Prof. Newcombe. It is called the iron-tannin-safranin stain and consists of the following solutions: 1, 1% aq. sol. of ferrous sulphate; 2, 5% aq. sol. of tannic acid; 3, alcoholic solutions of anilin-safranin; 4, aq. sol. of picro-nigrosin. The sections are placed for thirty to forty minutes in the iron solution, washed, then placed for the same period in the tannic acid solution; again washed and replaced for a few minutes in the iron sol. After washing again they are placed in the safranin for thirty minutes; then fifteen minutes in the picro-nigrosin. This method is said to give good results.

The special results of the investigations may be summarized as follows: (1.) Centrosomes and attraction spheres are present in non-reproductive as well as in reproductive vegetable cells. (2.) In phanerogams there are two of these bodies for each resting nucleus. (3.) When the nucleus prepares to divide, one or both of the centrosomes migrate to take their position at the poles of the future spindle. (4.) Subsequently they immediately begin to divide. The division is complete in the prophase of the mother nucleus. (5.) After their migration the spheres remain at the poles of the nuclear spindle and do not change their position until the beginning of the following division. (6.) Centrosomes are persistent.

One plate and a list of thirty-three valuable references accompany the article.

Albert Schneider.

NOTES AND NEWS.

The Elihu Thomson Prize.

The Elihu Thomson prize of 5,000 francs has been awarded to Dr. Arthur G. Webster, of Clark University, Worcester, Massachusetts. The history of this prize is, briefly, as follows:—

In 1889 the City of Paris offered a series of prizes for the best 'electric meters,' it being required that certain conditions should be satisfied, to be determined by an exacting practical test. The first prize, 5,000 francs, was awarded to Professor Elihu Thomson, who submitted the well known Watt-meter devised by him. Wishing to encourage investigation of certain theoretical questions Professor Thomson donated the prize for the establishment of a new competition, the subjects to be considered and the prize to be determined by a committee which consisted of J. Carpentier, Hippolyte Fontaine, Hospitalier, Mascart, A. Potier and Abdank-Abakanowicz. Four subjects for investigation and discussion were selected, and it was announced that competing memoirs must be submitted on or before September 15, 1893. Four memoirs were submitted to the committee; one of these was written in German, one in French and two in English. The two latter, numbered respectively three and four, related to the same subject, namely, the determination of the period of electric oscillations. On examining the memoirs the committee reported that it 'considered memoir number four to be worthy to receive the prize established by Professor Elihu Thomson,' and expressed the hope that the author will be encouraged to continue his beautiful researches.

At the same time they express their regret that they have not available another prize of the same value which they would be glad to award to memoir number three. When their desire in this respect was made known, Professor Thomson and the French and English Thomson-Houston Electric Companies joined in offering another 5,000 francs, which was awarded to the author of memoir number three. On opening the sealed envelopes containing the authors' names, it was found that memoir number four, for which the first prize had been awarded, was prepared by Dr. Webster, and number three was the joint product of Oliver Lodge and Glazebrook.

The title of Dr. Webster's memoir was 'An Experimental Determination of the Period of Electric Oscillations.'

He is to be congratulated upon so signal a success, and it is especially gratifying that an American should have come out in the lead in competition with the two distinguished Englishmen who contested with him, and especially so as their work and his were upon the same subject.

ENTOMOLOGY.

DR. MCCOOK is to be warmly congratulated on the successful issue of the third and final volume of his 'American Spiders and their Spinning Work,' which has appeared four years after the second volume. The author is more at home in his delineation of the outdoor world than in systematic work, with which this volume is mainly concerned, yet he has applied himself to this task with commendable zeal and success and describes 123 species and 30 genera. Apparently (as the table of contents curiously shows) he had intended to carry his work beyond the 'orb weavers,' but his courage or his time gave out as he saw his work grow to portentous dimensions. We have to thank him for thirty large and careful plates of spiders colored, besides a mass of structural details; they will greatly facilitate future study. The price of the complete work is now justly advanced to $50. Unhappily the title page is marked 1893, though the preface is dated in July, 1894, and the volume was not issued until December, 1894.

