MRS. ALEXANDER LOWY has established a fund in memory of her late husband, who for over twenty years was professor of chemistry in the University of Pittsburgh. This fund is to help students in the course leading to the degree of bachelor of science in chemistry or to the Ph.D.

THE two Lynn, Massachusetts, plants of the General Electric Company, employing 25,000 workers, received the Navy "E" on June 19 for excellence in turning out war equipment. The pennant was presented on the same day to the Bound Brook, N. J., plant of the Bakelite Corporation, which produces a synthetic electrical insulation.

Nature writes: "We understand that the trustees of Charles Darwin are considering disposing of original MSS of Darwin's which are in their care. These include the manuscript journal kept by Darwin during the voyage of the *Beagle* (1831–36) on which was based his 'Journal of Researches into the Natural History and Geology of the various countries visited by H.M.S. Beagle . . .'; Darwin's autobiography in his own handwriting with alterations made or suggested by Mrs. Darwin; the manuscript of 'The Effects of Cross- and Self-Fertilization in the Vegetable Kingdom'; the 1844 sketch of 'The Origin of Species,' and a large number of letters and miscellaneous material, most of which has been published. Although this material may contain little of strictly scientific value, it has an obvious interest to the historian of science as revealing the workings of Darwin's mind at different periods of his life, and it would be unfortunate if the material should be dispersed. Such documents should be preserved in a library where access to them can be had by students, and it is to be hoped that some benefactor of science, aided perhaps by the Friends of the National Libraries, or some similar body, may be able to secure them for that purpose."

AT the request of the British Minister of Agriculture, the National Institute of Agricultural Botany has set up a special Seed Production Committee the duty of which will be to take all possible steps to stimulate, coordinate and ensure home seed production. The chairman of the committee is W. Gavin, agricultural adviser to the Ministry of Agriculture.

DISCUSSION

POST-GLACIAL CLIMATIC AMELIORATION AND THE EXTINCTION OF BISON TAYLORI

THE extinction of the late glacial bison species or races variously assigned to *occidentalis, antiquus* and commonly of late designated as *Bison taylori,* has become a matter of more than ordinary interest to the archeologist. Followed on the time scale, as it is, by a closely related and still existing species, its possibilities as an index fossil are considerable. Unfortunately, as in the case of other Ice Age forms, considerable mystery has clothed its demise. Similar mystery attends the first appearance of *Bison bison,* the succeeding form.

Bison taylori has been reported associated with human artifacts over a wide area of the High Plains. In certain instances, however, the identifications were not based upon the evidence of skull characters which are, at the present time, the only diagnostic features carrying entire conviction. To date *Bison bison* remains have not been reported intermixed with the extinct species upon any of these sites, yet it is a reasonable assumption that the two species overlap at some point on the late Pleistocene or early Recent time scale.

Indeed, a recent assertion in Hibben's monograph on Sandia cave[1] as to the presence of a form "near but smaller than *taylori*" leads us to wonder whether a smaller type may not have existed contemporaneously in the southern regions—though the size range in both *Bison bison* and *taylori* is not sufficiently known to clarify the situation, a state of affairs which tends to vitiate evidence drawn from limb fragments alone.[2]

It has been intimated occasionally that climate could not have been a major factor in the extermination of the Pleistocene fauna[3] because these animals survived the great ice movements only to disappear at their close. In the case of certain northern forms, at least, this has always seemed to the present writer like a dubious and wilful inversion of a much more reasonable assumption; namely, that some species adapted to more boreal conditions were poorly adjusted physiologically to the climatic amelioration which attended the recession of the last ice sheet. This is not to assign climate a single role in the process of extinction. It is obvious, however, that under conditions of increased temperature, species contending for survival

[1] Frank C. Hibben, *Smithsonian Miscellaneous Collections,* 99: 33, 1941. See also the present writer's review of this work in *American Antiquity,* 7: 4, 1942 (in press).

[2] Interesting in this connection is the fact that Figgins and others have noted a greater spread in the horn cores of the existing species as one progresses from south to north. Indeed Figgins speculates on the basis of stratigraphic evidence that *Bison bison bison,* which he recognizes as the shorter-horned variety, has extended its range northward in more recent times. (J. D. Figgins, *Proceedings of the Colorado Museum of Natural History,* 12: 26, 28, 1933.)

[3] A. L. Kroeber, "Conclusions: The Present Status of Americanistic Problems," Chapter 34, "The Maya and Their Neighbors," Appleton-Century, New York, 1940.

might undergo delicate alterations in ecological balance, due to reduced fecundity and vitality.[4] It might give, for example, to a more southern variety of otherwise similar habits, a chance to expand over the retreating range once held by a more rugged and cold-resisting form. Ultimately the latter might be bred out or replaced.

