thalamic or peripheral receptors. Moreover, since adrenaline is present and, presumably, is metabolized in the brain, it must be formed there from precursors which cross the blood-brain barrier (*10*).

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Preliminary Identification of Crystalline Phases in a Transparent Stalactite

Abstract. Of two crystalline phases found in a cavern stalactite, the major phase is mirabilite, whereas the minor phase, according to preliminary data, is a new mineral, sodium hemicalcium sulfate dihydrate, which is unstable at temperatures above 25°C.

In 1955 W. T. Austin and J. J. Lehrberger explored and documented photographically a series of new passages in the Flint Ridge Cavern system of south-central Kentucky. A number of spectacular, glasslike stalactites were found in one of the passages. When specimens collected from these deposits were taken above ground, they effloresced and melted. Hence, to obtain material for the study described in this report, two samples were transported to the laboratory under a cool atmosphere saturated with water vapor.

Both samples consisted chiefly of a transparent material that occurs in short prismatic crystals showing a vitreous luster and a conchoidal fracture. About 1 percent of each sample was made up of a second substance somewhat less transparent and occurring in monoclinic needles.

The major phase was extracted from the mineral sample with ice water. After the insoluble minor phase had been removed by filtering, the filtrate was found to contain only Na^+ and SO_4^{--} ions accompanied by traces of Ca, Si, Mg, and Al; these elements were detected with a spectroscope. The observed melting point of the major phase was 33° to 34°C (sealed capillary). Accordingly, the water-soluble phase present in the stalactite is unquestionably mirabilite ($Na_2SO_4 \cdot 10H_2O$), which melts at 32.4°C; This finding was confirmed by measurements of the index of refraction and specific gravity. The observed value for the refractive index was 1.40 [literature value, 1.36 (*1*)], and the observed value for the specific gravity was 1.46 [literature value, 1.48 (*1*)].

A sample of the minor phase suitable for analysis was obtained by grinding the gross specimen to a fine powder, extracting the soluble major phase with an ice-cold alcohol-water mixture, and finally collecting the insoluble solid on a weighed, sintered glass filter. The weight of the minor phase indicated that it was originally present in the stalactite to the extent of about 1 percent. The weight loss obtained by heating the insoluble fraction to constant weight at 125°C (in a vacuum) indicated that the minor phase contains between 7.9 and 8.0 percent bound water. The anhydrous salt was found to be somewhat soluble in water and was readily soluble in dilute hydrochloric acid. The acid solution was found to contain only Ca^{++}, Na^+, and SO_4^{--} ions along with traces of Al, Mg, and Si (detected by spectroscope).

Two naturally occurring double sulfates of sodium and calcium are recorded in the mineralogical literature: These are glauberite ($Na_2SO_4 \cdot CaSO_4$) and ciempozeulite ($3Na_2SO_4 \cdot CaSO_4$), both of which are anhydrous salts. Therefore, a quantitative measurement of the Na : Ca ratio was necessary to ascertain whether the minor phase was a hydrated modification of those double salts or another mineral. A conventional determination of both elements gave a Na : Ca ratio of 3.821, which is not in agreement with the Na : Ca ratio of either glauberite (theoretically Na : Ca = 2.00) or ciempozeulite (theoretically, Na : Ca = 6.00).

Hill and Wills (*2*) have made a study of the ternary system $CaSO_4$-Na_2SO_4-H_2O at 25°, 35°, 50°, and 75°C. They obtained a labile sodium hemicalcium sulfate ($2Na_2SO_4 \cdot CaSO_4 \cdot 2H_2O$) from the action of gypsum on an aqueous solution of sodium sulfate. Upon standing, the solution becomes filled with long, slender needles which are so closely knitted together that as little as 1 percent of the labile salt will hold the mass in suspension, so that no movement occurs when the reaction vessel is inverted. The calculated Na : Ca ratio for Hill and Wills' metastable salt is 4.00, which is in fairly good agreement with the value of 3.821 obtained for the minor phase of the stalactite. The measured refractive index of the minor phase is 1.518, which compares favorably with the value of 1.510 observed by Hill and Wills for their metastable salt.

On the basis of the observed Na : Ca ratio, water of hydration, refractive index, and the weight ratio between the major and minor phases, it is tentatively suggested that the minor phase is identical with the sodium hemicalcium sulfate dihydrate described by Hill and Wills. The somewhat low Na : Ca ratio and the slightly high refractive index can best be explained by the probable presence of a very slight excess of calcium sulfate in the mineral specimen taken for this preliminary study.

The labile salt described is metastable with glauberite within the temperature range of 25° to 75°C (*2*) and is, therefore, stable at the cavern temperature (12° to 15°C). At temperatures above 25°C, the reaction

$$2Na_2SO_4 \cdot CaSO_4 \cdot 2H_2O \rightarrow CaSO_4 \cdot Na_2SO_4 + Na_2SO_4 + 2H_2O$$

would account for the conversion of the minor phase to an equilibrium mixture of glauberite and thenardite (*3*).

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3. This work was carried out under the auspices of the Cave Research Foundation and is Cave Research Foundation contribution No. 3. I acknowledge the assistance of R. W. Brucker, with whom I discussed the stratigraphy of the Flint Ridge Cavern system, and of Carl W. Melton, who measured the index of refraction. A more complete description of this mineral, which will include the results of analytical and crystallographic investigations, is in preparation.

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Occurrence and Morphology of a Phenotypic Male of a Gynogenetic Fish

Abstract. A phenotypic male of *Mollienesia formosa,* a gynogenetic fish, has been collected at Brownsville, Texas. The male and female fish are essentially similar, and their morphology supports a hypothesis that the species is of hybrid origin.

Many workers have demonstrated the occurrence of gynogenesis—activation of unfertilized eggs by sperms with the removal of paternal chromatin during early cleavage of the resulting offspring (*1*).