an "erroneous impression as to the development of our knowledge of this problem."

In a brief report such as mine, it is obvious that an extended bibliography would have been out of place. It seemed, moreover, advisable not to make any further reference to Dr. Loeb's work because of the following facts:

(a) The mixed stocks used in his experiments were raised outside of his own laboratory and their ages were only approximately recorded, while the mice which I used have been inbred brother to sister under constant observation since 1909, the exact date of birth of each animal being recorded.

(b) Loeb's youngest class of spayed animals was three to six months old at castration; they may or may not have been bred previous to this. He makes no statement regarding this point, whereas my female mice were all castrated within the 28 to 35-day period and were virgins.

(c) In his total of 133 castrated animals, 98 were non-tumorous, while 35, or 26.3 per cent., were tumorous. These findings he considers significantly different from his 63 non-breeding animals (virgins), 44 of which were non-tumorous and 19, or 30.1 per cent., of which were tumorous. It seems that should a probable error be applied to these figures, there would be no significant difference between them. This fact is shown more conclusively if the totals for my experiment, shown below, are compared with his, mentioned above.

Virgin females, 207; Cancerous 20, or 9.6 per cent.; Non-cancerous 187.

Spayed females, 210; Cancerous 21, or 10 per cent.; Non-cancerous 189.

This provides clear evidence that his statement "prevention of breeding has some influence on the cancer incidence in mice but to a much less extent than castration" is entirely unconfirmed by experiments more than twice as extensive as were his.

(d) In that part of his experiment in which he attempted to "feminize" castrated males by implanting ovaries, he used a grand total of 19 animals, none of which developed mammary tumors.

In my experiment 210 animals were used for operation and four developed mammary tumors.[1]

This in turn provides clear evidence that his conclusion that the "transplanted ovaries are probably not able to call forth rhythmic growth changes in the mammary gland . . . and consequently cancer is not induced in such animals as the result of the experimental procedure" is totally contrary to the fact obtained in a series more than ten times as extensive as his own.

Without the positive evidence that it is possible to cause mammary tumors by transplanting ovaries to the bodies of castrated males, the statement that ovarian hormones are one of the factors in the etiology of mammary cancer seems to lack final confirmation. Such proof was not provided by Loeb's work.

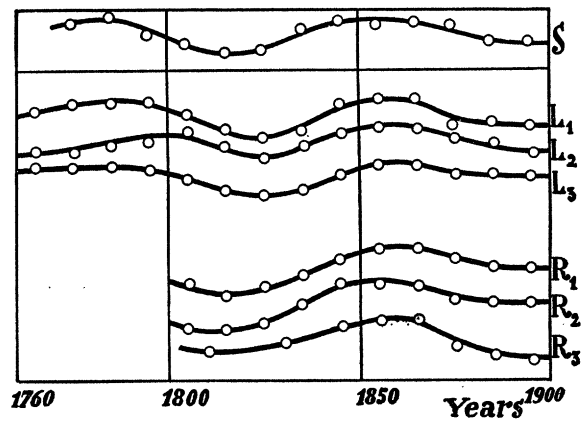
In view of these facts, it still seems that it would have been better had Dr. Loeb not forced a consideration of the earlier papers to which he referred.

WILLIAM S. MURRAY
LABORATORY OF MAMMAL GENETICS,
UNIVERSITY OF MICHIGAN

[1] Since my paper was published, seven additional males in this experiment have developed mammary tumors and many of the animals are yet alive.

## ON A RELATION OF THE SUN'S ACTIVITY TO SOME BIOLOGICAL FACTORS

THE relation between the activity of the sun and different physical and biological factors on the earth can be illustrated by the following curves. The curve S gives the number of sun spots as a measure of the sun's activity (*Wolf*). Curve $L_1$ gives the relative




numbers of births, $L_2$—deaths and $L_3$—marriages for Leningrad and the curves $R_1$, $R_2$, $R_3$ give the same numbers for all the territory of Russia. In all cases there are given *means for ten years*. It would be of interest to find the same relations for other countries.

G. I. POKROWSKI
PHYSICAL INSTITUTE OF THE SCHOOL
OF TECHNOLOGY, MOSCOW

## THE SHARP RATTLING IN STEAM-PIPES

WHEN the water in a cryophorus is at a temperature somewhat above freezing, it is possible to trap bubbles of water vapor in the liquid column by holding the cryophorus horizontally. Under the proper conditions of pressure due to motion of the liquid column, the bubble of water vapor will *suddenly* condense, causing the water surfaces of the bubble to come together with a sharp click.

