GEOPHYSICS, METEOROLOGY, AND ASTRONOMY.[1]

Under M. Mercanton of Lausanne, as chairman, a circle of the more active Swiss physicists, meteorologists, and astronomers assembled in the great physics lecture room of the University of Berne on April 28, 1917, to organize the society of the above name (Société Suisse de Géophysique, Météorologie et Astronomie) and adopt statutes in conformity with its proposed activities as a section of the Helvetian Society of Natural Sciences (Société helvétique des Sciences naturelles). The following officers were elected for 1917–1919: President, Prof. Dr. P.-L. Mercanton, of Lausanne; vice-president, Prof. Dr. A. de Quervain, of Zurich; secretary-treasurer, Prof. A. Kreis of Coire.

The first regular general meeting of the society was held September, 11, 1917, at Zurich, with an attendance of 34, out of 70 members already enrolled. The assemblage was welcomed, in the name of the Helvetian Society of Natural Sciences, by Dr. J. Maurer, Director of the Federal Meteorological Bureau, who congratulated the young society on the lively interest already awakened for it, and then retired in favor of the president, M. Mercanton.

After some discussion, the society unanimously adopted the proposal by P. Ditisheim (La Chaux-de-Fonds), a noted Swiss horologist, that the Federal Council be requested to adopt the *serial numeration* of the hours of the day, 1 to 24. This is a conscious renewal of the majority recommendation of the International Prime Meridian and Time Congress of Washington (1884), but would be only a rather tardy step for the Swiss Government. The system has been in use on the Indian railways since 1859, was legalized for Canada in 1891,[2] was actually introduced into Italy in 1893 with the adoption of Central European Time, was approved in 1895 at the London (fifth) session of the International Railway Congress, was adopted in Belgium in 1897, and put into practice by the Bureau des Longitudes (Paris) in all its publications in 1900; has been used by the French railways since July 1,

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[1] Compte rendu des séances de la Société Suisse de Géophysique, Météorologie, et Astronomie (G. M. A.) *in* Archives des sci. phys. et nat., 122ème année, 4 ème pér., Genève, 15 nov. 1917, 44: 345, fol.

[2] The system has been in actual use on the C. P. railway west of Winnipeg for many years.