mathematics. That a student succeeds well in Euclid does not argue that he will be a mathematician or even a lover of mathematics. Every teacher of experience knows how often his hopes, built on success in Euclid, have been dashed to the ground when the pupil began analysis. Euclid gives no hint of the mathematics which is to follow, and hence does not seem to fit in as an integral part of the science. Many of the proofs are long and tedious, with no hint whatever as to the method by which they were originated. The traditional limitations surrounding Euclid narrow the field of work by excluding almost all other mathematics, and thus must necessarily reach results that are special. The student who wishes to go on in mathematics finds himself almost totally unprepared for the next step.

Modern synthetic geometry meets all these criticisms. It is thoroughly mathematical, and the student who succeeds in it is assured of success in any branch of the science that he may undertake. Its steps are all logical, but logic is not emphasized as the end to be attained. It is constantly whetting the student's desire for mathematical study by giving him hints of that which is to follow. It also prepares thoroughly for trigonometry and analytical geometry. It is surrounded by no traditions, and so is free to use everything that serves its purpose. Its proofs are simple and direct, its results broad and general. Its symbolism and nomenclature are in harmony with mathematical science, and are at least two thousand years in advance of Euclid. It has a great fascination for the student, and classes are invariably enthusiastic over it. This year, as an experiment, one division of the freshman class in Indiana University studies the modern synthetic geometry, while the other divisions take Euclid. The modern synthetic class is by far the most enthusiastic, and gives strong evidence of the more rapid mental development.

The student who reads modern mathematical works must know the modern synthetic geometry. Modern writers appreciate its power, and use it freely. It is to be hoped that our American schools will give more attention to it. From a mathematical standpoint it is certainly desirable that it may soon entirely replace Euclid. The admirable elementary text-books of Dupuis of Toronto, Smith of Missouri, and Halsted of Texas, which have recently appeared, prove that the subject is growing in interest, and also make its general introduction more easy.

WEIGHTS AND MEASURES IN ENGLAND VERSUS THE DECIMAL AND METRIC SYSTEMS.

BY J. JAMES COUSINS, ALLERTON PARK, CHAPEL ALLERTON, NEAR LEEDS, ENGLAND.

IT is impossible for a comparatively new country like America to conceive the mode by which the English conduct their internal commerce, and the difficulties which exist in trading not only with foreigners but between the different portions of the United Kingdom, owing to the versatility of the weights and measures used in conducting her business, the different values of the varied denominations within the United Kingdom, and the many quantities represented by the same denominations when applied to articles of daily commerce.

If the ingenuity of man had been strained to the utmost to introduce a system of weights and measures calculated to throw difficulties in the way of commercial progress, to perfect a system that no one man has thoroughly mastered, and to place irritating obstacles in the path of education of both pupil and teacher, that end has been thoroughly attained, and, strange to say, it is the system pursued in the educational establishments throughout the kingdom at the close of this nineteenth century, although most of the colonies have set the Mother Country a better example.

Can anything be more absurd than the following? We sell "pickled cod" by "the barrel," "trawled cod" so much "each," whilst "large hooked cod" are sold by "the score," and "crimped cod" "per pound," shrimps by "the stone," soles by "the pair," Dutch smelts by "the basket," and English smelts by "the hundred."

This is the Billingsgate system, but at Grimsby (another important fish market) quite a different style of weights and measures is made use of, and the sale of fish is very much by "the box" and "the last."

A customer once asked a Grimsby fish salesman to let him have a stone of oysters, the reply was "We don't sell oysters by weight, we sell them by measure." "Then let me have a yard," said the buyer. Butter in Ireland is sold by "the cask" and "the firkin;" in England by "the pound" of 16 ounces, by "the roll" of 24 ounces, "the stone," and the "hundred-weight," which is not 100 pounds but 112 pounds.

Analyzing the quantities of the various denominations only makes confusion doubly confounded.

What is a "load?" A load of straw is 1296 pounds, a load of *old* hay is 2016 pounds, and a load of *new* hay 2160 pounds; but my tables do not tell me at what age hay becomes old.

What is a "firkin?" A firkin of butter is 56 pounds, a firkin of soap 64 pounds, and a firkin of raisins 112 pounds. A "hogshead" of beer is 54 gallons, but a "hogshead" of wine is 63 gallons, a pipe of Marsala wine is 93 gallons, of Madeira 92 gallons, of Bucellas 117 gallons, a pipe of port 103 gallons, and a pipe of Teneriffe 100 gallons. Again, what is a stone? A "stone" weight of a living man is 14 pounds, but a "stone" weight of a dead ox is 8 pounds, a stone of cheese is 16 pounds, of glass 5 pounds, of hemp 32 pounds, a stone of flax at Belfast is 16¾ pounds, but at Downpatrick 24 pounds, while a hundred-weight of pork is 8 pounds heavier at Belfast than it is at Cork—another injustice to Ireland.

England is slow to adopt new principles, but as more than 400 millions of people are using the metric system, surely it is time she took a step in that direction, a hint that probably may not be thrown away upon the grand American Republic.

In cataloguing the above absurdities of English measurement, I must not omit to inform you what quantities a barrel represents. A "barrel" of beef is 200 pounds; butter, 224 pounds; flour, 196 pounds; gunpowder, 100 pounds; soft soap, 256 pounds; beer, 36 gallons; tar, 26¼ gallons; whilst a barrel of herrings is 500 herrings.

One example of the comparative merits of the existing system with the decimal system will suffice.

Reduce 987,654,321 inches into leagues. To arrive at this we must divide these figures by 12 to get them into feet, then divide the product by 3 to make yards of them, next by 5½ to find the number of poles, another division of the product by 40 exhibits the furlongs, then if the brain will stand it, for we have decimals in the quotient, we must divide by 8, which gives us the miles, and lastly by 3 to furnish the leagues, *quid erat demonstrandum;* and, if we have made no mistake, we have arrived at a satisfactory result.

To attain the same end by the decimal system, allowing the same number of denominations but each a decimal, no calculation is necessary, no sums to work out, but as there are six denominations, place the pointer on the left-hand side of the 6, the figures on the left of the pointer, viz., 987, show the number of leagues, whilst the figures on the right of the pointer furnish the fractions of a league, viz., 6 miles, 5 furlongs, 4 poles, 3 yards, 2 feet, and 1 inch.

Yet, can it be believed? the old system is taught in every school in England, and the cruelty inflicted upon the brains and the temper of the young, to say nothing of the loss of time and the cost, cannot fail to lodge a grave responsibility upon the legislature which permits such a condition of things to exist.

Nov. 4.

A CHEAP FORM OF BOX FOR MICROSCOPE SLIDES.

BY GEORGE P. MERRILL.

PRESUMABLY no one ever started out with making a collection of slides for the microscope but has wrestled long with the problem as to how they may best be taken care of. In the administrative work of this department the problem early became a serious one. For its satisfactory solution I am indebted to my brother, L. H. Merrill, then assisting me.