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.)

The formal recognition of Newton's philosophy in 1916 by Professor Krylov's translation is the first definite public recognition history records. During the first one hundred years of the academy's life no English scholar or man of science was honored by membership. Newton was still alive during the first two years of the academy's existence. The translation of Newton's "Principia" by Professor Krylov was made from the fifth edition,[3] as he states, not the third, as Dr. Timoshenko and Dr. Uspensky state. In regard to my mention of the first edition, this is referred to on the title page of the new Russian edition of the "Principia."

Referring to the quotation of Professor Petrunkevitch's statement, I think it would have been much fairer to their national pride not to have reshuffled Professor Petrunkevitch's quotation, taking some part of it and bracketing it into another part, thus giving the reader the wrong impression. My effort was to bring out from this quotation something to the credit of Russian scientific training.

My source for the information concerning Nicholas and Daniel Bernoulli was "Tableau Général . . . dans les Publications de L'Académie Impériale des Sciences de St.-Pétersbourg, 1872," 1st part, pages 408–409. Under the heading of Membres Effectifs, it is stated that both Bernoullis were professors of mathematics in the academy. Nicholas was born in Basel, Switzerland, and Daniel in Groningue (in my paper I stated the latter was from Germany, which was an error.) Daniel did study medicine, but never practiced until after he retired from the academy. Drs. Timoshenko and Uspensky state that Goldbach was never a member of the academy. According to the last reference quoted on page 408 he was a "membre effectif" and was the first "Secrétaire de Conférence de l'Académie."

FREDERICK E. BRASCH,
Consultant in the History of Science, Library of Congress

SCIENTIFIC BOOKS

ELEMENTARY STATISTICS

Elementary Statistics. By MORRIS BLAIR. xiv + 690 pp., including 98 plates. Henry Holt and Company. 1944.

NEW developments in statistical methods are leaving their impact on pure science, manufacturing development, marketing and business practice, public opinion and government statistics, and accordingly attention is demanded from all branches of science when a new book on statistics appears. To the pure scientist, and to most readers of SCIENCE, their main concern is just what statistical practice has to do with scientific method. It is not realized by pure scientists in general that the statistical method over the past few years has brought about a revolution in the concepts of what is meant by exact sciences. Perhaps the "exact scientists" themselves are not under delusion with regard to what constitutes the so-called "exact sciences," but the delusion is certainly common in other places. Actually there is no such thing as exactness in the sense of exact reproducibility of results. While many scientists may agree with W. O. Willcox in the June issue of the *Journal of the American Society of Agronomy* that the result of an applied force "must be accepted as an absolute value and wholly reproducible under parallel conditions without margin for chance," all will agree that there is a hitch in it; the conditions of trials can not be kept constant, and the statement in practice can not be verified. One must recognize the inherent variability of all measurable phenomena. There is no such thing as constancy of measured results except in the sense of statistical control, a concept introduced by Shewhart in 1926. The concept of exactly reproducible results is now replaced, through the work of Shewhart, by the concept of statistical control or the constant cause system. A constant cause system produces not constant results, but constant variability, in the sense that on the basis of past results produced by the constant cause system, rational and dependable predictions can be made with regard to the proportion of the next 100 or 1,000 observations that will fall within any given pair of limits. In other words, probability theory applies to a phenomenon in a state of statistical control.

The statistician recognizes two kinds of variability: (1) variability that can be eliminated (arising from "assignable" causes), and (2) variability that can not be altered (arising from "chance" causes) without installing a fundamentally new cause system. The second type of variability exhibits statistical control. Whether a state of statistical control exists is decided by use of the control chart and the Shewhart criterion of randomness. As Shewhart states in his book, "The Statistical Method from the Viewpoint of Quality Control" (Graduate School, U. S. Department of Agriculture, 1939) the constant cause system represents the limiting state of knowledge.

Controlled variability is practically all contained within an "error band," which can be calculated from

[3] Sir Isaac Newton's Principia reprinted for Sir William Thomson, LL.D., Glasgow, James Maclehose, Publisher to the University. MDCCCLXXI. 4to. [According to Professor Krylov.]