MR. AND MRS. PECKHAM have given us (Trans. Wisc. Acad., X) a new series of their admirable experiments with spiders in a paper on their visual powers and color sense; they "prove conclusively that Attidae see their prey (which consists of small insects) when it is motionless, up to a distance of five inches; that they see insects in motion at much greater distances; and that they see each other distinctly up to at least twelve inches"; they are guided by sight rather than by smell. The experimenters are further "of the opinion that all the experiments taken together strongly indicate that spiders have the power of distinguishing colors."

CERTAINLY the University of California Entomological Society has done a unique thing in issuing from Berkeley, Cal., as a Californian journal of entomology '*The Entomologists' Daily Post Card*' at $2.00 a year. A card of regulation size and color is printed on both sides in clear type, leaving a meagre space for an address. The number before us contains an editorial on note taking, part of a list of species in Edwards's last catalogue of butterflies, and a portion of a tabular key to the genera of Nymphalidæ. It is a curious venture.

IN a recent paper on the Siphonaptera (Proc. Bost. Soc. Nat. Hist., XXVI., 312–355) Dr. A. S. Packard gives an excellent resumé of published observations on the embryology, postembryonic history and anatomy and the adult structure of the fleas, adding new data from his own preparations and numerous figures. He is led to regard them as forming a distinct order standing nearer the Diptera than any other, but with many points of relationship to the Coleoptera.

HANSEN gives in English (Ent. tidskr.' XV., 65–89, pl. 2–3) an important paper on the structure and habits of Hemimerus, a Platypsylla-like insect infesting rats in Africa, and which had previously been studied only from dried material. Saussure in particular had published a long memoir upon it, founding upon it a new order Diploglossata from its possessing, as he thought, a second labium. Hansen shows that this does not exist (it is difficult to understand how the figures of Hansen and Saussure can have been taken from the same

kind of insect) and he concludes that "Hemimerus belongs to the Orthoptera, constituting a separate family very closely allied to the Forficulina." He shows from his dissections that the insect is viviparous, bringing forth one young at a time.

THE COOLING OF HOSPITALS.

Dr. Morrill Wyman, of Cambridge, Massachusetts, has published in the Proceedings of the American Academy of Arts and Sciences, Vol. 30, page 482, an interesting paper giving the results of some experiments made in the Cambridge Hospital, in which the air admitted to the wards in warm weather was cooled by passing it through pipes in which cold water was circulating, these pipes being the same as those used for warming the air in the winter by the circulation of hot water. In one experiment the external temperature was at 83° F.; there was no wind and the patients were suffering from the heat. The temperature of the water as it entered the cooling pipes was 57 to 58 degrees. An electrical fan 36 inches in diameter, making five hundred revolutions a minute, forced about 10,200 cubic feet of the warm outer air through these pipes into the ward, which contained 21,000 cubic feet. In an hour the air entering the ward was at 71° F., and the comfort of the patients was manifestly improved. But the cooling surfaces were not only the ten cooling coils of 30 square feet each, but also the four walls of the air chamber beneath the ward, being about 3,300 square feet of surface, and it is estimated that the cooling power of the coils was about one-tenth that of the walls. A month later the heat of the external atmosphere was greater and the fan was more constantly in motion; the temperature of the air chamber had increased, and that of the water had risen to 70°. The quantity of water required for the circulation was large and expensive, and it was therefore shut off. But the same amount of ventilation was continued, the air passing through the air chamber. During the summer the ward temperature gradually rose until it differed but little from that of the open air. Nevertheless, the comfort given to the patients and nurses was immediate and decided, and there was a decided feeling of freshness and freedom of air.

