is not familiar is to befog and not to illumine the subject."

The transition from mathematics which "develops the quantitative reasoning power and ability to think mathematically" to the application of this power to concrete problems is one of the hardest steps to take and—in spite of the Perry movement—it is the province of physics to help the student to make this step. Realizing this difficulty we have introduced in the course of physics for engineering students of the University of Iowa "problem hours," *i. e.,* the class is divided into small sections spending under the supervision of an instructor one afternoon a week in the solution of concrete problems. The results are highly satisfactory. Of course there are always some "abstract" thinkers who are unable to grasp the meaning of the problems, and the sooner they are made to see that they were not meant for engineers the better.

The only objection to the introduction of the problem hours is that too little time will be left for experimentation and recitations. The engineering courses are so overcrowded with "practical" subjects that the fundamentals, mathematics and physics, are more and more crowded into the background. Make the foundation broad enough to build upon it the increased number of technical courses. Give us more time and, if necessary, lengthen the engineering course. The University of Minnesota has already done so and its good example should be followed in other institutions.

The time given to physics should be one and one half years. Where the entrance requirements are sufficiently high the study of mechanics in physics may well be taken up in the second half of the first year, after the course in trigonometry has been completed and before the students have forgotten what they have learned in it. The whole semester should be devoted to this subject, while the whole of the second year is given to the remaining part of physics, taking advantage, during the latter part of the course, of the training in calculus.

Thus in closely correlating the two necessary elements, (1) the teaching of methods and principles of mathematical thinking, in the courses in mathematics and (2) the application of these methods to concrete problems, in physics, the student will be properly prepared to take the last step, namely, to obtain technical results, in his engineering courses.

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CONCERNING THE REAL UNICORN

In a certain issue of Science (February 2, 1906, Vol. XXIII., p. 195) Mr. C. R. Eastman contributed an exceedingly interesting article under "Notes on the History of Natural Science," on "The Real Unicorn." In setting forth the facts as to the origin of this fabulous animal, brought to the notice of the western world by Ctesias, Mr. Eastman concludes that the source of this strange creature of the medieval mind is to be traced to certain relief profiles described by Ctesias as graven on the walls of the Persian court at Persepolis and figuring some "Asiatic ruminant new to the Greeks, with the two horns appearing in side-view as one." To the animal so depicted Ctesias gave the name of "unicorn" or "monoceros."

Unquestionably Mr. Eastman's view as to the unicorn's zoological position is probably close to the real facts. It remains to determine, if possible, what species of "Asiatic ruminant" can stand sponsor for the fabulous creature. Some horned beast known to the ancient Persians, the horns of which would appear as a single horn in profile and would point forward when the animal's muzzle was held downward as in the defensive attitude or when grazing, could be the only one so pictured as to give rise to the idea of a "unicorn" or "monoceros." Such a beast, I think, may be seen in the male Nilghai (*Boselaphus tragocamelus*), an Indian antelope, ranging at present from the southern foothills of the Himalaya to beyond Mysore, though most abundant in the central parts of Hindustan. Any one standing alongside of a Nilghai can see at once how the spike-like horns spring straight upward, bending slightly forward, and how the near horn hides its fellow.

The knowledge of this animal would undoubtedly have reached the ancient Persian civilization from the trans-Indus region, and the artists of the period would very naturally have graven but a single horn in bas-relief profile. Further evidence that this animal was known to the ancient Persians is to be found in the name itself—"Nilghai," or "Nylghau," being of Persian origin and meaning "blue bull." The species first became known to the modern world of Western Europe about 1745, and was described and figured in *Philosophical Transactions* for that year by Dr. Parsons, in a paper entitled "An Account of a Quadruped brought from Bengal, and now to be seen in London." In *Philosophical Transactions* for 1770 Dr. William Hunter published a very full account of this animal from living specimens brought to England, and bestowed upon it the native name "Nylghau."

As the unicorn of Ctesias failed to materialize in the fauna of any country, it was relegated to the land of fabulous creatures, and became conventionalized in the art of the ancient and medieval world. If, as Mr. Eastman points out, its origin is to be found in the bas-reliefs on the walls of Persepolis, then, undoubtedly, it must have been a figure from some living prototype, and this prototype could, it seems to me, be none other than the Nilghai, the only Asiatic ruminant with horns so placed as to give rise to such a conception.

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SCIENTIFIC BOOKS

A Manual of the North American Gymnosperms, exclusive of the Cycadales, but together with certain exotic species. By DAVID PEARCE PENHALLOW, D.Sc., MacDonald Professor of Botany, McGill University, 8vo, pp. viii + 374, with 48 text illustrations and 55 plates. Boston, Ginn & Company, The Athenæum Press. 1907.

The book is prepared for "working botanists," "engineers, and especially foresters." For the latter the author hopes that his histological diagnoses may be of great value in the difficult task of identifying the various species of coniferous woods in the absence of the usual botanical data. The author tells us that

> The present work had its origin in 1880 in an attempt to construct a system of classification for the North American Coniferae based upon the anatomy of the vascular cylinder of the mature stem. The fundamental idea was that such a classification would prove of great value in the identification of material used for structural purposes, but investigations had not been carried very far when it became manifest that some such arrangement was imperatively demanded in other directions and for purposes of a more strictly scientific character.

The author here refers to the value of such data in the study of fossil plants.

The book is divided into two parts, the first, devoted to the general anatomy of the conifers, covering half of the volume. In this the reader or student finds very useful general directions for the preparation of material, discussions of growth-rings, tracheids, bordered pits, medullary rays, wood parenchyma, resin passages, etc. In part second the author arranges and describes the genera and species of North American Gymnosperms (exclusive of Cycadales) under three orders, viz., Cordaitales (including the extinct *Cordaites,* and the surviving *Dammara,* and *Araucaria*), Gingkoales (including the surviving *Gingko*) and Coniferales (including seventeen genera of surviving or recent gymnosperms). Here we have the species of each genus separated by means of a convenient key. Then we have the species arranged systematically, and in each case the scientific name is first given, with a citation of the authority. Next follows a paragraph descriptive of the transverse section, a second for the radial section, a third for the tangential section. For extinct species the mode of fossilization and the geological position are given, while for living species data are given as to specific gravity, fuel value, strength, etc., and geographical distribution.