The phosphorescent substance shone in the thin film of soil above the gravel and some of these units of light were removed and examined under strong illumination and the source of each was found to be a small round, slender, pink earthworm varying from one half inch to one and one fourth inches in length and about as large in diameter as the small end of a hardwood toothpick. These earthworms have the same color, general appearance and movements as those of the much larger worms usually known as angle or earthworms. The worms evidently lie coiled on or very near the soil surface and are covered by a very thin film of leaf mold, and when this is moved the worms glow with white light. The night the first specimens were found the temperature was standing at 36 degrees above (Fahrenheit), and when the writer put the tip of his finger on the largest one, which measured one and one fourth inches in length, he thought that it emitted a slightly perceptible amount of heat, and this apparent effect has since been observed. The writer's sense of touch perhaps is above the average and he does not believe that this observation is subjective and he would like to see the matter checked with some delicate heat-recording apparatus. On the next night at 11:50 many more phosphorescent worms were found and the temperature then stood at 38 degrees above (Fahrenheit). On the following morning at 7:30 the temperature stood at 32 degrees above (Fahrenheit) and a heavy frost covered everything. The soil was not frozen, however, and the worms still remained on or just beneath the surface and their lights shone brightly when disturbed.

On bringing the worms indoors into a temperature of 60 degrees above (Fahrenheit) it was found to be difficult to get any phosphorescent reaction out of them, but on taking them back outside into the nearly freezing temperature and dumping them onto the cold earth they again glowed when touched.

To determine whether the phosphorescence was in the body of the worm or in the slimy secretion around it one of the largest specimens was washed in water and the light then did seem weak, but when the body of the worm was crushed against a stone and rubbed over its surface the whole area glowed brightly for some seconds. Of what use the phosphorescence is to the worm the writer is uncertain, but the observations thus far made might indicate that the light-producing mechanism may generate enough heat as well as light to enable the animal to remain active during periods of low temperature which inhibit the activity of most lower organisms.

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COMPARATIVE UNIVERSITY STRENGTH IN SCIENTISTS STARRED IN "AMERICAN MEN OF SCIENCE" V-VII

THE accompanying table gives in Column I the number of scientists first starred in 1933 to 1944 which were on the faculties of the universities which had three or more such scientists in 1944. These totals were obtained by a check of the 1944 edition, supplemented by changes announced in SCIENCE.

The leading universities in the number of fairly young starred scientists on their faculties are Harvard, California, Columbia, Chicago, Michigan, Princeton, Stanford, Yale, California Institute of Technology, Massachusetts Institute of Technology, Cornell, Illinois, Minnesota, Hopkins and Wisconsin, with totals decreasing from 50 to 13. Most of these institutions possess a somewhat comparable number of older starred scientists, some of whom are still active workers.

Apparently little or no consideration has been given, in discussion of comparative scientific strength, of the contrasts in size of the faculties. However, this consideration throws interesting light upon what might be called median faculty strength. In brief, what proportion of the staff are distinguished scientists? The second and third columns of the accompanying table supplement Column I. Column II is the number of the members of the teaching staff on November 1, 1944, as officially supplied to Raymond Walters for his "Statistics of Attendance in American Universities"

TABLE 1

LEADING UNIVERSITIES AS TO YOUNGER STARRED SCIENTISTS, WITH SUPPLEMENTARY DATA

	I	II	III	IV	V	VI
Brown	4	157	2.6	8	1,500	0.5
California	41	2,376	1.7	30	2,500	1.1
Calif. Tech.	20	140	14.3	6	....	..
Chicago	30	798	3.8	36	1,500	2.2
Columbia	36	2,488	1.4	13	1,900	0.6
Cornell	18	1,052	1.8	21	1,100	1.8
Duke	3	465	0.6	..	....	..
Harvard	50	1,775	2.8	44	2,700	1.4
Hopkins	16	765	2.1	7	400	1.6
Illinois	18	1,743	1.0	15	1,200	1.1
Indiana	7	467	1.5	5	1,300	0.3
Iowa	10	622	1.6	7	1,500	0.4
Iowa State	4	413	1.0	..	....	..
Mass. Tech.	19	442	4.3	10	....	..
Michigan	30	820	3.7	17	3,000	0.5
Minnesota	18	836	2.1	13	1,900	0.6
N. Carolina	6	311	2.0	..	....	..
Northwestern	12	1,330	0.9	5	800	0.6
Ohio	9	1,123	0.8	10	1,900	0.5
Pennsylvania	14	1,322	1.1	7	1,000	0.6
Penn. State	3	864	0.3	..	....	..
Princeton	26	220	10.2	14	2,100	0.6
Rochester	7	544	1.3	..	....	..
Rutgers	5	444	1.1	3	....	..
Stanford	22	645	3.4	14	1,900	0.7
Swarthmore	3	91	3.3	4	....	..
Virginia	6	270	2.2	..	1,000	..
Wash. (St. L.)	6	468	1.3	7	600	1.0
Wisconsin	13	1,469	0.9	11	1,200	0.8
Yale	22	994	2.2	18	1,200	1.4

