TABLE IV

	Number of Cases	Number not Devoting 20 Per Cent. of the Total Degree Requirements to any one of the Following: (1) Ancient Languages. (2) Modern Foreign Languages. (3) English. (4) Philosophy, etc. (5) History. (6) Economics. (7) Government and Public Law. (8) Physics and Chemistry. (9) Biological Science (10) Other Natural Sciences. (11) Mathematics. (12) Art and Music. (13) Education. (14) Law. (15) Medicine. (16) Engineering. (17) Architecture	Per Cent.
I. Stanford	20	0	0
Columbia	21	0	0
Cornell	42	0	0
II. Harvard	50	6	12
III. Beloit, Knox Marietta Ripon and Wabash	93	16	17
IV. Bowdoin	36	0	0
Wesleyan	38	3	8
Williams	40	2	5
Wellesley	22	0	0
Yale	95	7	7½
Princeton	49	23	47
Total.	506	67	13

closely related work. This is the case, for example, with four of the six cases from Harvard.

For the Committee on Collegiate Education of Section L of the American Association.

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THE SEXAGESIMAL SYSTEM AND THE DIVISION OF THE CIRCLE

THE division of the hour and the degree into 60 equal parts, called minutes, and the minute into 60 equal parts, called seconds, keeps fresh in our minds the fact that the ancient Babylonians used 60 as a base of numeration. Less than ten years ago all seemed to agree on the probable origin of this system. It was assumed that the ancient Babylonians supposed that there were only 360 days in a year and hence divided the circle so that one day corresponded to each division. In support of this hypothesis it was pointed out that the ancient Chinese divided the circle into 365¼ parts in their *Tcheou pei,* and that this work could not have been written before 213 B.C.; but at this early date the Chinese were already acquainted with the year of 365¼ days. From the assumption that the circle was divided into 360 equal parts before the origin of the sexagesimal system, and the fact that the radius of a circle can be applied exactly six times as a chord of the circumference, it was easy to account for the base 60.

In recent years this question has received considerable attention and many arguments have been advanced against the given hypothesis as regards the division of the circle. These arguments appear convincing, but it is not so easy to replace the old theory by one which is free from objections. In the third edition of his classic "Vorlesungen über Geschichte der Mathematik" (1907, volume I., page 37) Moritz Cantor accepts the hypothesis that the base 60 was selected as a consequence of the mingling in the Babylonian country of two ancient civilizations, one employing 10 and the other 6 as a base of numeration. In view of the difficulties which this hypothesis entails efforts have been made to find a more plausible one.

Professor Edmund H. Hoppe, Hamburg, Germany, has recently advanced such a hypothesis[1] and has given a large number of historical facts tending to its support. He assumes that the normal angle among the ancient Babylonians was an angle of an equilateral triangle and that it was observed at an early date that six such angles cover the entire area around a point. Hence the number 6 assumed great importance, being regarded to stand for completeness. The base 60 could then have easily resulted from a division of the normal angle into ten equal parts. After this base was established, alongside the much older base 10, the normal angle itself was divided into 60 equal parts and this led to the division of the circle into 360 equal parts.

Whether this hypothesis will be generally accepted remains to be seen. The fact that the

[1] *Archiv der Mathematik und Physik,* Vol. 15 (1910), p. 304.

ancient Babylonian wheel had six spokes while the ancient wheels in Egypt and Greece had only four tends to support the hypothesis that among the former an angle of 60° was regarded as normal while the right angle was regarded as normal among the latter. At any rate, the hypothesis advanced by Professor Hoppe tends to throw additional light on a question which relates to our daily experiences, but had not received a satisfactory answer.

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NOTES ON ENTOMOLOGY

The first volume of Mr. Kirkaldy's long-expected catalogue of the Hemiptera Heteroptera of the world has been issued, and is truly a great work. Indeed it is, if possible, too extensive and elaborate for ready reference. This volume[1] treats of the families known to us as Pentatomidæ, Scutelleridæ and Cydnidæ. The general plan is similar to that of the Lethierry and Severin Catalogue: the species of each genus are numbered, the localities at the right side of the page, and each reference includes the generic name used by each writer. Wherever known the food plants are given. In the introduction he has a classification of the order, and an exposition of the rules of nomenclature followed by him, which differ in several respects from those commonly adopted by entomologists.

The era of discovery of strange insects is not yet passed. Dr. Karl Jordan has described a new and truly remarkable genus of insects which was found in a sack on the wings of a Malayan bat.[2] He considers that it belongs to the Forficulidæ, but its resemblance to the common earwigs is extremely slight. It is a very flat insect, with a pair of small, curved, oval cerci; the pro- and mesothorax have a median suture; the head looks like that of a perlid larva, with a suture from eye to eye, the basal joint of the antennæ is very large and long. Dr. Jordan calls it *Arixenia esau.* He considers that it shows some relation to *Hemimerus,* and that it may possibly form a new suborder of Orthoptera. It might be useful to compare the insect with some of the Mallophaga, as a possible connecting link between them and some of the neuropteroid insects.

Dr. Alex. Schepotieff describes a new genus of primitive insects[3] which he calls *Protapteron indicum;* it comes from the Malabar coast. It is a small, slender form and has some resemblance to *Acerentomon,* but probably more allied to *Campodea.* It has four pairs of rudimentary feet on the basal abdominal segments, each two-jointed. There are no terminal cerci, and the antennæ are slender; there are five widely separated ocelli on each side of the head; each segment has only a dorsal and ventral plate, no other chitinized parts; the tarsi end in a single claw; and there are but two pairs of spiracles.

Dr. Albert Tullgren is the author of a most valuable paper on Swedish Aphidæ.[4] In this first part he treats of the Swedish Pemphiginæ. This subfamily he divides into six groups: Vacunina, Hormaphidina, Mindarina, Pemphigina, Schizoneurina and Anœciina. He gives a full description of each genus and species, and as much of the life history as is now known. He reviews the previous classifications of the subfamily Pemphiginæ, and presents considerable matter on the structure of the group. The numerous figures illustrate the essential structural characters, such as head, antennæ, cornicles and wings.

Dr. A. E. Shipley has given a valuable account of the insects affecting the red grouse in Scotland.[5] These are principally a biting louse, *Goniodes tetraonis,* the bird fly, *Ornithomyia lagopodis* and a dung-fly, *Scatophaga stercoraria.* The author has not found any connection between any of these parasites and

[1] "Catalogue of the Hemiptera Heteroptera," Vol. I., Cimicidæ, pp. 392, Berlin, December, 1909.

[2] *Novitates Zoologicæ,* Vol. 16, pp. 313–326, 1909, 3 plates.

[3] "Studien über niedere Insecten," *Zool. Jahrb., Abt. Syst.,* Vol. 28, pp. 121–135, 1909, 3 pls.

[4] "Aphidologische Studien," *Arkiv f. Zoologi,* Bd. V., No. 14, pp. 190, figs. 92, 1909.

[5] "The Ectoparasites of the Red Grouse (*Lagopus scoticus*)," *Proc. Zool. Soc. London,* 1909, pp. 309–334.