duced four papers or less. The remaining eighth produced over 42 per cent. of the total number of papers. Of the 2,200 papers, one fifth was produced by the one-paper men, 46 per cent. by those writing three papers or less, and one fifth by those producing nine or more papers. Certain special classes, including paleontologists, mineral resource analysts, mineralogists and administrative geologists, include most of the longer individual bibliographies. Of 73 men producing over five papers, 44 belong in these classes; of 17 writing over 10 papers, 14 are so classified.

The average paper written by the one-paper men contained 34 pages; that written by the nine, ten and eleven-paper men grouped contained 17 pages. The average geologist of the entire group produced in the two-year period 2.5 papers averaging 27 pages in length, thus aggregating 34 pages per year. Twenty men in several Canadian Bureaus and Societies (excluding the Geological Survey of Canada) average 68 pages per year, 92 men in state surveys averaged 60 pages per year, 224 men in universities and colleges averaged 45 pages per year and 119 men in the U. S. Geological Survey averaged 38 pages per year.

Seventy-eight institutions appear in the university and college group. Fifty per cent. of the university total and one sixth of the entire amount was produced by men in nine leading universities. The first twenty universities were the source of over eighty per cent. of the university total. One university, Yale, during this period produced considerably over a tenth of the university total, and more than twice as much as the next university.

Among the 32 state surveys which produced a total of about 11,000 pages, the two most productive were the source of one fourth of the total and the first eight produced over 60 per cent. of the whole. It is not to be supposed that analysis of publications of another two-year period would result in identical rank of the various institutions since variations from year to year in any but the larger institutions are considerable. Nevertheless, there have been stated above only those general facts which the writers believe would be fairly characteristic of the composition of any biennium when conditions were not notably different from those during the 1921–1922 period.

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CONCERNING THE ENCYSTMENT OF BUCEPHALUS CERCARIAE

In the October, 1926, issue of the Transactions of the American Microscopical Society, Dr. George R. La Rue makes the statement (p. 274) that the entrance of the Bucephalus larva into the second intermediate host, so far as he was aware, had not been observed. He inferred that they enter the host by penetrating through the surface of the body just as the schistosome and strigeid cercariae are known to do.

I have performed an experiment to observe the method of penetration. A small (two-inch) rock bass was placed in a finger bowl containing a fresh-water mussel (*Elliptio dilatata*) which was rapidly shedding active cercariae. As the fish fluttered about cercariae became entangled on the margin of the fins, especially the dorsal and caudal. Active movements of the fish resulted in many of the cercariae being cast off. After a few minutes the fish was transferred to a watch glass and the movements of the cercariae observed under the binocular. At first the tails of the Bucephalus aided the larva to maintain its anterior sucker in contact with the fin. Many attempts were made to find a place of entry. Gradually the tails became only a confused coiled mass, as the body portion began to penetrate. Within five minutes the body had become separated from the tails and had entered the space between the fin rays. The course of the cercariae is well defined by the bright pink color of the blood corpuscles which gather in its wake. Working by means of a worm-like movement, the cercariae, within thirty minutes of its entanglement on the fin, completes its excursion within the host and begins to encyst.

Encystment usually takes place at the base of the fin rays under the last few rows of pigmented scales. Five hours afterwards active movement was still visible within the cysts. Within twenty-four hours the characteristic clear cysts of Bucephalus are complete. These unpigmented cysts are not very visible to the unaided eye but are easily seen with a microscope. In a ten- to sixteen-inch small-mouthed bass hundreds of cysts may be found, in all the fins, but more especially on the pectorals and the caudal.

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A PROTEST

The author has noticed an ever-increasing tendency on the part of writers of college text-books and of research papers not to conform to consistent conventions and to correct English. Accordingly, he hopes that the following concrete examples may help to ameliorate this inexcusable state of affairs.

