Place. The dining quarters and the kitchens will be far enough advanced to accommodate the number of undergraduates who formerly took their meals at "Commons," comprising about one thousand students.

DR. WALTER A. JESSUP, dean of the college of education at the State University of Iowa, has been elected president of the university, to succeed Dr. Thomas H. Macbride, the botanist, who retires at the age of sixty-eight years.

HOWARD C. PARMALEE, of Denver, has been elected president of the Colorado State School of Mines at Golden.

AT Dartmouth College, Charles N. Haskins has been promoted to be professor of mathematics on the Chandler foundation, Norman E. Gilbert has been promoted to be associate professor of physics and Arthur B. Meservey to be assistant professor of physics. Carl C. Forsaith has been appointed instructor in biology.

W. S. MILLER, of the department of anatomy, at the University of Wisconsin, has been promoted from associate professor to professor of anatomy.

STANLEY C. BALL, Ph.D. (Yale, '15) has been appointed instructor in zoology in the Massachusetts Agricultural College. Frank N. Blanchard (Tufts, '13) has resigned from the department in order to enter the graduate school of the University of Michigan.

DR. T. G. MOORHEAD has been elected professor of the practise of medicine in the School of the Royal College of Surgeons in Ireland, in the place of Sir John Moore, who has retired.

DISCUSSION AND CORRESPONDENCE

NORTH AMERICAN FAUNAL AREAS

A VERY interesting discussion of the geographical distribution of the fresh-water faunas of North America[1] has recently been published by Mr. Louis Germain. This author reviews the works on this subject by American authors in a very able manner and the paper is a valuable contribution to the literature of this subject. There are several statements, however, which probably will not be accepted by all American zoologists. Germain accepts Simpson's[2] division of the continent into the Pacific, Atlantic and Mississippian regions as representing the best and only natural division into faunistic areas. The subdivisions by Dall[3] and Baker[4] are believed to be too complex; and the latter author is criticized for establishing so complex a subdivision of the territory based on the data supplied (apparently) by a single small division of animals. But the facts are that the map on page 57 of the Lymnæa monograph was made not only from data furnished by the Lymnæas, but also by all of the families of basommatophorous mollusks, *Planorbis, Physa,* etc., the data for which was secured while working upon the Lymnæid monograph. Not only, however, do the families of Basommatophora fit into this detailed scheme, but it is quite possible that all of the fresh-water mollusks, gastropods as well as pelecypods, may be included. The Amnicolidæ, Pleuroceridæ and Viviparidæ, as well as the great Unionidæ family, have many groups of species which are confined to some one of the divisions indicated by the map in question.

As the writer has already stated in the Lymnæa monograph, the distribution of fresh-water mollusks, or for that matter of any fresh-water group of animals, can be understood only by a study of the river systems, past and present. It is more frequently the natural divides separating river drainages that form the boundaries of faunal areas rather than the presence of mountain chains, which indeed do not always afford a barrier, but a means of communication, as, for example, Two Ocean Pass in Wyoming, at the summit of the continental divide, where the head waters of the

[1] "L'Origine et la Distribution Géographique des Faunas d'eau Douce de L'Amérique du Nord," *Annales de Géographie,* No. 32, XXIII–XXIV. année, pp. 394–406, 1915.

[2] C. T. Simpson, "Synopsis of Naiades," p. 505.

[3] W. H. Dall, "Land and Fresh-water Mollusks of Alaska," p. 1.

[4] F. C. Baker, "Lymnæidæ of North and Middle America," p. 56.

Yellowstone and Snake rivers mingle during the wet season and afford a means by which fresh-water animals have crossed from one drainage to the other. The dispersal of all fresh-water forms has been normally by means of the changes in river systems, the fauna following up the river as the head waters of the latter work their way into new territory. Frequently, ancient changes in streams, incident to piracy or beheading, etc., may be known long afterward by the peculiarities of the fauna inhabiting the present river system, indicating many times that the present system is made up of several ancient systems. A case in point is the Tennessee River system which has been shown by C. C. Adams,[5] from a study of the distribution of the molluscan genus *Io*, to be made up of several smaller systems once separated by divides. Ortmann's studies on the Unionidæ and the crayfishes also bring out the value of distributional areas by river systems. The peculiar physical changes in the Ohio River previous to and following the glacial period, will doubtless be reflected in the fauna, both recent and extinct, when detailed studies are made bearing on this subject.

The point which the writer wishes to bring out and emphasize is that while it is true that there are the three primary divisions as indicated by Simpson and so strongly advocated by Germain, there are also in addition many smaller divisions which form precise faunal areas just as true and natural as the three major areas. The true relation of the different fresh-water faunas can only be determined by dividing the continent into areas separated by natural water partings, as has been done by Dr. Dall and the writer. That too many divisions have been made by the writer in his Lymnæa monograph may be true and is to be expected in a first attempt, but the method is the only satisfactory one for the study of fluviatile animals, a statement in which I am sure all American students will agree. Studies from this standpoint, however, have not yet been made in sufficient number and detail to work out a comprehensive scheme of subdivision. It was with a view to stimulating such studies that the map in question was published.

