

dodging. The case against them is very plain and may be put thus: I offer to pay a year's subscription to SCIENCE for any man, woman or child who will inform the editor of any book in any language where can be found a Section, Partition of a Perigon, or, as Beman and Smith reprint it, Partition of *the* Perigon, and the problems: Problem I., to bisect a perigon; problem II., to trisect a perigon; problem III., to cut (divide) a perigon into five equal parts (angles); problem IV., to cut (divide) a perigon into fifteen equal parts (angles), excepting Halsted's Elements (1885) and Beman and Smith (1895). The question about the word perigon is an issue introduced by Beman and Smith to distract attention from their 'take.'

But their laborious researches on this matter turn out highly complimentary to me. They find that not a single geometry can be found in any language that ever used this word until after mine. They find, by actual laborious correspondence that W. B. Smith, Newcomb, and even the Italian Faifofer, saw the word for the first time in Halsted's books.

They say, SCIENCE, p. 275: "*We have reason to believe that W. B. Smith, Newcomb and Faifofer all did see the word for the first time in Halsted's books.*" This is all that I have ever claimed about this word, and surely it does me great honor. As to whether I first coined this word, I gave the facts to Cajori (see his 'The Teaching and History of Mathematics in the United States,' 1890, p. 237); but the question for Beman and Smith is whether, like the other geometers, they first saw the word in the only place where any man, before their plagiarism, ever saw the phrase Partition of a Perigon.

GEORGE BRUCE HALSTED.

#### THE NATIONAL UNIVERSITY: A SUGGESTION.

ON the birthday of Washington this year it has been proposed to bring before as many persons as possible the thought of a National University, with portions of Washington's addresses to Congress, and the clause of his will relating to the subject, in order, to use his own words, 'to set the people ruminating on the importance of the measure as the most likely means of bringing it to pass.'

Relatively few people know that in this document the far-sighted man whom we love to call the Father of his Country bequeathed to the Nation the equivalent of \$25,000, in trust as the nucleus for the endowment of such an institution. To-day such an endowment would appear small, but neither principle nor earnings of this sum have ever been applied to the purpose for which it was intended, and had it been kept invested at six per cent. during the century that has all but passed since the testator's death this modest gift would be worth to-day over \$12,000,000.

Some sentiment is, no doubt, behind the earnest movement that is now making toward the realization of Washington's hopes, and popular sentiment in a popularly governed country is far from powerless. But the establishment of an educational institution, especially of a university in the proper sense, and above all of a university which is expected to be in fact as well as in name a National University, should depend upon more than popular feeling that the hopes of the broad-minded Washington deserve, even at this late day, to be realized.

When these hopes were formed the country had, in fact, not one university which to-day could justify its use of the name. To-day, among the hundreds of nominal universities, there are scores which offer post-graduate facilities in one or more departments sufficient to justify them in offering advanced degrees, and a few possess an equipment for work whereby the doctor's degree may be earned in either of the principal departments recognized as necessary or desirable for post-graduate work, or university work as contrasted with that which is purely collegiate. Surely these institutions may properly lay claim to the name of university.

Yet, if we possess universities worthy of the name, can it be urged that these are sufficiently numerous, or even sufficiently strong individually, to preclude the desirability of adding to their number one which may hope to do in its every department work equal to that done in the best departments of the best existing institutions? The president\* of one of the most

\*Jordan, The urgent need of a National University. The Forum, 22: 600, January, 1897.

amply endowed of our colleges does not hesitate to declare for the advisability of the proposed action. He opens his appeal with the statement that 'the most important event in the history of modern Germany has been the foundation of the University of Berlin'—its National University; and he even tells us that the place at the head of our own American educational system is now held by the universities of a foreign land.

True it is that the real scholar who has earned his baccalaureate degree turns to a stronger center than his alma mater, if possible, when he enters upon the struggle for the doctorate; and having taken this, if he deserve it he may sometimes hope for a fellowship from the university that has stamped its official seal on him as a scholar and an investigator, which enables him to pursue his studies still further—not at home, but in foreign universities.

Doubtless, this will always be so. Men, if suitably supported, and not places, make universities; and, with all respect for the learned men who compose the faculty of the Berlin University, it may be said that even the graduate of that great institution finds profit in traveling elsewhere, for help and skill not to be found in Berlin. The practical question is: Are Americans in search of opportunity for advanced study which is not afforded by our existing universities? Are these not increasing in efficiency and capacity in proportion to the growing demand for the best that they can offer? Are there local obstacles in the way of their fullest utilization? Will a National University attract men who need some special inducement to advanced study not now offered? And can it be made to replace the foreign university as the Mecca of our graduate students? Let the university catalogues themselves and the annually collected government statistics answer this in part, nor fear, as some do, that petty ambition and petty jealousy can bias the utterances, on this point, of the officers of any university worthy of the name. Yet, it may well be asked, whatever the answer, who can venture to say that the opening of a National University may not in some real, if not clearly definable, manner appeal to enough men who now stop at the completion of a collegiate

course, to justify in the most satisfactory manner its establishment?

