memorial in St. Louis would in itself symbolize Jefferson's statesmanship in the conception and consummation of the Louisiana Purchase, the Lewis and Clark Expedition, Pike's explorations of the Mississippi and the Southwest and the settling of the valley and the west following the war of 1812.

Jefferson, it will be remembered, was one of the early Americans distinguished for interest in science. The pursuit of natural science and the application of scientific discovery to man's use and benefit interested him throughout his long life. He has been regarded as the founder of American paleontology. He is said to have dropped the practice of law because in his day it was unscientific. In all his work he invoked the scientific method, and his success in statesmanship can be attributed in no small measure to his habit of scientific reasoning and scientific treatment of political questions.

He was deeply interested in education. As the "Father of the University of Virginia" Jefferson formulated its organization, planned the layout of the grounds, selected its first faculty and subscribed generously to its financial support. His interest in education appears in his establishing the first public school system in Virginia, the Congressional bill for the diffusion of knowledge, his unsuccessful attempt to have Congress create a national university.

Architecture and landscape architecture occupied much of Jefferson's time and thought; the capitol in Richmond, homes of Madison and Monroe, the quadrangle of the University of Virginia, Monticello and its grounds, are among a rather long list of notable public and private edifices and gardens originally planned by or the results of Jefferson's expert architectural knowledge and advice. Jefferson was a lover of the beautiful in nature and in man's works, and, devoted to its cultivation in the nation, he labored by example to inculcate his belief in the effort to improve the standard of architecture both in cities and in rural surroundings.

One learns from his biographers that he was an accomplished musician; but his relation to music is much broader and deeper than is expressed by his performance on a single instrument. His music, his delvings in language and writings on ethics were not merely brilliant flashes of a versatile personality, but outward signs and expressions of a rare studious, scholarly and philosophic mind. Jefferson's idealism did not make him the less practical, for he was always striving to invent useful things, to introduce plants beneficial to American farmers, to improve and simplify by eminently practical suggestions the reform of needlessly cumbersome procedures and systems.

No monument to Thomas Jefferson would satisfy that did not in some way impress the visitor with the feeling of freedom. Take away from the man all his traits and attributes but the hunger for freedom for his fellow men and most of Jefferson's character would remain. Inspired by reflections over the emancipation of men from bonds and tyranny of every sort he wrote the Declaration of Independence. A monument to Jefferson should create about it the atmosphere of freedom.

As already stated, the location of the monument would symbolize the Louisiana Purchase, the greatest achievement of its kind in the history of the United States and second only to the Declaration among the acts of Jefferson's statesmanship. A monument consisting of an architecturally superb building in spacious grounds, embellished with the best attainable landscaping effects, would conform to two of Jefferson's deepest interests. A building containing and exhibiting grand collections of natural objects and man's inventions, presenting the methods and results of scientific investigation and their application in agriculture, industry and the arts, to comprise a museum of science for the purpose of diffusing knowledge; asking no entrance requirements, demanding no tuition or laboratory fees, open and free for the youth and the man of the street to enter and acquire useful knowledge to the making of better citizens. A building hospitably planned to foster the scientific movement and the spreading of knowledge; to carry on perpetually the method of objective instruction that demonstrated its appeal to the popular mind by the myriad visitors to the Louisiana Purchase Exposition. A towering monument, symbolizing the spirit of Jefferson and the American ideal of democracy, arresting the eye of visitors from afar, a sign of the forward look of the people of St. Louis.

SPECIAL ARTICLES

THE CORRELATION OF DEEP-FOCUS EARTHQUAKES WITH LUNAR HOUR ANGLE AND DECLINATION

CERTAIN small variations in latitude previously announced[1] and corresponding small changes in longitude show an apparent correlation with the hour angle and declination of the moon.[2] The possibility of such small changes in geographical coordinates being asso-

[1] SCIENCE, 69: 17, 1929.

