Raman Spectra and Their Application to Organic Molecules, Thermodynamic Data on Organic Reactions, Free Radicals in Organic Reactions and Mechanism Studies on Hydrogenation Catalysis. Further information may be obtained from Dr. P. H. Emmett, the Johns Hopkins University, Baltimore, Md.

MISS MAY MORRIS, of Kelmscott-Manor, Lechlade, daughter of William Morris, poet and artist, who died on October 16, left to the University of Oxford, as a memorial of her father, her Kelmscott estate and certain furniture and effects with £3,000 for its maintenance, for a House of Rest for artists, men of letters, scholars and men of science. She directed that no modern innovations or improvements or installations be made to the house in view of its age and its historic interest as the home of the late William Morris, "as it is in the same condition as when he left it."

AT a recent meeting of the Board of Directors of the Finney-Howell Research Foundation, Baltimore, Md., eight fellowships were renewed and further fellowships for 1939 were awarded as follows: G. M. Badger, of Melbourne, Australia, to work at the Royal Cancer Hospital, London; Dr. Arthur Kirschbaum, to work at Yale University; Dr. J. L. Melnick, to work at Yale University; Dr. John F. Menke, to work at Stanford University Hospital; Dr. John L. Wood, to work at Harvard University; Dr. Paul C. Zanecnik, to work under Dr. K. Linderström-Lang at the University of Carlsberg, Copenhagen. Grants-in-aid were awarded to: Dr. R. D. Fowler and to Dr. R. Walter Graham, Jr., of the Johns Hopkins University, and to Dr. George O. Gey, of the Johns Hopkins School of Medicine. Applications for 1940 awards must be received at the office of the foundation by January 1, 1940.

DISCUSSION

A DILEMMA IN VITAMINS

A HALF century ago the geologists were demanding a hundred million years for the age of the earth, while the astronomers were not willing to concede them more than ten million. Now there seems to be a corresponding situation between the anthropologists and the dietitians with regard to vitamin C.

The position of the dietitians, or at least of a certain school of dietetics, may be taken from the 1938 revised edition of "The Foundations of Nutrition," by Dr. Mary Swartz Rose, and reinforced by quotations which Dr. Rose gives (personal communication) from Dr. Henry Clapp Sherman's "The Vitamins" (in collaboration with S. L. Smith):

> . . . what little (vitamin C) there may be in fresh raw muscle becomes practically negligible in meat as ordinarily eaten. Even in liver, which is normally well supplied with vitamins A and B, vitamin C is found in low concentration and is lost in cooking. (Rose, p. 305.)
>
> The vitamin C which they (kidney and liver) contain is mostly destroyed in cooking. (Rose, p. 429.)
>
> Muscle tissues, ordinary meats, are so poor in antiscorbutic vitamin that attempts to show its presence by experiments upon guinea pigs have given negative results. . . . Dutcher, Pierson and Biester (1919) were not able to observe any antiscorbutic effect from raw lean beef fed to guinea pigs. (Sherman and Smith.)
>
> . . . meat, if eaten sufficiently fresh, raw, or "rare" and in large quantities has an appreciable though small antiscorbutic value. (Sherman and Smith.)
>
> In view of the fact that even when eaten in very large amounts meat can be expected to prevent scurvy only if eaten raw or nearly so, we must conclude that cooked meat, as ordinarily eaten, probably furnishes but insignificant amounts of the antiscorbutic vitamin. (Sherman and Smith.)

Few readers would think either from these quotations or from the whole of the cited book of Dr. Rose that it would be possible to live in good health on a diet consisting of thoroughly cooked meat (medium-done to well-done) and from which diet are absent most or all of the organs described as "particularly rich in vitamin C." But it is known to students of "primitive" peoples, whether ancient or modern, that this is just what hunting man has been doing from time immemorial.

The records of travelers, field anthropologists and frontiersmen (*e.g.*, post managers of the Hudson's Bay Company throughout the north of Canada) are full of case histories and general information which show that exclusive meat-eaters never show a vitamin C deficiency and that many of them consume few or none of the organs said to be rich in vitamin C.

Nor do all groups of exclusively carnivorous people eat large or even considerable amounts of raw or underdone animal tissue, as Rose and Sherman-Smith say and imply they would have to do in order to avoid scurvy.

