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NOTE.—Geophysical Abstracts 1–86 were issued in mimeographed form by the Bureau of Mines; Abstracts 87–108 were published in bulletins of the Geological Survey.

Correction for Geophysical Abstracts 106, page 90

Under No. 6144, Chapman, S., "Notes on isomagnetic charts, Part 5," the word "dipoles" in title and in lines 1, 5, and 10 of abstract should be corrected to "dip-poles." In lines 6, 7, and 8 of abstract the word "dipole" is correct. Insert hyphens so that the words will be "pole-pairs" in lines 7 and 13, "pole-pair" in line 14, and "dipole-field" in line 8.

GEOPHYSICAL ABSTRACTS 109, APRIL–JUNE 1942

Compiled by W. Ayvazoglou

1. GRAVITATIONAL METHODS

6500. Adler, J. L., Simplification of tidal corrections for gravity-meter surveys: Geophysics, vol. 7, No. 1, pp. 35–44, Menasha, Wis., 1942.

Recent papers have called attention to the considerable effect of lunar and solar tidal forces on the vertical component of gravity but have given no instructions for the computation of this effect. Material published in English on this subject, so far as the author has been able to discover, does not present a rapid, practical method of computation which could be used economically as a matter of routine in gravimeter work. In this paper the author attempts to analyze the degree of accuracy required in these computations and develops a chart from which the tidal correction for any gravimeter observation in the United States can be obtained directly in less than a minute with an average error of less than 0.01 milligal.—*Author's abstract.*

6501. Aksentieva, Z., Results of horizontal-pendulum observations on the tides of the solid earth in Poltava [in Russian]: Acad. sci. U. R. S. S. Bull., sér. Géog. Géophys., No. 6, pp. 563–567, Moscow, 1940.

Aksentieva gives the results of the harmonic analysis of observations made with horizontal pendulums in Poltava from 1930 to 1938. These observations confirm the results of those that have been made by Orlov (see Geophys. Abstracts 100, No. 5307). The main lunar semidiurnal wave M_2 was determined. It was again established that for Poltava $\gamma_n > \gamma_e$; and the value of these coefficients were determined with greater accuracy. The mean value obtained was $\gamma = 0.74$.—*Author's abstract, translated by W. A.*

Bullen, K. E., The density variation of the earth's central core. *See* Geophys. Abstract 6514.

6502. Elkins, T. A., Test of a quantitative mountain-building theory by Appalachian structural dimensions: Geophysics, vol. 7, No. 1, pp. 45–60, Menasha, Wis., 1942.

A mathematical paper by Ross Gunn (see Geophys. Abstracts 91, No. 4072) gives a mountain-building theory which makes possible the calculation of certain structural dimensions in terms of thickness and strength of the geologic elements involved. The present paper applies various formulas from Gunn's paper to the calculation of width and amplitude of folds, to basin widths and depths, and to mountain heights of the Appalachian Mountain system. The numerical values resulting are in surprisingly good agreement with previously published values measured or estimated from the known geology of the area. A brief discussion is also given of the theoretical interpretation, by Gunn's theory, of the large isostatic gravity anomaly here as due to possible crustal stress.—*Author's abstract.*

6503. Siegert, A. J. F., Determination of the Bouguer correction constant: Geophysics, vol. 7, No. 1, pp. 29–34, Menasha, Wis., 1942.

A formula is given which eliminates some of the usual graphical work and makes the result independent of the judgment of the computer. The probable error can be determined easily.—*Author's abstract.*

6504. Tavolini, Altiero, Determinazione dei coefficienti di densità e di temperatura dei pendoli gravimetrici "Mioni" dell' instituto di geofisica della R. Università di Napoli [Determination of the density and temperature coefficients of the gravimetrical pendulum "Mioni" of the Geophysical Institute of the Royal University of Naples]: Annali Inst. Navale, vol. 9, pp. 47–61, Napoli, 1940.

In this paper the writer describes attempts to determine the coefficients of density and temperature of the gravimetrical pendulum "Mioni" at the University of Naples. First, he followed the usual procedure of allowing the pendulum to oscillate alternately (1) under ordinary conditions and (2) with density and temperature changed considerably. Then he compared the values for the length of the oscillations with those obtained from other pendulums that oscillated simultaneously under ordinary conditions. In determining the coefficient of density he used an ordinary balance, as well as one provided with a pneumatic lock constructed by the Geodetic Institute of the University of Padua; in determining the thermal coefficient he used the thermal apparatus "Mioni" of the Royal Italian Geodetic Commission of the Royal Observatory in Padua. He gives in detail numerical results of the determinations.—*Bossolasco's abstract in Zentralbl. Geophy., Meteorol. u. Geod., vol. 7, No. 6, 1941, translated by W. A.*

2. MAGNETIC METHODS

6505. Chapman, Sydney, Notes on isomagnetic charts, Part 6, Earth-air electric currents and the mutual consistency of the H and D isomagnetic charts: Terres. Magn. and Atmos. Electr., vol. 47, No. 1, pp. 1–14, Baltimore, Md., 1942.

Atmospheric-electric observations indicate that the electric currents crossing the earth's surface are too weak to have an observable effect on the distribution of the geomagnetic field, which should therefore (to a high degree of accuracy) be derived from a scalar potential. This question has been examined in various ways: By means of line integrals of the horizontal magnetic intensity; by drawing magnetic parallels; by spherical harmonic analysis; and (by Schuster) by calculating the vertical component of the curl of the field at particular points. A discussion of these various methods leads to the conclusion that the curl method is the most generally useful. A new formula is given for calculating the curl directly from the isomagnetic charts for declination (D) and horizontal intensity (H), the elements that are most usually observed and charted. The new process is applied to the 1922 Admiralty charts. The error of estimation of the curl, or of the resulting inferred vertical current-intensity i, is also examined. The nonzero values of i are due partly to errors of estimation, but the larger values are ascribed mainly to a lack of mutual consistency between the D and H charts in particular localities, due to errors in one or both charts. It is suggested that when new charts of D and H are constructed, the value of i should be taken as zero (on the atmospheric-electric evidence), and the mutual consistency of the charts should be tested and adjusted by the methods here developed.—*Author's abstract.*

6506. Knapp, D. G., The new isogonic chart of the United States: Terres. Magn. and Atmos. Electr., vol. 47, No. 1, pp. 53–62, Baltimore, Md., 1942.

The discussion explains some of the factors affecting the production of isogonic charts and presents a comprehensive plan which is expected to promote uniform standards of treatment for future work. The scheme used for the chart for 1940 is outlined as a modification of that plan, designed primarily to correlate that chart with the previous one (1935). The behavior of secular change as reflected in the new chart is discussed, and the use of shading in a way not previously employed in this series of charts is also explained.—*Author's abstract.*

6507. McComb, H. E., Geophysical measurements in the laboratory and in the field: Washington Acad. Sci. Jour., vol. 32, No. 3, pp. 65–79, Menasha, Wis., 1942.

McComb deals briefly with certain physical measurements in geomagnetism and in seismology, describes in detail a few of the instruments and methods used in such measurements, and compares some of the results obtained in the laboratory with results obtained with the same equipment in the field. Finally, he describes some shaking-table investigations with three-component accelerographs conducted in cooperation with the Massachusetts Institute of Technology.—*W. A.*

6508. Sawdon, W. A., Orientation of conventionally recovered cores: Petroleum Engineer, vol. 13, No. 6, pp. 46–48, Dallas, Tex., 1942.

Polar-core orientation, discussed in this paper, is a magnetic method based on the fact that many rock strata have acquired and retained polarity from the earth's magnetic field. By utilizing this polarity, the writer determined the magnetic north and south of the core with reference to the dip and strike, as shown by the bedding planes of the core, and then computed the true direction of the dip and strike. He describes briefly the equipment used for polar-core orientation and interprets the curves, which show the results of tests made by polar-core orientation.—*W. A.*

6509. Swanson, C. O., The use of the dip needle in mapping structure: Canadian Inst. Min. Metallurgy and Min. Soc. Nova Scotia Trans., vol. 44, pp. 1–11, Montreal, Quebec, 1941.

