whereas Kansas and Nebraska paleontologists agree that the Broadwater and Rexroad faunas are equivalent in age and that both faunas correlate with that of the Blanco locality. These beds (Rexroad and Broadwater) occur stratigraphically above the horizon of the "algal limestone" and below the horizon of beds of undoubted Pleistocene age (Meade formation in southwestern Kansas, Grand Island and Upland formations in western Nebraska).

It is here proposed that the placement of the Blancan in either the late Pliocene or in the early Pleistocene of the standard time scale be held in abeyance until there is more general agreement among paleontologists as to its age; and that Blancan be used to serve as a provincial time zone for beds and faunas in the Great Plains region younger than the "algal limestone" and older than beds of undoubted Pleistocene age. The use of Blancan in this sense will serve to clarify current concepts with reference to these beds, will afford a uniform regional classification usable by workers in different states, and will avoid exhaustive controversy about a point of correlation that is not yet subject to conclusive proof. Of course, it is to be hoped that continued study of these beds and faunas will eventually lead to general agreement on correlation with the glacial sections of the Upper Mississippi valley and other parts of the world, and with marine beds, and thus effect a placement of Blancan time within the standard time classification.

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SPINACH AND BONE FORMATION

IN some experiments designed to test the availability of iodine as contained in certain vegetables, we have had occasion to feed a commercially prepared powdered spinach (Spintrate) to rats as an addition to a diet that had been successfully used by us as a breeding ration over several years (Purina Dog Chow). Since it has been reported that there is some substance, presumably oxalic acid, present in spinach which interferes with the utilization of calcium for bone formation,[1] it seemed of interest to keep records (Table 1) of food consumption and gain in weight of the different groups during the experimental period, and also to determine the ash content of the dried, fat-free leg bones of the animals at termination. Each group consisted of 10 young rats, equally divided as to sex. The experimental period was 35 days.

On the assumption that fresh spinach contains 90 per cent. of water, the rats which received 20 per cent. of dried spinach consumed an equivalent of 25 grams of fresh spinach per day, roughly proportional to 2¾ pounds in a human dietary of 2,500 calories. Calcium deficiency manifests itself by either decreased bone-ash or stunting of growth or both. Such effects are absent in the experiment reported, neither is there any decline in appetite or efficiency of food utilization.

TABLE 1

Diet	Gain in weight	Daily food intake (Ave.)	Bone ash
Basal	149 grams	12.3 grams	68.3 per cent.
5 per cent. spinach .	139	12.0	69.1
10 per cent. " .	148	12.2	67.4
20 per cent. " .	141	12.3	67.9

Since the basal diet here used is considered to have supplied an adequate amount of calcium for growth, it would seem that spinach, even in such relatively enormous amounts as would never be taken by human beings, would not exert a deleterious effect on growth or on bone formation unless the customary diet of the individual were lacking in calcium.

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PHOSPHORESCENT TEXAS EARTHWORMS

WHEN going down damp woods earth paths at night the writer occasionally has noticed that bright spots of phosphorescence lighted up in the disturbed soil surface after he passed, glowed for a while and then ceased. He also noticed that by scraping a foot over the area the phosphorescent effect could be repeated an indefinite number of times.

On examination of the path with a flashlight nothing was visible which could have caused the illumination. The tentative conclusion then was that the illumination came from soil bacteria or some other form of invisible microorganism which thus reacted to disturbance. However, the phosphorescence glowed in pea-sized balls, which when raked about remained as units in new positions and glowed brightly. While these balls of light sometimes were thickly placed there was no uniform distribution through the soil such as one might expect if bacteria were the cause. This phosphorescent effect usually had only been noticed during the cool weather of fall or early winter. On the night of December 6, 1944, the closing of the writer's garage door activated some of this phosphorescence when the door scraped the soil surface. The idea then occurred to remove the spots of light and examine them under bright indoor electric lights to see if the cause could be located. The area of phosphorescence was on the edge of a gravel driveway which was covered with a thin film of leaf mold composed of the small leaves of the mesquite tree.

[1] M. L. Fincke and H. C. Sherman, *Jour. Biol. Chem.*, 110: 421–428, 1935.

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