California geologists consider Pliocene (See Carnegie Inst. Washington Pub. 418, pp. 1–25. 1931)."

Heretofore, no Tertiary of definitely marine origin has been known to occur in Arizona, and none nearer than the Salton Sea-Carrizo Creek region, some sixty miles west of the Colorado River. John Brown,[3] C. P. Ross,[4] and others have suggested the possibility that, in late Tertiary time, the Gulf of California may have extended far up the drainage of the Colorado River. East of Parker, R. C. Blanchard[5] collected *Bittium* and a probable young *Corbicula*. In the same area, C. P. Ross[6] found what appeared to be a minute *Corbicula*. West of the Colorado River, opposite Cibola, Brown[6] gathered the same material as Ross. Although *Bittium* and *Corbicula* are prone to inhabit brackish waters, Ross[7] did not regard the presence of the one *Bittium* and the probable *Corbicula* as conclusive evidence of the character of the waters in which these beds were deposited. The barnacles found by the writer, however, are unquestionably marine.

Very little faulting, no folding, and only minor tilting are apparent in this formation. Near Parker, it overlies an extensive, tilted series of red beds and underlies basalt. East and southeast of Cibola, it abuts against and overlies unconformably the roughly eroded slopes of granite, schist, and lavas of present-day mountains. Because of such barriers, its eastward extension in Arizona may not have been great, and no traces of it were found along the river south of, approximately, latitude 33° 10′, where its limiting mountains converge to the river's channel. West of the Cibola region, however, no continuous mountain barriers are apparent for a great distance. John Brown's map[8] of the Salton Sea region shows many wide passes between the mountain ranges of that part of the region between the Salton Sea and Colorado River. Consequently, this sea-way probably had its outlet westward towards the present Salton-Carrizo region, and thence southeastward to the Gulf of California, rather than directly along the present Colorado River channel.

The writer plans to carry out further study of this formation, in as much as it offers to shed much needed light upon the Tertiary history of western Arizona.

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[3] U. S. Geol. Survey Water-Supply Paper 497, p. 46, 1923.

[4] U. S. Geol. Survey Prof. Paper 129, pp. 195–196, 1922.

[5] Columbia Univ. Contr. Geol. Dept., vol. 26, No. 1, p. 39, 1913.

[6] See U. S. Geol. Survey Prof. Paper 129, pp. 189–190, 1922.

[7] U. S. Geol. Survey Prof. Paper 129, p. 195, 1922.

[8] U. S. Geol. Survey Water-Supply Paper 497, Pl. 12, 1923.

## THE SO-CALLED AUTOXIDATION OF CYSTEINE

IN a recent paper Gerwe[1] presents figures to show that the oxidation of neutralized cysteine hydrochloride is much too rapid to be accounted for by the extremely minute amounts of iron which may be present in a pure preparation, and concludes, therefore, that pure cysteine is autoxidizable. It is very surprising that he should make this conclusion without considering the possible effect of copper in the oxidation of cysteine. Gerwe[2] states in a previous paper concerning the preparation of iron-free cysteine hydrochloride by crystallization from HCl that small traces of copper which may have been present in the crude preparation were completely removed long before the iron in the early crystallizations. He gives no data to substantiate this statement.

I wish to call attention to several facts in a paper[3] which I published about a year ago on the catalytic action of copper in the oxidation of cysteine which bear on this question. The method which I used for the preparation of cysteine at that time is very similar to the one which Gerwe describes in his recent paper. The oxygen consumption of my sample was 1.2 cmm per hour for 8 mg cysteine hydrochloride, while Gerwe reports his to consume 2.2 cmm per hour for 10 mg cysteine. My sample was, therefore, equally as pure as his preparation. When pyrophosphate, which increases the activity of copper, was added to my sample of cysteine, there was a considerable increase in the oxygen uptake. This shows that the impurity which caused the residual oxidation was undoubtedly copper. If the metal had been iron, the oxidation would have been retarded rather than increased.

Gerwe found the oxygen consumption of 10 mg of cysteine to increase 5.22 cmm per 0.0001 mg Fe. I found the oxygen uptake for 8 mg of cysteine to increase 86.0 cmm for every 0.0001 mg Cu. Therefore copper is at least 16 times as active as iron. Gerwe concludes that the amount of iron necessary to account for the oxidation of his pure cysteine would be 44 times as much as could possibly be present. Since copper is so much more active than iron, the presence of this element in slightly larger amount than that calculated for iron would explain the observed oxidation of the cysteine.