The construction and operation of the dip needle are described, and the principles and practice of its use in working out geologic structure are outlined. Calculation of the sensitivity of the dip needle is discussed in some detail in relation to the following five conditions: Assumption that the inclination remains constant at 75°; effect of inclination of the earth's field upon sensitivity to changes in intensity; sensitivity to changes in inclination; effect of inclination of the earth's field upon sensitivity to changes in inclination; and the problem of an imperfect instrument.—*W. A.*

6510. Tullis, E. L., Magnetometer surveys during 1941: South Dakota Geol. Survey, Rept. of Investigations, No. 42, 40 pp., Vermilion, 1942.

The magnetometer surveys of 1941 continue the work done by Jordan and form a part of the projected survey of the entire State of South Dakota (see Geophys. Abstracts 101 and 104, Nos. 5474 and 5897, respectively). The purpose of the surveys was to investigate a possible extension of the pre-Cambrian ridge traced by Jordan to the vicinity of Chamberlain and to outline conditions about the southeast margin of the important structural basis of west-central South Dakota, known as the Lemmon geosyncline. In addition to checks at several of the stations established by Jordan, 8 new base stations and 237 new magnetometer stations were occupied. The writer outlines the region covered by the surveys—a total of 190 townships, or about 6,850 sq. miles—and shows the results of the surveys in a magnetic map of the region.—*W. A.*

3. SEISMIC METHODS

6511. Bauer, Christian, Beitrag zu den Untersuchungen über Erdbebenfrequenz und Polhöhenschwankungen [Contribution to investigations of earthquake frequency and variations in the latitude of the pole]: Gerlands Beitr. Geophysik, vol. 57, No. 1, pp. 38–64, Leipzig, 1941.

The author finds that the highest earthquake frequency is always observed when the distance of the region of the earthquake is farthest from the pole and closest to the equator. This means that variations in earthquake frequency may become perceivable even if the change in velocity of rotation that occurs during the shifting of the pole of rotation of the earth with regard to a point near the surface is very small.—*Wegener's abstract in Zentralbl. Geophys., Meteorol. u. Geod., vol. 7, No. 6, 1941, translated by W. A.*

6512. Birkenhauer, H. F., The structure of the earth's crust east and north of St. Louis [abstract]: Missouri Acad. Sci. Proc., vol. 7, No. 4, p. 112, Columbia, 1942.

Within the past year a detailed study has been made of the crustal structure of North America east of the meridian of St. Louis, by means of seismograms of eight well-recorded earthquakes occurring in that region. The crustal structure that seemed to account best for the observed arrivals of the seismic waves consists of an upper layer 5 km. thick, underlain by three layers of thicknesses 8, 12, and 12 km., in order of increasing depth above the normal substratum. Each layer has a characteristic velocity for longitudinal (P) and transverse (S) waves. Traveltime curves for epicentral distance intervals of 5 km. were computed for the five P phases, the five S phases, and the five S–P intervals.

6513. British Association Seismological Committee: Nature, vol. 148, No. 3763, pp. 721–722, London, 1941.

The report of the British Association Seismological Committee for 1941 shows that progress is being made in spite of the war. The new-type electrically-driven recording drums for the Milne-Shaw seismographs are proving satisfactory in India. Difficulties with the International Seismological Summary are being successfully overcome at Oxford. Jeffreys has investigated the deep earthquake of June 29, 1934, has obtained from it helpful readings of the receding branch of *PKP*, has improved the table of *PKP*, and has constructed a table for *sP*. Stoneley makes helpful and pertinent remarks concerning the integration of seismograms in the long-wave phase of earthquakes. We may now accept without hesitation the usual identification of the early part of the long-wave phase (apparent velocities 4.4–4.0 km./sec.) as Love waves.—*Editorial note, condensed by W. A.*

6514. Bullen, K. E., The density variation of the earth's central core: Seismol. Soc. America Bull., vol. 32, No. 1, pp. 19–30, Berkeley, Calif., 1942.

A detailed analysis of the problem of the earth's density variation has been extended to the earth's central core. It is shown that in the region between the outer boundary of the core and a distance of about 1,400 km. from the earth's center the density ranges from 9.4 gm./cm.^{3} to 11.5 gm./cm.^{3} with an uncertainty which, if certain general assumptions are true, does not exceed 3 percent. The density and pressure figures are, moreover, compatible with the existence of fairly pure iron in this part of the earth. The result for the earth's outer mantle as given in a previously published paper, together with those in the present paper, are found to give with good precision the density distribution in a region occupying 99 percent of the earth's volume. Values of the density within 1,400 km. of the earth's center are subject, however, to a wide margin of uncertainty, and there appears to be no means of resolving this uncertainty for the present. The most that can be said is that the mean density in the latter region is greater than 12.3 gm./cm.^{3} and may quite possibly be several gm./cm.^{3} in excess of this figure. In the present paper figures are also included for the variation of gravity and the distribution of pressure within the central core. The gravity results are shown to be subject to an appreciable uncertainty except within about 1,000 km. of the outer boundary of the core, but the pressure results are expected to be reasonably accurate at all depths.—*Author's abstract.*

6515. Coombs, H. A., and Barksdale, J. D., The Olympic earthquake of November 13, 1939: Seismol. Soc. America Bull., vol. 32, No. 1, pp. 1–6, Berkeley, Calif., 1942.

The Olympic earthquake was perceptible as far north as Grand Forks, British Columbia, as far east as Spokane, Wash., and as far south as Florence, Oreg. The area affected was approximately 212,000 sq. miles. The writers summarize the results of their investigation as follows: "(1) the area of this earthquake was unusually large for the region, considering its low intensity; (2) a definite relation seems to exist between the amount of unconsolidated sediment on the surface (either glacial drift or alluvium, or both) and the high-intensity zones; (3) pre-Tertiary rocks at and near the surface in the Olympic and northern Cascade Mountains may have some effect on the distribution of intensity ratings; and (4) the basalts of the Columbia Plateau may or may not modify the apparent intensities." They tabulate the intensities according to the modified Mercalli scale and give an isoseismal map of the earthquake.—*W. A.*

6516. Hayes, R. C., The seismicity of New Zealand: New Zealand Jour. Sci. Technology, vol. 33, No. 2b, pp. 49b–52b, Wellington, 1941.

New Zealand is divided into four seismic regions on the basis of maximum earthquake intensity and average frequency of shocks. The approximate boundaries of these regions, together with the epicenters of destructive earthquakes, are shown on a map. A table is presented giving the average frequency of earthquakes and the relative seismicity for each region. Some remarks are offered regarding the seismic activity within each region.—*Author's abstract.*

6517. Leypoldt, H., Sea-level changes as trigger forces: Seismol. Soc. America Bull., vol. 31, No. 7, pp. 233–238, Berkeley, Calif., 1941.

Curves are obtained for the seasonal variations in the level of the sea at several American stations. These mean values indicate that the change of loading must effect a change in the moment of inertia of the rotating spheroid, causing the annual, and probably secular, change in latitude as well as variations in internal stresses. Earthquakes may then be the release of stressed areas, the stressing of which may have been caused in part by these load changes, which also form the trigger forces.—*R. S. R., Sci. Abstracts, vol. 45, No. 529, 1942.*

6518. Linehan, Daniel, and Leet, L. D., Earthquakes of the northeastern United States and eastern Canada, 1938, 1939, 1940: Seismol. Soc. America Bull., vol. 32, No. 1, pp. 11–18, Berkeley, Calif., 1942.

This article continues the work of Leet in cataloging the earthquakes of northeastern America (see Geophys. Abstracts 95, No. 4637). A table lists the earthquakes of the northeastern United States and eastern Canada for 1938–40, a map gives the locations of the epicenters, and a graph shows the concentration of earthquakes by years since 1663.—*W. A.*

6519. Mantle, Edward, Amateur seimology in the making: Royal Astron. Soc. Canada Jour., vol. 36, No. 2, pp. 41–48, Toronto, 1942.

In a brief account of his efforts to build a seismograph the writer describes all essential details of the instrument and reproduces a seismogram of the earthquake of November 25, 1941. The epicenter of this earthquake was in the Atlantic Ocean north of a line joining the Azores and Madeira Islands, about 2,900 miles from Hamilton, Ontario, where the seismograph had been set up in the basement of the writer's house. Mantle designed and built this seismograph alone, with the exception of the drum and of casting and drilling the mass. He showed considerable ingenuity in making a "Big Ben" alarm clock drive the drum at an extraordinarily good rate and in using home-made contacts on a "Pocket Ben" watch for the timing device. He claims that the instrument can record most of the large earthquakes that occur in any part of the world.—*W. A.*

McComb, H. E., Geophysical measurements in the laboratory and in the field. *See* Geophys. Abstract 6507.

