

## NOTES FROM THE RESEARCH LABORATORY EASTMAN KODAK COMPANY.\*

### THE DRYING AND SWELLING OF GELATIN.<sup>1</sup>

Preliminary Note by S. E. Sheppard and F. A. Elliott.

[ABSTRACT.]

THE theory of drying and swelling of gelatin gels is discussed, and observations are reported which make it more reasonable to believe that a so-called "case-hardening effect" is responsible for the maintenance of the original shape on swelling and drying. The initial stages of the drying process take place at edges and corners, thus creating a drier, rigid framework which guarantees the shape, and hence, submicroscopic structures inherent in gelatin are unnecessary to account for this phenomenon.

**Talc and Soapstone in 1921.** (*U. S. Geological Survey Press Notice.*)—The production of talc and soapstone in 1921 showed a great decline as compared with that in 1920. The quantity sold was the smallest since 1908 and was about 40 per cent. less than the average for the five preceding years.

The total quantity of talc and soapstone sold in 1921 was 126,000 tons, valued at \$1,821,000, as compared with 211,000 tons, valued at \$3,035,000, in 1920. This represents a decrease of 40 per cent. in both quantity and value. Vermont, which since 1917 has been the largest producer, maintained its position by producing 38 per cent. of the total quantity. New York produced 33 per cent. of the quantity sold, but for the first time took second place in the value of its product. Virginia, which produced 14 per cent. of the total, ranked next to New York in quantity, but for the first time led in the value of its output, owing to the fact that the soapstone industry in that State was not nearly so much affected as the ground talc industry, on which the other principal producing states depend.

The quantity of ground talc sold by producers in 1921 was 106,900 tons, valued at \$1,181,000, as compared with 178,500 tons, valued at \$2,143,000, in 1920. A canvass of the producers made to determine the quantity of talc consumed in 1921 by different industries shows that the paper industry used 38 per cent. of the total, and that the average value was about \$10.60 a ton. Most of the supply was obtained from Vermont and New York. The paint industry, which

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requires a high grade of talc, used 23 per cent. of the total. Nearly all the supply was obtained from New York, and the average value was about \$14.10 a ton. The roofing industry consumed 18 per cent. of the total and drew its supply almost entirely from Vermont. The requirements for talc used in this industry are not exacting, as is shown by the average value, which was only \$8 a ton. The rubber industry used a large quantity of talc for filler, and in 1921 consumed  $9\frac{1}{2}$  per cent. of the total. Vermont furnished most of the supply, which had an average value of about \$9.50 a ton. The textile industry used about 4 per cent. as a filler for cotton cloth. The average value was about \$9.40 a ton. Only  $2\frac{1}{2}$  per cent. of the domestic output was used for toilet powder, the demand for talc for that use having been supplied largely by imported material. California supplied most of the demand for domestic talc for this purpose, and the average value was \$18.60 a ton.

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**On the Elementary Quantity of Electricity.** R. BAER. (*Ann. d. Physik*, No. 3, 1922.)—It is now generally recognized that electricity has an atomic structure. Upon this foundation is built the modern theories of atomic structure. Quantities of electricity cannot be changed continuously, but only by the addition or subtraction of one or more elementary quantities, just as the weight of a mass of water cannot be changed continuously but only by the addition or removal of one or more molecules. Moreover the body of physicists are agreed on the magnitude of the elementary quantity of electricity. It is  $4.774 \times 10^{-10}$  electrostatic units, for our own Millikan has measured it to a few tenths of a per cent. There has been, however, one protest registered against the validity of this conclusion. Ehrenhaft, in Austria, and his followers for a dozen years have been claiming to find a quantity of electricity, much smaller than Millikan measured, even perhaps as small as one two-thousandth of it. This is an important matter, and in science decisions are made by evidence and not by "the infallibility of the odd man" or even by a preponderance of votes as is the case when we go to the polls.

The whole question has been examined by the author of this paper, and he comes to the conclusion that the atomic structure of electricity rests on a firm foundation. The contrary results of Ehrenhaft and Miss Parankiewicz have arisen from their failure to make allowances for the Brownian Movements, and from the assumption of too large densities. "There is not the least evidence for the existence of quantities of electricity smaller than the charge of an electron." This is comforting especially for those who were trained at first to look on atoms as fine little billiard balls and have been subsequently constrained to adjust their conceptions to the belief that the atom is a miniature solar system and who were apprehensive lest still later the electron with its charge of electricity should turn out to be of an unexpected complexity.

G. F. S.