THE CONSTITUTION AND STRUCTURE OF ULTRAMARINES[1]

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The problem of the constitution and structure of ultramarine, the splendid blue paint formerly extracted from lapis lazuli, has puzzled scientists ever since Giumet, a hundred years ago, discovered a method of preparing this dye synthetically. The difficulties of getting an insight into the nature of this remarkable kind of sodium aluminium thiosilicate are manifold. The author and his collaborators attacked the problem by means of x-rays, comparing the results obtained with those for some related silicates, such as nosean and hauyne. A certain part of the constituents of the ultramarines, which are easily replaceable by other elements, do not have fixed positions within the crystalline structure, but must be considered as "errant." A certain radical containing sodium, silicon, aluminium and oxygen is common to all ultramarines, but is electrically charged like the ammonium ion and hence cannot be separated from the ultramarine in the free state. The sulfur is present as a cause of color but is predominatingly "errant," being dispersed throughout the whole crystalline mass. The results of the calculation of the relative intensities of the x-ray diffraction lines are in good agreement with the observed values.

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