

2-86-21

NOV 3 1933

DEPARTMENT OF THE INTERIOR
CANADA

HON. THOMAS G. MURPHY, *Minister*

H. H. ROWATT, *Deputy Minister*

PUBLICATIONS
OF THE
Dominion Observatory
OTTAWA

R. MELDRUM STEWART, *Director*

Vol. X

Bibliography of Seismology

No. 18

APRIL, MAY, JUNE, 1933

BY

ERNEST A. HODGSON

OTTAWA
J. O. PATENAUDE
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1933

Price 25 cents

This document was produced
by scanning the original publication.

Ce document est le produit d'une
numérisation par balayage
de la publication originale.

DEPARTMENT OF THE INTERIOR
CANADA

HON. THOMAS G. MURPHY, *Minister*

H. H. ROWATT, *Deputy Minister*

PUBLICATIONS
OF THE
Dominion Observatory
OTTAWA

R. MELDRUM STEWART, *Director*

Vol. X

Bibliography of Seismology

No. 18

APRIL, MAY, JUNE, 1933

BY

ERNEST A. HODGSON

OTTAWA
J. O. PATENAUDE
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1933

LIBRARY
GEOLOGICAL SURVEY
OF CANADA

LIBRARY
GEOLOGICAL SURVEY
OF CANADA

Bibliography of Seismology

APRIL, MAY, JUNE, 1933

- AGAMENNONE, Giovanni and ALESSANDRI, Camillo, "La sismologia a Roma e nel Lazio." See No. 1701 of this list.
1701. ALESSANDRI, Camillo and AGAMENNONE, Giovanni, "La sismologia a Roma e nel Lazio." A reprint of 22 pages from the volume *Le scienze fisiche e biologiche in Roma e nel Lazio*, published by Istituto di Studi Romani, Rome, 1933.
1702. (1) ARAKAWA, H., "Dispersion and Absorption of the Dilatational and Distortional Waves in a Visco-elastic Solid," *Geophysical Magazine*, 4, No. 3, 215-224, 3 figures, 1 table, Tokyo, December, 1931. T.O.
- (2) ARAKAWA, H., "The Effect of Temperature on the Deformation of Infinite or Semi-infinite Elastic Body (Second Part)," *Ibid.*, 5, No. 2, 139-146, 1 figure, Tokyo, September, 1932.
- Part I of this paper was reported as No. 1304 of these lists. T.O.
- (3) ARAKAWA, H., "On Water Waves," *Ibid.*, 5, No. 2, 147-162, Tokyo, September, 1932. T.O.
- (4) ARAKAWA, H., "On the Influence of Gravity on Surface (Rayleigh and Love) Waves Treated in Cylindrical Co-ordinates," *Ibid.*, 5, No. 3, 237-244, Tokyo, December, 1932.
- The author concludes that there exists no effect of gravity on Love-waves and that the gravity effect in the case of Rayleigh-waves is insensibly small. T.O.
1703. BALLARD, J. I., "Building Damage Sustained in California Earthquake," *Engineering News-Record*, 110, No. 12, 378-381, 9 illustrations, New York, March 23, 1933.
- The summary reads: "Long Beach earthquake (March 10, '33) did no damage to the structural frames of major buildings. Many deaths caused by falling debris but few structures collapsed. Failure of brick masonry outstanding. Minor damage to residences and public works."
1704. BEBB, A. H., "Damping and Resonance with an Einthoven String Galvanometer," *Journal of Scientific Instruments*, 10, No. 3, 75-83, 9 figures, London, March, 1933.
- The author's abstract reads: "This paper gives the theory of conditions necessary to maintain the Einthoven string galvanometer in the critical condition with and without inductance in circuit. Records are given showing agreement with theory and a comparison between these circuits when the field strength only is varied. Also, when a sinusoidal electromotive force is applied, the conditions under which the string resonates is considered, and graphs plotted showing amplitudes against impressed frequencies. These also show fair agreement with theory. In a non-inductive circuit, resonance is not possible when the string is in the critical condition, but the presence of inductance modifies the conditions considerably."
1705. BIOT, M., "Theory of Elastic Systems Vibrating under Transient Impulse, with an Application to Earthquake-proof Buildings," *Proceedings of the National Academy of Sciences*, 10, No. 2, 262-268, Washington, February, 1933.
1706. BODLE, Ralph R., "Earthquake Notes," 4, No. 4, 5 pages, Washington, March, 1933.

The above publication is the organ of the Eastern Section of the Seismological Society of America. The address of the Editor is: Ralph R. Bodle, U.S. Coast and

Geodetic Survey, Washington, D.C. Items of interest to members of the Section should be forwarded to the Editor at this address.

1707. BOIS, C., "Les séismographes pour l'inscription de la composante verticale du mouvement du sol," *Journal de Physique et le Radium*, **3**, No. 3, 56-57, Paris, 1932.

1708. BOWIE, William, "The Earth as an Engineering Structure," *Scientific Monthly*, **32**, No. 5, 457-460, New York, May, 1932.

The above constitutes one of the Science Service Radio Talks, which are broadcast over the Columbia Broadcasting System.

1709. BOWIE, William, "A Method for Testing Airy and Pratt Isostasy," *Gerlands Beiträge zur Geophysik*, **36**, Heft 2-3, 171-176, Leipzig, 1932.

1710. BRANNER, George C. and HANSELL, J. M., "Earthquake Risks in Arkansas (A Statistical Study covering the period from 1811 to 1931)." Arkansas Geological Survey, Information Circular No. 4, 14, Little Rock, 1932.

This is a report by the state geologist of Arkansas in which "an attempt is made to compile and interpret available data concerning those earthquakes which have affected the Mississippi Valley and Arkansas in particular."

R. R. B.

1711. BRAZIER, C. E. and GÉNAUX, L., "Quelques remarques concernant le séisme du 2 mars 1933," *Comptes rendus*, **196**, No. 10, 716-717, Paris, March 6, 1933.

A note by Ch. Maurain is appended on pg. 717.

1712. BRIDGMAN, P. W., "The Physics of High Pressure," G. Bell and Sons, Series: *International Text-books of Exact Science*, vii + 398 pages, 5 plates. Price 22s. 6d. London, 1931.