(1) The symbol for an electric cell consists of two segments of parallel straight lines, one of which is

much shorter and thicker than the other. The thin longer line and the thick shorter line refer respectively to the copper and zinc plates which, when immersed in dilute sulphuric acid, constituted an early form of cell. The chemical actions involved made it desirable to construct the cell with a much greater mass of zinc than of copper. Hence, automatically and obviously, the longer line in the symbol pertains to the positive terminal and the shorter line to the negative one. Accordingly it should be (as it was formerly) superfluous to print plus and minus signs close to the symbol for an electric cell and it is a useless perversion of convention to reverse the polarity of the symbol. This old convention was looked into and adopted on the occasion of the writing of the second edition of "The Principles underlying Radio Communication" prepared by the U. S. Bureau of Standards for the Signal Corps, May 24, 1921. Nevertheless, in a very recent edition of a composite text-book one author marks the longer line negative and the next author labels it positive.

If the symbol for a lead storage cell consisted of an even number of lines ($2m$) to represent the grids joined to one terminal and an odd number of lines ($2m-1$) to indicate the grids of the other set, would it be at all necessary to label the terminals with plus and minus signs?

(2) By common consent the prefixes milli and micro signify respectively the one one-thousandth (10^{-3}) and the one one-millionth (10^{-6}) part of the original unit. As examples: millimeter, milliampere, . . . microfarad, microvolt, . . . Quite consistently the micron (symbol μ) is defined as 10^{-6} of a meter. Consequently the micro-micron (symbol $\mu\mu$) means (10^{-6}) (10^{-6}) meter or 10^{-12} meter, or 10^{-9} millimeter. The milli-micron (symbol $m\mu$) stands for the one one-thousandth part of a micron, that is, for the one one-millionth part of a millimeter. Such carefully edited publications as the Journal of the Optical Society of America and the Smithsonian Physical Tables use $m\mu$, but altogether too many scientists indicate the wave-length of the maximum of an absorption band in the visible spectrum as "543$\mu\mu$" or "543$^{\mu\mu}$" when 543$m\mu$ is meant. Probably this error arose from the following sequence of folly: 1μ equals 0.001 mm, hence the symbol μ denotes the multiplier 10^{-3}. Therefore $\mu\mu$ must mean (10^{-3}) (10^{-3}) mm or 10^{-6} mm. $\mu\mu$ is closer to an X-unit than to any other common unit.

(3) The singular of data is datum; nevertheless speakers and writers persist in using such combinations as "this data."

(4) The same criticism applies to the use of phenomenon and phenomena, *e.g.*, "this phenomena."

(5) It takes two or more objects to constitute a battery. One Leyden jar is not called a battery even by the confusion makers, a single boiler in a tug boat does not constitute a battery of boilers, a single field piece is not a battery in artillery practice, nevertheless a single electric cell is very frequently referred to as a battery not only in automobile service stations and in radio supplies shops but in laboratory manuals and text-books intended to guide students in the exact science called physics.

(6) The domain of Einstein's wonderful work on relativity affords, in the hands of many over-enthusiastic writers and lecturers, an almost unlimited supply of illustrations of the kind with which the present protest deals. To this extent unnecessary difficulties and hindrances are placed in the way of the general student of the subject.

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SCIENTIFIC BOOKS

A Manual of Plant Breeding for the Tropics. By NEMESIO B. MENDIOLA. xxiii. 360 pp. Manila, University of the Philippines. 1926.

A FOREWORD by Dean Baker explains the occasion for preparing and publishing this book. "The almost total lack of texts in the many lines of modern agricultural science, especially adapted to tropical plants, to tropical crops and to tropical conditions, makes the operation of a modern college of agriculture of full university grade in any of the new tropical countries a most difficult undertaking." Such texts had to be in preparation from the day the Philippine college of agriculture opened, in 1909. The original faculty, five Americans, might prepare one or two of them; but the job as a whole had to be tackled indirectly, by training the men to write them. The college is now almost completely Filipino-manned, and Mendiola's is announced as the first of a series of texts from their pens.

The first forty pages are given to a very concise digest of the principles and methods of plant breeding in general. The comparative brevity of this general treatment indicates the scale on which more particular matters demand space.

Rice breeding follows with fifty pages. There has been a great deal of careful rice breeding, in many lands, during the last two decades, but this is the first comprehensive showing of tests of basic data. The necessity of such a comprehensive study of fundamentals is obvious from two facts: Where pure-line selection has been practiced most perfectly with rice, the result has been a colossal disappointment; and, while the publications on rice hybridization would fill a volume, not one authentic product of artificial crossing has come into farm use. The careful basic work of Mendiola and his students has yet to be applied