E scarlet	S white	5 white
F pink	T red	6 white
G — — —	U golden brown	7 golden
H yellow	V gray	8 brown
I white	W — — —	9 red
J white	X — — —	0 black
K — — —	Y white	
L — — —	Z red	
M olive green		
N olive green		

Although I have never associated colors with letters or figures, from my earliest recollection I have always thought of letters and of figures arranged in the relative positions shown on page 395. The origin of this I do not know. It might have been something in the presentation of these things by my first teacher, or the manner in which little wooden sticks were laid out on my desk in the first number work. These little sticks, each about 3 mm. in diameter and 20 mm. long, had been split out of pine for me by my father. Occasionally I used to chew up one of them, because it tasted sweet.

Arthur B. Smith

Evanston, Ill.

QUOTATIONS

WAR AND ENGINEERING EDUCATION

Last week some 500 colleges opened their doors to receive some 150,000 students. These young men were inducted into the Students' Army Training Corps and have thus become candidates for commissions in the army. The part of the engineering colleges will be to train men especially for the Engineer Corps, the Signal Corps and the Chemical Warfare Service, and it may be noted with pardonable pride that the training previously given in engineering is considered the best preparation for these branches of the service. Under the new regime, however, the maximum time allowed for the full engineering course is two years, including work in the summer quarters, and the further training of men with advanced standing will be curtailed accordingly. Each college will be expected to outline its courses much on its own initiative, especially for men who have already spent a year or more in that institution.

At this stage of the development of engineering education for war we are reminded of the work done by teachers in the engineering colleges beginning a year ago last May, when they were asked on about two weeks' notice to prepare to receive men for training in military aeronautics. While the lecture material and laboratory apparatus were collected and arranged under difficult circumstances, the officers in responsible charge in Washington were enabled to choose the best methods developed in the six different schools and thus quickly arrange a satisfactory training course. It is to be hoped, however, that the engineering colleges will not follow in the footsteps of the aviation schools in at least two respects. It seems undesirable to put civilian instructors in uniform and certainly a mistake to have them decorated with brevet officers' bars. An instructor with any character should have no trouble in gaining the respect of his classes in this serious undertaking. Again, in the matter of standardization we trust the engineering colleges will not make animated phonographs of their teachers.

It is quite evident that the War Department has outlined an excellent device for producing a high grade of men to lead the army. Those who are left behind in their college work are transferred to army cantonments, while those who complete their college courses with credit are sent to officers' training camps and there must prove their ability to handle men before they receive commissions. Only the most capable men will survive such tests.

While we are thus assured that the primary purpose of developing a high class of officers will be attained, it is interesting to speculate upon the effect of this intensive training on engineering education. Much of the preliminary work in mathematics, languages and science will be eliminated or curtailed, and we shall have an opportunity to view the results of this system of education, provided that the war lasts several years. On the one hand, it is doubtful if these men will have the training which will probably be required for meeting the tremendous problems of reconstruction. It would seem desirable, therefore, to encourage them to complete their engineering prepara-

tion after the war, and the plan of giving credit for the intensive war courses toward a degree in engineering should be adopted. On the other hand, it is reasonably certain that the character of the men who complete the new engineering courses will be excellent, and the colleges should insist upon this high standard of scholarship and character after the war.—*The Electrical World.*

SCIENTIFIC BOOKS

Annals of the Astronomical Observatory of Harvard College. Vol. 79, Part 1. 4°, pp. 86; Vol. 83, Part 2, 4°, pp. 28; Vol. 91, 4°, pp. 290. Edward C. Pickering, Director. Cambridge, Mass. 1918.

The *Annals of the Harvard College Observatory* occupy a unique position in the literature of astronomy by reason of their great extent and the wide range of subject matter included in them. Collectively they form an impressive memorial to the indefatigable director who has inspired the production and publication of more than three fourths of the four score volumes composing the series. In diversity of subject matter, in successful coordination of effort and in condensed presentation of material the three volumes briefly cited above are typical of the institution from which they come.

The first of the three, prepared by Leon Campbell, contains observations of three hundred and twenty-three variable stars made during the years 1911-16, in continuation of a program commenced twenty-two years earlier. In accordance with the general policy of the observatory its purpose is the accumulation and preservation of reliable data for future study of the changes in the amount of light received from stars of the class designated variables of long period. These changes of brilliancy are notoriously irregular in character and our knowledge of the causes upon which they depend is only fragmentary. The relation between these causes and the data furnished by the present volume is committed to the future investigator.

The second volume cited, prepared under the direction of Alexander McAdie, lies in the very different field of meteorology and contains observations made at Blue Hill Observatory (Mass.) in the year 1917. Apart from a brief preface the work is wholly tabular in character and contains both in detail and in summarized form the customary meteorological data.

The last of the volumes named above, prepared jointly by Annie J. Cannon and Edward C. Pickering is an initial installment of the Henry Draper Catalogue of Stellar Spectra, to be completed in seven more similar volumes. For the most part its pages are tabular in character and are intended to place at the disposal of the theorist, data as accurate and as extensive as can be derived from the great store of Harvard photographs of stellar spectra, relative to the spectrum and magnitude of a great number of stars, so chosen as to be typical of every part of the sky. These photographs, taken partly at Harvard and partly in Peru, have been laboriously examined and classified by Miss Cannon and others and the result of four years of such labor is a catalogue showing as its chief data the magnitude and the spectral type for more than 200,000 stars. The classification is naturally upon the system originated at Harvard and now in general use, in which for the most part, stellar spectra constitute a continuous sequence whose chief divisions are represented serially by the letters B, A, F, G, K, M, with subdivisions of these classes upon a decimal system. The physical significance of this series is recognized to be of fundamental importance in every investigation of the larger problems of stellar astronomy. In accordance with its distinctly enunciated plan that we have noted above, the present volume is devoted to the preparation of material out of which the implications of this series may be worked more perfectly than has yet been done. As a contribution to that end the introduction to the volume contains explicit definition and illustration of each spectral class and of many of their subdivisions, presented in brief but very convenient form.

The three volumes are worthy additions to a long line of predecessors whose characteris-