A review of this important book appears on page 259 of *Nature*, No. 3304, **131**, London, February 25, 1933.

The book not only reports the very extensive contributions of Prof. Bridgman in this field but gives a complete picture of the results obtained by other workers. The results are most important as affording a means of reasonably interpreting the seismological data with respect to the interior of the earth in terms of geology.

1713. BRYAN, Frank, "Recent Movements on a Fault of Balcones System, McLennan County, Texas," *Bulletin of the American Association of Petroleum Geologists*, **17**, No. 4, 439-442, 1 figure, Tulsa, April, 1933.

The note presents details of continued slipping on a fault as evidenced by the repeated fracture of a pipe line crossing it.

- CHARRIN, P. and GEOFFROY, P., "Études géologiques et prospections minières par les méthodes géophysiques." See No. 1724 of this list.

1714. DALY, Reginald A., "The Depths of the Earth," *Bulletin of the Geological Society of America*, **44**, Part 2, 243-264, 5 figures, New York, April 30, 1933.

The table of contents reads: Introduction; Shells and Core of the Earth; An Earth Largely Vitreous, (Cosmogony and the vitreous shells; Seismology and the earth shells; Evidence from thermal gradients; Isostasy and the vitreous shells; Evidence from petrology; Some objections); Conclusion. See also No. 1613 of these lists. This paper is the author's Presidential Address, delivered before the Geological Society of America at the Cambridge meeting, December 28, 1932.

1715. DAVISON, Charles, "The Recent Japanese Earthquake (March 2, 1933)," *Nature*, No. 3306, **131**, 351-353, London, March 11, 1933.

1716. DAY, Arthur L., *et al.*, "Report of the Advisory Committee on Seismology," Carnegie Institution of Washington, Year Book No. 31, 355-372, Washington, 1932.

The Report deals with the following topics: The San Andreas Rift in the Desert Region of Southeastern California; Geodetic Work in Regions of Seismic Activity; Work of the Seismological Laboratory; Earth Movements Recorded; Instrument Development; Publications; Recommendations.

1717. DEMARCHI, L., "Controversie sull'isostasi; Parte I," *Scientia*, Series III, No. 252-4, 53, 249-262, Bologna, April 1, 1933.

A translation into French by M. BreLOT, appears on pages 109-120 of the appendix to the same issue of *Scientia*, under the caption: "Controverses sur l'isostase."

1718. EDDINGTON, A. S., "Notes on the Method of Least Squares," *Proceedings of the Physical Society*, No. 247, 45, Part 2, 271-287, London, March 1, 1933.

The author's abstract reads: "In inferring the value of a physical quantity x from observations, some risk must be accepted. It is therefore presumed that the investigator has made up his mind how much risk he will take, and desires the closest possible limits—the narrowest range of values of x —that he can adopt without exceeding this risk. The aim is to furnish a concise treatment of combination of observations on this basis, which it is hoped may be found useful in clearing up common misconceptions. Stress is laid on the fact that the method of least squares is justified without the assumption of a Gaussian error law of the observations. Most of the paper deals with quite elementary points, but it ends with a discussion of more difficult questions which arise in inferring the mean square error of observations from the residuals."

1719. (1) ENGINEERING NEWS-RECORD, "The San Francisco-Oakland Bay Bridge," *Engineering News-Record*, 109, No. 16, 457, New York, October 20, 1932. R. R. B.
 (2) ENGINEERING NEWS-RECORD, "The U. S. Coast and Geodetic Survey, A View of Its Activities," *Ibid.*, 110, No. 3, 73-77, New York, January 19, 1933.
 (3) ENGINEERING NEWS-RECORD, "Destructive Earthquake Centres on Long Beach, California," *Ibid.*, 110, No. 11, 353-355, New York, March 16, 1933.

"Series of shocks starting on evening of March 10 does \$50,000,000 damage, mostly to poorly built structures, and takes over 100 lives. Los Angeles is among the 30 cities affected but damage there is slight."

It is interesting to compare the above estimated loss with the estimate made by the late John R. Freeman as to the total loss due to earthquake damage in the United States and Canada during the past 100 years (1932). The figures are given on page 663 of his "Earthquake Damage and Earthquake Insurance," (see No. 1316 of these lists) as \$40,000,000. Yet we have here an earthquake, which is relatively unimportant as an earth tremor, but which occurred in a region where poor construction was prevalent and which resulted in damage greater than that caused by all earthquakes which have preceded it in the United States and Canada! Surely this is a most important example of the fact that earthquakes are becoming of increasing economic importance as our relatively unimportant but actively seismic regions are being built up. The fact that well-constructed buildings suffered almost no loss even at Long Beach, the centre of the disturbance, is also most suggestive. E. A. H.

- (4) ENGINEERING NEWS-RECORD, "Better Construction in Earthquake Zone Recommended by Jury," *Ibid.*, 110, No. 15, 480-481, New York, April 13, 1933.

A general statement as to the effect of the Long Beach Earthquake of March 10, 1933, and five specific recommendations based on observations by construction engineers. W. W. D.

- (5) ENGINEERING NEWS-RECORD, "Frame and Wall Resistance," *Ibid.*, **110**, No. 16, 509, New York, April 20, 1933.

The Long Beach earthquake had little effect on the frames of major buildings but damaged in many cases the filler walls. W. W. D.

- FAUST, L. Y., "Études géologiques et prospections minières par les méthodes géophysiques," A review. See No. 1724 of this list.

1720. FENNEMA, R., "Over de oorzaken van aarbevingen (On the causes of earthquakes)," *Natuurkundig Tijdschrift voor Nederlandsch-Indië*, **56**, 59-80, Batavia and The Hague, 1897.

An historical review of the theories on earthquakes; communications on the earthquake of May 17, 1892, in the *residentie* "Tapanoeli," isle of Sumatra, and on the observed horizontal earth-movements at Quetta, India, 1897, and Tapanoeli, 1897.

J. F. S.

1721. FERRAR, H. T., "The Murchison (N.Z.) Earthquake, 1929," *The Geological Magazine*, No. 789, **67**, 132-134, London, March, 1930. J. B. M.