A catalyst does not initiate a chemical reaction but merely alters the speed of the reaction. Naturally then even absolutely pure cysteine must undergo some oxidation or else the rate of oxidation could not be increased by the addition of catalysts. An oxygen uptake of about 2 cmm of $O_2$ per hour for 10 mg of cysteine is a very slow rate of oxidation (the 10 mg

[1] E. G. Gerwe, *J. Biol. Chem.*, 92: 399, 1931.

[2] E. G. Gerwe, *J. Biol. Chem.*, 91: 57, 1931.

[3] C. A. Elvehjem, *Biochem. J.*, 24: 415, 1930.

of cysteine would be completely oxidized only after a period of about 7 days) but if the cysteine were completely metal-free the oxygen consumption would undoubtedly be still less. The oxidation which has been observed by Gerwe can not be called autoxidation until the presence of other metals such as copper and manganese has been studied.

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# SPECIAL ARTICLES

## A NEW MUTATION IN THE HOUSE MOUSE (MUS MUSCULUS)

IN the fall of 1926 a female mouse of unusual color, caught in the country several miles from the nearest town, was brought to our laboratory. The eyes were pink, indistinguishable from the eyes of the common pink-eyed varieties but the coat color, though plainly agouti, was lighter than that of a pink-eyed black agouti.

A mating of this animal with a pink-eyed brown non-agouti produced young phenotypically like the ordinary wild. This result indicated that this new mutation was different from the common pink-eyed form. Further matings of the $F_1$'s produced dark and pink-eyed agoutis, blacks, browns and the new mutation. This new mutation which is tentatively called $p_2$ is not in the pink-eye (P, p), color (C, $c^{ch}$, $c^d$, c), or dilution (D, d) series.

The new $p_2$ gene seems to dilute both the yellow and black or brown in agouti individuals. So far a non-agouti in the new mutation has not been found. The combination of the new pink-eye gene and extreme dilution $c^dc^dp_2p_2$ produces an animal with very little color and eliminates pigment from the ears. A complete report of the inheritance of this new character together with linkage studies will be published later.

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## "AT THE TOP IS MAGIC"

IT is sometimes difficult to understand how certain books can get published, especially by reputable publishers. Many readers of SCIENCE will doubtless raise that question if they dip into "The Adventure of Mankind," translated by Robert Bek-Gran from the original German of Eugen Georg.[1] The "blurb" on the jacket states that "to read it thoughtfully and to weigh its challenges should become the pleasure as well as the duty of all enlightened Americans."

Thumbing its pages as a botanist, though possibly not as an enlightened American, and more in pursuit of the promised pleasure than from a sense of duty, we read as follows:

> The poplar tree fell ill throughout all of Middle Germany. None of the trees were raised from seed, but were slips from a single mother tree; that is, they were a single individual distributed along a thousand highways. Suddenly these shoots perished, because the life energy of the mother plant (in the park of Wörlitz) became exhausted. Similarly the La France rose has languished, the blood-beeches have become decrepit, Malvasier grapes and Borsdorfer apples have turned sterile, and certain varieties of potato have disappeared, whenever they have been raised from shoots rather than, as formerly, from seeds of their kind. All these descendants, these grandchildren, these daughter cultures are but segments of a super-individual unity. When the root dies, they die (p. 234).

In other words if Ephraim Bull's original Concord grape-vine, at Concord, Massachusetts, should suffer from mildew all the other Concord grape-vines in the country, being descended from the Concord vine by cuttings, would also suffer from mildew; if the Concord grape should die that would be the end of all the Concord grapes in the world! This, we are told, is owing to the fact that there is a "rhythm of all living substances," "a magic bond which thus disregards space and time to unite the parent of a race, a family, a species with his heirs. Sometimes the links are so strong that the offspring perishes with the parent, the branch with the root, the daughter with the mother—be it plant, nation or civilization." A terrible thought for daughters!

What a pity that the French physiologist, Leo Erera, whose researches illuminated the subject of "physiological action at a distance," was not possessed of these data!

On page 246 we learn that, "The influence of the moon reaches the elemental depths of our animal and plant world," so that "The sap of trees rises and falls with the phases of the moon. If the walla tree of East Africa is felled at the time of the new moon, it produces splendid building material. Cut down at the full, it has no durability at all. Plants sown under the waxing moon are strongly rooted, but those set under its wane turn mostly to leaf; hence the first phases of the moon insure the best harvest."

This passage should insure a good sale of the book in Vermont, so that those engaged in the maple sugar industry will not fall into the error of tapping their trees at the wrong phase of the moon.

In the discussion of sunspots (p. 247) we note

[1] Putnam's, September 28, 1931.