take its heavy equipment. Professor Frederick Stratton, of the Cambridge Solar Physics Laboratory, is leading a party to Magog, near the Vermont boundary, while Dr. Herbert Dingle, of the Imperial College of Science, will observe the eclipse from Montreal. Later the delegates, with other European visitors, will attend the meeting of the International Astronomical Union at Harvard University.

A SECOND expedition left England on July 9, in connection with the International Polar Year—1932–33. This expedition, which is being sent out by the Radio Research Board, is to make special wireless observations at Tromsö, within the Arctic Circle. The party, consisting of Professor E. V. Appleton, Mr. G. Builder, Mr. R. Naismith and Mr. W. C. Brown, sailed in the motor-vessel *Venus* from Newcastle for Bergen, whence they proceeded to Tromsö.

HANS KNUDSON, of the Danish Observatory at Copenhagen, arrived at Rio de Janeiro on July 5 on the way to the island of Tristan da Cunha to install a magnetic observatory. The small colony on Tristan da Cunha has been described as the loneliest in the world. About 130 persons, descendants of Napoleon's guards at St. Helena, live on the extinct volcano which towers 8,000 feet up out of water two miles deep. It is about half way between Africa and South America.

PLANS for extensive educational and scientific exhibits in the buildings of Rockefeller Center, New York City, were outlined by the Rockefeller interests after an announcement in Washington that President Hoover had signed a bill authorizing the entry under bond of foreign goods for such purposes without prepayment of customs duty. The legislation is intended to foster displays of the arts, sciences and industries of many nations, "together with products of the soil, mine and sea." Duties will be paid on any such goods sold while on exhibition. Articles remaining on display for more than two years will be subject to customs charges.

DISCUSSION

THE MUDDY MOUNTAIN THRUST IN FACT AND IN FICTION

I HAVE had my attention called to two articles in which some reference is made to my work in the Muddy Mountains of southern Nevada. These articles are published in *The Pan-American Geologist,* and the author is the editor of that journal, Charles Keyes. Neither of the papers is complimentary to me, and in one of them the author's denunciation of my poor efforts can only be described as vituperative. This condemnation I accept humbly, bearing in mind that the human spirit grows arrogant on a diet of praise. My wonder is aroused, however, by a peculiar statement that is made in the first paper and somewhat amplified in the second.

In the October number of his journal, 1929, Keyes published an article entitled "Reflection of Submontane Structures in Desert Range Features." On pages 204–205 of that issue he represents that an examination of borax mines in White Basin led him to the discovery, a full decade before I was in that country, that the Muddy Mountains are underlain by a great thrust fault. In the April issue of his journal, 1932, is an article by Keyes entitled "Mechanics of Orogenic Over-thrusting." On pages 205 and 206 he states that he discovered the thrust "a decade or so" before I saw it, and that he so directed the building of the borax road from the railway point to White Basin that the grade exposed a clean section of the thrust.

The Muddy Mountain thrust is so beautifully exposed that every geologist whom I have guided to the area has exclaimed that the structure is "diagrammatic." This truly remarkable geologic exhibit requires no artificial cuts for its demonstration; it is exposed so plainly and on a scale so large that any competent student of tectonics would recognize it after a brief examination of the area. If any geologist should state simply that he was in the Muddy Mountains and saw the thrust before I described it, I would believe him readily. But Keyes does not make any such simple statement; he amplifies his claim by tying it to events that are dated exactly. It is this fact that excites my profound wonder and leads me to lay the facts before my colleagues in geology.

My study of the Muddy Mountains was made in the summer and fall of 1919. During part of that time I was assisted by a worthy Mormon prospector, John Perkins. On our pack-train expeditions together Perkins used every opportunity to ply his trade, and after I left the region he continued to prospect actively. Exactly one year later—in the late fall of 1920—Perkins discovered small deposits of colemanite in the Tertiary beds of White Basin. His discovery was epochal. Not only were these the first borate deposits ever reported from Nevada, but, as Hoyt S. Gale wrote,[1] "These discoveries are also notable in that they constitute the first record of commercial deposits of the mineral colemanite outside the State of California, not only in the United States but

[1] "The Callville Wash Colemanite Deposit," *Eng. and Min. Jour.*, Vol. 112, p. 524, 1921.

apparently in the whole world."[2] Announcement of the find was followed at once by a rush of prospecting, resulting in the discovery of other workable beds of colemanite, including the large Callville Wash deposit south of the Muddy Mountains. In 1921 the Pacific Coast Borax Company constructed the automobile road connecting the White Basin deposits with a point on the Union Pacific Railway. This road was laid out through rugged topography along the route of an old Indian trail, and crosses the large window in which the thrust is so well exposed.

