

lowed to, and is easily caught, while after dark I must corner it to catch it. I have heard it make no vocal sound save a slight squeak if accidentally hurt. It appeared to be fully adult when caught, but I have no other means of knowing how old it then was. It now acts as if feeling the effects of age. At first I tried feeding it grain, seeds, and green food. It would eat no green food that I gave it and would not touch water. For two years I have given it only dry barley or dry wheat and no water. It seems to prefer the wheat. It is a mystery to me how such an animal can live and thrive for years on dry grain without water or moisture in any form. Once or twice a year I empty its box and put in fresh, dry sand, and set the box in an angle in the hall where it is perfectly dry. I put nothing more in the box but dry grain and a little cotton to make a nest of, yet under these conditions it has lived three years. Many birds and animals do not drink water, or but rarely, but most such eat either green food, soft insects, or freshly-killed flesh, from all of which sources some moisture is obtained.

From where does my pocket-mouse get its moisture? Some seems necessary to make blood, replace water evaporated from the lungs and skin and other waste.

F. STEPHENS.

Santa Ysabel, Cal., Nov. 22.

### Confusion in Weights and Measures.

THE interesting article in *Science* Nov. 25, on "weights and measures in England versus the decimal and metric system," recalls to my mind the difficulties I once experienced in stating the value in grains of a U. S. gallon of water at 60° F. A telegram was handed me one morning, requesting the above information, and I requested the messenger to wait until I had written a reply. Much to my astonishment, there existed the greatest confusion among the authorities upon this simple point, and it took me several months of investigation before I could write a satisfactory answer to the above telegram. Among the values noted were the following:—

U. S. Pharmacopœia, 1870,	58328.8862 grains.
“ “ 1880,	58329.6 “
Miller's Chemistry,	58317.3 “
Am. Chemist, Vol. I., p. 318,	58319.8 “
U. S. Dispensary (last edition),	58328.886 “
Oldberg's Weights and Measures,	58335.218 “
U. S. Treasury Department,	8.3312 pounds.

The report on "Weights and Measures," by the Secretary of the Treasury (Senate Doc., 1857), says: "The gallon is a vessel containing 58372.2 grains (8.3389 pounds avoirdupois) of the standard pound of distilled water, at the temperature of maximum density of water, the vessel being weighed in air in which the barometer is 30 inches, at 62° F."

In view of all this confusion I thought it best to calculate a value for myself, basing my work upon the weight of a cubic inch of water as given in Barnard's "Metric System." My result was: "The U. S. gallon of distilled water at 60° F., weighed in air at 60° F., with barometer at 30 inches, weighs 58334.94640743 grains.

Referring to this result, Dr. Rice, Chairman of the Committee of Revision of the U. S. Pharmacopœia, was good enough to say: "Until further information is supplied, the value reported deserves preference before all others. It seems, however, highly desirable that this whole question of standards and relation of weight to measure, be finally settled by law, and preliminary to this, by a new scientific investigation which might be most suitably conducted under the auspices of the National Academy of Sciences or some other representative scientific body."

This U. S. gallon, of which we have been speaking, is, as is generally known, a survival of the old English wine gallon of 231 cubic inches, which has become disused in England since the Imperial gallon was introduced in 1826. It is not generally known, however, that although dignified by an apparently "standard" title, the U. S. gallon has no statutory existence whatever. In this lack of formal recognition the gallon does not stand alone, for not one of our common weights and measures, with the single exception of the "Troy" pound has any place upon the na-

tional statute books. In 1873 an act was passed providing that "For the purpose of securing a due conformity in weight of the coins of the United States, the brass troy-pound weight procured by the Minister of the United States at London in the year 1827, for the use of the mint and now in the custody of the mint at Philadelphia, shall be the standard troy pound of the mint of the United States, conformably to which the coinage thereof shall be regulated." Thus even the troy pound is seen to have no official recognition for general use, but only for the special purposes of the mint.

It is curious in this connection to note that the metric system, as a whole, was legalized in this country by act of Congress of July 28, 1866. The act reads: "It shall be lawful throughout the United States of America to employ the weights and measures of the metric system; and no contract, or dealing, or pleading in any court shall be deemed invalid or liable to objection because the weights or measures expressed or referred to therein are weights or measures of the metric system." By act of Congress the Secretary of the Treasury was directed to furnish each State with "one set of the standard weights and measures of the metric system." It is true that an act passed June 14, 1836, directed a distribution to be made to the several States of complete sets of "all the weights and measures adopted as standards," reference being made to the weights and measures then and now in common use, but it will be found upon inquiry that the expression "adopted as standards" refers to an action of the Treasury department made on the recommendation of Mr. Hassler in 1832, and not to any action on the part of Congress.

To quote from the report of the Secretary of the Treasury for 1857:—

"The actual standard of length of the United States is a brass scale of eighty-two inches in length, prepared by Troughton of London, and deposited in the Office of Weights and Measures. The temperature at which this scale is standard is 62° F., and the yard-measure is between the 27th and 63d inches of the scale."

"The gallon is a vessel containing 58372.2 grains of the standard pound of distilled water, at the temperature of maximum density of water, the vessel being weighed in air in which the barometer is 30 inches at 62° F."

"The standard of weight is the troy pound, copied by Captain Kater in 1827 from the imperial troy pound. The avoirdupois pound is derived from this; its weight being greater than that of the troy pound, in the proportion of 7,000 to 5,760."

This troy pound was, as has been said, afterwards recognized by act of Congress, thus becoming distinguished from the other so-called "standards."

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Rensselaer Polytechnic Institute, Troy, N. Y., Dec. 13.

### Is There a Sense of Direction?

ON the first of May last, my camping outfit started from Austin, Texas, bound for the northwestern part of the State. They went through the country, taking with them our camp dog, "Old Rock," a common cur.

Professor Cope of Philadelphia and myself joined the party at Big Springs, two hundred and fifty miles from Austin. Our destination was the upper Red River and the Staked Plains. We travelled northward along the foot of the plains, sometimes without a road, for about one hundred and fifty miles. Thence we went west one hundred miles, and thence south across the high plateau of the Staked Plains one hundred miles. Thence we turned east, crossing our former route at Clarendon, continuing southeastward to Archer County, a distance of one hundred miles. We then went southwestward seventy-five miles, and then back eastward to Archer and Montague Counties. From there we turned southward to near Dallas, where I disbanded my party, and started my outfit back to Austin, the last of October. We had been in the field six months. "Old Rock" had faithfully followed the wagon except at one time, when, his feet getting sore from travelling in the hot sand, he had been hauled for a few days.

After the outfit started for Austin and when at Hillsboro, one