exposed rock surface about 2½ by 4 feet were over 200 more or less imperfect benitoite crystals, amid thin patches of remaining natrolite, the whole standing out prominently from the surrounding rough and unprotected surface of the schist.

The altered portions of the schist are full of cracks and cavities, varying in size up to two or three inches in width, and having a rough orientation parallel to the planes of schistosity. The cavities are for the most part filled with natrolite, with which benitoite or carlosite or both are often associated. The natrolite is not always accompanied by benitoite and carlosite, but in no instance noted did the benitoite occur without the natrolite and in only a few cases was the carlosite found alone. A soft dark brown mineral substance, resembling cadmium oxide, is also sometimes associated with the natrolite. It is not uncommon to find the cavities only partially filled, in which case the occurrence resembles a geode, the crystals of the natrolite (sometimes associated with benitoite and carlosite) forming the inner surface. The natrolite in such cases is usually coated with a brownish or brownish-yellow stain, or is covered by an intricate mass of microscopic, needle-like crystals of a peculiar greenish-drab color.

As a usual thing the benitoite and carlosite are in contact with the country rock, the carlosite sometimes having one extremity buried in it, while the remainder of the crystal extends into the natrolite. One instance was noted where a long slender carlosite crystal extended across a vein of natrolite with an extremity penetrating the schist on either side. The facts above noted imply the crystallization of the benitoite and carlosite previous to the complete deposition of the natrolite. Isolated crystals of the benitoite and carlosite are not rare in masses of natrolite, however, so that possibly the crystallization of the three minerals was practically contemporaneous, at least in certain instances. In some cases the benitoite appears to be entirely surrounded by the schist, but a close examination usually reveals a thin film of natrolite between the former and the country rock. In the places where the carlosite occurs alone or associated with only minor quantities of natrolite, the carlosite is in the form of thin veins, the crystals being imperfect and forming a series of thin plates or flakes. Close associations of the benitoite and carlosite are not uncommon and indicate contemporaneity of origin for the two minerals. No alteration of the natrolite or benitoite was noticed, but red stains resembling iron oxide were seen emanating from around several of the carlosite crystals. Mr. Schaller has called the writer's attention to the fact that minute fragments of the carlosite also show a brick-red color, so that the coloring around the crystals may be due to fine particles of the unaltered mineral.

Development work has so far been confined to near the middle of the schist lens, and consists of a tunnel and several open cuts following the strike of the schist. The tunnel is 50 feet long and the largest cut 10 feet deep, 4 feet wide and 14 feet long. The gems are secured either by pounding up the richer portions of the matrix and then picking out the few crystals or fragments that have withstood the shock, or else chiseling out the larger individual crystals at the expense of the smaller surrounding ones. Only a small percentage of the gems are saved by either method, as the crystals are very brittle and usually considerably jointed and cracked. The present value of the cut stones is said to be $40 per carat.

Ralph Arnold

Coalinga, California,
September, 1907

Notes on Organic Chemistry

Keten

A number of derivatives of ketene have been known for some time and the announcement has just been made of the preparation of the parent compound.[1] This substance is of great interest because it is the simplest member of the highly important class of ketones and, moreover, it is the simplest anhydride of acetic acid. Its mode of formation and reactions show that its formula is $H_2C:CO$, *i. e.*, it is *methylene ketone;* the

[1] N. G. M. Wilsmore, *Jour. Chem. Soc.* (London), **91**, 1938 (1907).

relationship to acetic acid may be indicated by the expression,

$$H\,CH_2\,CO\,OH\ .$$

Ketene is prepared by bringing liquid acetone, ethyl acetate, or, preferably, acetic anhydride into contact with a glowing platinum spiral; instead of the spiral an arc burning between carbon or metallic poles may be employed. The gaseous products of the reaction are passed through a condenser and then cooled to —100° in liquid air. Ketene is a colorless gas at the ordinary temperature, but it may be liquefied and frozen, and it has a peculiar penetrating odor. Its molecular weight agrees with the simple formula given above, but the substance undergoes polymerization rather readily, as would be expected. Ketene does not react with *dry* oxygen, but it quickly combines with water forming acetic acid; with alcohols it gives the corresponding acetates. Moreover, it is an admirable acetylating agent. With aniline, for example, it yields pure acetanilide directly, and similar compounds are obtained with other primary amines. These reactions demonstrate the correctness of the formula for ketene given above. The further investigation of this interesting substance should yield results of decided value.

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THE BALLONS-SONDES AT ST. LOUIS

A FINAL series of ascensions of *ballons-sondes,* or registration balloons, at St. Louis was completed in November, 1907, by Mr. S. P. Fergusson, of the Blue Hill Observatory, under the direction of the writer. These experiments to obtain the meteorological conditions at great heights in America were begun in 1904, with the cooperation of the authorities of the Louisiana Purchase Exposition, as related in SCIENCE, Vol. XXI., pages 76–77, and were continued during subsequent years with the assistance of grants from the Hodgkins Fund of the Smithsonian Institution. Seventy-six balloons have been despatched and all but six have been recovered with the attached instruments, while there is the possibility of the number lost being further reduced by the finding of three of those sent up last autumn. The preliminary results of the earlier ascensions are given by the writer in the *Proceedings of the American Academy of Arts and Sciences,* Vol. XLI., No. 14, and are discussed by Mr. H. H. Clayton in *Beiträge zur Physik der freien Atmosphäre,* Band 2, Heft 2. The object of the recent ascensions, twenty-one in number, was to supply data for the high atmosphere during the autumn, a season when there were few observations, and also to compare with those obtained simultaneously in Europe on the international term-days in October and November. The work at St. Louis at the time of the international balloon race was facilitated by the cooperation of the Aero Club of St. Louis. An examination of the record sheets recently returned indicates generally the presence, at an altitude exceeding eight miles, of the isothermal, or relatively warm stratum, which was found somewhat lower in summer. For example, on October 8 the minimum temperature of — 90° Fahrenheit was found at a height of 47,600 feet, whereas at the extreme altitude reached, namely 54,100 feet, the temperature had risen to —72°. Similarly, on October 10, the lowest temperature of —80° occurred at 39,700 feet while —69° was recorded at 49,200 feet, the limit of this ascension, showing that the temperature-inversion had come down about 8,000 feet in two days. The prevailing drift of the balloons last autumn was from the northwest, whereas in previous years they traveled more from the west.

Professor Moore, chief of the United States Weather Bureau, announces that, in view of the success achieved by the Blue Hill experiments, he will send up *ballons-sondes* simultaneously from various stations.

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January 9, 1908

CARL VON VOIT

FROM Munich announcement is made of the death of Carl von Voit in the seventy-seventh year of his age. Voit was born at a time when his native land was poor and when there