1722. FUJIWHARA, S., "On the Mechanism of North Izu Earthquake," *Geophysical Magazine*, **5**, No. 2, 171-172, 1 figure, 2 plates, Tokyo, September, 1932. T. O.

- GABRIEL, V. Gavrilovich and SLICHTER, L. B., "Studies in Reflected Seismic Waves: Part I." See No. 1787 of this list.

1723. GEBELEIN, H., "Störungen von Pendeluhren durch Bodenerschütterungen," *Astronomische Nachrichten*, No. 5931, **248**, 33-42, 1 figure, Hamburg, February 15, 1933.

- GÉNAUX, L. and BRAZIER, C. E., "Quelques remarques concernant le séisme du 2 mars 1933." See No. 1711 of this list.

1724. GEOFFROY, P. and CHARRIN, P., "Études géologiques et prospections minières par les méthodes géophysiques," *Bulletin du Service de la Carte Géologique de l'Algérie*, Series 4, Géophysique, No. 1, 346 pages, 103 figures, Algiers, 1932.

A review of this book, criticizing the seismological side of the above treatise, appears on pages 444-445 of the *Bulletin of the American Association of Petroleum Geologists*, **17**, No. 4, Tulsa, April, 1933. The review is signed by L. Y. Faust of the Geophysical Research Corporation.

1725. GHERZI, E., S.J., "Nota su una onda lunga, all'inizio delle onde P e delle onde S," *Atti della Pontificia Accademia delle Scienze Nuovi Lincei*, **85**, 389-392, Rome, 1932.

1726. GLENNIE, E. A., "Gravity Anomalies and the Structure of the Earth's Crust." Survey of India, Professional Paper No. 27, 1-35, 7 charts. Price one rupee and eight annas or two shillings and six pence. Dehra Dun, 1932.

The introduction reads: For three years preceding this report an attempt was made to "derive a gravity anomaly (in India) which would show a satisfactory correlation with superficial geological conditions, a correlation which the usual Hayford gravity anomalies had almost entirely failed to show. . . . The conclusions reached are completely opposed to the Pratt system of isostasy and only to a limited extent favourable to isostasy on the Airy system. Indeed the general appearance of isostatic conditions, which has so captivated the scientific world, appears to be mainly due to a somewhat fortuitous concomitance of circumstances. It is desirable to emphasize this point strongly since India is the birthplace of the theory of isostasy and it is widely believed that the theory of isostasy is supported by gravity and deflection results in India. This is not the case."

In his preface the author states: "The views expressed in this paper are mine and do not necessarily represent the accepted opinion of the Survey of India."

- GLOVER, P. W., "Tables for Facilitating the Solution of Wiechert's Equation." See No. 1769 of this list.
1727. GREEN, Norman B., "Reinforced Concrete in the Long Beach Earthquake," *Engineering News-Record*, **110**, No. 18, 560-562, 2 illustrations, New York, May 4, 1933.
- The author, who is a consulting engineer of San Francisco, concludes that: "damage, although slight, revealed some weaknesses that can be remedied; beneficial bracing effect of concrete walls is notable."
- Attention may here be drawn to two short unsigned notes in the same issue of the *Engineering News-Record*, pp. 569-570: "School Building in California to be Regulated by the State," and "Masonry Code at Long Beach Revised by Inspector's Order."
1728. GUTENBERG, B., "Structure of the Earth's Crust as Derived from Seismograms," *Bulletin of the Geological Society of America*, **43**, No. 1, 236-237, Washington, 1932.
- This paper was presented at the thirteenth annual meeting of the Cordilleran Section of the Geological Society of America, held at Pasadena, Cal., March 6-7, 1931. The abstract of the paper, published in the *Bulletin* of the society mentioned, reads as follows: "The waves starting from the epicentre of an earthquake follow different paths through the interior of the earth. If we have a certain number of diagrams from the neighbourhood of an epicentre we can calculate the velocities of the waves in the different layers, the thickness of these layers and their elastic constants. By comparing these values with those found in laboratories we can make some statements on the material of the different layers of the earth's crust. Results for different regions of the earth are given."
- F. W. L.
- HANSELL, J. M. and BRANNER, George C., "Earthquake Risks in Arkansas." See No. 1710 of this list.
1729. HAYATA, Koti, "Note on the Destructive Earthquake of Hyuga-nada on November 2nd., 1931," *Geophysical Magazine*, **6**, No. 4, 363-369, 3 figures, Tokyo, March, 1932.
- T. O.
1730. (1) HECK, N. H., "Structural Hazard of Earthquakes Measured by New Instruments," *Engineering News-Record*, **109**, No. 10, 288-289, 3 figures, New York, September 8, 1932.
- (2) HECK, N. H., "Strong-motion Records of Long Beach Earthquake," *Ibid.*, **110**, No. 14, 442-443, 1 figure, New York, April 6, 1933.
- The first of the above papers reports the construction and placement of strong-motion seismographs to record earthquake motions close to the epicentre for the information of engineers. The second paper reports the records obtained from the Long Beach earthquake of March 10, 1933. See also an editorial on page 444 of the issue indicated in the second reference.
1731. HEILAND, C. A., "Announcement of the Series of Publications of the Department of Geophysics at the Colorado School of Mines," *Quarterly of the Colorado School of Mines*, **27**, No. 3, 5-9, Golden, July, 1932.
- C. A. H.
1732. HEILAND, C. A., "Einige neuere Anwendungen der Geophysik bei Talsperren-und Grundwasser-Problemen," *Geologische Rundschau*, **23a**, Salomon-Calvi-Festschrift, 279-303, Berlin, 1932.
- Pages 296-298 are devoted to the subject "Seismische Refraktionsmethoden." The paper is No. 44 of the *Publication Series of the Department of Geophysics of the Colorado School of Mines*.
- C. A. H.

1733. HEILAND, C. A., "Geophysical Methods of Prospecting: Foundation of Methods and Results of Their Application in the United States" (in Russian). State Scientific and Technical Publishing Office, 161 pages, 93 figures. Price 3.25 roubles. Moscow-Leningrad, 1932.