6520. Mukherji, S. M., and Pillai, A. R., The Hindu Kush earthquake of November 21, 1939: Meteorol. Dept. Sci. Notes, India, vol. 8, No. 91, pp. 85–90, Calcutta, 1941.

The epicenter is obtained as 36°11′ N. and 70°53′ E., in the Hindu Kush. The depth of focus as determined is 210±14 km., and the hypocentral time 11 h. 01 m. 43 s. G. M. T. The various characteristics observed in respect to this shock are discussed and are found to be essentially similar to those of the previous deep ones from the same region. The possibility of getting useful information regarding the origin of these shocks from a careful study of their seismograms obtainable at a single Indian station is pointed out. It is found that strong shocks occur generally in winter and weak ones in all the seasons. Frequency of occurrence of both the classes is two per year. The phase *sP* is especially strong in the Indian seismograms being recorded at 8°, the smallest epicentral distance at which seismograms were available for this study.—*Authors' abstract.*

6521. Richter, C. F., Earthquake near Whittier, Calif., January 29, 1941: Seismol. Soc. America Bull., vol. 32, No. 1, pp. 7–10, Berkeley, Calif., 1942.

The instrumental epicenter was very close to 33°58′ N., 118°03′ W., about 1 mile southwest of the center of the city of Whittier, Calif. A table shows the distances to several places calculated from this epicenter, together with data on the time of arrival of the first motion, and traveltimes, and times of origin. Richter considers the epicenter to be of geologic and economic importance.—*W. A.*

6522. Swartz, C. A., and Lindsey, R. W., Reflected refractions: Geophysics, vol. 7, No. 1, pp. 78–81, Menasha, Wis., 1942.

A number of very steep reflections were observed while making a seismograph survey of a salt dome. A time plot of events recorded along a typical profile is shown. The steep reflections came both from the sides of the dome material and from the adjacent upturned sedimentary strata. A particular event of very infrequent occurrence, a reflection from the vertical side of the dome traveling essentially horizontally along a refracted trajectory, is discussed in detail.—*Authors' abstract.*

6523. Thoenen, J. R., and Windes, S. L., Seismic effect on quarry blasting: U. S. Bur. Mines Bull. 442, 83 pp., Washington, D. C., 1942.

This study is based upon data collected from records of several hundred tests conducted at 28 stone quarries situated in 11 Southern and Eastern States, in a limestone mine, and in 20 residential structures of various types. The tests covered the detonation of explosive charges in regular quarry practice ranging in weight from 1.5 to 42,000 lbs. Distances between shot points and seismometer stations ranged from 100 ft. to 2 miles. Transmitting mediums through which the seismic waves were propagated ranged from granites through limestones, shales, and clays to unconsolidated sand and gravel beds. Amplitudes of ground displacement as recorded ranged from 0.0001 to 0.06 in. and similar movements in structures from 0.0001 to 0.01 in. for quarry blasts and up to 0.3± in. for mechanical vibrations. Frequencies of the seismic waves ranged from 3 to 80 cycles per second and the duration of individual vibrations from 0.1 to 8 sec.—*Authors' abstract.*

6524. Walter, E. J., Local earthquakes and crustal layering immediately south of St. Louis: Missouri Acad. Sci. Proc., vol. 7, No. 4, p. 113, Columbia, 1942.

The writer has made a careful study of the crustal layering south of St. Louis, Mo., based on the seismograms of six earthquakes centered in this area. An analysis of these seismograms yielded velocities for four different longitudinal waves and four different transverse waves. The crustal structure that had the observed velocities and that seemed most capable of producing the observed phases consists of three layers—5, 12, and 20 km. thick, respectively—underlain by the normal substratum, each layer with its own peculiar velocity.—*W.A.*

6525. Williams, J. S., The Oldham seismograph station at Utah State Agricultural College, Logan, Utah: Seismol. Soc. America Bull., vol. 32, No. 1, pp. 49–60, Berkeley, Calif., 1942.

The new seismograph station at Utah State Agricultural College has been described. A review of the evidence of recent faulting in Utah as exhibited in recent fault scarps and the location of known earthquakes shows that the station is located where strong-motion records may be expected. It appears that Utah's position as the most active seismically of the Rocky Mountain States is due to its situation on the eastern boundary of the Great Basin.—*Author's abstract.*

6526. Wolf, Alexander, A mechanical device for computing seismic paths: Geophysics, vol. 7, No. 1; pp. 61–68, Menasha, Wis., 1942.

Wolf describes and presents a schematic diagram of a mechanical device for computing the circular seismic paths occurring in a medium in which the velocity increases uniformly in one direction. Construction of the instrument requires expert workmanship and is not justified unless the instrument is to be used extensively. The calculation and drawing of the special time and depth scales, however, requires only about 2 hours, and with them the work can be done more rapidly and with much less effort than in working with the variety of charts by means of which the same object is sometimes achieved.—*W. A.*

6527. Worrell, F. T., On the calibration of the Wenner seismograph: Seismol. Soc. America Bull., vol. 32, No. 1, pp. 31–48, Berkeley, Calif., 1942.

The writer outlines a method for determining the operating characteristics of the Wenner seismograph by means of a procedure essentially the same as that originally worked out by Robinson and McNish for the United States Coast and Geodetic Survey seismological stations (see Robinson, E. C., On the determination of the performance of the Wenner seismometer, unpublished ms. in file RP–S, section S–45, U. S. Coast and Geodetic Survey). He gives sections on interpretation of the data, computation of the intrinsic constants, performance constants, and magnification; shows the results of actual measurements; and points out the strong and weak points of the method. He gives sample calculations in the appendix.—*W. A.*

4. ELECTRICAL METHODS

6528. Bowsky, M. C., The effect of mud resistivities on the intensities of electrical logs: Geophysics, vol. 7, No. 1, pp. 82–89, Menasha, Wis., 1942.

The drilling mud is one of the variables that prevents comparing the actual intensities of electrical logs. This paper deals with the effect of the resistivity of the drilling mud on the intensities of the natural potential and normal apparent resistivity curves.—*Author's abstract.*

6529. Keck, W. G., and Colby, W. F., The depth dependence of earth conductivity upon surface potential data: Jour. Applied Physics, vol. 13, No. 3, pp. 179–188, Lancaster, Pa., 1942.

The problem of determining electrical earth conductivity from the surface, in the case where it is a function of the depth only, is solved by a perturbation method, which, formally at least, allows the unperturbed functions to be perfectly arbitrary. Numerical work, however, is restricted to those functions which are available as solutions of the so-called "inverse" problem, a group of which is given. Of this group the case in which the unperturbed conductivity varies exponentially is treated in detail, and two examples showing the success of the method are presented. A numerical method of solving integral equations of the Laplace type, which occur in the above, is also submitted.—*Authors' abstract.*

6530. Neuenschwander, E. F., and Metcalf, D. F., A study of electrical earth noise: Geophysics, vol. 7, No. 1, pp. 69–77, Menasha, Wis., 1942.

A method of investigating the characteristics of electrical ground noise is described. A description and functional diagram of the measuring apparatus and a series of noise-level profiles are given, as well as a discussion of measuring technique, the results obtained, and the application of ground-noise measurements to geophysical prospecting.—*W. A.*

6531. Parsons, C. P., Caliper logging in the Southwest: Oil Weekly, vol. 104, No. 13, pp. 24–26, 34, Houston, Tex., 1942.

Caliper logging is a method of measuring the variations in diameter of an open hole. Illustrations accompanying the paper include caliper logs of salt sections and also electrical and temperature logs taken in the same wells for comparison with the caliper logs.—*W. A.*

6532. Sherborne, J. E., and Newton, W. M., Jr., Factors influencing electrical resistivity of drilling fluids: Am. Inst. Min. Met. Eng. Tech. Pub. 1466, 17 pp., New York, 1942.