The foregoing recitation of facts and dates leads to the following summary: When I studied the Muddy Mountains in 1919 there was not so much as a prospect pit in White Basin, and the site of the present borax road was marked only by a rough and obscure trail. Therefore in the first of the articles mentioned above, Keyes claims to have inspected mine workings more than ten years before the first of those workings was begun or even conceived; in the second quotation he practically repeats and elaborates this remarkable claim. That he wrote his statements with full knowledge of the date of my field work is indicated by his references to my publications on the Muddy Mountains, including my original paper, which appeared in January, 1921.

I refrain from stating obvious conclusions, and also from commenting at length on the general merits of the two papers by Keyes. One additional fact is somewhat illuminating. In the more recent article Keyes gives the appearance of supporting his claims regarding the Muddy Mountain thrust by printing footnote references (without titles) to several of his own earlier publications. Some of these (supposed) articles can not be found in the places cited (perhaps because of grievous errors in the printing of the citations), and the others make no mention of a thrust in the Muddy Mountains but discuss the efficacy of wind as a geologic agent.

Before this article was submitted for publication, the writer wrote to Keyes, pointing out that some of his printed statements appear to be contrary to fact and asking him for an explanation. His reply contains additional grave discrepancies and does not explain any of those discussed above.

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THE SPONTANEOUS OXIDATION OF CYSTEINE

IN a note recently published,[1] Elvehjem criticizes my conclusion[2, 3] that cysteine is autoxidizable, stating that the oxidation observed can not be called autoxidation until the possible presence of metals other than iron and especially copper and manganese has been considered. He states also that, since copper is a catalyst at least sixteen times stronger in cysteine oxidation than is iron, the oxidation could be explained by the presence of traces of copper.

The possibility of traces of contaminants other than iron has been considered and tests, carried out both at the time the reported studies were made and since their publication, have proved as conclusively as a negative can be proved the absence of the metals mentioned. Some of the cysteine used in the experiments had been recrystallized by the method described by the author[4] as often as sixteen times. The rate of oxidation of cysteine thus prepared was identical with that recrystallized but six times, indicating that the additional crystallization did not affect the purity of the product with respect to possible contaminating metals which may act as active catalysts. Further, the samples of the cysteine thus prepared were ignited in two-gram samples and tested for both iron and copper. In no instance was there a visible residue nor any evidence of the presence of either of these metals. The method employed for testing for traces of copper was that described by Yoe,[5] which makes use of the purplish brown color produced when a solution containing copper ions is added to potassium ferrocyanide. This method is sensitive to 1 part in 2,500,000.

Further evidence of the absence of copper was manifest in the failure of cyanide to reduce the oxidation rate of the purified cysteine. Since cyanide is such a powerful poison to both iron and copper catalysis, and since its addition failed to affect the rate of oxidation, it was concluded that both iron and copper were absent.

That manganese, too, was absent was shown by the results of preliminary tests not included in the papers published. The oxidation of cysteine was carried out in the presence of 0.2 molar pyrophosphate which, as Warburg has shown,[6] completely inhibits the activity of iron and manganese but not of copper. The oxidation rate was neither increased nor decreased, the average of several runs being very nearly that obtained for a series of runs on cysteine alone.

In view of the considerations outlined above, it must be inferred that Elvehjem's criticisms are unwarranted and that the oxidation rate observed represents approximately the basic rate of oxidation

[2] Another account of the deposits and their discovery was published by L. F. Noble in "Colemanite in Clark County, Nevada," U. S. Geol. Surv. Bull. 735-B, 1932.

[1] C. A. Elvehjem, SCIENCE, 74: 568–9, 1932.

[2] E. G. Gerwe, *J. Biol. Chem.*, 92: 399–411, 1931.

[3] E. G. Gerwe, *J. Biol. Chem.*, 92: 525–33, 1931.

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

[5] J. H. Yoe, "Photometric Chemical Analysis," New York, 1: 182, 1928.

[6] O. Warburg, *Biochem. Z.*, 187: 255, 1927.