The recrystallized substance corresponds in chemical and physical properties to a hexuronic acid, and is apparently identical with the hexuronic acid described by Szent-Györgyi and reported as a reducing factor in adrenal cortex, cabbage and other sources. Feeding approximately 0.5 mg. daily protects growing guinea pigs from scurvy and permits normal vitality in the animals when on a vitamin C free diet. A detailed account of the experimental work will be published in the near future, but this involves only a few steps beyond the work previously published.

On April 16, 1932, Svirbely and Szent-Györgyi[11] announced that they had, by means of 1 mg of hexuronic acid daily, protected guinea pigs from scurvy in an experiment lasting 56 days. Because of the unavailability of milk powder for making the basal diet this test was unfortunately marred by loss of weight of all animals. A current experiment with a satisfactory diet was in progress, and three animals which had received 1 mg of hexuronic acid for 55 days were found to be free of scurvy. However, it was not until May 7, 1932, that Svirbely and Szent-Györgyi[12] stated that hexuronic acid is vitamin C. They said:

> This allows us to conclude that vitamin C is a single substance and identical with hexuronic acid.

Simultaneously with our previous note, C. G. King and W. A. Waugh[10] reported that they have obtained, from lemon juice, crystals which showed antiscorbutic activity and were apparently similar in chemical and physical properties to hexuronic acid. The duration of the test period was not stated, and apparently no chemical analysis was made. Until this is done, the nature of their product remains in doubt.

The results of Waugh and King[13] and those of Svirbely and Szent-Györgyi[14] were published in full in 1932. Subsequent studies by others have shown that vitamin C had indeed been identified.

The following facts in chronological order are evident from the above analysis of the statements appearing in the literature:

(1) Szent-Györgyi first isolated "hexuronic acid" but viewed it only as a reducing substance associated with vitamin C (1928).

(2) McKinnis and King first published a positive suggestion that hexuronic acid is vitamin C (1930).

(3) King and his students carried out a sustained study of vitamin C resulting in the isolation of the active substance in the crystalline form and first stated that the crystalline substance was apparently identical with Szent-Györgyi's hexuronic acid (April 1, 1932).

(4) Fifteen days after King and Waugh published, Svirbely and Szent-Györgyi gave their first evidence that hexuronic acid has anti-scorbutic properties, but it was not until May 7, 1932, that they stated that "Vitamin C is a single substance and identical with hexuronic acid."[12]

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11 *Nature*, 129: 576, 1932.
12 *Nature*, 129: 690, 1932.
13 *Jour. Biol. Chem.*, 97: 325, 1932.
14 *Biochem. Jour.*, 26: 865, 1932.

## NON-TRANSMISSIBILITY OF TRICHINELLIASIS IN PIG

A sow with a bodyweight of about 550 pounds has been fed Trichinellas on the 35th, 56th, 80th and 103rd day of its pregnancy. Each time about 3,000 Trichinellas have been given. The age of the Trichinellae, which had been raised in mice from a strain originally isolated from pork sausages, was from three to four months.

The sow farrowed a litter of eleven pigs eleven days after the last infection. About two weeks later lactation ceased.

Six of the young pigs have been autopsied and their striated muscles digested during the first three weeks after birth; similarly, the remaining five pigs during the next three weeks. In none of the little pigs could Trichinellas be found. The diaphragm of the sow contained 434 Trichinellae per gram of muscle.

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## THE PROGRESSIVE CONFUSIONAL SYNDROME FOLLOWING INJURIES TO THE CERVICAL PORTION OF THE SPINAL CORD[1]

IN a large proportion of cases of fracture of the cervical vertebrae, mental symptoms of loss of memory, confusion, hallucination and even delirium have been observed. Such symptoms have usually been considered the result of cerebral contusion or concurrent disease, and so of course they may be in many instances. Similar symptoms have been observed, however, in six cases of non-traumatic injury to the spinal cord which are being reported in more detail elsewhere. One of them was a chordotomy for pain, two chordotomies for athetosis, one a pathologic fracture from tuberculosis of the spine, one a spontaneous hematomyelia and one a rapidly progressing sarcoma. All the patients died; in three the circulation appeared to fail before the respiration.