The diet experimenters and the diet historians are, then, in square contradiction. The experiments say of animal tissues that vitamin C is negligible to begin with, except in certain glandular organs, and that in any case this vitamin C is nearly or quite destroyed by ordinary cooking; so that to avoid scurvy on a meat diet you have to eat considerable quantities of these organs and have to eat them raw or underdone. To this contention the diet historians reply that meat-eaters, such as the northern Canadian Eskimos and the northern Athapascans, feed to dogs or throw away most of the "glandular organs rich in vitamin C"; and

that the Athapascans, without ever developing scurvy symptoms, punctiliously cook their food to that extent which Rose and Sherman-Smith say or imply would either wholly or practically destroy their vitamin C efficiency.

With regard to the solution of this apparent dilemma between the animal experimenters and the observers of "primitive" human diets, we make four suggestions:

(1) The experimenters reach unsound conclusions with regard to human needs when they analogize for vitamin C from guinea pigs to humans.

(2) Those who measure the vitamin C content of animal tissues through the current methods have probably overestimated by from two to ten times the amount necessary to prevent scurvy symptoms in man —or perhaps they have underestimated the superiority of the human over the guinea pig mechanism for extracting and utilizing vitamin C.

(3) The experimenters have overestimated the destructive effect of ordinary cooking upon the vitamin C efficiency of animal tissues—in all probability the vitamin C is greatly weakened or destroyed only in the outermost layer of a piece of meat. Most carnivorous people boil or roast their meat in large pieces and cook to where the outside only is well done while the inside of either boiled or roast is about like the inside of our roasts. In such cooking the vitamin C efficiency may remain nearly or quite undiminished through 90 per cent. of the diameter of each chunk.

(4) Or possibly there is some component of animal tissues other than vitamin C which is able to prevent scurvy.

Perhaps the solution is in a combination of two or more of the suggestions, or in one that has not occurred to us. In any case, it is as necessary for the experimenters and the observers to get together on the "vitamin C in animal tissues" problem as it was for the astronomers and the geologists to get together on the chronology of the solar system.

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A QUANTITATIVE MEASUREMENT OF THE NATURAL RATE OF GROWTH OF CALCITE CRYSTALS IN GEODES

THERE has lately come under the observation of the writer some crystals formed in artificially manufactured stone under circumstances which give some information concerning the time during which the growth of these crystals has taken place, and, therefore, a quantitative measurement of the rate of this growth.

The Chemistry Building of Texas Technological College, in common with other buildings of the campus, is of the Spanish Renaissance type of architecture, with cloisters extending along the whole length of the building on the front. On each of the arches of these cloisters there are ornamental columns of cast stone.

In the manufacture of these columns some defects occurred, leaving small cavities near the surface. In some places the covering of these cavities has weathered off in part, exposing the interiors, which are seen to be lined with small crystals.

The cavities described above have a maximum size of about 15 mm and range in depth from 3 to 5 mm.

The crystals which line these cavities when examined under the microscope are seen to be prisms and scalenohedrons of calcite. They range in size from 1.0 mm to 2.5 mm in length and from 1.0 mm to 1.5 mm in thickness.

Since these crystals have evidently been formed since the construction of the building, they seem to constitute an interesting basis for a quantitative measurement of the rate of growth of such crystals. The building was completed early in the year 1929, so these crystals must have developed in the cavities within this ten-year period.

The writer is not aware of any quantitative data on the rate of natural growth of calcite crystals in geodes, but it seems that the development of these crystals within this time limit is growth at a more rapid rate than is generally believed. This seems especially true since the conditions under which these crystals formed are probably much more unfavorable for crystal growth than the conditions in rocks *in situ*.

The cast stone columns are so placed on the arches of the cloisters that there is little, if any, opportunity for ground water to enter the pores of the rock, and certainly not in the proportion to that of rocks *in situ*. The water which has acted as the agent of solution and deposition must in this case have been derived, largely if not altogether, from rainfall. In the climate in which this building is situated, however, there are normally long seasons of dry weather, and even the total rainfall for an entire year is not large.

Another condition which would be less favorable for the growth of crystals is that the proportion of calcium carbonate in the stone is relatively much smaller than in many rocks, such as limestones, in which calcite geodes occur.

Since these crystals have developed in a relatively short time, under conditions that are more or less unfavorable, they seem to offer an interesting illustration that processes, which may ordinarily be regarded as very slow, may sometimes proceed at a more rapid rate than usually supposed, the general opinion regarding the rate of the process being influenced, no doubt, by the natural tendency to regard all geologic processes as consuming great amounts of time.

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