The words "apophysis" and "epiphysis," formed from the same root, were however used in English early in the eighteenth century. At first they were commonly written in the French spelling, *apophyse* and *epiphyse.*

The root word, "physis" came into English from the Greek much earlier, in the adjectival form "physic"; but this became a noun and a verb and is now rare as an adjective, so that the present adjectival form is "physical." It seems that by the time the words apophysis, epiphysis and hypophysis were introduced into our language, the words physic and physical had acquired such special connotations that "apophysic" or "apophysical," etc., would not have been clear. These words therefore took adjectival forms according to another standard method by which English adjectives are formed from certain Greek words, namely by adding the suffix -al, making apophysial, epiphysial, hypophysial. This is the only form and the only spelling which has ever been accepted by the lexicographers of England.

In the 1864 revision of Webster, however, epiphyseal appears before epiphysial; in the revision of 1909 apophyseal enters the lists; in the current (1934) revision hypophyseal appears, and the spelling with -eal is preferred in all three cases. There is admittedly no philological defense for this spelling. The suffix -eal is not English; words like lacteal, osteal, have the e in their roots, not in the suffix. Evidently, however, Webster has recorded a trend in the American spelling of these words, which began to show itself by 1864, influencing first the then most commonly used of the three terms, later overtaking the others.

Why have American lexicographers, following our biologists and physicians, introduced an aberrant spelling? Possibly "epiphyseal" goes back to the days when the noun was often written "epiphyse," or possibly some writers thought it was advisable to make the adjectives from the genitives of the Greek nouns (*e.g., epiphyseos, hypophyseos*).

Much more likely, however, the spelling has been influenced by an American trend in the pronunciation. All the dictionaries, British and American, place the primary accent invariably on the third syllable, *e. g.,* hypophýsial. At the present time (and as far as my observation goes, for decades past) American speakers almost universally place the primary accent on the fourth syllable, *e.g.,* hypophyséal, with a secondary accent on the second syllable. This has the practical advantage that the spoken adjective clearly suggests the noun, thus avoiding the mental effort of associating the dissimilar sounds "hypo-fizzial" and "hy-poffy-sis." The shift in pronunciation is, I believe, helpful, inevitable and permanent. Webster and the other dictionaries have simply not caught up with it.

Returning to the question of spelling, it is clear that "hypophyseal" suggests the current pronunciation, while "hypophysial" does not, for *i* before *a* is commonly short and unaccented. In spite of the fact that "-eal" is philologically irregular, I make bold to suggest that it be adopted as standard in American scientific writing, to the exclusion of the form in "-ial," in conformity with our well-nigh general pronunciation of the three words in question. At the price of a trifling deviation from one of the usual habits of word formation in English, too small to have troubled the careful lexicographers of Webster's staff these eighty years past, we choose the clearer, more phonetic form. Recognition of the current pronunciation by the dictionaries will no doubt promptly follow.

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THE UTILIZATION OF SCIENTIFIC RESOURCES

DR. THEODOR ROSEBURY, in the December 25, 1942, issue of SCIENCE voices a plea for the fuller utilization of scientific resources for total war with which every scientist can be in hearty accord. It is not clear, however, what Dr. Rosebury means when he speaks of chemists as on a "business as usual" basis. Perhaps the clue lies in his entirely erroneous statement that "more complete use has been found in war work for physical chemists than for those in other categories." By war work he may be thinking mainly of the development of new methods and new techniques such as those for detecting airplanes, submarines, and the like. As a matter of fact, the great majority of the seventy thousand chemists and chemical engineers in the United States are actively engaged in war work, mostly alon , the well-established lines of mass production of everything which the armed forces will need. This includes literally everything which they use either directly or indirectly in the war. Moreover, it includes adequate support of the civilian production army upon which the armed forces must depend. In addition, it includes a steady flow of chemically trained men and women to fill the expanding ranks of the technical production army.