A translation into Russian of the book "Geophysical Methods of Prospecting: Principles and Recent Successes," with adaptation of some parts of the original (see No. 125 of these lists): In addition, a translation into Russian of the paper by John J. Jakosky, "Inductive Method of Geophysical Prospecting." N. V. R.

1734. (1) HIDAOKA, Koji, "Tidal Oscillations in a Rectangular Basin of Variable Depth (Second Paper) (Problems of Water Oscillations in Various Types of Basins and Canals—Part VI)," *Geophysical Magazine*, 5, No. 3, 265-271, Tokyo, December, 1932.

T. O.

- (2) HIDAOKA, Koji, "A Practical Method of Integrating Chrystal's Seiche Equation," *Ibid.*, 5, No. 3, 273-281, 1 figure, Tokyo, December, 1932.

T. O.

- (3) HIDAOKA, Koji, "Theory of Uninodal Longitudinal Seiche in Lake Yamanaka," *Ibid.*, 5, No. 3, 283-291, 4 figures, 3 tables, Tokyo, December, 1932.

T. O.

1735. HILLER, W. H., "Seismische Berichte der Württembergischen Erdbebenwarten, 1932," *Meteorolog-geophysikalische Abteilung des Württembergischen Statistischen Landesamts*, Parts I-III, 1-62, Stuttgart, January, 1933.

In addition to the reports of the records obtained at Württemberg an account is given of a method of improving the time marks on the seismograms and also a report on the registration of S-waves at distances greater than 10,000 km. W. H. H.

1736. (1) HONDA, H., "On the Initial Motion and the Types of the Seismograms of the North Idu and the Ito Earthquakes," *Geophysical Magazine*, 4, No. 3, 185-213, 17 figures, 8 tables, Tokyo, December, 1931.

T. O.

- (2) HONDA, H., "On the Types of the Seismograms and the Mechanism of Deep Earthquakes," *Ibid.*, 5, No. 4, 301-324, 12 figures, 10 tables, Tokyo, December, 1932.

An appendix on pages 325-326 presents a note by the same author with the title: "The Mechanism of Shallow Earthquakes and the Stress in the Upper Layer of the Earth Crust." The original paper with this title was reported as No. 1630 of these lists.

T. O.

- (3) HONDA, H., "A Note on the Anomaly of the Velocity of the Seismic Waves," *Ibid.*, 6, No. 2, 189-192, 5 figures, 2 tables, Tokyo, March, 1932.

T. O.

1737. HUBER, Walter L., "Long Beach Earthquake Emphasizes Known Facts," *Engineering News-Record*, 110, No. 15, 474-475, 5 illustrations, New York, April 13, 1933.

The article shows that the damage caused by the above-mentioned earthquake was confined almost wholly to structures of faulty design lacking unity and strength.

W. W. D.

1738. IMAMURA, Akitune, "On Crustal Deformation in West-central Kii Peninsula," *Proceedings of the Imperial Academy*, 9, No. 2, 39-42, 4 figures, Tokyo, February, 1933.

1739. IMAMURA, Akitune, "On Crustal Deformations Preceding Earthquakes," *Japanese Journal of Astronomy and Geophysics*, 10, No. 2, 81-92, 4 figures, Tokyo, 1933.

A. I.

The paper is a brief but comprehensive review of the subject indicated, as studied in Japan. The historical data given are particularly interesting in that records of tilts associated with great earthquakes are extant for most of the great shocks which have occurred in Japan for hundreds of years. The author stresses the desirability of making studies of preseismic tilts in as many active areas as possible.

1740. ISIKAWA, T., "Sound and Seismic Waves Produced by the Eruptions of Mount Asama," *Geophysical Magazine*, 6, No. 2, 193-206, 8 figures, 2 tables, 1 plate, Tokyo, March, 1932. T. O.
- JEFFREYS, Harold, "Further Revision of Seismological Tables." See No. 1769 of this list.
1741. JONGMANS, W. J. and VAN WATERSCHOOT VAN DER GRACHT, W. A. J. M., "Enkele voorloopige beschouwingen omtrent oorzaak en beteekenis van de in November 1932 in Nederland waargenomen aardbevingen (Some Preliminary Considerations as to Cause and Significance of the Earthquakes which have been Observed in November, 1932, in the Netherlands)," *Jaarverslag over 1931 van het Geologisch Bureau voor het Nederlandsche Mijngedebied* (Annual Report of the Geological Bureau), 51-53, Heerlen, South Limburg, 1931.
The authors consider the earthquake to be only a result of the normal (vertical ?) movement of the underground. J. F. S.
1742. KATO, Yosio, "Seismic and Volcanic Activities and Changes in the Earth's Magnetic Field," *Japanese Journal of Astronomy and Geophysics*, 10, No. 2, 249-262, 13 figures, Tokyo, 1933.
1743. KEMMERLING, G. L. L., "De aardbeving van Maos op 9-10 September 1916 (The Earthquake of Maos on September 9-10, 1916)," *Jaarboek van het Mijnwesen, Verhandelingen*, 45, No. 2, 11-24, Batavia, 1916.
An abstract appeared in *Geologisches Zentralblatt*, No. 502, 24, 177, Berlin, 1919-20.
A paper by the same author and on the same subject was published in *Natuurkundig Tijdschrift voor Nederlandsch-Indië*, 77, 168-171, Weltevreden, isle of Java, 1918, of which an abstract was published on page 416 of *Geologisches Zentralblatt*, No. 1299, 25, Berlin, 1920. J. F. S.
1744. KOCH, H. W. and ZELLER, W., "Zur Theorie der Schwingungsmesser," *Zeitschrift für Instrumentenkunde*, 53, Heft 2, 64-70, Berlin, February, 1933.
An abstract by F. K. Harris appears on page 235 of the *Review of Scientific Instruments*, 4, No. 4, New York, April, 1933.
1745. KODAIRA, Y., "Investigation of the Method of Obtaining the Depth of the Seismic Focus and of the Velocities of Seismic Waves from the Observed Data (First Part)," *Geophysical Magazine*, 5, No. 2, 97-121, Tokyo, September, 1932. T. O.
1746. KOENUMA, K., "On the Surface Waves of the Sea," *Geophysical Magazine*, 5, No. 3, 245-263, 3 figures, Tokyo, December, 1932. T. O.
1747. (1) KUNITOMI, S. I., "Note on the Dzungaria Earthquake of August 10, 1931," *Geophysical Magazine*, 4, No. 3, 225-229, 3 figures, Tokyo, December, 1931. T. O.
(2) KUNITOMI, S. I., "Propagation of Seismic Wave in Japan: Abstract of Seventh Report," *Ibid.*, 6, No. 2, 207-211, 3 figures, Tokyo, March, 1932. T. O.
1748. LAKE, Philip, "Gutenberg's Fliesstheorie; a Theory of Continental Spreading," *The Geological Magazine*, No. 825, 70, 116-121, 1 figure, London, March, 1933.
The author reviews the theory put forward by Gutenberg in his articles in *Beiträge zur Geophysik*, 16, 239-247, and 18, 281-291 (reported as Nos. 522 and 737, respectively, of the old series of this *Bibliography*) to take the place of the theories of Wegener and Köppen. His object is "simply to introduce to the notice of English geologists the suggestions of a well-known geophysicist."
1749. LAMP, Irwin E., "Oil Industry Preparing Fine Exhibit for World's Fair," *The Pure Oil News*, 15, No. 10, 10-11, 3 figures, Chicago, March, 1933. C. A. H.

