sions in this particular book. Some recent books on astrophysics are quite as badly at fault in this matter. One, for example, makes no mention of Huggins, Keeler, Langley or Vogel!

Again, every astronomer is aware that the total number of stars in our stellar system is an unknown quantity, though we arrive at *estimates* of this number by extrapolation. Thus,[1] in what is probably the most careful and reliable investigation of the number of the stars that has so far been made, it is said, "the *assumption* that these formulae [*i.e.*, the formulae which represent the number to the 21st photographic magnitude] also apply to the luminous stars *beyond observational reach* leads to 3×10^{10} [30 billion] as the total number of stars in the galactic system" (italics mine). He knows that *measures* of stellar diameter are possible at present only by means of the interferometer and that these diameters when given in linear units (miles or kilometers) depend in part upon the adopted distance (parallax), which may be uncertain by 25 per cent. or more of its total value. *Antares,* for example (which is the largest star of measured diameter, unless, perhaps, *Mira Ceti* slightly exceeds it), has a diameter of 280,000,000 miles on the basis of one assumed parallax, and of 430,000,000 on the basis of another, the former being probably (but not certainly) the more reliable.

But in a recent popular article, printed in a journal of high standing and later reissued as a reprint by the observatory with which its author is connected, we find the categorical statements: "Our Milky Way system contains about fifty billion stars," and, a star is "a sphere of glowing gas varying in size from a globe not much larger than the earth to one *a thousand times larger* (italics mine) than the sun in diameter," *i.e.*, more than 860 million miles, or double, possibly treble, the value of the star of largest measured diameter.

The author also remarks blithely that "fifty billion years is but a short interval in the life of the average star," which may (or may not) be true, but is certainly not a demonstrated fact. Furthermore, he lets the reader infer, as a friend pointed out to me, that the Magellanic Clouds have recently moved so far north that their radial velocities can be and have been measured from Mount Wilson or Flagstaff!

The question is this: Is it quite fair to the intelligent public to give the impression, which the average reader will certainly gain from this article, that these figures and dimensions are matters of knowledge and on the same footing as our knowledge of the distance to the sun or of its diameter? Does not the writer of such an article owe it to his reader to make it clear that some of his results rest upon theories, assumptions and extrapolations, all of which, though they may now seem to us to be well-founded, may be subject to revision—possibly even to rejection—in the light of further investigation?

Finally, to revert to my opening paragraph: while every scientific investigator is concerned primarily with the advancement of knowledge, and not with his own fame, is it not his due to be given recognition for his work in books that record for the student the chief steps in the development of his science?

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[1] "Mean Distribution of Stars according to Apparent Magnitude and Galactic Latitude," by F. H. Seares, P. J. van Rhijn, Mary C. Joyner and Myrtle L. Richmond. *Contrib. Mt. Wilson Obs.,* No. 301, 1925.

ON MANSON'S EYE WORM IN POULTRY

IN certain sections of Florida, especially the seacoast areas, quite severe outbreaks of Manson's eye worm (*Oxyspirura mansoni*) in poultry occur each year, occurring most frequently during the rainy season of the summer months. Due to its economic importance, and also since its life history was unknown, a detail study of the parasite was begun in November, 1925, by Dr. D. A. Sanders, of the veterinary department, Florida Agricultural Experiment Station.

The first experiments conducted were simply exposure tests to determine if the parasite would pass from infected to non-infected birds kept under continuous exposure. It was impossible to transmit the parasite by simple exposure of non-infected to infected birds.

Experiments were conducted in an effort to produce infection by placing eggs containing embryos of the parasite into the eyes of non-infected birds. It was impossible to produce infection in this manner.

It was also found impossible to produce infection by placing newly-hatched larvae into the eye of non-infected birds.

