

# SCIENCE

A WEEKLY JOURNAL DEVOTED TO THE ADVANCEMENT OF SCIENCE, PUBLISHING THE  
OFFICIAL NOTICES AND PROCEEDINGS OF THE AMERICAN ASSOCIATION  
FOR THE ADVANCEMENT OF SCIENCE.

EDITORIAL COMMITTEE: S. NEWCOMB, Mathematics; R. S. WOODWARD, Mechanics; E. C. PICKERING, Astronomy; T. C. MENDENHALL, Physics; R. H. THURSTON, Engineering; IRA REMSEN, Chemistry; CHARLES D. WALCOTT, Geology; W. M. DAVIS, Physiography; HENRY F. OSBORN, Paleontology; W. K. BROOKS, C. HART MERRIAM, Zoology; S. H. SCUDDER, Entomology; C. E. BESSEY, N. L. BRITTON, Botany; C. S. MINOT, Embryology, Histology; H. P. BOWDITCH, Physiology; J. S. BILLINGS, Hygiene; WILLIAM H. WELCH, Pathology; J. McKEEN CATTELL, Psychology; J. W. POWELL, Anthropology.

FRIDAY, JANUARY 3, 1902.

## CONTENTS:

<i>The Relations between the Variability of Organisms and that of their constituent Elements:</i> DR. FRANZ BOAS.....	1
<i>On the True Nature of Tamiasoma:</i> PROFESSOR WILLIAM HEALEY DALL.....	5
<i>The Relative Progress of the Coal-tar Industry in England and Germany during the Past Fifteen Years:</i> ARTHUR C. GREEN.....	7
<i>Concerning Certain Mosquitoes:</i> PROFESSOR JOHN B. SMITH.....	13
<i>University Registration Statistics:</i> DR. GEO. B. GERMANN.....	16
<i>Scientific Books:—</i>	
<i>Hertwig on Die Entwicklung der Biologie:</i> WM. A. LOCY. <i>Loeb on the Comparative Physiology of the Brain:</i> ROBERT MEARNS YERKES. <i>Mohr's Plant Life in Alabama:</i> DR. F. E. CLEMENTS. <i>Two Papers on Animal Mechanics:</i> PROFESSOR THOMAS DWIGHT. <i>Young on the Teaching of Mathematics:</i> PROFESSOR DAVID EUGENE SMITH.	17
<i>Scientific Journals and Articles.....</i>	26
<i>Societies and Academies:—</i>	
<i>N. Y. Academy of Sciences: Section of Geology and Mineralogy:</i> EDMUND O. HOVEY. <i>Research Club of the University of Michigan:</i> PROFESSOR FREDERICK C. NEWCOMBE. <i>The Academy of Science of St. Louis:</i> PROFESSOR WILLIAM TRELEASE.....	27
<i>Shorter Articles:—</i>	
<i>The Smallest Known Vertebrate:</i> DR. H. M. SMITH. <i>Dinosaurs in the Ft. Pierre Shales and Underlying Beds in Montana:</i> EARL DOUGLASS. <i>Magmatic Differentiation of Rocks:</i> DR. CHARLES R. KEYES. <i>On the Reason for the Retention of Salts near the Surface of Soils:</i> THOS. H. MEANS.....	30
<i>Chemistry in the California Schools:</i> EDWARD BOOTH.....	35
<i>Scientific Notes and News.....</i>	36
<i>University and Educational News.....</i>	40

MSS. intended for publication and books, etc., intended for review should be sent to the responsible editor, Professor J. McKeen Cattell, Garrison-on-Hudson, N. Y.

## THE RELATIONS BETWEEN THE VARIABILITY OF ORGANISMS AND THAT OF THEIR CONSTITUENT ELEMENTS.

In a study of the varying forms of organisms we may either direct our attention to the variability of the organism as a whole, or to the variability of its constituent elements. When two organisms differ in form, their differences are necessarily founded on differences in the forms of their corresponding parts, and we are justified in assuming each of these parts as very small. The corresponding parts may consist of homologous cell groups, of individual cells, or of other small homologous elements of the two organisms. These small elements may differ in size and form, and new elements may also be added in the one or the other organism, so that there may also be a difference in the number of elements. The difference between the two organisms may then be considered as a resultant of the differences between their constituent elements. Therefore, there must be a certain definite relation between the variability of the elements and that of the whole organism.

In order to make this clear we will, for a moment, consider the elements as independent units, not as parts of an organic whole. In this case, each element would be entirely independent of the other. When we consider two organisms thus con-