The relation between the properties of electric logs and the fluid used in drilling a well is briefly discussed in this paper, and the fact that the resistivity of the drilling mud and its filtrate can appreciably affect such logs is shown. Apparatus was designed and procedure established to determine the effect of various factors on the resistivity of drilling mud. Five muds commonly employed in California were tested, and the following observations were made: (1) The effect of raising the temperature from 80° F. to 180° F. is to decrease the resistivity of the mud or filtrate approximately 50 percent; (2) The resistivity of the mud in most cases closely approximates that of its filtrate; (3) the change in the resistivities of muds caused by the addition of chemical is not the same function of the amount of chemical added for each mud; (4) the effect produced by increased sodium-chloride content is to reduce markedly the resistivity of the mud and its filtrate; (5) weighting materials, such as baroid and limestone, tend to increase the resistivity of drilling mud; (6) cement and counteracting reagents reduce mud resistivity.—*Authors' abstract.*

5. RADIOACTIVE METHODS

6533. Beers, Yardley, A precision method of measuring Geiger counter resolving times: Rev. Sci. Instruments, vol. 13, No. 2, pp. 72–76, Lancaster, Pa., 1942.

The counting rates due to two separate constant β-ray sources and due to the two sources combined are measured. Because of the finite resolving time of the counter, the sum of the counting rates due to the single source exceeds that due to the combined source. By application of formulas which are derived the resolving time and errors involved can be calculated from these quantities. Relatively high accuracy can be obtained by this method without excessive expenditure of time upon the measurements and without the use of very large counting rates, which might damage the counter.—*Author's abstract.*

6534. Larsen, E. S., and Keevil, N. B., The distribution of helium and radioactivity in rocks: Am. Jour. Sci., vol. 240, No. 3, pp. 204–215, New Haven, Conn., 1942.

As a part of an extensive petrologic study of granite intrusives in southern California, helium and radioactivity determinations were made on minerals separated from three fresh specimens. The radioactivity of the accessory minerals is found to be from 100 to 1,000 times higher than those of the common rock minerals. The helium retentive properties in decreasing order are hornblende, biotite, quartz, apatite, feldspar, sphene, and zircon. The assignment of Jurassic age is found to be the most consistent with the corrected helium age determinations and with field data.—*Authors' abstract.*

6535. Pontecorvo, Bruno, Radioactivity analyses of oil-well samples: Geophysics, vol. 7, No. 1, pp. 90–94, Menasha, Wis., 1942.

A laboratory method of analyzing the radioactivity of rock samples is described in which the laboratory tests are designed to simulate the conditions which prevail when radioactivity logs of wells are made. Thus the radioactivity of samples may be correlated with the results of such well logs and their interpretation improved thereby.—*Author's abstract.*

6. GEOTHERMAL METHODS

6536. Dale, C. R., Thermal logging of producing oil wells: Oil and Gas Jour., vol. 40, No. 45, pp. 49–50, Tulsa, Okla., 1942.

The writer describes briefly the many useful applications, as well as the limitations, of temperature measurements in oil wells and gives a few examples of thermal logging that may serve to suggest many other applications. Thermal logs can be obtained with minimum equipment and little expenditure of time for field work. Interpretations, which can be made according to established principles, assist in securing better performance of the wells.—*W. A.*

7. GEOCHEMICAL METHODS

6537. Flood, H. L., Mud analysis as a basis for well logging: Petroleum Engineer, vol. 12, No. 13, pp. 21–26, Dallas, Tex., 1941.

Flood describes the new method of logging wells by mud analysis through application of principles developed from the assumption that the drilling mud contains cuttings from the formations through which the bit passes and therefore should disclose useful information. He discusses details of operation and of the equipment used and, by presenting a few of the more interesting logs of West Texas wells, illustrates the manner in which logging information may be employed. The method proved to be satisfactory for obtaining information on the gas-oil contact plane or zone, on the presence of intermediate waters, and on related data.—*W. A.*

6538. Merritt, J. W., Advanced geochemical well logging: Oil Weekly, vol. 105, No. 4, pp. 32–38, Houston, Tex., 1942.

Although this article outlines the development of the new direct method of exploring for oil by geochemical mapping, otherwise known as soil analysis, it is not directly concerned with the details of soil analysis but only with chemical analysis of well cuttings and interpretation of the results. Subsurface geochemical studies, through chemical well logging, offer a correlative tool in oil-well testing by increasing greatly the scope of other methods and by acting as a check method. The writer emphasizes the commercial value of the chemist's ability to sense by this means the approach of the drill to an oil or a gas body. He gives a description of analytical equipment used in the separation and identification of the lighter hydrocarbons in geochemical well logging and several typical logs of wells.—*W. A.*

6539. Pirson, S. J., Theoretical and economic significance of geodynamic prospecting: World Petroleum, vol. 13, No. 4, pp. 38–42, New York, 1942.

Pirson believes that the rules of mathematical probability should be used to determine the relative values of oil-prospecting methods at hand and derives equations by which the probability of discovery of oil by a combination of geology and geophysics may be expressed. In particular he attempts to establish the value of a prospecting method of high resolving power such as that provided by geodynamic prospecting, recently introduced (see Geophys. Abstracts 106, Nos. 6189 and 6190, and 108, No. 6432). For comparison, the following figures give the pure resolving powers of all classes of oil-prospecting methods on which statistical information is available to the writer: Random drilling, 0.0575; geology, 0.0818; geophysics, 0.1490; and geodynamics, 0.578.

As it is imperative that prospecting be done by the method or combination of methods requiring the least expense and affording the highest resolving power (or, otherwise expressed, the least cost per unit of resolving power per acre), a table is given to show how this cost may be computed for the various methods. From the considerations discussed the writer draws the following conclusions concerning the proper planning of a prospecting campaign: Geodynamic prospecting appears to be an economical prospecting technique of high resolving power and should be used in preference to a detailed geologic survey as the first scientific step in surveying a prospective territory for oil and gas; a surveying technique that offers the lowest cost per added unit of resolving power per acre should be used as the second step in a prospecting campaign. The use of an exploration method with a very low resolving power appears economically unsound, as the cost per unit of resolving power for the added information becomes extremely high.—*W. A.*

8. UNCLASSIFIED METHODS AND TOPICS RELATED TO GEOPHYSICS

6540. Atwill, E. R., Progress of stratigraphic studies in California: Am. Assoc. Petroleum Geologists Bull., vol. 26, No. 2, pp. 153–161, Tulsa, Okla., 1942.

Many geologists in California have been converted to the belief that the stratigraphic type of trap will provide a majority of future oil fields in the State. Therefore, considerable impetus has been given to the study of sedimentation from every possible approach. This paper presents the various methods now used in California to study sedimentation and stratigraphy, describing briefly the innovations to date and analyzing the future trend of this type of work.—*Author's abstract.*

6541. Blau, L. W., Geophysics: Mining and Metallurgy, vol. 23, No. 422, pp. 62–65, New York, 1942.

This is a brief discussion of the application of geophysical investigation to problems connected with the war, such as aircraft and submarine detection, relation of seismology to the study of bombing effects (ground displacements, velocity, and acceleration in the vicinity of large explosions), problems of locating guns, direction finding, and aircraft vibrations. The activity of geophysical exploration in the United States during the 10 months of 1941 is presented as follows:

(1) Seismic work increased about 5 percent from January to November, when about 200 parties operated in the field; no notable improvements were made in apparatus or field procedure. (2) Gravitational and magnetic work increased about 20 percent; 64 gravimetric parties were in the field in November, but the number of magnetometer parties decreased from 13 in January to 8 in November. (3) The number of parties making electrical geophysical measurements in the field increased; an interesting application of such measurements to military purposes is seen in the elaborate protection against static electricity and spark discharges in certain parts of munition plants. (4) Thermal measurements in wells are being made in increasing numbers, especially for the location of cement behind the casing and for gas-oil contacts. (5) Geochemical prospecting has been increasing slowly.

Investigations of educational problems made by the Committee on Geophysical Education organized by the American Institute of Mining Engineers are noted, and geophysical work in Alaska, Canada, and Australia is reviewed briefly.—*W. A.*

6542. Brant, A. A., The present status of geophysics in Canada: Canadian Min. Met. Bull., Trans. Section, No. 357, pp. 45–65, and No. 358, pp. 66–87, Montreal, 1942.

