tators than the old game ever did. It is now played in most of the leading high schools of California. It is firmly and permanently established on the Pacific Coast, unless, as in the East, it is modified to suit the purposes of professional coaches. It seems to me that our experience in California should be worth something to our colleagues in the East.

Very truly yours,

David Starr Jordan

UNIVERSITY AND EDUCATIONAL NEWS

The medical school of the University of Pennsylvania has been given $100,000 by an unnamed alumnus to endow a chair to be known as "the Benjamin Rush professorship of physiological chemistry."

The valuable library on mathematics and science of the late Oren Root, for many years professor of mathematics at Hamilton College, has been presented to the college by his son, Mr. Elihu Root.

The dedication of three new engineering buildings at the University of Kansas occurred on February 25. The buildings are those provided for by the legislature of 1907, and are a general engineering building, housing the departments of civil and mechanical engineering and, as a temporary matter, the department of electrical engineering; a mining and geology building, and the mechanical laboratory and power plant. In the afternoon, at 2:30, addresses were given by Dean Frank O. Marvin, Dr. Richard C. Maclaurin, president of the Massachusetts Institute of Technology, and Mr. Ernest R. Buckley, president of the American Mining Congress. Following these were the dedication ceremonies, under the direction of Chancellor Frank Strong. In the evening a banquet was held at Robinson Gymnasium, with after-dinner speeches.

The Dutch government has appropriated $100,000 for a laboratory of physical and mineral chemistry at Groningen, where Professor F. M. Jaeger is head of the department.

Dr. Bertram E. Boltwood has been elected professor of radio-chemistry in the graduate school of Yale University.

Professor Seitaro Goto has been called to the chair of zoology at the Tokyo Imperial University to succeed the late Professor Kakichi Mitsukuri. Naohide Yatsu, Ph.D. (Columbia), has been appointed assistant professor. Katashi Takahashi, Ph.D. (Chicago), has been appointed to the professorship of zoology at the First High School to fill the vacancy caused by the resignation of Professor Goto.

DISCUSSION AND CORRESPONDENCE

A SUBSTITUTE FOR CROSS WIRES IN THE SPECTROSCOPE

To the Editor of Science: Should any of the readers of Science be in possession of spectroscopes which are unprovided with cross wires, it may interest them to learn of a cheap method of supplying a substitute for such desirable articles, which has been found of service in this laboratory, and which, so far as the writer knows, has not hitherto been published.

The method consists in inserting, either in the ocular, or telescope tube, at the proper focal point, a thin glass disc on which is etched a cross with lines about as heavy as the wires in an ordinary cross wire eyepiece. This cross, when in focus, appears as perfectly opaque lines, which fully answer the purpose of cross wires.

These discs have been in use here for some time, and their working has been compared with that of the regular cross wire eyepieces without any difference between the two being noticed. In fact, the cross wires of one of our instruments being somewhat too heavy, we removed them, and substituted a ruled disc with manifest gain in ease of working. The glass disc does not seem to obscure any portion of the spectrum; all portions, both of emission and absorption spectra, having been observed therethrough with instruments of various powers, both prism and grating, without any appreciable loss of either brightness or definition.

For observing a bright line spectrum it is

advantageous to have one of the cross lines made shorter than the width of the spectrum. The disc is then so placed in the instrument that this short line is vertical, and hence parallel with the spectrum lines. Under such circumstances, when this short vertical cross line is placed over a bright spectrum line, the latter is seen extending above and below it, and the small dark *ends* of the cross line being thus brought prominently in view, materially assist in marking the spectrum line upon which they are placed. The horizontal arms of the cross are, in this case, of no particular advantage in marking the spectrum lines, but they facilitate the finding of the optic axis of the telescope, and, where the instrument is provided with an illuminated scale, help to align the same. It is best to so place the scale that one end of the short vertical line reaches about the middle thereof.

Various devices may be employed to fix the disc in the spectroscope. If the instrument is provided with a negative ocular, the disc may be placed against the diaphragm, and held in position by a spring wire. It is well in that case to provide the ocular with a sliding eye lens, which can be cheaply done by any good brass worker. If the instrument has a positive ocular and a diaphragm in it, or in the telescope tube, the disc may, as before, be laid against the diaphragm, and if such is in the telescope tube, focused by sliding the ocular, or if that be fixed, the diaphragm may be moved till the cross lines are in focus. Where there is a positive ocular and no diaphragm, as is the case with some instruments, the disc may be cemented to a brass ring of proper diameter to fit snugly inside the telescope tube, and the proper position having been found, the ring can be so set that the cross lines will be at that point. Each of the above devices has been tried in this laboratory and found satisfactory, and others will probably suggest themselves.

It is true that such devices do not always succeed in making the center of the cross and the axis of the telescope coincide; but this is the case in but few cross wire spectroscopes, and, for that matter, a spectroscope is not a transit, and does not require such a rigid adjustment of the line of collimation as the latter instrument. If the center of the cross is at the center of the disc, and the disc fits its tube snugly, the cross lines will be sufficiently centered. Were an absolutely accurate adjustment of the line of collimation worth the cost, it could be secured by inserting an adjustable ring at the proper focal point and attaching the disc thereto.

The same method of supplying cross lines answers equally well for microscopical observations, either for goniometric, or for polariscopic work; in fact, it was from noting its utility in such microscopic work, that the idea arose of applying it to the spectroscopic investigations.

Several of the above-described discs have been made for this laboratory by the Bausch & Lomb Optical Co. and they have given perfect satisfaction. C. M. CLARK

NOTE ON SOME PENNSYLVANIA FISHES

DURING the warm weather of 1908 and 1909 Mr. R. W. Wehrle, of Indiana, Indiana County, Pa., made a number of collections of fishes, amphibians and reptiles, from his vicinity. As almost all animal life is either extinct or rapidly becoming so in the main basin of the Conemaugh River, possibly the following list will be of use in partly recording a vanishing fish fauna. I take this opportunity to thank Mr. Wehrle for his care in collecting full series of specimens, besides notes and information relative to the former condition of the fish fauna. *Notropis photogenis* and *Micropterus dolomieu* are from Cherry Run and all the others are from Two Licks Creek, besides such other streams as may be mentioned after each. *Ichthyomyzon concolor, Salvelinus fontinalis, Campostoma anomalum,* also from Ramsey's Run; *Pimephales notatus,* Ramsey's Run, Harris's Run, Cherry Run and Marsh Run; *Semotilus atromaculatus,* Ramsey's, Harris's, Cherry and Marsh Runs; *Leuciscus elongatus,* Ramsey's and Harris's Runs; *Notropis cornutus,* Ramsey's and Cherry Runs; *N. atherinoides,* Cherry Run; *Ericymba buccata,* Cherry and Ram-