

modern times who has built up this new realm is the late Dr. Ernst Schroeder, professor of mathematics at the Polytechnic school at Karlsruhe in Baden. He wrote a voluminous book on *The Algebra of Logic* and his main rival in this field of most abstract thought is the American scholar Charles S. Peirce, who uses the term "the logic of relatives." Since Professor Schroeder's death, Dr. Eugen Müller of Constance has been in charge of his manuscripts, and he has undertaken to condense the great work of Schroeder into small compass so as to make the main principles of the new science accessible to those who would not have the time to wade through the books of Boole and of Schroeder. He condenses Schroeder's *Algebra of Logic* into about 150 pages, which is to appear in three installments, the first of which, comprising 50 pages lies now before us.

THE NEW SCHAFF HERZOG ENCYCLOPEDIA OF RELIGIOUS KNOWLEDGE. Edited by Samuel Macauley Jackson, DD., LL. D. (Editor in Chief), Charles C. Sherman, Geo. W. Gilmore, and others. Vol. III, Chamier—Draendorf. New York: Funk & Wagnalls, 1908-1909. Pp. 500. Price, per vol., cloth \$5.00; per set \$50 to \$108.

We are glad to welcome the third volume of this valuable work. It is the expectation of the publishers to continue issuing a new volume from the press every three months until the work shall be complete in twelve volumes. The present volume is of very especial interest as will be clear to any one who considers the possibilities of the initial letter C. Charlemagne, Christ, Christian, Christology, Church, Confession, Confirmation, Constantine, Councils, Creation, Creed, Cross, Crucifixion and Crusades are a few suggestive titles, bringing many others in their train, and all are treated with the same special thoroughness that characterizes the management of the work as a whole. The usual bibliographies are supplied at the end of each item and the volume contains a supplemental bibliographical appendix which brings the list of books covering the topics from Vol. I to the end of Vol. II down to January, 1909, thus placing the latest published information available at the disposal of the reader.

THE PLACE OF ANIMALS IN HUMAN THOUGHT. By Countess Evelyn Martinengo Cesaresco. London: Fisher Unwin, 1909. Pp. 376. Price, 12s. 6d. net.

To the lover of animals this book will open up a new field of interest. It is the result of the thought and investigation of several years on the part of the author, to whom the study and compilation has been a labor of love. A suggestion of Count Goblet d'Alviella at the Oxford Congress of the History of Religions last September, to the effect that the psychology of animals might have some bearing on the science of religions, confirmed Countess Martinengo-Cesaresco in her belief in the importance of animal psychology. Her discussion treats of the views of the various nations of the earth on the subject, under the following headings: Soul-Wandering as It Concerns Animals, The Greek Conception of Animals, Animals at Rome, Plutarch the Humane, Man and His Brother, The Faith of Iran, Zoroastrian Zoology, A Religion of Ruth, Lines from the Adi Granth, The Hebrew Conception of Animals, "A People Like Unto You," The Friend of the Creature, Versi-

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REPORT

OF THE

NATIONAL ACADEMY OF SCIENCES.

FOR

THE YEAR 1908



WASHINGTON
GOVERNMENT PRINTING OFFICE

1909

APPROPRIATIONS FROM BACHE FUND.

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When the present board came into office, formal rules were adopted requiring the production of proper vouchers for expenditures and also making it necessary that the board of direction should be unanimous. For many years past Prof. J. E. Hilgard, as the only member of the board residing in Washington, has been chairman of the board and has conducted business directly with the treasurer. Applications for money have, it is believed, been most frequently made to him, but sometimes to the other two members of the board. The difficulty in making out an absolutely perfect list of all the appropriations made by the board arises from the fact that the orders prior to April 19, 1884, were stolen from the treasurer's box (together with all other vouchers) in the academy room in the Smithsonian Institution. It is believed, however, that the list herewith furnished up to April, 1888, is nearly, if not quite, complete. (The list which followed is given on pages 39-45.)

SPECIAL STATED SESSION, NOVEMBER 2, 1894.

The following recommendation of the council was approved by the academy:

That the treasurer be authorized to sell the 4 per cent government bonds belonging to the Bache fund now in the possession of the academy (about \$3,800), and to invest the proceeds of such sale under the advice of the investment committee.

STATED SESSION, APRIL 16-18, 1906.

The treasurer reported the following cash addition to the capital of the Bache trust fund during the year:

From sale of Missouri lands.....	\$1,288.20
This is the net proceeds from the sale of 160 acres of land in Polk County, Mo., belonging to the estate of the late Alexander D. Bache, which was sold, as authorized by the council, at \$8.50 per acre.	
As thus increased the capital of the fund amounts to.....	52,286.00

ANNUAL MEETING, APRIL 21-23, 1908.