The various geophysical methods have been described as regards their physical basis, field procedure, basis of interpretation, applications, and limitations. In the light of the discussion, certain generalities may be drawn as to the limitations of geophysical methods: (1) Any geophysical method is limited by the necessity for contrast in the given physical property for the rock materials present. If contrast in the physical property is lacking, the method is useless, for example, lack of sufficient radioactive contrast as regards many pre-Cambrian regions. (2) All geophysical methods are limited by the fact that the value measured at the surface is the resultant of conditions at and around the observation point. Hence, an interpreted geophysical picture can never be more than an idealized, simplified picture of a geological complexity. (3) All geophysical methods are limited by decrease in resolving power with the depth of the body of contrasting physical property. Hence, the deeper the body the greater volume it must have to create a given anomaly, and, by the same token, the greater is the effect of surface anomalous bodies compared to comparable bodies at depth. The result is, first, that the correction for surface anomalies is important for most methods, and, second, that the presence of large irregular surface anomalies may, for practical purposes, eliminate the applicability of certain methods (for example, torsion balance and high-frequency electromagnetic methods in the pre-Cambrian) and seriously limit the applicability of others (for example, low-frequency electromagnetic, self-potential, and equipotential methods). (4) As regards practical application, geophysical methods may be limited economically, that is, by their inability to yield geological information at the cost for which comparable information may be derived by other means. This limitation is important, for into it come factors of reliability, mobility, necessary personnel, etc. Gravimetric, seismic, and perhaps soil-analysis methods are thus eliminated as regards general pre-Cambrian applicability. (5) A further limitation is interpretation by which the physical picture is changed into a geological one. Factors limiting interpretation are the number of points of geological correlation, the extent to which theory approximates the field conditions, factor (3) above, and the personal equation of the geophysicist.—*Author's summary.*

6543. DeGolyer, Everette, The development of the art of prospecting: The Guild of Brackett Lectures, 38 pp., Princeton Univ. Press, 1940.

The development of the art of prospecting is discussed by the author with special reference to the American petroleum industry. In his conclusion he says: "I have sketched, all too briefly, the historical development of the art of prospecting for petroleum and natural gas and have shown it to be a dynamic art consisting of a series of more or less individual techniques invented from time to time. Not all of the prospective areas are amenable to investigation by the sum or any one of the techniques yet developed. The chief fields of enterprise for any new technique invented is the diminishing area or sum of areas not yet satisfactorily examined by existing techniques. We are past the apex of our chief current technique—that of seismic reflections. Once it has examined all of the areas suitable to examination by it, we are again without any prime technique and must fall back onto the residual value of existing techniques and upon casual and random drilling unless a new technique should be invented."—*W. A.*

6544. Ferguson, K. H., and Casey, S. R., Wilcox trend play at peak: Oil Weekly, vol. 105, No. 2, pp. 41–50, Houston, Tex., 1942.

This article summarizes, as objectively as possible, some pertinent data concerning the Eocene Wilcox trend of the upper Gulf coast of Texas, the regional areas most favorable for exploration, the type of structure to search for, past and present methods of exploring, and the future possibilities that may be expected from this vast expanse of land.

That part of the Eocene Wilcox trend of the upper Gulf coast of Texas discussed is bounded on the east by the Sabine River and extends more or less along the strike of the Wilcox through DeWitt County, Tex. The north boundary is considered as being the 3,000-ft. contour on the top of the Wilcox, with the 10,000-ft. contour line forming the southern boundary. A total of 21 counties is embraced along this trend.—*Editorial abstract.*

6545. Fleming, J. A., Summary of the year's work to June 30, 1941, Department of Terrestrial Magnetism, Carnegie Institution of Washington: Terres. Magn. and Atmos. Electr., vol. 47, No. 1, pp. 45–52, Baltimore, Md., 1942.

During the year ending June 30, 1941, the activities of the Department of Terrestrial Magnetism were directed mainly toward a further detailed study of the accumulated material on hand, as many countries, owing to the war, had little opportunity for new geophysical research or collaboration. Several members of the scientific and administrative personnel were withdrawn from the department and assigned to national defense work. Notwithstanding this, a skeleton staff was maintained in all the sections so that the regular work of the department was continued without too serious interruption. The work is summarized with reference to geomagnetic investigations, terrestrial electricity, ionosphere, cosmic-ray investigations, nuclear physics, observatory and field work, and instruments.—*W. A.*

6546. Heiland, C. A., A decimal classification system for geophysical exploration: Geophysics, vol. 7, No. 1, pp. 1–28, Menasha, Wis., 1942.

After calling attention to the urgent need for "classifying geophysical methods" for use by organizations in which several individuals contribute to the accumulation of all kinds of data, the author examines critically the classification systems available—the Uren system, the Dewey decimal system, and the Classification Décimale Universelle—and proposes a classification system for geophysical exploration that he himself worked out. He discusses details of his system and gives tables that show its application and advantages.—*W. A.*

6547. Heiland, C. A., Geophysics in war: Mines Mag., vol. 32, No. 2, pp. 65–70, 86, Denver, Colo., 1942.

This article includes excerpts from Heiland's book of the same title (see Geophys. Abstracts 108, No. 6451).—*W. A.*

6548. Rosaire, E. E., Prospecting tactics in a total-war economy: Oil Weekly, vol. 105, No. 1, pp. 13–18, 32, Houston, Tex., 1942.

Rosaire suggests a nine-step coordinated prospecting program that would utilize and combine the merits of geological, geophysical, and geochemical research, with consequent minimization of the shortcomings peculiar to each.—*W. A.*

6549. Tarbet, L. A., Geology of Del Valle oil field, Los Angeles County, Calif.: Am. Assoc. Petroleum Geologists Bull., vol. 26, No. 2, pp. 188–190, Tulsa, Okla., 1942.

Oil has been produced at the Jasper Petroleum Co.'s Videgain well No. 1, 8,000 ft. west of R. E. Havenstrite's Lincoln well No. 1, which was the discovery well of the Del Valle oil field. Future development may be expected to join these two areas of production. The structural trap may be controlled on the north by a south-dipping fault and on the east and south by the easterly and southerly plunge of the folded sediments. The trap on the west side of the field is obscured by a south-dipping fault, but it may be formed by lenticular oil sands or minor faulting. Typical electric logs in the Del Valle oil field and in the Newhall-Potrero oil field 2 miles to the southwest, indicate that the upper and lower zones of production in the Del Valle field are comparable with the first and third zones in the Newhall-Potrero field.—*W. A.*

9. NEW PUBLICATIONS

6550. Earthquake notes, A. K. Ludy, editor, vol. 13, No. ½, 4 pp., Seismol. Soc. America., Eastern Section, Washington, D. C., 1941.

This issue of Earthquake notes contains reprints of reports and papers presented at the 22d annual meeting of the Section of Seismology of the American Geophysical Union, held from April 30 to May 3, 1941, in Washington, D. C. (see Geophys. Abstracts 107, No. 6324). In addition, it contains notes on (1) the Fordham symposium of the interior of the earth; (2) the Gold Coast earthquake of June 1939; (3) seismology and sonic soundings; (4) submarine seismic investigations; and (5) buried cities and earthquakes.—*W. A.*

6551. Stratigraphic-type oil fields, A. I. Levorsen, editor, 902 pp., Am. Assoc. Petroleum Geologists, Tulsa, Okla., 1941. Price, $5.50.

This monographic work under the able editorship of the outstanding contributor to this subject is the first book on stratigraphic oil traps. Today it is generally realized that the greatest advance in oil finding of the future is to come from a better knowledge of stratigraphic traps. Here is the information. It is given in a group of 38 articles arranged geographically by States, by as many carefully selected authors. Questions of variations in stratigraphy, nonporosity, varying porosity, unconformities, and other stratigraphic features are considered in detail by examples of different fields and are made clear by excellent illustrations. An excellent annotated bibliography is a valuable addition. It is a worthy monograph to follow its worthy predecessors of the Association, and all geologists are indebted to Mr. Levorsen.—*Alan Bateman, Am. Jour. Sci., vol. 240, No. 3, 1942.*

10. PATENTS

6552. Method and device for determining the magnitude of magnetic fields; Gustav Barth, Berlin, Germany, assignor to Siemens Apparate und Maschinen Gesellschaft mit beschränkter Haftung, Berlin, Germany, a corporation of Germany: U. S. patent 2,252,059, issued August 12, 1941.

This invention relates to the method of determining the magnitudes of a unidirectional magnetic field, for instance the magnetic earth field, which includes producing in an elongated body of high permeability a periodically variable magnetic flux and a superposed constant flux of adjustable magnitude for selecting the effective working range of the magnetization curve of said body; exposing said body to the field to be tested so as to produce another constant flux in said body depending upon the magnitude to be determined; and determining a magnitude depending upon the reciprocal effect of said latter flux and said variable flux on the magnetization of said body. Claims allowed, 11.