This observation is at once applicable to the steam in radiator pipes. Most text-books in physics give the following explanation: "The sharp rattling noise in steam pipes is due to the water hammer. A column of condensed water is driven along the pipe by the steam, the cooler steam ahead of the column condenses, and the column of water hammers against the end of the pipe or against a stationary body of water in the pipe." This description of the phenomenon is correct as far as it goes, but it fails to emphasize the fact that for the sharp clicks the whole mass of water vapor between the two surfaces of water (that is, the bubble) *condenses into water instantaneously.*

The observations upon the bubbles in the cryophorus were made by my assistant, Mr. Lee Fullmer, who also differentiated the sharp clicks in the steam-pipes from the duller thud of the water hammer.

R. C. COLWELL

WEST VIRGINIA UNIVERSITY

## SCIENTIFIC OBSCURITY

SINCE it has been my lot for many years to earn my living by translating scientific literature into the vulgar tongue, I have often wondered why the writers made it such hard work to read the original language.

If the difficulty were due to the profundity of the thought or complexity of the reasoning, then it could not be avoided. But I have found that important papers by the deepest thinkers were apt to be easier to follow than those by minor men dealing with comparatively trivial topics.

Nor does the cause of the obscurity lie, as is commonly said, in the use of technical terms. The sports section or fashion page of a newspaper has as specialized a vocabulary as a scientific paper. Many scientists do indeed employ technical language unnecessarily in writing for the outside public, but even where the words are all familiar the meaning may still be obscure.

I have come to the conclusion that the chief reason why scientific literature offers such high resistance to reading is the use of the alternating current instead of the direct in conveying the thought. The writer interposes a negative every few words that reverses the meaning of the sentence. This keeps the reader on the jump.

The asymptotic ideal toward which scientific writing tends is a sentence structure something like this:

> The present writer is indisposed to deny that he is unconvinced of the necessity of refusing to accept the infrequency of negative reactions as a not insuperable argument in disproof of the theory.

Such sentences may be quite logical and free from technical terms. They can be disentangled in time and when straightened out the meaning may turn out to be something simpler than it sounds. But they are constructed like the Chinese boxes, when you get one opened you come on to another. The process of extracting the meaning is like the simplification of a complicated algebraic equation, and in extricating the internested parentheses you are likely to come out with the plus and minus signs mixed.

In conclusion, the present writer is indisposed to deny that he put the wrong title at the top of the letter. It should be, not "Scientific Obscurity" but "Unscientific Obscurity in Writing on Scientific Subjects."

EDWIN E. SLOSSON

SCIENCE SERVICE,
WASHINGTON, D. C.

## SCIENTIFIC BOOKS

*Birds of the Pacific States.* By RALPH HOFFMANN. Boston, Houghton Mifflin Co., xix + 1–353 pp., with 10 color plates, and over 200 black and white illustrations, by Major Allan Brooks. 1927.

THE diversity of native animal and plant life in the Pacific states has long been a source of attraction for students of biology, but beginning acquaintance with the fauna and flora has heretofore been hampered by the lack of suitable manuals. This need is now in process of being satisfied, as during the past three years there have appeared four important keys which will help to unlock the doors leading to accurate knowledge of the western biota. Jepson's "Manual of the Flowering Plants of California" is the first statewide botanical key for California; Essig's "Insects of western North America" is the very first comprehensive western volume in entomology; Johnson and Snook's "Seashore Animals of the Pacific Coast" is the pioneer volume in the popularizing of western marine biology; and Hoffmann's "Birds of the Pacific States," while preceded by other volumes dealing with birds, easily stands premier as a manual for field ornithology in the west.

Most bird students are interested in the living bird, and in the early stages of their interest they are concerned chiefly with the problem of identification in the field. Despite this obvious fact, a majority of the bird books heretofore issued have ignored or given but minor attention to this phase of the subject. Mr. Hoffmann was, and still is, a pioneer in the production of workable field manuals. In 1904 there appeared his "Guide to the Birds of New England and eastern New York" which dealt with "over two hundred and fifty species with particular reference to their appearance in the field." For the novice this volume is still the best field book of birds for the area