1750. LANDSBERG, H., "Zur Seismizität des Mainzer Beckens und seiner Randgebirge," *Gerlands Beiträge zur Geophysik*, **38**, Heft 2, 167-171, 2 figures, 1 table, bibliography, Leipzig, 1933.

The author's summary reads: "The earthquakes of Gross-Gerau from 1869 to 1871 were followed by a second seismic period lasting from February to August, 1871. The 119 shocks of this period, the focus of which was situated at the border of the Odenwald, show a diurnal variation with a maximum during the night. Based on 109 isoseist-maps of earthquakes from the Mayence district, the Taunus, and the Odenwald, a map was constructed showing the seismic structure of this country." H. L.

- LARSEN, Palmer, "Index to Geophysical Abstracts No. 33 to No. 44." See No. 1751 of this list.

1751. LEE, Frederick W., "Geophysical Abstracts." United States Bureau of Mines: No. 45, 680-729, January; No. 46, 730-756, February; No. 47, 757-782, March; No. 48, 783-805, April; Washington, 1933.

No. 45 contains an index to Nos. 33-44, compiled by Palmer Larsen. F. W. L.

1752. LEE, S. P., "Note on the Earthquake of August 10, 1931," *Seismological Bulletin of the Chiufeng Seismic Station*, **2**, Nos. 3 and 4, 51-60, 4 figures, Peiping, September, December, 1932.

The note presents the local macroseismic data, the details of the method by which the epicentre was determined from the microseismic reports, and discusses the probable depth of focus and the geological significance of the earthquake. *The Seismological Bulletin from Chiufeng* is issued by the Geological Survey of China. Beginning with Volume 3, it will appear in two semi-annual printed instalments, the monthly reports being issued in mimeographed form.

1753. LEROLLAND, Paul and SORIN, Pierre, "Sur une nouvelle méthode de détermination des modules d'élasticité," *Comptes rendus*, **196**, No. 8, 536-538, Paris, February 20, 1933.

1754. LETTAU, Heinz, "Freie Schwingungen (Seiches) des Kurischen Haffes," *Schriften der Physikalisch-ökonomischen Gesellschaft zu Königsberg i. Pr.*, **67**, Heft 3-4, 63-73, 6 figures, Königsberg, 1932.

1755. LINDGREN, Waldemar, *et al.*, "Annotated Bibliography of Economic Geology for 1932," Vol. 5, No. 1, 1-228, Washington, January, 1933.

The *Bibliography* is prepared under the auspices of the National Research Council, U.S.A. It is published by the Economic Publishing Co., Urbana, Ill. Subscription price \$5.00 per year, \$3.00 per single issue. Annotations to be sent to Waldemar Lindgren, Massachusetts Institute of Technology, Cambridge, Mass. Subscriptions to be sent to the publishers.

Following a list of the journals consulted (in itself a valuable reference) the above issue reports a total of 1309 entries arranged under subject headings. A very complete index is provided. Geophysical prospecting papers appear in the range Nos. 1144 to 1309 inclusive.

1756. LOOS, P. A., "Beitrag zur Erklärung der argentinisch-chilenischen Erdbeben zwischen 27 und 33° südlicher Breite: Teil I," *Gerlands Beiträge zur Geophysik*, **38**, Heft 3-4, 321-338, Leipzig, 1933. W. W. D.

1757. MACELWANE, James B., S.J., "Earthquakes—What Are They?" *Scientific Monthly*, **36**, No. 8, 457-460, New York, May, 1933.

The above reports the text of a radio talk presented by Dr. Macelwane under the auspices of Science Service, on April 28, 1933.

1758. MARTIN, H., "Die Genauigkeit von Pendelkontakten und der Einfluss des Steigrades einer Pendeluhr auf die Schwingungsdauer des Pendels," *Zeitschrift für Geophysik*, **9**, Heft 1-2, 83-87, 3 figures, Braunschweig, 1933. A. S.

— MAURAIN, Ch., "Le séisme du 2 mars 1933." See No. 1711 of this list.

1759. MEINESZ, F. A. V., "Gravity in the Atlantic Area," *Proceedings of the Koninklijke Akademie van Wetenschappen te Amsterdam*, **35**, No. 9, 1143-1149, Amsterdam, 1932.

The paper reports the observations made on the gravity anomalies in the Atlantic in the summer of 1932, by means of the Meinesz pendulum apparatus mounted in a submarine. A short review appears in *Science Abstracts*, Section A, Physics, **36**, No. 423, Item 979, pg. 243, London, March, 1933.

1760. MEISSER, O., "Das logarithmische Dekrement von Pendeln," *Zeitschrift für Geophysik*, **9**, Heft 1-2, 88-90, 1 figure, Braunschweig, 1933. A. S.

1761. MOTHES, H., "Zu den Bemerkungen von W. C. Salm über die Arbeit von H. Mothes über die Bestimmung der Eisdicke am Hintereisferner," *Gerlands Beiträge zur Geophysik, Ergänzungshefte für Angewandte Geophysik*, **3**, Heft 2, 211-216, Leipzig, 1933.