6553. Distance-determining system; Gustav Guanella, Zürich, Switzerland, assignor to Radio Patents Corporation, a corporation of New York: U. S. patent 2,268,587, issued January 6, 1942.

This invention relates to a system for measuring the distance between two points in space, comprising means located at one of said points for generating oscillatory energy the frequency of which varies according to a predetermined nonlinear periodic function with respect to time; means for transmitting a portion of the energy generated to the second point and back therefrom to the first point; means for combining the received energy with another portion of the energy generated at the first point to produce beat energy having a periodically varying frequency depending upon the distance traveled by said first energy portion to and from said second point; further means for converting the beat energy into energy having an amplitude varying according to a predetermined relation with the beat frequency variations; and means for segregating and selectively translating the amplitude of a predetermined component of said last energy. Claims allowed, 17.

6554. Well logging; Daniel Silverman, Tulsa, Okla., assignor to Stanolind Oil & Gas Co., Tulsa, Okla., a corporation of Delaware: U. S. patent 2,268,627, issued January 6, 1942.

In a method of logging a well, the steps which comprise filling at least a portion of said well with liquid; applying to said liquid a pressure in substantial excess of the normal hydrostatic pressure; substituting for the portion of said liquid remaining in said well, while retaining substantially said excess pressure, a second liquid having at least one property substantially different from the corresponding property of said first-mentioned liquid; then reducing pressure on said second liquid to cause said first-mentioned liquid to reenter said well opposite said porous and permeable strata; and then measuring said property at various levels in said well. Claims allowed, 10.

6555. Frequency-modulation distance finder; Murray G. Crosby, Riverhead, N. Y., assignor to Radio Corporation of America, a corporation of Delaware: U. S. patent 2,268,643, issued January 6, 1942.

A distance-determining device including a wave transmitter; means for frequency-modulating said wave; means for receiving said wave after reflection from an object whose distance is to be determined; means connected to said receiver for converting the received frequency-modulated wave into an amplitude-modulated wave; means for demodulating said amplitude-modulated wave; means connected to said converting means for amplifying said demodulated wave; and an indicator connected to said amplifier and responsive to the thus detected wave to indicate the distance of said object as a function of the amplitude of said demodulated wave. Claims allowed, 16.

6556. Well-surveying instrument; Ernest Ray Webb, Long Beach, Calif., assignor to Sperry-Sun Well Surveying Co., Philadelphia, Pa., a corporation of Delaware: U. S. patent 2,268,682, issued January 6, 1942.

In combination, a pendulum, means for supporting the pendulum and an electrically conductive record member with a free end of the pendulum adjacent said record member, the pendulum having, relative to said record member, a location which is variable upon inclination of the supporting means, and having variable spacing relative to the record member depending upon the location of the pendulum, and means for producing a spark between said pendulum and record member to mark the latter, the spacing of the pendulum and record member and the spark voltage being such that, within the effective range of variable location of the pendulum, the spark will be substantially straight and will deviate from the point of the record member closest to said pendulum only to an unobservable extent. Claims allowed, 3.

6557. Well logging; Frank W. Jessen, Houston, Tex., assignor to Standard Oil Development Co., a corporation of Delaware: U. S. patent 2,269,269, issued January 6, 1942.

This invention relates to a device for locating the discontinuities of the metal forming a metal conduit comprising a container having in its walls at least one passage of capillary dimensions; a second container of smaller dimensions than the first, arranged inside of said first container and provided with at least one passage in its walls of capillary dimensions; a metal strip arranged within said second container; an electrolytic solution arranged within said container for contact with said metal strip, the cation of said electrolyte being the same metal as that of which said strip is composed; an electrolyte in the space between said first and second cell, the cation of which is the same metal as that forming the major portion of said casing; a single-conductor electrode arranged to support said cell with one end of the conductor of said cable electrically connected to said metal strip, the other end of the conductor of said cable being attached to a potentiometer; and an electrical connection between said potentiometer and the metal of said conduit. Claims allowed, 6.

6558. Process for analysis of core samples containing oil and water; Milton Williams, Houston, Tex., assignor to Standard Oil Development Co., a corporation of Delaware: U. S. patent 2,269,569, issued January 13, 1942.

This invention relates to a process for analyzing a core sample, comprising the steps of flowing a stream of drying air over the sample while the sample is at a temperature of at least 100° C. and sufficient to vaporize moisture therefrom; passing the stream of air through a drying agent to absorb the moisture from the air; weighing the drying agent to determine the moisture absorbed; subsequently increasing the temperature of the sample, while continuing to flow drying air thereover, to a temperature sufficient to remove substantially all the oil from the sample but not substantially above 425° C.; and then weighing the treated sample. Claims allowed, 2.

6559. Well-surveying device; Donald Hering, South Gate, Calif., assignor to Sperry-Sun Surveying Co., Philadelphia, Pa., a corporation of Delaware: U. S. patent 2,269,717, issued January 13, 1942.

This invention relates to a device for recording inclination of a well bore comprising a reservoir for holding a record-making liquid; a chamber in which a record is to be made; a chamber for receiving liquid from the record chamber following the formation of a record; means for controlling flow from the reservoir into the record chamber; means for effecting return of the liquid from the receiving chamber to the reservoir upon inversion of the device; and means for straining the liquid during such return to remove any solid material therefrom. Claims allowed, 2.

6560. Process for locating valuable subterranean deposits; Ludwig W. Blau, Houston, Tex., assignor to Standard Oil Development Co., a corporation of Delaware: U. S. patent 2,269,889, issued January 13, 1942.

This invention relates to a method of prospecting for petroleum deposits, which comprises collecting samples of soil at spaced points along the surface over an area under investigation and examining said samples for the determination of the presence therein of a product of the action of hydrocarbon-consuming bacteria on hydrocarbons. Claims allowed, 6.

6561. Seismic-electric prospecting; Ludwig W. Blau, Houston, Tex., assignor to Standard Oil Development Co., a corporation of Delaware: U. S. patent 2,269,890, issued January 13, 1942.

This invention relates to a method of seismic-electric prospecting, comprising the steps of passing an electric current through the ground; using a plurality of separate potential pickup circuits to determine the potential of said current at various points of its passage through the earth, whereby variations in said current caused by a seismic disturbance are detected by the potential pickup circuits; and creating a seismic disturbance in ground influenced by said current. Claims allowed, 7.

6562. Geochemical prospecting; Leo Horvitz, Houston, Tex., assignor to Esme E. Rosaire, Houston, Tex.: U. S. patent 2,270,299, issued January 20, 1942.

In the method of geochemical prospecting in which samples of soil gas obtained from spaced points in an area to be explored and analyzed for their content of hydrocarbons and derivatives thereof which constitute indications of leakage from subterranean petroliferous deposits, the step of securing the gas samples by treating the soil with an acid capable of disintegrating the carbonates therein, whereby entrained constituents are evolved in gaseous form. Claims allowed, 7.

6563. Seismic-wave detector; Pierre M. Honnell and Lin W. Dickerson, Houston, Tex., assignors by mesne assignments to The Texas Co., New York, N. Y., a corporation of Delaware: U. S. patent 2,271,864, issued February 3, 1942.

In a vibration detector having a magnet unit comprising a magnet and pole pieces forming an air gap therebetween, an output coil and means for resiliently suspending said coil entirely within said air gap; a casing of magnetic material for said magnet unit, said casing forming a magnetic shield for said unit; means for insulating said magnet unit from said casing; and a two-land output cable for said coil, one of said leads forming a shield for the other lead and electrically connected to the magnet unit, the arrangement being such that the magnet unit and shielded cable lead form an electrostatic shield for said output coil. Claims allowed, 3.

6564. Electrical-prospecting method and apparatus; John M. Pearson, Swarthmore, and George A. Smith, Philadelphia, Pa., assignors to Sperry-Sun Well Surveying Co., Philadelphia, Pa., a corporation of Delaware: U. S. patent 2,271,951, issued February 3, 1942.