If, in my own mind, after trying to view the question impartially, I am not perfectly convinced that there is a real need for a National University, as a center of advanced instruction, I must admit that there may be other more cogent reasons for the attempt now being made to carry Washington's idea into effect; and if, as I cannot help believing, the reasons that influenced his judgment are less weighty to-day than they were a century ago, other reasons, not then revealed, may, perhaps, stand out to-day with greater force than the original reasons ever possessed.

Frequent comment is made, in the scientific press of other nations, on the wonderful liberality of the American government in supporting scientific investigation of our great natural resources. No branch of applied science, or science capable of economic application, is without representation under government auspices. It has been shown recently that no less than 5,225 persons are employed on this scientific and economical work, on which is expended annually nearly \$8,000,000.

For some years observing and thinking persons have realized that, great as the value of this work is, it is carried on in too irresponsible and disjointed a fashion to permit of the realization of the greatest possible results, and several more or less successful attempts have been made to secure its partial unification. Quite recently one well fitted to grasp and analyze the situation\* has distinctly stated that the time has now arrived when the successful prosecution of the scientific work of the government requires that the various bureaus should be organized in accordance with a logical plan, either under one of the existing governmental departments or in a new department, under the direction of one secretary or executive head.

The scientific bureaus now constitute true university departments in this fundamental respect that they are primarily and preeminently centers of research, manned by investigators.

\* Dabney, A national department of science necessary for the coordination of the scientific work of the United States government. *SCIENCE* N. S. 5: 73, 15 January, 1897.

Nowhere else in the country are men as free to delve into the unsolved mysteries and work out the practical application of discoveries as here. If, as President Jordan asserts,\* and as, I think, no one will deny, "The National University should not be an institution of general education, with its rules and regulations, college classes, good-fellowship, and football team; it should be the place for the training of investigators and men of action," can a more favorable plan be formulated, for at once realizing the popular idea of a truly National University and meeting the need for a reorganization and centralization of the National Scientific Departments, than to reorganize the latter as the former, charged with the twofold duty of prosecuting all needful investigation and of training all competent students desirous of devoting their lives to a like purpose? To this scientific foundation, history, literature and the arts would be readily added, without wasteful duplication.

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#### SCIENTIFIC LITERATURE.

*Die Spiele der Thiere.* By KARL GROOS, Professor of Philosophy in the University of Gießen. Jena, Gustav Fischer. 1896. Pp. xvi + 359.

In this volume Professor Groos makes a contribution to three distinct but cognate departments of enquiry: philosophical biology, animal psychology, and the genetic study of art. Those who have followed the beginnings of enquiry into the nature and functions of play in the animal world and in children will see at once how much light is to be expected from a thorough-going examination of all the facts and observations recorded in the literature of animal life. This sort of examination Professor Groos makes with great care and thoroughness, and the result is a book which, in my opinion, is destined to have wide influence in all these departments of enquiry.

I cannot take space for a detailed report of Professor Groos' positions. It may be well, therefore, before speaking of certain conclusions which are to me of especial interest, to give a résumé of the contents of the book by

\**l. c.* 603.

chapters. Chapter I. is an examination of Mr. Spencer's 'surplus energy' theory of Play; the result of which is, it seems, to put this theory permanently out of court. The author's main contention is that play, so far from being 'by-play,' if I may so speak, is a matter of serious business to the creature. Play is a veritable instinct, true to the canons of instinctive action. This view is expanded in Chapter II., where we find a fine treatment in detail of such interesting topics as imitation in its relation to play, the inheritance of acquired characters apropos of the rise of instincts, the place and function of intelligence in the origin of these primary animal activities. This chapter, dealing with the biological theory of play, is correlated with Chapter V., later on in the book, in which the 'Psychology of Animal Play' is treated. Together they furnish the philosophical and theoretical basis of the book, as the chapters in between furnish the detailed data of fact. I shall return to the biological matter below. Chapters III. and IV. go into the actual 'Plays of Animals' with a wealth of detail, richness of literary information and soundness of critical interpretation, which are most heartily to be commended. Indeed, the fact that the first book on this subject is, at the same time, one of such unusual value, both as science and as theory, should be a matter of congratulation to workers in biology and in psychology. The collected cases, the classification of animal plays, as well as the setting of interpretation in which Professor Groos has placed them—all are likely to remain, I think, as a piece of pioneer work of excellent quality in a new but most important field of enquiry.

As to the plays which animals indulge in, Professor Groos classifies them as follows: 'Experimenting,' 'Plays of Movement,' 'Play-Hunting' ('with real living booty,' 'with play living booty,' 'with inanimate play booty'), 'Play-fighting' ('teasing, scuffling among young animals,' 'play-fighting among adult animals'), so-called 'Building Art,' 'Nursing' plays, Imitation' plays, 'Curiosity,' 'Pairing' plays, 'Courting by Means of Play of Movements,' 'Courting by the Exhibition of Colors and Forms,' 'Courting by Noises and Tones,' 'Coquetry on the part of the Female.'