ing on the same basic principles, although the developments by which such devices have been perfected are not made public for obvious reasons.

Nor is the process of echolocation limited to sound waves. The "absolute" or radio altimeter used in airplanes is the counterpart of the fathometer except that radio waves are employed as the "probing" signal. A radio signal is sent out from the airplane and electronic devices measure the time required for this signal to be reflected back as an echo, either from the ground below the airplane or from a mountain ahead of it.

Finally we have radar, a refinement of the radio altimeter so beautifully perfected that it can echolocate airplanes at great distances by sending out radio waves and picking up the reflected energy returning from the distant aircraft. It would be presumptuous for a biologist to discuss radar in detail, even if information were available; but it does seem clear that the same fundamental process is involved in all these phenomena, from the bat's supersonic cries and the blind man's tapping cane to the intricacies of radar.

Echolocation may be employed in still other situations. Owls or flying squirrels, for instance, could use it to advantage, and future studies may disclose that they have evolved some variant of the bat's method of finding its way about. Unsuspected forms of echolocation may be found in nature or developed by human technology, and the use of a single unifying term can help clarify our ideas and stimulate such future developments.

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MORTALITY AMONG GEOLOGISTS

IN SCIENCE for May 26, 1944, there appears a short article by Professor William H. Hobbs under the title "Unusual Mortality among Geologists." This is interesting but perhaps of very little scientific value, and Professor Hobbs's suggestion that the war may be responsible for the phenomenon seems a bit far-fetched. Another explanation seems more reasonable.

Professor Hobbs has taken a period of a little over five months, from November 16, 1943, to April 19, 1944, and finds that sixteen fellows of the Geological Society of America died during that period. I have no statistics at hand as proof, but I believe these winter months are much more hazardous to elderly people than the summer months. Professor Hobbs does not compare the total for this five-months period with similar periods of the past, but with annual totals. Only two of these sixteen deaths occurred in 1943, so if we stick to annual totals it is quite probable that 1943 will show nothing unusual, but 1944 may easily show a high. But is there any reason why it should not? Every phenomenon which shows variations must have highs and lows, and some high is bound to be greater (or equal to) any other high. It might easily be that 1944 will show one of those highs in the death-curve of fellows of the Geological Society of America.

The ages of these sixteen deceased fellows range from sixty-four to ninety-four. This means that they were in college roughly from 1870 to 1900. Now it is well known that that was the period in which students were turning from the classical studies to science and engineering. That was the time when the number of students in the colleges and universities, especially in the Mid-west, increased by leaps and bounds, and that was the time when great geologists like Thomas C. Chamberlin, Joseph Le Conte and John C. Branner, to mention only three under whose influence I happened to come, flourished and attracted many students to their classes. It is not surprising but inevitable that some fifty or sixty years after those sixteen fellows were in college there should be a maximum in the death curve of geologists. $\frac{1}{2}(1870+1900)+59=1944$. It may be permissible to point out what appears to be a small error in the article under consideration. The last name in the table of deceased fellows is that of R. C. Wells. In the second paragraph below there are given the names of three geologists, not fellows of the Geological Society, who died during the period under consideration. R. C. Wells is one of these names. Of course there might have been two geologists of the same name and initials who were born and died on the same days, but the probabilities in favor of such an event would seem to be rather small.

If we want to be sticklers for accuracy, then the name of F. B. Hanley should not have been included among the three geologists because he died on April 24, which was after the period under consideration.

The suggestion of Professor Hobbs that the phenomenon considered might be laid to the war seems almost fantastic. Most of these men were too old to have sons in the present war and it seems highly improbable that worry over the destruction of cultural institutions and values could have played more than a very minor role in the case.

Why drag in the war to explain what appears to be a perfectly natural phenomenon taking place in the orderly course of events?

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REVISTA SUDAMERICANA DE MORFOLOGIA

THIS *South American Review of Morphology* is a new biennial publication of great scientific value

which aims to publish, beginning with its 1943–44 volume, all the most important original contributions, in Spanish and Portuguese, relating to anatomy, pathological anatomy, comparative anatomy, histology, anthropology and embryology, and bearing an intimate relation to morphology.

