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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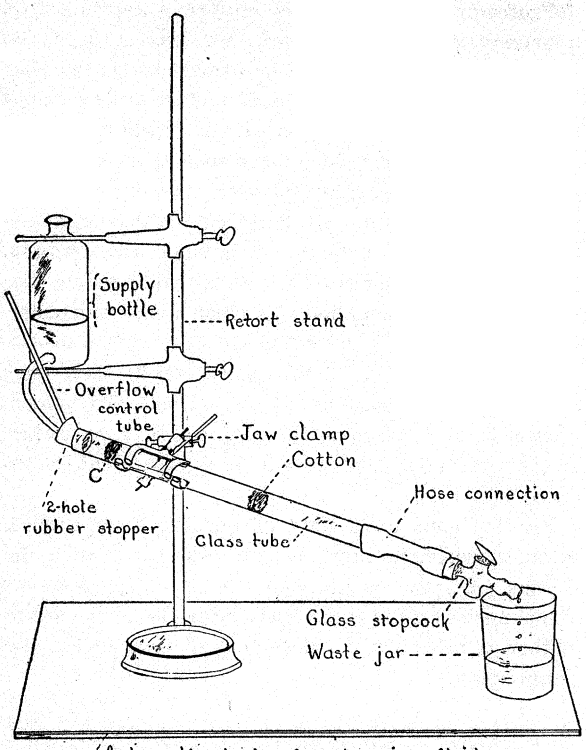
SCIENTIFIC APPARATUS AND LABORATORY METHODS

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



Automatic device for changing fluids on many small objects

FIG. 1

tube about 300 millimeters long by 16 millimeters inside diameter supported at an angle of about 30 degrees, fitted with a glass stopcock at the lower end and with a 2-hole rubber stopper at the upper, through which fluids are conducted from the supply bottle. The overflow tube fitted into the rubber stopper serves two purposes. When the large glass tube is being filled from the supply bottle, it allows air to escape; and also prevents overflow when the tube is full and the stopcock closed. A retort stand fills all the needs of a support, if fitted with rings and clamps as shown in the figure. Other means of support are readily devised. The supply bottle is of the aspirator type.

As used by the author, each ovary is put into a short piece of small glass tubing, the ends of which have been smoothed on a small emery wheel. The corresponding number is written in pencil on a small strip of paper and placed with the ovary in the tube, which is then wrapped in a piece of loosely woven cotton cloth, fastened at the side by either thread or fine copper wire, leaving only one layer of cloth over each end of the tube. Many of these small tubes, each with its numbered ovary, are placed in the large glass tube which is filled with the appropriate fluid, clamped in place, connected to the supply bottle as shown, and the desired fluid allowed to flow in. For example, if the next step is to pass from 30 per cent. to 95 per cent. alcohol, this latter fluid is placed in the supply bottle, and the glass stopcock adjusted to a very slow rate of dropping, perhaps one drop per second. The 95 per cent. alcohol passes very slowly into the tube at the upper end, is diluted and the mixture gradually works its way downward. Ultimately the tissues are in 95 per cent. alcohol. By placing a small loose wad of absorbent cotton at the two places indicated in the figure (C and cotton), it was seen by admitting colored alcohol from the supply bottle into water or a low grade of alcohol in the glass tube, that the front of the new mixture moved evenly, thus proving that all the objects in the glass tube would be affected serially from top downward.

It is wise not to put tissues between the upper wad of cotton (C) and the 2-hole rubber stopper, as the amount of fluid contained in this space allows mixing of the two fluids, which prevents too sudden a change on the upper pieces of tissues. The large glass tube holds about fifty of our small glass containers, which measure about 15 mm. long by 5 mm. inside diameter. These are easily cut in the laboratory. The large glass tube and the small containers may be varied in size according to the needs of the user; but it is likely that if the large tube is much greater in diameter the flow of the fluid might be difficult to control evenly. Several tubes may be filled and joined end to end for simultaneous treatment.

The inflow may be checked at any time by closing the glass stopcock. Tissues may remain immersed any length of time in a particular fluid without loss of fluid by evaporation. They may be fixed, washed, stained, dehydrated and cleared without further handling. So far as the author can see, this device is as reliable as an air current or a mechanical agitator. The user will realize the necessity of a very slow movement of fluids. The dropping may be regulated to any rate desired, from less than a drop per second to as many as may seem best. The clearing fluid should probably be added more slowly than the alcohols, and be started in a mixture with 95 per cent. or 100 per cent. alcohol. In placing the small containers in the large glass tube, one should avoid closing either end by contact with another surface. Small animals and some hard tissues may be kept separate by mosquito netting or cloth sacks only.