This invention relates to means for determining the location and character of strata penetrated by a borehole comprising an exploring unit and means for supporting said unit for movement within and lengthwise of the borehole; said exploring unit including a generator of high-frequency oscillations, means for establishing thereby an electromagnetic field penetrating strata in the vicinity of the borehole, means responsive to varying effects upon said field of materials in the vicinity of the field establishing means, and means for automatically producing substantially continuous records of the responses of said responsive means related to the depths at which the responses occurred. Claims allowed, 21.

6565. Method and apparatus for signaling; Herbert Hoover, Jr., Sierra Madre, Calif., assignor to Consolidated Engineering Corporation, Pasadena, Calif., a corporation of California: U. S. patent 2,272,201, issued February 10, 1942.

In seismic-surveying apparatus, the combination comprising means for generating seismic waves in the earth; a receptor for receiving the seismic waves after being subjected to dispersion by virtue of their travel within the earth, said receptor being adapted to convert said received seismic waves into corresponding electrical waves; means for recording said electrical waves; a variable-phase distorting network including interconnecting impedances intermediate said receptor and said recording means; and means operatively associated with said impedances for varying the impedances and thus for varying the phase distortion produced by said network as a predetermined function of seismic-wave traveltime during the recording. Claims allowed, 14.

6566. Geochemical prospecting; Esme E. Rosaire, Houston, Tex.: U. S. patent 2,272,645, issued February 10, 1942.

In the method of exploration for petroliferous deposits, the steps of creating a shallow borehole in the earth's surface; treating the soil within the hole with an acid capable of disintegrating components of the soil to evolve gases; applying a subatmospheric pressure to draw off and collect the evolved gases; and analyzing the collected gases for hydrocarbons and their derivatives. Claims allowed, 5.

6567. Apparatus for seismic surveying; Tweed E. Failing, Houston, Tex., assignor to George E. Failing Supply Co., Enid, Okla., a corporation of Oklahoma: U. S. patent 2,272,741, issued February 10, 1942.

In a seismic-surveying apparatus for surveying subterranean formations, an explosive charge located in the lower end of a borehole extending in the direction of the formation to be surveyed; a seismograph stationed in spaced relation with the borehole for detecting sound waves reflected from the subterranean formation being surveyed; an oscillograph connected with the seismograph; and means casing the borehole from the top thereof and through which the explosive charge is lowered to said lower end of the borehole, said casing means being formed of a material having the characteristics of being substantially nonresonant for shielding the formations through which the borehole extends from direct transmission by way of said casing means of sound waves emanating from the explosive charge to said seismograph, whereby the reflected sound waves received by the seismograph are better distinguished from any direct waves received by the seismograph and recorded by said oscillograph. Claims allowed, 3.

6568. Seismograph; Otto F. Ritzmann, Baldwin Township, Allegheny County, Pa., assignor to Gulf Research & Development Co., Pittsburgh, Pa., a corporation of Delaware: U. S. patent 2,272,984, issued February 10, 1942.

In a seismograph detector, a dual translating means comprising mechanical-vibration-responsive magnet means in vibration-receiving relationship to the earth; two movable coils spaced therefrom and each adapted in cooperation with said magnet means to produce electrical signals on movement of the coils with respect thereto; resilient means mounting the two coils for movement at different natural vibratory frequencies, independently with respect to each other and with respect to the magnet means; and an electrical circuit receiving the outputs of the coils in opposition, whereby at relatively low frequencies below the lower of said natural frequencies said coils tend to move in unison with the magnet means and produce a small resultant signal, at relatively high frequencies above the upper of said natural frequencies the coils tend to remain stationary in space and produce a small resultant signal, and at frequencies intermediate said natural frequencies the coils move in phase difference with respect to each other and produce a relatively large resultant signal. Claims allowed, 3.

6569. Well-surveying method and apparatus; Jacob Neufeld, Tulsa, Okla., assignor to Well Surveys, Inc., Tulsa, Okla., a corporation of Delaware: U. S. patent 2,273,215, issued February 17, 1942.

This invention relates to a method of determining the point of entrance of fluid into a well bore that comprises taking a radioactivity versus depth parameter of the fluid in the well, reducing the hydrostatic pressure of the fluid in the well, and taking a second parameter of the radioactivity versus depth of the fluid in the well. Claims allowed, 7.

6570. Well-surveying method; Serge Alexander Scherbatskoy and Jacob Neufeld, Tulsa, Okla., assignors to Well Surveys, Inc., Tulsa, Okla., a corporation of Delaware: U. S. patent 2,274,248, issued February 24, 1942.

This invention relates to a method of exploring characteristic differences between geologic strata traversed by a borehole, consisting in moving a source of heat through the borehole to successively expose each stratum individually to the heat; recording the temperature at a determined horizontal distance from the said source; recording the temperature at a determined vertical distance from the said source; and comparing both temperatures as a measure of the varying character of the traversed strata. Claims allowed, 5.

6571. Electrical-prospecting apparatus; Shelley Krasnow, New York, N. Y., and Joseph M. S. Kaufman, Washington, D. C.: U. S. patent 2,274,903, issued March 3, 1942.

In an electrical-prospecting apparatus, a current circuit and a potential circuit, rigidly fixed members of both said circuits for making connections to the earth, and a cooperating calibrating member having elements registering mechanically with the members of both circuits, the calibrating member serving to connect temporarily simultaneously the current and potential circuits, the calibrating member having a resistance element serving to simulate the effect of an earth resistance of known value. Claims allowed, 2.

6572. Apparatus for sending and recording time impulses; Otto F. Ritzmann, Aspinwall, Pa., assignor to Gulf Research & Development Co., Pittsburgh, Pa., a corporation of Delaware: U. S. patent 2,275,316, issued March 3, 1942.

This invention relates to an apparatus for sending and recording clearly a current impulse of irregularly fluctuating character, comprising a circuit including an inductive coupling means and means for producing an abrupt change in current in said circuit whereby on such abrupt change a current impulse is induced in the coupling means, said impulse being subject to irregular fluctuations; oscillographic impulse recorder arranged to receive and record the induced impulse, said recorder being constructed and arranged to record the characteristic wave form of impulses applied to it; an electrical network having shunt and series branches arranged to transmit pulses from the coupling means to the recorder; and at least two half-wave rectifiers each in a different branch of said network and each connected to allow transmission to the recorder of pulses of the polarity resulting from the abrupt change in current in said circuit and to obstruct transmission to the recorder of signals of opposite polarity, whereby the impulse as recorded is of sharp unidirectional character. Claims allowed, 4.

6573. Method and apparatus for radioactive investigation of drill holes; Jacob Neufeld, Tulsa, Okla., assignor to Well Surveys, Inc., Tulsa, Okla., a corporation of Delaware: U. S. patent 2,275,456, issued March 10, 1942.

This invention relates to a method of measuring radiation that comprises subjecting a compressed gaseous medium, in the presence of radiation, to a constant electrical potential sufficient to cause a continuous current flow proportional to the intensity of said radiation, continuously measuring said current flow without appreciably altering the potential on the gaseous medium, and continuously recording the measurement. Claims allowed, 9.

6574. Method and apparatus for determining distances of elastic discontinuities; Raymond T. Cloud, Tulsa, Okla., assignor to Stanolind Oil & Gas Co., Tulsa, Okla., a corporation of Delaware: U. S. patent 2,275,735, issued March 10, 1942.

This invention relates to an apparatus for seismic surveying comprising means for generating continuous seismic waves in the earth having a continuously varying frequency; means for receiving reflected, refracted, and relatively direct seismic waves, and transforming said waves into corresponding electrical variations; means for producing electrical waves corresponding to said generated seismic waves; and means for modifying said electrical waves with respect to time and amplitude until said modified electrical waves are substantially the same as said electrical variations. Claims allowed, 10.

6575. Seismic-wave-velocity well logging; Raymond T. Cloud, Tulsa, Okla., a corporation of Delaware: U. S. patent 2,275,736, issued March 10, 1942.

In a method of determining the velocity of seismic waves through subterranean formations, which comprises passing continuous seismic waves between a point in a borehole traversing said formations and a point vertically spaced therefrom, whereby seismic waves travel between said points by at least two different paths, and generating electrical variations corresponding to the composite effect of at least said two seismic waves, the improvement which comprises substantially balancing out that portion of said electrical variations corresponding to seismic waves traveling at least one of said paths and determining from the remaining portion of said electrical variations a function of the time of transit of the seismic waves along the other of said paths between said points. Claims allowed, 20.