[2] Monthly Notices Royal Astronomical Society, 91: 569, 1931, and March, 1935.

ciated with tidal phenomena in the earth's crust suggested a renewed study of seismic phenomena as a function of the moon's position. Recent results of Davidson[3] have indicated a connection between the frequency of earthquake aftershocks and the phases of the moon. Investigations by Father Rodés[4] have shown an apparent increase of seismic disturbances with the moon near perigee as compared with the moon near apogee. Some two thousand earthquakes have recently been investigated here from the point of view of a possible correlation of the frequency of their occurrence with the moon's position referred to the epicenter at the time the shocks occur. These studies have also included the relation of both major and minor earthquakes to the magnitude and direction of the tidal forces operating in the region of the epicenter at the time of the occurrence of the seismic disturbances concerned. While the treatment of all earthquake disturbances indiscriminately in such a study may be open to question, and the investigations thus far have yielded somewhat conflicting results, nevertheless a study of deep-focus earthquakes whose epicenters lie more than one hundred kilometers below the earth's surface has yielded a surprisingly striking correlation between the frequency of these deep-focus quakes and the horizontal components of the lunar tidal forces in operation at the time.

One hundred and twenty-two well-determined deep-focus earthquakes, taken from a list furnished me by Dr. J. A. Sharpe, of the Massachusetts Institute of Technology, have furnished the material for the results summarized in Table I. This selected list includes only those earthquakes whose depth of focus exceeds one hundred kilometers and for which an ample number of reliable observations have been secured. In Table I is listed the number of occurrences of these deep-focus quakes for twenty-four equal intervals corresponding to hourly values in the changing hour angle of the moon referred to the epicenter at the time of the occurrence of each deep-focus earthquake. The

TABLE I

TABLE SHOWING RELATION OF FREQUENCY OF DEEP-FOCUS EARTHQUAKES TO THE LUNAR HOUR ANGLE

Hour angle of moon	Number of quakes	Hour angle of moon	Number of quakes
0	7	12	3
1	2	13	4
2	3	14	5
3	5	15	9
4	8	16	9
5	5	17	6
6	8	18	5
7	6	19	9
8	1	20	2
9	2	21	2
10	0	22	5
11	5	23	2
12	3	24	7

[3] *Jour. Geol.*, 42: 5, July, 1934.

[4] Ass. Seis. Trav. Sc., Ser. Â, Fasc. 10: 87–90, Strasbourg, 1934; Lisbon Congress, 1933.

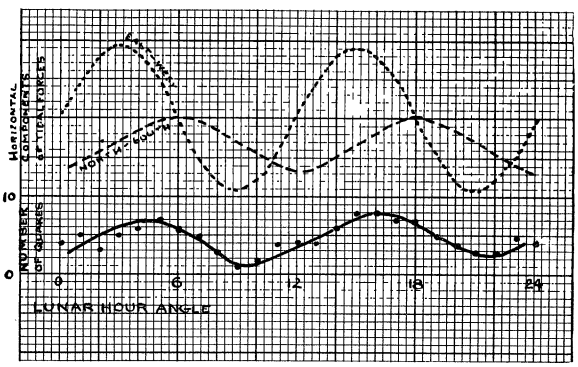

FIG. 1. Upper curves (dotted), Horizontal Components of Lunar Tidal Forces. Lower curve (full), Earthquake Frequencies *vs.* Lunar Hour-angle.

full line curve printed herewith is drawn through points representing the running means of the numbers of earthquakes for hourly intervals. The broken line curve represents the north and south component, and the dotted line curve the east and west component of the horizontal lunar tidal force for the corresponding hour angles and declinations of the moon. It will be observed that the curve of earthquake frequencies shows a much closer correspondence to the curve representing the east and west component of the lunar tidal force than to the curve representing the north and south component. A curve representing the resultant of the north-south and east-west curves would resemble the earthquake frequency curve with striking similarity.

It should be stated that Dr. Sharpe's list shows that the bulk of these deep-focus earthquakes occur in four regions—the Japanese Archipelago, the East Indies, the west coast of South America and the Himalayas—the greater number of deep-focus quakes in the list lying in the first three regions mentioned.

It seems hardly conceivable that the gravitational lunar tidal forces of the order of 10^4 dynes/cm.^{2} can be sufficient to be any major cause for the high energy disturbances recorded. The significance of the curve relationships herewith shown may offer some new evidence for the hypothesis of trigger action, or furnish a basis for further speculation as to other causes which may be dependent on the lunar period. A more extended report will be published elsewhere on the results of these investigations.

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