It is clear that such a publication has come to fill a long felt need in South America where biological and medical research has made remarkable progress in recent years and, by not restricting its scope to highly specialized lines of endeavor, ought to appeal to a large number of readers, both in South America and elsewhere, thus fulfilling its double purpose of disseminating the results of local research and of promoting a truly Pan-American spirit of scientific collaboration.

Finally, it ought to be pointed out that the editorial board, headed as it is by the well-known names of Professors A. E. Bianchi, of Argentina; M. de Freitas Amorim, of Brazil, and E. Herzog, of Chile, and including two representatives of each of the South American Republics, is a guarantee of the high quality and broad scope, both scientific and geographic, of the articles to come.

It is hoped that a number of scientists and scientific organizations in the United States will subscribe to this journal, the cost of which is $5.00 per year. All correspondence regarding the journal should be addressed to Professor Bianchi, Córdoba 827, Buenos Aires, Argentina.

COMMITTEE ON INTER-AMERICAN SCIENTIFIC PUBLICATION, HARVARD COLLEGE OBSERVATORY

FURTHER REMARKS CONCERNING THE U.S.S.R. ACADEMY OF SCIENCES

IN reply to the criticisms of Dr. S. P. Timoshenko and Dr. J. V. Uspensky, of Stanford University, to my paper entitled "History and Activities of the U.S.S.R. Academy of Sciences during the Past Twenty-Five Years," published in SCIENCE for June 2, I wish to make the following remarks relative to their paper published in the issue of September 1.

It is still maintained that Newton's philosophy was opposed by leading Russian scientists at the time of the founding of the Russian Academy of Sciences and that what was done in Western Europe in the seventeenth and the beginning of the eighteenth century was accomplished in Russia nearly two centuries later.[1] In France the first appearance of Newton's "Principia" of 1687 caused the adherents of Descartes' philosophy of vortices considerable speculation; but in spite of this, Newton was rapidly accepted in France, Holland and Germany. Scientific progress is universal and therefore must be measured in terms comparable to universal history and not nationalistic progress. Fifty years in the history of science is indeed a brief period measured, as a unit, from the time of the origin of the ancient Egyptian civil calendar, 4236 B.C.[2]

However, the main contention of my remarks was, What caused the delay of approximately two hundred years before Newton's "Principia" was published in Russia?

I am under great obligation to my friend and colleague, Mr. Anatol J. Shneiderov, of The George Washington University, for examining a recent publication of the U.S.S.R. Academy of Sciences commemorating in Moscow, 1943, the three hundredth anniversary of Newton's birth. We find the following by A. D. Lublinskaya: "In 1688 the *Journal des Savants* recognized that Newton's 'Principia' gives a better explanation of the mechanics of planetary motion. In 1690 Huygens (Holland) in his 'Traité de la lumière' analyses the 'Principia' and agrees with Newton's thesis of mutual gravitation as irreproachable. From 1691–1725 violent polemics continued between the formally recognized Newtonian mechanism and the Descartian theory of vortices." But Voltaire's influence sounded the end of this verbal warfare.

In Russia the name of Newton was first mentioned in the *Proceedings of the Russian Academy of Sciences* in 1725, where it is mentioned that the Russian academician Bülfinger opposed Newton's point of view concerning polar flattening of the earth, because according to the knowledge of the time the sphericity of the earth had not yet been proven. Again in 1726 Newton's name was mentioned in connection with some physical experiments performed by Bülfinger. From 1727 to 1747 there is no record relating to Newton's work, or commentaries; but in 1748 Lomonosov in his letter to Euler opposes Newton in regard to the identification of mass and weight. In 1751, not 1752, Clairnaut's "La Théorie de la lune" received the official prize of the Russian Academy of Sciences. This would seem to indicate that Russia acknowledged and paid homage to France and Clairnaut and not to England and Newton. Professor Krylov further states that Lomonosov, in 1756, opposes Newton's theory of light, and in 1760 criticizes Newton's theory of gravitation as a fundamental property of matter. Lomonosov was the founder of Russian scientific thought and a follower of Cartesian doctrines. His consequent influence in opposing the Newtonian philosophy can not be disregarded.

[1] Krylov's translation of the "Principia."

[2] Tyler's "History of Science." (Or, more definite, when man first had concepts of the meaning of air, fire, water and earth, and found a basis for some logical system of definition and classification.)