Dr. Wyman points out that we can do little towards lowering the temperature of the air in hot weather in the volumes required for the ventilation of a hospital. It is a question of the rate of evaporation from the perspiring surface, which is governed in a great measure by the velocity of the air coming in contact with that surface, and this is a factor which by art it is possible to control. If we try to cool the air before it enters the ward, it must be remembered that air absolutely humid, when brought into contact with warmer air also saturated, will cool the latter, which will approach dew-point, and if its moisture is condensed into visible vapor will give out heat. "Evaporation consumes heat, condensation liberates heat." "To give comfort during the excessive heats of summer the sick require three or four times the air needed for satisfactory ventilation in winter. It required 400,000 cubic feet an hour for our sixteen patients, and yet while this large quantity was passing through the ward it was only known, except at the registers, by the accompanying sense of freshness and pleasant coolness; it was never felt as a draught."

"The experience of the Cambridge hospital leads to these two conclusions: first, that fresh air directly from the open, in the quantity and manner there supplied, can be made to give great comfort to the sick during the heats of summer; and, secondly, that previous cooling of the air so supplied is difficult and practically useless."

PITHECANTHROPUS ERECTUS.

PROFESSOR MARSH has contributed to the February number of the *American Journal of Science* an account illustrated by plates of the discovery by Dubois described in SCIENCE (January 11) by Professor Brinton. A writer in *Nature* (January 24) under the initials R. L. (Professor Lankaster) holds that the remains are human, the skull being that of a microcephalous idiot. Professor Marsh writes:—

"The brief review here given of the main facts relating to this discovery, together with the figures reproduced from the memoir, will afford the reader some idea of the importance of this latest addition to the known allies of primæval man, if not to his direct ancestry. Whatever light future researches may throw upon the affinities of this new form that left its remains in the volcanic deposits of Java during later Tertiary time, there can be no doubt that the discovery itself is an event equal in interest to that of the Neanderthal skull.

"The man of the Neander valley remained without honor, even in his own country, for more than a quarter of a century, and was still doubted and reviled when his kinsmen, the men of Spy, came to his defense, and a new chapter was added to the early history of the human race. The ape-man of Java comes to light at a more fortunate time, when zeal for exploration is so great that the discovery of additional remains may be expected at no distant day. That still other intermediate forms will eventually be brought to light no one familiar with the subject can doubt. Nearly twenty years ago, the writer of the present review placed on record his belief that such missing links existed, and should be looked for in the caves and later Tertiary of Africa, which he then regarded as the most promising field for exploration in the Old World. The first announcement, however, has come from the East, where large anthropoid apes also survive, and where their ancestors were doubtless entombed under circumstances favorable to early discovery. The tropical regions of both Asia and Africa still offer most inviting fields to ambitious explorers."

SOCIETIES AND ACADEMIES.

NEW YORK ACADEMY OF SCIENCES.

THE section of Geology and Mineralogy of the New York Academy of Sciences met on Monday evening, January 21, and listened to a paper by Prof. R. S. Woodward, of Columbia College, on the *Condition of the Interior of the Earth*, of which the following is an abstract. The two envelopes of the earth, the atmosphere and the ocean are important factors in the problem of the interior, and yet we know less of the condition of the outer atmosphere than of the inner earth. The atmosphere's shape we can calculate, with some approximation to the truth, as an oblate spheroid, whose polar radius is 5.4 times the earth's radius, and whose equatorial radius is 7.6 times the latter. This shape is determined by centrifugal force and gravity. Its bulk is 310 times that of the earth, but its mass is only one-millionth that of the latter. If we speak of the latter as 6642×10^{18} tons we can get some conception of the mass of the atmosphere, and of its extreme tenuity in the outer portions.

Our inferences regarding the interior of the earth rest chiefly upon four facts, viz.

1. Its shape and size, which are known with great accuracy.

2. Its surface density, 2.6.

3. Its mean density, 5.58, which is probably accurate within two units in the second decimal place.

4. The precession ratio $\frac{C-A}{C}$, in which C is the moment of inertia of the earth with respect to the polar axis, and A is the moment of inertia with respect to an equatorial axis.

These facts limit the distribution of the earth's mass. The density of the mass must