The treasurer made the following statement as to the present condition of the A. D. Bache fund:

Capital account.....	\$52,286.00
Invested income.....	5,446.64
Cash on hand.....	2,827.45

APPROPRIATIONS MADE FROM BACHE FUND.*

1871.	
Sept. 6. J. E. Hilgard (1).....	\$500.00
Magnetic survey of the United States.	
1872.	
Jan. 15. J. E. Hilgard (2).....	500.00
Magnetic survey of the United States.	
Jan. 16. Joseph Winlock (1).....	400.00
Investigation of sun spots.	

*The list of appropriations to April, 1888, is copied from the report of the board of direction, above mentioned.

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Apr. 29.	J. E. Hilgard (3)	-----	\$500.00
	Magnetic survey of the United States.		
July 20.	Joseph Winlock (2)	-----	400.00
	Investigations of sun spots.		
Nov. 28.	J. E. Hilgard (4)	-----	1,000.00
	Magnetic survey of the United States.		
1873.			
Feb. 17.	Joseph Winlock (3)	-----	1,200.00
	Investigations in solar physics.		
Nov. —.	J. E. Hilgard (5)	-----	1,200.00
	Magnetic survey of the United States.		
1874.			
Mar. 16.	Joseph Winlock (4)	-----	500.00
	Investigation of sun spots.		
	The money received by Professor Winlock was employed under his direction in observations of the sun, as described in the preface to Volume VIII of the Annals of the Observations of Harvard University, and the results were published in the second part of the same volume.		
June 15.	J. E. Hilgard (6)	-----	1,200.00
	Magnetic survey of the United States.		
1875.			
June 17.	J. E. Hilgard (7)	-----	1,000.00
	Magnetic survey of the United States.		
Oct. 4.	J. E. Hilgard (8)	-----	500.00
	Magnetic survey of the United States.		
Oct. 25.	Charles S. Peirce (1)	-----	400.00
	Study of color.		1,200.00
	Comparison of sensations.		500.00
1876.			
Apr. 28.	A. M. Mayer (1)	-----	250.00
	Acoustic researches.		
	Professor Mayer's results are contained in the Memoirs of the National Academy of Sciences, Volume III, part I, 1884.		
May 24.	J. E. Hilgard (9)	-----	1,000.00
	Magnetic survey of the United States.		
Sept. 18.	Charles S. Peirce (2)	-----	400.00
Nov. 18.	S. P. Langley (1)	-----	500.00
Dec. 12.	Charles S. Peirce (3)	-----	400.00

APPROPRIATIONS FROM BACHE FUND.

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1877.			
May 16.	Wolcott Gibbs (1)	-----	\$100.00
	Researches on complex inorganic acids.		
June 13.	A. M. Mayer (2)	-----	500.00
	Researches on nature of the discharge of the inductorium.		
	Memoirs of the National Academy, Volume III, part 1, 1884.		
Oct. 5.	J. E. Hilgard (10)	-----	600.00
	Magnetic survey of the United States, computations of field work from 1871 to 1876.		
	The magnetic survey of the United States was completed in 1876, and the results obtained up to that time were published in detail in the Coast Survey Report for 1882, Appendix 14, 106 pages, 4to.		
Oct. 22.	Wolcott Gibbs (2)	-----	200.00
	Researches on complex inorganic acids.		
Nov. 19.	S. P. Langley (2)	-----	500.00
1878.			
Sept. 30.	Charles S. Peirce (4)	-----	500.00
Sept. 30.	C. R. Powalky	-----	500.00
	For a new reduction of La Caille's observations of fundamental stars in the southern heavens in 1749-1757. Published in the Report of the Coast and Geodetic Survey for 1882, Appendix 21, 1879. June 17, to R. M. Willson, treasurer Fort Worth eclipse party, to pay part of the expense of publishing the observations made by the party at Fort Worth in July, 1878. Published: Report of the Observations of the Total Solar Eclipse, July 29, 1878, made at Fort Worth, Tex.		
1879.			
Jan. 17.	Leonard Waldo	-----	100.00
	Work on eclipse party.		
	Report published by John Wilson & Son, Cambridge, and distributed to leading observatories and societies.		
May 10.	Samuel Hein	-----	150.00
May 20.	Wolcott Gibbs (3)	-----	300.00
	Researches on complex inorganic acids.		
Aug. 2.	J. C. Watson	-----	1,000.00
	Computations on the lunar theory.		
1880.			
Feb. 17.	American Journal of Science	-----	60.00
	Magnetic maps.		
Mar. 13.	C. S. Lyman, for the board of managers of Yale Observatory	-----	500.00
	To aid the thermometric bureau of the university in purchasing standard thermometers and other instruments for its necessary equipment.		
	Reports published: Report of the Board of Managers of the Observatory of Yale University to the President and Fellows, 1880-81 to 1887-88.		