The fact is that all industrial units can be divided into three categories. Each of these requires more chemical service in wartime than in peacetime. The first group consists of units which have always made materials directly useful in war such as T.N.T. and armor plate. They are expanded at least a hundred fold and need largely increased technical staffs, including chemists. A second group consists of units which normally fill necessary civilian needs which continue during war and which are shared by the armed forces. Such are the groups producing food. Their problems are multiplied and intensified because of the war. This group of industries also needs more chemists than in peacetime. The third group consists of those producing goods which are essential neither to the armed forces nor to the civilian production army. Such units have already largely shifted over to war work. This shift is continuing at an increasing rate. Here again the need for technical help, especially of a chemical nature, is increased many fold. For instance, a peacetime company making ten-cent automatic pencils probably needs a minimum of chemical help. On the other hand, when it shifts over to making machine gun parts it certainly can not get along with less help of this kind.

Whenever we do find a chemist doing "business as usual" it is not something which we have to "tolerate" but something for which we can be thankful. This is because of the fact that, as a nation, we are hardly more than ten per cent. into total war. As we get fully into the war effort we shall need more chemists than can possibly be found or produced. Thus, the few chemists who are not yet fully in the war effort constitute our only chemical reserve. It is indeed too bad that this reserve is so small.

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d-TUBOCURARINE CHLORIDE AND CHOLINE ESTERASE

MANY have reported inhibition of choline-esterase by crude curare preparations, and recently Harris and Harris[1] have found that 0.016 mg of a partially purified curare preparation[2] will inhibit 85 per cent. of the choline-esterase activity of 0.5 cc of human serum. All preparations of impure curare, including "Intocostrin," examined in this laboratory were found to possess this choline-esterase inhibitory property. However, our recent experiments have shown that the chemically pure substance d-tubocurarine chloride is devoid of inhibitory action upon the choline-esterase activity of dog serum. It was found that 0.866 mg of d-tubocurarine chloride injected into the femoral artery of a barbital anesthetized 10 kilogram dog caused the complete curarization of the skeletal musculature. There was no change in blood pressure. *In vitro* experiments using concentrations of d-tubocurarine chloride up to approximately 29,000 times the calculated concentrations used in the *in vivo* experiments were entirely without inhibitory activity upon choline-esterase activity of dog serum. From these experiments it appears that the curare-action and the effects upon choline-esterase of the impure preparations of curare are not necessarily related.

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SPECIAL CORRESPONDENCE

ODE ON NEWTON'S THEORY OF GRAVITATION BY EDMOND HALLEY

WHEN Newton opened the printed copy of the first edition of the "Principia" in 1687, he found prefixed to the text a poem dedicated to his work and signed "Edm. Halley." It was at Halley's urging that the book had been written, and Halley had seen it through the press and paid the expenses of publication. He was then thirty years of age, Newton forty-four. The poem was in Latin like the Principia itself. It consisted of forty-eight hexameters; apart from its dedication, it bore no title.

The verses were reprinted in the second edition of the "Principia" (1713), which was edited by Roger Cotes, the mathematician, and seen through the press by Richard Bentley, the classical scholar. Bentley, without Halley's consent, altered some of the lines and omitted others. In the third edition (1726), edited by Henry Pemberton, a physician and scientist, Halley's original text was restored in most places; but a few of Bentley's changes were retained and some additional ones introduced. This text, like that of the second edition, did not meet with Halley's approval.

No further edition of the "Principia" appeared during the lifetime of Newton, who died in 1727. Both Halley and Bentley died in 1742; so that the two hundredth anniversaries of their deaths coincide approximately with the three hundredth of the birth of Newton and the death of Galileo, and the four hundredth of the death of Copernicus.

The text of all three editions of Halley's poem is printed in Stephen Peter Rigaud's "Historical Essay on the First Publication of Sir Isaac Newton's Principia," Oxford, 1838 (pages 57–59); in Sir David Brewster's "Memoirs of the Life, Writings and Discoveries of Sir Isaac Newton," two volumes, Edinburgh, 1855 (volume 1, pages 457–459); and in Eugene Fairfield MacPike's "Correspondence and Papers of Edmond Halley," Oxford, 1932 (pages 203–206).

[1] *Proc. Soc. Exp. Biol. and Med.*, 46: 619, 1941.
[2] Intocostrin. There is no evidence that the choline-esterase inhibitory activity of Intocostrin constitutes a clinical hazard.