(*School and Society,* December 23, 1944). It shows that the teaching staffs of Columbia and California include more than 2,300 persons, while several other universities have more than a thousand teachers. Conversely, some strong schools have fewer than 300 staff members.

Column III is the number of scientists starred in 1933–1944 per 100 members of the 1944 teaching staff. It indicates that in this respect the leading universities are the California Institute of Technology, Princeton, Massachusetts Institute of Technology, Chicago, Michigan and Stanford. Thus the three leaders in total numbers (Column I) fall behind the fourth (Chicago), but three which are among the second five in Column I lead in Column II, and seven surpass Harvard. This is possible because these three specialize in the sciences in which starring is done, while Chicago, Harvard and Columbia, for example, offer instruction in many fields not recognized by starring, the humanities, and the social sciences, law, education and divinity, for example. Column III gives support to the claims of alumni of certain other schools that Harvard's average scientific faculty strength is not as great as Princeton's or Chicago's, for example, despite its leadership in the number of starred scientists on its staff.

Another manner of rating the strength of institutions in so far as it is revealed by starred scientists is the number of alumni who win stars. Collegiate alumni are considered in Columns IV, V and VI. Column IV is the number of scientists first starred in 1933, 1937 or 1944 who received their college degree at the institutions in this list which graduated three or more. It shows that Harvard led with 44 such alumni, followed by Chicago 36, California 30, Cornell 21 and Yale 18. Since enrolments vary widely, an effort has been made to discover the output in proportion to enrolments.

Column V is the approximate number (nearest 100) of undergraduate college men in attendance November 1, 1922, according to Raymond Walters' report (*School and Society,* February 24, 1923). The approximate median date of graduation of these scientists is 1922.

Column VI is a ratio between attendance and starred collegiate alumni. It is based on the reasonable assumption that the 1922 enrolment of men in the college was approximately the average number enrolled during the years when most of the scientists who were starred in 1933–1944 graduated from college. The numeral is the approximate number of starred college alumni per 1,000 male college students. It was obtained by dividing eleven times the enrolment into the number of starred college alumni (the starring was spread over eleven years). Men only are considered, as very few women won stars—only 4 of the 250 starred in 1944. College men, instead of all undergraduate men, are considered because most starred men attended the college rather than the schools of agriculture, engineering or education, for example.

According to the information at hand, presented in Column IV–VI, the leading colleges in the yield of starred alumni of the last three starrings in proportion to size are Chicago, Cornell, Hopkins, Harvard and Yale, with Chicago doing about 50 per cent. better than Harvard or Yale.

Other colleges which have had relatively many of their college alumni starred lately, but for which data comparable to those in Table I are not at hand, are Amherst, California Institute of Technology, Dartmouth, Denison, Haverford, Missouri, Nebraska, Pomona, Oberlin and Swarthmore.

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THE SOCIETY FOR FREEDOM IN SCIENCE

IT has come to our knowledge that statements have been made in the United States alleging that the Society for Freedom in Science is partly a political organization. Such allegations are completely untrue. The society includes members of all shades of political opinion from Conservative to Socialist. It opposes totalitarianism in the sphere of science whatever the political complexion of the Government imposing it.

J. A. CROWTHER
A. G. TANSLEY
JOHN R. BAKER, *Secretary*
Executive Committee of the Society

SCIENTIFIC BOOKS

CLIMATOLOGY

Methods in Climatology. By VICTOR CONRAD. 228 pp + x, 3 App. Index, 46 figs. and 46 tables. Harvard University Press. 1944. $4.00.

THE impact of weather on military strategy and tactics in the present global conflict has confronted innumerable planners and operators, journalists and scientists with "practical" problems in applied climatology—a field which *ante bellum* meagerly supported only a very small "profession." Dr. Conrad's book therefore appears before an eager group of consumers for whom no other adequate guide book on climatological method is available in English. However, readers expecting instructions for correlating clima-