1 From the Neurological Unit, Boston City Hospital, and the Department of Neurology, Harvard Medical School.

In searching for a cause for the syndrome, the possibility that deficient aeration played a part in it naturally suggests itself. The sequence of events is much like that described in "mountain sickness" and certain cardiac psychoses. While the respiration was regular and of approximately normal rate, the action of the intercostal muscles was feeble or absent in all cases. Slight cyanosis was often observed. Atelectasis of the lungs was observed at autopsy in three of the cases. Studies of the oxygen content of the arterial blood in three cases showed it to be reduced in all, and in one at a level at which symptoms might be expected.

Another possibility is that the syndrome is due to interruption of vasomotor pathways or of sensory tracts. The physiologic aspects of the condition are being studied further under a grant from the Committee on Scientific Research of the American Medical Association.

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## "IDEST"

ONE may profit by Mr. Charles H. Briggs's warning against ambiguous use of "or" (SCIENCE, November 5) without accepting his proposal to substitute "idest" (Latin *id est*) where the terms connected are equivalent. Equivalence is unmistakably implied by the use of commas in the phrase "A, or B, . . ." Conversely, "A or B . . ." should imply that A and B are non-equivalent, and it would do so if all readers knew the rule and trusted all writers to know and apply it. But there's the rub! Mr. Briggs evidently distrusts, in this regard, the writer of the phrase "gauze or leno"—and so do I, after having found from the dictionary that leno is a kind of gauze.

A writer who wishes to make the non-equivalence of two terms connected by "or" unmistakable even to a distrustful or a careless reader, or to emphasize it for any reason, can do so at the cost of an extra word or two (*e.g.*, "either A or B"; "of A or of B"). Equivalence, on the other hand, may be emphasized by substituting dashes or parentheses for commas, or by inserting "that is" or *"i.e."* (usually read as "that is"). Mr. Briggs mentions all these devices only to reject them. He stigmatizes "that is" and *"i.e."* as "awkward and interruptive." But it seems to me that neither they nor the punctuation marks interrupt the reader; he takes them in his stride because they are familiar. "Idest," on the contrary, will slow up most readers, even though it be defined in a footnote for each article in which it appears, unless and until it becomes so broadly accepted as to be "an English word," which it is not now.

But "idest" may appeal to those who use "A and/or B" instead of the plain English, "A or B or both"!

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# SCIENTIFIC BOOKS

## CALCULUS

*Differential and Integral Calculus.* By RICHARD COURANT. Translated by E. F. MCSHANE. Blackie and Sons, Ltd., London and Glasgow. New York: Nordemann Publishing Company, Vol. I, xiii + 568 pp., 1934 ($5.00); Vol. II, x + 682 pp., 1936 ($7.00).

EXCELLENT treatises on advanced differential and integral calculus are as valuable as they are rare. Such a treatise can do much to spur the student of marked mathematical ability to go on beyond the beginnings of the calculus and can help greatly in deepening and making effective the knowledge of those who wish to use the calculus as a tool in some of its varied applications. And yet only two English works of this kind seem to me to have been available in the last two decades: I refer to the well-known books written by Osgood and by Edwin B. Wilson. The two volumes of Courant's "Differential and Integral Calculus" here under review form a third distinctive treatise of high quality. This comes as a translation and extension of his well-known German work on the same subject. As in the other cases mentioned, Professor Courant's presentation is a labor of love. Its pages are steeped with a broad and appreciative mathematical spirit which is deeply interested in purely mathematical considerations, but at the same time recognizes the importance of the numerous applications. Of their significance no one is more aware than Professor Courant, whose mathematical text-book for physicists, written in collaboration with Professor Hilbert, has proved extraordinarily useful.

The two volumes have the great advantage that they are written so clearly and at such length (some 1,250 pages) that they can be read without the fatiguing necessity of weighing each word, which too often confronts the reader of a mathematical book. Furthermore, the style is lively and the matter is treated from a modern point of view by one who is himself a distinguished mathematician, which makes the reading interesting in detail. Differential calculus and integral calculus are introduced side by side.

The ground covered in the two volumes is extensive. In fact, such a subject as uniform continuity is soon introduced in the first volume, while the last 150 pages of the second volume deal with differential equations, the calculus of variations and functions of a complex variable. The precise limitations of the