The above presents a reply to comments by Salm regarding the work reported by Mothes in a previous article listed as No. 464 in this *Bibliography*. The paper by Salm is reported in this issue as No. 1780. The discussion deals with the possibility of determining, among the many reflections received from the ice by the seismic method of determining the thickness of the glacier, that reflection which proceeds from the ice-rock contact.

1762. NAGAOKA, Hantaro, "Fluctuations in Secular Variation of the Rotation of the Earth and Volcanic Eruptions," *Proceedings of the Imperial Academy*, **9**, No. 2, 35-38, Tokyo, February, 1933.

1763. NAKANO, H., "Some Problems Concerning the Propagations of the Disturbances in and on Semi-infinite Elastic Solid," *Geophysical Magazine*, **2**, No. 4, 189-348, 18 figures, 24 tables, Tokyo, February, 1930. T. O.

1764. NAVARRO NEUMANN, M. Ma. S., S.J., "Notas sismológicas y volcanológicas (primer semestre de 1932)," *Ibérica*, No. 960, 8 pages in reprint, 8 illustrations, Barcelona, January 21, 1933. N. N.

1765. (1) NILSSON, Gerhard, "Die Temperaturen im Weltraume," 8 pages, Stockholm, 1932.

G. N.

- (2) NILSSON, Gerhard, "Der Bau des Universums," 16 pages, Stockholm, 1933.

G. N.

The above booklets (5" x 7") are copyrighted and appear to have been printed privately.

1766. NISHKIAN, L. H., "High Seismic Factors in Recent Earthquake," *Engineering News-Record*, **110**, No. 15, 476, New York, April 13, 1933.

Rough calculations on damaged tension members in some structures indicate possible horizontal acceleration of 0.2 g. or more (Long Beach earthquake of March 10, 1933). W. W. D.

1767. NOLKE, Friedrich, "Kritische Rechtfertigung der Kontraktionshypothese," *Gerlands Beiträge zur Geophysik*, **38**, Heft 2, 172-194, Leipzig, 1933.

The author's abstract reads: "The chief objections against the hypothesis of contraction are treated and it becomes evident that they have no conclusive power as they are based on suppositions which either are not confirmed by the observations or are of another nature."

1768. NOTO, Hisashi, "Some Experiments on Earth Current (II)," *Japanese Journal of Astronomy and Geophysics*, **10**, No. 2, 263-303, Tokyo, 1933.

The concluding section states in part: "The probable existence of some relation between the earth potential gradient and the occurrence of earthquakes may be inferred from our present investigation, though the elucidation of the real nature of the relation is left for future investigations."

1769. OBSERVATORY, "Geophysical Discussion," *The Observatory*, No. 707, **56**, 123-125, London, April, 1933.

The note reports the discussion at a meeting on Friday, February 24, 1933, at the rooms of the Royal Astronomical Society. Dr. H. Jeffreys discussed the corrections which he is finding for the *P*-tables. An account was given of a paper by Mr. P. W. Glover on "Tables for Facilitating the Solution of Wiechert's Equation." This equation gives the relation between the statical and dynamical magnifications of a seismograph. Dr. R. Stonely dealt with "The Crustal Warping Hypothesis." It was a discussion of a recent paper by Major E. A. Glennie (reported as No. 1726 of these lists).

1770. OKA, Y., "Note on the Lake Tazawa Earthquake of January 9, 1931," *Geophysical Magazine*, **6**, No. 2, 213-222, 7 figures, 1 plate, Tokyo, March, 1932. T.O.

1771. OXFORD UNIVERSITY, "International Seismological Summary, January, February, March, 1929," pages 1-126, Oxford, 1933.

1772. PAPE, Paul F., "Earthquake Design for Bank Buildings," *Engineering News-Record*, **110**, No. 15, 457-460, 4 illustrations, New York, April 13, 1933.

An article on the application of modern earthquake proof design in constructing four new branches of the Mitsui Bank in Japan. W. W. D.

1773. (1) PASTOR, A. Rey, "El periodo sísmico de 'La Canal de Berdún' (Pirineos) 1923-1925," Publication of the Seismological Station of Toledo, 70 pages, bibliography, numerous illustrations and tables, Toledo, 1931. A. R. P.

- (2) PASTOR, A. Rey, "El Servicio Sismológico Español," *A Terra*, Nos. 1, 2, and 3, 12 pages in reprint, 1 map, 4 illustrations, Toledo, 1931-2. A. R. P.

- (3) PASTOR, A. Rey, "Vulcanismo dos Açôres," *Ibid.*, No. 4, 5 pages in reprint, 2 figures, Toledo, 1932. A. R. P.

- (4) PASTOR, A. Rey, "El Sismo de la Sierra de Lúcar (Granada-Almería)," 17 pages in reprint from *Ibérica*, 11 figures, tables, Toledo, 1933. A. R. P.

1774. PIRSON, Sylvain, "Study of an Adjustable Wave-filter Suitable for the Reception of Reflected Seismic Waves," *Colorado School of Mines Quarterly*, **27**, No. 3, 42-64, 21 figures, 6 tables, bibliography, Golden, July, 1932. C. A. H.

1775. PORUSH, W., "Earthquake Stresses in Rigid Building Frames," *Bulletin of the Seismological Society of America*, **23**, No. 1, 1-12, 3 figures, 3 tables, Stanford, January, 1933.

1776. RAMIREZ, J. Emilio, S.J., "Earthquake History of Colombia," *Bulletin of the Seismological Society of America*, **23**, No. 1, 13-22, 1 figure, bibliography, Stanford, January, 1933.

1777. RICHARDS, T. C., "On the Elastic Constants of Rocks, with a Seismic Application," *The Proceedings of the Physical Society*, No. 246, **45**, Part I, 70-81, 9 figures, 3 tables, London, January 1, 1933.

The author's abstract reads: "The results of a geophysical survey by means of the seismic method over a large oil-bearing limestone structure in southwest Persia indicate that the limestone possesses a higher elastic velocity at its lower boundary than

at its upper. Specimens of the limestone at different depths obtained by coring do not give the same elastic constants when measured by a simple optical method, and the bearing of this result on the practical seismic observation is discussed."