If the apparatus is used for staining it is well to make new paper labels before infiltrating the tissues with paraffin, as pencil marks are likely to be dimmed if the stain remains in the paper, and consequently difficult to read when covered with paraffin. Paper labels may be avoided by numbering the small glass tubes and keeping complete corresponding records.

Used fluids may be preserved, account being kept on the labels of the number of times used.

EZRA ALLEN

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SPECIAL ARTICLES

SURVIVAL OF ABILITY

HAVING found from two different sources unmistakable confirmation of an earlier research of mine showing that mental evolution is going on to-day through a process of natural selection, I would like to present briefly the results, as the full publication may be for some time delayed.

It is often stated that there are now no forces at work to lead towards increase of brain power, because the primitive struggle for existence has ceased to be operative under present conditions of civilization, in which the weak and incompetent are bolstered up and the poor and shiftless are allowed to have many offspring.

It appears, however, that society is being divided into two classes, a small percentage of "aristocrats" and a large percentage of proletariat.[1] Within the so-called aristocracy there is taking place a genuine process of survival of the fittest in which the more ambitious, successful and intellectually eminent are having a larger number of children than their friends and relatives who are less well endowed.

In studying the royal families of Europe I found this to be the case (see "Heredity in Royalty," 1906). Now I have found it to be the same among Harvard graduates and also in the British peerage.

Mr. A. E. Wiggam, writing in the *World's Work* for November, 1926, page 32, makes comment upon the figures for Harvard graduates, which I sent him as confirmation of a belief I have held for twenty years that by-and-large all good human qualities are correlated and therefore mental evolution must continue. Also such facts give an added justification for eugenics and a brighter outlook for the future of mankind. This point of view is contrary to the attitude of Conklin, Pearl and Castle if I interpret their writings correctly, but is accepted by Thorndike; and I think by Terman judging from this same article by Wiggam.

This announcement of mine regarding Harvard graduates has apparently stimulated a number of people to look up the records and see if it be true. This I gather through correspondence. John C. Phillips writes me that he is finding confirmation. No figures have as yet been published. Those which I possess are for only four graduated classes, '90, '92, '94 and '98. I had hoped to include '96 for the sake of symmetry but the figures as they stand are sufficient to make the conclusion almost certain that judged by the oft-used standard of success, "Who's Who in America," the graduates who are parents of three or more children are a little more likely to be in "Who's Who" than those with less and much more likely than the bachelors. All figures are taken from the class books made up on the twenty-fifth anniversary after graduation, which books have at least the appearance of approximately sufficient care, accuracy and completeness.

PERCENTAGES OF HARVARD GRADUATES IN "WHO'S WHO IN AMERICA," 1924–25

Number of Living Children

	Unmarried	0	1	2	3	4 or more
Class of '90	15.2	19.40	22.92	18.27	24.45	14.26
" " '92	14.75	14.10	18.75	22.81	20.76	18.92
" " '94	6.25	20.0	13.33	18.07	22.45	25.45
" " '98	2.63	12.26	12.64	8.0	8.0	13.73
Averages	9.71	16.44	16.91	16.79	18.92	18.09

It can be seen from the figures that no one would suspect from the data regarding any single class, that any such truth lay buried. Take the Class of '90, for instance, which was the first investigated. Here the unmarried have actually a higher percentage of inclusion in "Who's Who in America" than those with four or more children. The grand average, however, smooths the curve out, giving the two highest percentages at the right, 18.92 and 18.09, with the lowest at the left, 9.71, for the bachelors. The remaining figures are satisfactory though the rise is not perfectly uniform. If we add the percentage of the bachelors to the married without children, and divide by two we get 13.08 for the childless compared with 16.+, 16+, 18+, 18+ for the other four groups. The total number of individual cases studied is well over 1,000, which is the number usually necessary in correlation investigations.

This confirmation of the results from the royal families led me to believe that the same truth would undoubtedly be found in the records of the British peerage, namely, that the more notable or able, are (within any one homogeneous social class), the ones who have the largest number of living children. The well-known "Burke's Peerage" is an exceedingly complete and accurate book. I have divided all the peers (Edition of 1921) into two groups: first those whose male lines are traceable as early as 1450, and second,

[1] See F. A. Woods, "Social Conification," in Proceedings of Second Eugenics Congress, 1921. Published in "Eugenics, Genetics and the Family," 2 vols., Baltimore, Md.