From the above-mentioned experiments, it was quite apparent that an intermediate host was necessary in the development of the life cycle of Manson's eye worm. Search for the intermediate host was begun, and this search included examinations of many of the insects most commonly found around the premises of the poultry flock. After examining many insects, finally specimens of *Pycnoscelus* (*Leucophaea*) *surinamensis* Linn., a species of cockroach, were examined and encysted larvae of the eye worm were found in the body cavities of some of these roaches. Larvae were taken from the infected roach, and when placed into the eyes of birds, these larvae remained therein and produced infection. Larvae were taken from the body of a roach and placed into the mouth cavity of non-infected birds with the result that

shortly afterwards, the birds showed infection of Manson's eye worms. Whole roaches were fed to non-infected birds with the results that within twenty to thirty minutes after the birds had eaten the roaches containing larvae, the parasites had reached the eyes of these birds.

The results obtained by Sanders in Florida confirm the work of J. W. Fielding as reported in *The Australian Journal of Experimental Biology and Medical Science* Vol. III (1926) that *Pycnoscelus* (*Leucophaea*) *surinamensis* is the intermediate host for Manson's eye worm of poultry. However, the work of Sanders in finding this intermediate host was done independent of Fielding's work.

The mature parasites are located in the tear sinus just beneath the third eyelid or nictitating membrane. In some cases, birds harbor only one or two parasites, while in a severe infection as many as fifty or more parasites may be present in the eyes. The mature parasite is 14–18 mm. in length and thread-like in diameter.

It is possible to infect many different kinds of wild birds by feeding them infected roaches.

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RE NOMINA CONSERVANDA

EVEN after being so professorially lectured in SCIENCE[1] in an article which could more appropriately have appeared in the same medium as did the paper it attacks, the writer wishes to reply only to the extent of clearing up possible misapprehensions in the minds of readers.

By implication the writer is classed with those having the "mihi itch" in an objectionable form. He would state therefore that his object from his very first paper on entomological taxonomy has been to do essentially revisional work that would have a maximum of teaching value to younger entomologists and be a real aid to identification of species in the hands of more advanced students. To date he has been sole or joint author of fifty-two articles dealing with the classification of insects and thirty-nine of these are revisional in scope or at least include keys. The piling up of mere descriptions of new species has never been his object; but on the contrary is an activity he heartily condemns. At the same time he believes that personal interest in achievement is no more lacking in taxonomic work than in other fields of human endeavor, and that this is only as it should be, altruistic platitudes to the contrary notwithstanding.

[1] Bradley, J. Chester, 66, 100–103, July 29, 1927.

Professor Bradley insists on the separability of taxonomy and nomenclature, but passes over the writer's suggestion that a code of vernacular or other names could be used by general biologists that would have no necessary connection with technical taxonomy.

Bradley's reference to general zoologists, morphologists, etc., riding rough shod over taxonomists is certainly well put, for just that is what has been attempted in the making of nomina conservanda. Taxonomists deal constantly with morphology and use morphological terms almost as much as the morphologists themselves, yet they have not attempted to dictate standardization of anatomical terms, new ones of which are constantly being introduced. Taxonomic nomenclature is no more the language of science than is anatomic nomenclature and is no more subject to dictatorial rule.

Bradley ends on a note of not becoming a slave to rules, which he may be sure finds an echo in the breasts of men so individual and independent as taxonomists usually are. They desire to be the slaves neither of rules nor of rulers (*i.e.*, of Committees and Congresses).

W. L. MCATEE

EARTHWORMS AND SPECTRAL COLORS

THE article by W. R. Walton on "Earthworms and Light" in SCIENCE for August 5, 1927, recalled to me some research I did in this line some years ago but did not publish.

For the experiment I used a box about two and a half feet long, two feet wide and eighteen inches high. This I thoroughly blackened inside. For light I used gas with a mantel and a reflector. The light was passed through a carbon-di-sulphide prism. The light fell on a white paper in the bottom of the box. Into this array of spectral colors I dropped angleworms. As they moved to get away from the light they always went out the red end. They would pull back from the blue as if it hurt them and turn toward the red. This reaction occurred with every worm except one. This worm lay full length in the green and stayed there. I was not able to repeat this last reaction.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SIMPLE AUTOMATIC DEHYDRATING APPARATUS FOR MANY SMALL OBJECTS

THE accompanying figure represents a very satisfactory apparatus for changing fluids on many small objects. It grew out of the need for saving time in handling ovaries of mice. It is essentially a glass