Bearing upon this point, there exists a certain amount of data from scattered sources which the writer believes are worthy of some degree of attention and which he has not seen organized with this problem in mind. First and most importantly, we encounter information detailing the effects of hot dry climate upon northern European cattle whose bovidean affinities are not too remote to invite serious analogies with the extinct *Bison taylori*. This latter animal, slightly larger and undoubtedly heavier pelted than the existing buffalo, moved in a cooler and more humid world than the historic species. Almost certainly he was capable of enduring more difficult winters. What happened, then, when the ice fell back?

The information dealing with European cattle, to which we now proceed, suggests a tentative explanation. Though climate may influence animals indirectly through its effect upon pasturage, for example, experimenters with live stock have noted that for these animals "there are optimum climatic conditions under which they will develop and produce best within the limits of their inherent capacity."[5] Many observations testify to the reduced vitality of European cattle under higher temperatures both as to milk production and fertility. Exposure to strong sunlight in summer causes a higher respiration rate, and the rise in body temperature indicates increased difficulty in the reduction of body heat. It has been observed that in hot climates cross-breeding of European cattle with tropically adapted bovids strengthens and improves the strains, suggesting favorable genetic distinctions in the ability of the southern types to adjust to warmer conditions.

Now the available evidence upon *Bison bison* suggests that in terms of ruggedness of physique, the northern phase or variety *Bison bison athabascae* approached most closely to the extinct *Bison taylori* in size.[6] Can it not be reasonably suspected, then, that *Bison bison* may have existed originally as a southern variant which, by reason of greater adaptability to heat and perhaps more impoverished and less succulent grazing conditions, expanded its range in the closing Pleistocene or early Recent at the expense of its larger and less heat-resisting relative? The paleontologist Hay, as a matter of fact, suggested as long ago as 1913, albeit in the course of a somewhat cursory survey, that he had noted some skulls referable to *B. occidentalis* "which might be looked upon as illustrating the transition from *B. occidentalis* to the existing American buffalo."[7]

The taxonomy, the morphological distinctions or relationships between the late Pleistocene bisons have never been examined with satisfactory thoroughness. Differences of opinion exist as to the relationship of these with the living form which can only be elucidated by more thorough anatomical and statistical studies than now exist. Perhaps, however, some of the assignments of southern limb fragments found with the Folsom culture are not valid in the light of hints of sizes ranging within *B. bison* specifications or not indicated at all. At all events the writer's purpose will be attained if this discussion leads to a more serious examination of the whole problem. The range, the intergradation of characters (if such exist) between *B. bison, B. bison athabascae*[8] and *taylori* should help greatly in clarifying a situation which has archeological as well as paleontological implications. Such a study, be it observed, will have to consist of more than the recording of the measurements of an occasional fine bull, of whatever species, and will have to take account of a possible progressive specific change which began earlier in the South.

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UNFERMENTABLE REDUCING SUBSTANCES IN MOLASSES

WHEN pure invert sugar is heated at P_H 4.5 over a period of ten weeks at 55° C, a considerable quantity of material is formed which is not fermented by bakers' yeast. From the unfermentable residue of sugar thus treated we have isolated a product with the following properties: It is acid to litmus, soluble in water and glacial acetic acid, and it vigorously reduces both Fehling and Tollens solutions and gives no positive murexide test. It melts with decomposition at 226.5° C.

Quantitative analysis:

C 45.11 per cent.	H 6.67 per cent.	N 8.57 per cent.
	P 3.79 per cent.	

[4] Even the living species, as pointed out some years ago by Seton, in spite of its vast numbers was subject to enormous losses from prairie fires, floods and blizzards, which led Seton to comment that it could have done no more than hold its own in the struggle for survival. (Ernest Thompson Seton, "Life Histories of Northern Game Animals," Vol. I. Scribners. New York, 1909).

[5] A. O. Rhoad, "Climate and Livestock Production," *1941 Yearbook of Agriculture*, Washington, D. C., 1941, pp. 508–516.

[6] E. H. Barbour and C. B. Schultz, *Bulletin Nebraska State Museum*, 1: 435–436, 1936. Seton, *op. cit.*, p. 250. S. N. Rhoads, Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. for 1897, pp. 499–500.

[7] O. P. Hay, *Proceedings of the U. S. National Museum*, 46: 176, 1913.

[8] S. N. Rhoads (*op. cit.*) expressed the view that *B. b. athabascae* was taxonomically intermediate between *B. bison* and the most recent fossil species.