6576. Well-survey method and apparatus; Robert Earl Fearon, Tulsa, Okla., assignor to Well Surveys, Inc., Tulsa, Okla., a corporation of Delaware: U. S. patent 2,275,747, issued March 10, 1942.

In a method of geophysical exploration in which an ionization chamber is lowered into a drill hole to detect radioactive radiations which are indicated by time-lagging variations in the flow of electrical current therethrough, the steps of bringing a true indication of the current variations substantially free from time lag to recording equipment by taking from the ionization chamber circuit a voltage proportional to the flow of current through a resistance at least part of which is in that circuit; generating one current proportional to a time derivative of this voltage; generating a second current proportional to and having substantially the same time lag as the voltage itself; combining the two currents to produce a third current substantially free from time lag; and conducting said third current to recording equipment. Claims allowed, 18.

6577. Well-survey method and apparatus; Robert Earl Fearon, Tulsa, Okla., assignor to Well Surveys, Inc., Tulsa, Okla., a corporation of Delaware: U. S. patent 2,275,748, issued March 10, 1942.

This invention relates to an apparatus for geophysical prospecting that comprises a sealed casing adapted to be lowered into an opening in the earth; a source of alpha particles within said casing; a material within said casing that will emit neutrons upon being subjected to radiation with alpha particles; a shutter between said source of alpha particles and said neutron-emitting material; means to drive said shutter so as to periodically interrupt the radiation of said neutron-emitting material with alpha particles; an ionization chamber sensitive to gamma rays within said casing; a shield between said neutron-emitting material and said ionization chamber; a source of potential and a resistor connected in series with the electrodes of said ionization chamber; an amplifier having its input connected across said resistor; and means for conveying the output of said amplifier to the surface of the earth for recording. Claims allowed, 18.

6578. Seismograph amplifier; Ralph D. Wyckoff, Pittsburgh, Pa., assignor to Gulf Research & Development Co., Pittsburgh, Pa., a corporation of Delaware: U. S. patent 2,276,708, issued March 17, 1942.

In combination with a seismograph amplifying and recording circuit including a seismograph signal amplifier, a recorder connected thereto, and sensitivity control means for the circuit constructed and arranged to increase the sensitivity of the circuit from the initial low value to higher values, an auxiliary amplifying circuit having its input side and output side respectively of said control means, said auxiliary circuit being initially operative to transmit signals, whereby signals are initially transmitted to the recorder at a sensitivity higher than said initial sensitivity of said amplifying and recording circuit alone, means adapted on operation to render said auxiliary circuit inoperative to transmit signals, and means for so operating said last-named means after transmission of the first signal energy through said auxiliary circuit. Claims allowed, 7.

6579. Apparatus for and method of seismograph prospecting; Ralph D. Wyckoff, Pittsburgh, Pa., assignor to Gulf Research & Development Co., Pittsburgh, Pa., a corporation of Delaware: U. S. patent 2,276,709, issued March 17, 1942.

In a seismograph circuit including an amplifier for seismic detector signals, a recorder and an expander in said circuit adapted to increase the sensitivity thereof as a function of time, substantially independently of fluctuations in original energy, during the period of receipt of seismic waves, the improvement comprising means adapted on supply thereto of energy of predetermined selected amplitude to arrest the sensitivity-increasing action of the expander, said selected amplitude being such that the arresting action goes into effect only for relatively high amplitude signals which tend to exceed the useful amplitude range of the recorder, and circuit means for applying signal energy to said means. Claims allowed, 5.

6580. Method of and means for determining the velocity of propagation of waves through subsurface formations; Gerald M. Howard, Dallas, Tex.: U. S. patent 2,276,974, issued March 17, 1942.

This invention relates to the method of determining the velocity of propagation of electrical or seismic waves through a subsurface formation, which includes utilizing the waves for varying the frequencies of devices generating electrical oscillations and then comparing the variations in the frequencies of said devices to ascertain the differences therebetween and thereby determine the velocity of propagation of the waves through the formation. Claims allowed, 14.

6581. Carrying device for geophysical instruments; Charles H. Barker and Kearny Q. Robert, Dallas, Tex., assignors by mesne assignments to Socony-Vacuum Oil Co., Inc., New York, N. Y., a corporation of New York: U. S. patent 2,277,505, issued March 24, 1942.

This invention relates to an apparatus for transporting sensitive instruments that depend upon contact with the earth's surface for their operation, which comprises in combination a base structure and a cushion structure thereon for yieldably supporting said instrument; releasable means for rigidly mounting said base in a vehicle body; means associated with said base and projectable into contact with the earth's surface through but out of contact with the vehicle body; and means for leveling said instrument upon said contacting means. Claims allowed, 4.

6582. Gravity meter; Dayton H. Clewell, Dallas, Tex., assignor by mesne assignments to Socony-Vacuum Oil Co., Inc., New York, N. Y., a corporation of New York: U. S. patent 2,277,509, issued March 24, 1942.

In a gravity meter in which a mass is resiliently suspended from a support during the measuring process, the improvement that comprises means for producing a damping impulse, said means including an inductive coil fixed to the support; an electrical capacitance; means for electrically charging the capacitance; means for discharging capacitance through inductive coil; and an electroconductive nonmagnetic element attached to the mass adjacent the inductive coil whereby a discharge of the capacitance through the inductive coil will produce a monetary repulsion force between the mass and the inductive coil. Claims allowed, 2.

6583. Electrical impedisivity or resistivity measuring; Frederick W. Lee, Owings Mills, Md.: U. S. patent 2,277,707, issued March 31, 1942.

This invention relates to a method of measuring electrical impedisivity of a medium, comprising the steps of laying out configuration for applying, from a source, electrical energy to the medium and for picking up potentials existing in the energy field thus created in the medium, said configuration being one for which the relation is known between the geometrical constants of the configuration, the electrical energy applied thereto, the potentials picked up therefrom, and the unknown apparent impedisivity of the medium; supplying electrical energy to said configuration of a value in predetermined ratio to the size of said configuration; electrically proportioning the scale of a potential balancer to multiply potential indications by a factor rendering the potential-balancer-scale direct reading in magnitude of impedisivity for said known configuration, with energy applied in accordance with said ratio; and balancing picked-up potentials with the so-adjusted potential balancer, whereby the apparent impedisivities of the medium embraced by the configuration are readable directly on the potential-balancer scale. Claims allowed, 12.

6584. Geophysical-exploration apparatus: Hans Lundberg, Ltd., assignee of Hans T. F. Lundberg, both of Toronto, Ontario, Canada, assignee of Theodor Zuschlag, West Englewood, N. J., U. S. A.: Canadian patent 402,212, issued January 13, 1942.

Apparatus of the character described, comprising two pick-ups adapted to change continuous mechanical vibrations into continuous electrical oscillations, a plurality of similar electrical resistance in circuit with said pick-ups, similar phase-shifting devices electrically connected to one said resistance in each circuit, and a direct-reading and balance-indicating device electrically connected to the said circuits for measuring the amplitude and phase relation of the artificially produced mechanical vibrations without the employment of a recording device involving manual procedure for obtaining its indication. Claims allowed, 8.

6585. Geophysical-exploration method: Hans Lundberg, Ltd., Toronto, Ontario, Canada, assignee of Theodor Zuschlag, West Englewood, N. J., U. S. A.: Canadian patent 402,526, issued January 27, 1942.

This invention relates to the method of geophysical exploration, comprising creating a continuous mechanical wave pattern, intermittently determining the momentarily effective amplitude ratio and phase difference between two points within said wave pattern by a noncontinuous measuring procedure, repeating the procedure with other selected points, plotting the thus-determined values, and interpreting the resultant amplitude and phase patterns as to their geophysical meaning. Claims allowed, 4.

6586. Oil-bearing-horizon detecting method; Ralph H. Fash, Trustee, Fort Worth, assignee of John G. Campbell, Houston, both in Texas, U. S. A.: Canadian patent 402,696, issued February 3, 1942.

In a method of exploring for oil, which consists in determining the oil content of the solid residues, respectively, of the drilling fluid entering and leaving a well, comparing the results obtained, and noting any material increase in the oil content of the solid residue of the fluid leaving the well in contrast to the oil content of the solid residue of the fluid entering the well, to thereby detect the penetration of an oil-bearing horizon. Claims allowed, 8.

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