Germain (page 397) criticizes the author for his statement (page 84) that "It is not believed by the writer that the supposed land connection with Europe via Greenland contributed to any extent in the formation of the present Lymnæid fauna," and states that it is dangerous to base a general conclusion on a particular case. The statement was not based on the Lymnæidæ alone, but on the whole Basommatophorous group, the exotic species of which, from the data at present known, seems to have reached America by way of Alaska rather than by the Greenland connection. The absence of such striking forms as *Lymnæa stagnalis, Galba palustris* and *Aplexa hypnorum* from the Greenland fauna and their presence in the Alaska fauna is tangible evidence, to say the least. It is of course possible that this condition is due to a lack of sufficient detailed field work in northeastern America, but until this has brought to light the missing data the deductions must remain as based on present information. The invasion from Siberia was evidently contemporaneous with that of the larger mammals which occurred in the late tertiaries. The northeastern land connection is thought to have been used by several mollusks (Margaritana and some helices) and it would be strange indeed if some fresh-water mollusks of other groups did not also take advantage of the land bridge. However, in this as in other things the deductions must be based on the available facts and not on theories. The discovery of the European land snail *Tachea hortensis* in Pleistocene deposits[6] goes a long way toward establishing the existence of a northeastern land connection in late Tertiary time.

The critical study of the fresh-water faunas of many states and the ecological work of several universities is providing a mass of data which will ultimately afford the material for a satisfactory division of North America into natural faunal areas. It is quite possible, however, that it will be difficult to establish a system that will include both fresh-water and ter-

[5] National Academy Sciences, Memoir XII., No. 2, 1915.

[6] C. W. Johnson, *Nautilus*, XX., p. 73, 1906.

restrial species, the methods of dispersal being different in the two classes of animals.

FRANK COLLINS BAKER
NEW YORK STATE COLLEGE OF FORESTRY,
SYRACUSE UNIVERSITY

"SAME"—EDUCATIONAL EXPERIMENT STATIONS

TO THE EDITOR OF SCIENCE: I have read with much interest the bill of Senator Newlands for the establishment of engineering experiment stations and heartily approve "same."

It is especially gratifying to note that bulletins giving results of investigations "shall be sent to persons, newspapers, institutions and libraries . . . as may request same" (Sec. 3, SCIENCE, p. 891).

In connection with "same" it is interesting to note that the use of the word "same" without "the" before it, which formerly was considered a sign of illiteracy, has now so far become customary that it may be allowed in a bill introduced in the Senate of the United States, and that both "same" and "as" may be used as relative pronouns.

The bill for the establishment of engineering experiment stations should be passed, after it has been improved by the Senate's grammatical censor. It is to be hoped that some day in the near future another bill will be introduced in the Senate for the establishment of one or more Educational Experiment Stations. The government, through its Agricultural Experiment Stations teaches the farmer how to raise crops; through its Bureau of Mines it teaches the mine owners how to mine coal and to avoid wastes of property and of life; should it not have Educational Experiment Stations to teach our schools and colleges how to avoid educational wastes?

WM. KENT

SCIENCE AND WAR

TO THE EDITOR OF SCIENCE: The Boston Sunday *Herald* prints a feature called "Herbert Kaufman's Weekly Page." It must be popular, though the writer has never heard it quoted—in contrast to this paper's apotheosis of American wit, the "Line o' type." The page is a collection of moral sentiments in a form to which no one can deny a frequent force and picturesqueness. Its dominant appeal is emotional. A few issues since it contained an appreciation of science running in part as follows:

> For half a century we have liberally endowed, supported and encouraged the scientists. Community funds paid for the institutions in which they were educated and underwrote their experiments.
>
> And all the while, we believed that these endeavors were promotions in the interest of civilization. . . .
>
> To-day we stand horror-stricken before the evidence of inhumanities only made possible through scientific advancement. . . .
>
> Chemistry, you stand indicted and shamed before the Bar of History! . . .
>
> You have prostituted your genius to fell and ogrish devices. . . .
>
> You have turned killer and run with the wolf-pack.
>
> But we will reckon with you in the end.

We can probably agree with Mr. Kaufman that science has increased the amount of suffering that war inflicts. No account need be taken here of the questions if this is due to science or human nature, and if the compensations are not sufficient; the second because it admits an endless argument, and the first, of none. The issue boils down to whether, if the encouragement of science on the broad lines of the past were abandoned, the horrors of war would be proportionately lessened.

This would be conceivably so if it were humanly possible to restrict scientific work to lines of no value for warfare. But success in war is as keenly desired as ever, and it is the part now of every prudent nation to equip itself in the best practicable manner for carrying it on. The writer has elsewhere remarked on the commonplace that victory is not to the side that can exert the strongest physical force with its own bodies but which can most intelligently direct the forces of nature. If the total amount of scientific work were thus restricted the human result would be to concentrate the work of science more and more upon warlike matters with a consequently increased social suggestion of war. A liberal encouragement of scientific progress serves to diffuse men's energies over other and more peaceful interests. To blame chemistry for the horrors of