1778. ROTHÉ, E., "Annuaire de l'Institut de Physique du Globe, 1930; deuxième partie—Séismologie," University of Strasbourg, Faculty of Sciences, 101 pages, 1931.

The publication reports the registered earthquakes of 1930 for each of the nine French stations: Strasbourg, Parc Saint-Maur, Alger-Bouzareah, Besançon, Puy-de-Dôme, Marseille, Bagnères-de-Bigorre, Grenoble, and Le Mans. The man-felt earthquakes of France for the same year are reported in tabular form and described in accompanying text.

1779. SAGISAKA, K., "On the Motion of the Seismic Origin of the North Idu Earthquake," *Geophysical Magazine*, 6, No. 3, 223-238, 7 figures, 4 tables, Tokyo, March, 1932.

T. O.

1780. SALM, W. C., "Zu der Arbeit von H. Mothes über die Bestimmung der Eisdicke am Hinter-eisferner," *Gerlands Beiträge zur Geophysik, Ergänzungshefte für Angewandte Geophysik* 2, 401-408, 2 figures, Leipzig, 1932.

For the reply of Mothes to the above criticism by Salm, see No. 1761 of this list.

1781. SCIENCE, "Effects of Earthquakes on Waters of the Earth," *Science*, No. 2001, 77, 9 (Supplement), New York, May 5, 1933.

The short note reports a paper on this subject presented by Captain N. H. Heck, before the American Geophysical Union at their Washington meeting, April 27-29, 1933.

1782. (1) SCIENCE NEWS LETTER, "Scientists, Not Surprised by Earthquakes, Expect Others," *Science News Letter*, No. 623, 23, 163-164, Washington, March 18, 1933.

In addition to describing the Long Beach earthquake of March 10, there is a short account of the new strong-motion accelerometers which are being set up in the seismic areas of California by the United States Government and which registered the Long Beach shock, thus furnishing data of value to engineers.

A map of California, indicating the geological "faults" on which earthquakes have occurred or may be expected to occur, is given on page 188 of *Science News Letter*, No. 624, 23, Washington, March 25, 1933. The map was prepared by H. O. Wood, of the Carnegie Institution of Washington.

- (2) SCIENCE NEWS LETTER, "Death-dealing Quake Was Not a Major Disturbance," *Ibid.*, No. 629, 23, 267 and 269, Washington, April 29, 1933.

A short note on the intensity of the Long Beach earthquake of March 10, 1933.

W. W. D.

- (3) SCIENCE NEWS LETTER, "Alaska Earthquake 'Seen' with Telescope," *Ibid.*, No. 630, 23, 275, Washington, May 6, 1933.

The slow regular oscillations of the level bubble of the telescope at the International Latitude Observatory at Gaithersburg, Md., on the evening of April 26, 1933, were found to have been caused by the earth waves from the Alaska earthquake, of which the epicentre lay about 4,000 miles distant.

1783. (1) SELLARDS, E. H., "The Wortham-Mexia, Texas, Earthquake," *University of Texas, Contributions to Geology, 1932*, Bulletin No. 3201, 105-112, Austin, 1933.

The earthquake had a maximum intensity of V in the Rossi-Forel Scale and was felt within a radius of only fifteen or twenty miles from the origin. It originated along the line of the Wortham-Mexia faults.

- (2) SELLARDS, E. H., "The Valentine, Texas, Earthquake," *Ibid.*, pp. 113-138, Austin, 1933.

The maximum intensity was VIII in the Rossi-Forel Scale and a few buildings were slightly damaged. The shock was felt for a distance of five hundred miles from the origin in a northeasterly direction but, in other directions, the shock was not felt at a distance of more than three hundred miles. S. T.

1784. SHRADER, J. E., "The Tri-dimensional Vibrograph," *Journal of the Franklin Institute*, **215**, No. 4, 455-469, 17 figures, Philadelphia, April, 1933.
1785. SIEBERG, A., "Zur Mechanik tektonischer Vorgänge," *Zeitschrift der Deutschen Geologischen Gesellschaft*, **84**, Heft 9, 673-676, Berlin, 1932. A. S.
1786. SIEBERG, A., "Beziehungen zwischen Erdbebenforschung und Geologie," *Zeitschrift der Deutschen Geologischen Gesellschaft*, **84**, Heft 9, 737-740, Berlin, 1932. A. S.
1787. SLICHTER, L. B. and GABRIEL, V. Gavrilovich, "Studies in Reflected Seismic Waves: Part I. Some Computations of the Reflection of Seismic Waves at Solid Boundaries," *Gerlands Beiträge zur Geophysik*, **38**, 228-238, 8 figures, Leipzig, 1933.

The authors' abstract reads: "In the first part of this paper, the reflected and refracted seismic waves are computed at three boundaries, chosen to approximate the transitions which are supposed to occur in the upper crust of the earth. In the second part, the influence of an assumed layered crust in contributing to the oscillatory character of the *P* and *S* phases of seismograph records is examined. In many cases the contributions to the surface motion from secondary waves produced by internal reflections in the crust are noteworthy and tend to produce a motion of irregular oscillatory type. Of these secondaries, more than a dozen attain significant amplitudes at parts of the epicentral range. The relative amplitudes of their surface motions and their arrival times are plotted as functions of epicentral distance." L. B. S.

1788. SLICHTER, L. B., "Studies in Reflected Seismic Waves: Part II. Surface Motions due to the Reflections in a Layered Crust," *Gerlands Beiträge zur Geophysik*, **38**, 239-256, 18 figures, Leipzig, 1933.

For summary of this important contribution to the study of reflections see the entry next above.

1789. SORGE, Ernst, "The Scientific Results of the Wegener Expedition to Greenland," *The Geographical Journal*, **81**, No. 4, 333-344, London, April, 1933.

Part of the paper is devoted to an account of seismic ice soundings taken during the expedition. W. W. D.

— SORIN, Pierre and LEROLLAND, Paul, "Sur une nouvelle méthode de détermination des modules d'élasticité." See No. 1753 of this list.

— STONELEY, R., "On the Crustal Warping Hypothesis." See No. 1769 of this list.

1790. TAKAYA S., "Some Problems on the Motion of Water Waves," *Geophysical Magazine*, **6**, No. 4, 347-362, Tokyo, March, 1932. T. O.

1791. TOMLINSON, G. A., "A New Type of Free-pendulum Clock," *The Proceedings of the Physical Society*, No. 246, **45**, Part 1, 41-48, 5 figures, London, January 1, 1933.

The author's abstract reads: "A new method of taking accurately defined seconds signals from a pendulum is described, in which a photoelectric cell is used in conjunction with a special arrangement of multiple slits. This has been developed into a complete free-pendulum system, self-maintained *in vacuo* by means of electrostatic impulses and having a closely governed arc."

1792. TSUBOI, Chuji, "Investigation on the Deformation of the Earth's Crust Found by Precise Geodetic Means," *Japanese Journal of Astronomy and Geophysics*, **10**, No. 2, 93-248, 143 figures, Tokyo, 1933.
The above paper is extraordinarily comprehensive and presents a *résumé* of the work already completed, the observations made, the theories suggested, and the further studies indicated.
1793. TURNER, H. H., "Shallow and Deep Earthquakes," *Geophysical Magazine*, **2**, No. 3, 179-187, 5 tables, Tokyo, November, 1929. T. O.
1794. VAN DIJK, G., "Seismische Registreringen in De Bilt, 1930," *Publications of Koninklijk Nederlandsch Meteorologisch Instituut*, No. 108 (18), 46 pages, De Bilt, 1932. G. v. D.
1795. VAN DIJK, G., "De Aardbevingen in Noord-Brabant van November 1932," *Hemel en Dampkring*, **31**, 5 pages in reprint, De Bilt, January, 1933. G. v. D.
- VAN WATERSCHOOT VAN DER GRACHT, W. A. J. M. and JONGMANS, W. J., "Some Preliminary Considerations as to Cause and Significance of the Earthquakes which have been Observed in November, 1932, in the Netherlands." See No. 1741 of this list.
1796. VISSER, S. W., "Vulkanische Verschijnselen en Aardbevingen in den Oost-Indischen Archipel, waargenomen gedurende het Jaar 1931," *Natuurkundig Tijdschrift voor Nederlandsch-Indië*, **92**, No. 2, 48 pages, Batavia, 1932.
1797. VON SCHMIDT, Oswald, "Brechungsgesetz oder senkrechter Strahl? Eine kritische Studie auf Grund seismischer Arbeiten in Venezuela," *Zeitschrift für Geophysik*, **8**, Heft 8, 376-396, 14 figures, bibliography, Braunschweig, 1932.
1798. WADATI, K., "Preliminary Report on the Irregular Propagation of Seismic Waves in the Kwanto-district," *Geophysical Magazine*, **6**, No. 3, 239-250, 7 figures, 4 tables, Tokyo, March, 1932. T. O.
1799. WESTERGAARD, H. M., "Measuring Earthquake Intensity in Pounds per Square Foot," *Engineering News-Record*, **110**, No. 16, 504, New York, April 20, 1933.
The sub-heading of the above article reads: A suggested deduction based on a controlling maximum ground velocity for all periods in a given disturbance. W. W. D.
1800. WILLIS, Bailey, "Studies in Comparative Seismology," *Carnegie Institution of Washington, Year Book No. 31*, 372-377, Washington, 1932.
- ZELLER, W. and KOCH, H. W., "Zur Theorie der Schwingungsmesser." See No. 1744 of this list.

Erratum:

Item No. 1695, reporting the *International Seismological Summary* for October, November, December, 1932, was inadvertently entered in the name of Dr. Whipple, who wrote the introduction to that particular issue. It should have been entered in the name of Oxford University, as is done with Nos. 1561 and 1771, reporting issues published since the death of Prof. H. H. Turner. The work in connection with the *Summary* is all done at the University Observatory, Oxford.

LIST OF COLLABORATORS

The initials appended to various items throughout the *Bibliography* indicate, in each case, the contribution by the respective collaborator.

Bodle, Ralph R., Editor, "Earthquake Notes," U.S. Coast and Geodetic Survey, Washington, D.C., U.S.A.	R.R.B.
Doxsee, W. W., Dominion Observatory, Ottawa, Canada.	W.W.D.
Heiland, C. A., Colorado School of Mines, Golden, Colo., U.S.A.	C.A.H.
Hiller, W. H., Württembergisches Statistisches Landesamt, Stuttgart, Germany.	W.H.H.
Imamura, Akitune, Tokyo Imperial University, Tokyo, Japan.	A.I.
Landsberg, H., Universitätsinstitut für Meteorologie und Geophysik, Frankfurt a.M., Germany.	H.L.
Lee, Frederick W., Editor, "Geophysical Abstracts," United States Bureau of Mines, Washington, D.C., U.S.A.	F.W.L.
Macelwane, James B., S.J., Saint Louis University, Saint Louis, Mo., U.S.A.	J.B.M.
Navarro Neumann, M. Ma. S., S.J., Villa S. Luigi, Via Posillipo 276, Naples, Italy.	N.N.
Nilsson, Gerhard, Flygarehotellet, Stockholm 5, Sweden.	G.N.
Okada, T., Central Meteorological Observatory, Tokyo, Japan.	T.O.
Pastor, A. Rey, Seismological Station, Toledo, Spain.	A.R.P.
Raiko, N. V., Pioneerskaia Ulitza 8/a, appt. 9., Leningrad 3, U.S.S.R.	N.V.R.
Sieberg, A., Reichsanstalt für Erdbebenforschung, Jena, Germany.	A.S.
Slichter, L. B., Massachusetts Institute of Technology, Cambridge, Mass., U.S.A.	L.B.S.
Steenhuis, J. F., Kleverparkstraat 16, Haarlem, Holland.	J.F.S.
Taber, Stephen, Department of Geology, University of South Carolina, Columbia, S.C., U.S.A.	S.T.
van Dijk, G., Koninklijk Nederlandsch Meteorologisch Institut, De Bilt, Holland.	G.v.D.

