ulated by the war and is especially reflected by the demand for investigators by the industries. Obviously, if this interest is to be maintained, if indeed it is not to be seriously checked by unsatisfactory work of poorly trained men, a supply of investigators must be available, and they must come from the colleges. Of course, a student can not be taught to be an investigator. He can only be given the tools of the trade, the essential training in the fundamentals, and the opportunity to make himself into an investigator if he has the proper mental equipment. He must learn first of all that there is such a thing as research by which a livelihood and an honorable position can be gained. Through contact with research workers he must acquire that spirit which is absolutely essential to continued investigation, and without which few young men will choose the laboratory in preference to the more lucrative offerings of the business and professional world. This contact can be obtained only in colleges doing research work. Every one who has had experience in maintaining the personnel of an investigational institution knows that the chances of getting good research men is much greater in the colleges doing research work. Not only does he find there students sufficiently interested in research to consider it as a calling, but those who are temperamentally adapted to this exacting type of work have had some opportunity of demonstrating their fitness. Colleges doing no research work rarely turn out an investigator. It is improbable that the students in these institutions differ essentially from those whence most of our investigators come. The difference lies in the fact that nothing is done to develop those having qualifications for this work. Musicians are not developed in a technical school, nor artists in a college of law.

Presumably research is conducted primarily for the results it may yield, but what we usually consider as the results of university research is in reality but a by-product; the real results are the investigators it develops.

There has never been a time when the colleges were so unable to meet the demand for men to fill research positions. Under these conditions should the Carnegie Foundation attempt to discourage research in the universities, or should it use its great resources and power to strengthen the weak places it has found?

L. A. ROGERS

WASHINGTON, D. C.

RADICALISM AND RESEARCH IN AMERICA

IN a communication by Neil E. Stevens having the title "Radicalism and Research in America" printed in the last issue of SCIENCE, both the title and the purport of the article seem to challenge comment as a form of veiled propaganda such as is all too common at the present time. When radicalism is now pretty clearly identified with bolshevism, I.W.W.ism and other similar yearnings after dictation by the proletariat styled pure democracy, and when these eruptions within the body politic are threatening to overthrow our established system of representative (not democratic) government, the claim is set up through insinuations rather than by direct assertions that the fathers of our government, Washington, Adams, Jefferson, Franklin and Madison, were all radicals identified with such tearing-down movements. It seems further to be implied that because they encouraged science, therefore scientific men need have no fear that such overturns as our radical now propose will be other than advantageous to them.

If I have misinterpreted the purport of the article I trust that Mr. Stevens will explain just what *radicalism* connotes in his communication.

WILLIAM HERBERT HOBBS

ANN ARBOR, MICHIGAN,
July 10, 1920

[Dr. Stevens writes that he does not wish to reply to Professor Hobbs, but that he has no objection to a quotation from a personal letter to the editor in which he says: "I used the word 'radicalism' in what I believed to be its correct sense as established by good usage, as Dr. True uses it in the opening paragraph of his article 'Thomas Jefferson

in Relation to Botany' (*Scientific Monthly*), and as Henry Jones Ford uses it in 'Radicalism in American Poltics' (July, *Yale Review*), in the first paragraph of which he refers to Madison and Franklin as radicals. The word can not possibly be regarded as synonymous with, or identified with, Bolshevism, I.W.W., or anarchy." ED.]

ANATOMICAL LITERATURE

PROFESSOR ERICH KALLIUS (Anatomisches Institute, Breslau, Germany), who has taken over the editorship of the Anatomische Hefte and Ergebnisse der Anatomie und Entwicklungsgeschichte, writes that it is difficult now to obtain foreign literature and that he would be very glad if American contributors would send reprints as freely as possible for the use of these journals.

H. V. WILSON
UNIVERSITY OF NORTH CAROLINA, CHAPEL

SCIENTIFIC BOOKS

Greek Science and Modern Science. A Comparison and a Contrast. By CHARLES SINGER. London, Oxford University Press, 1920, 8o, 22 pp.

This lecture, inaugurating a systematic course on the history of science and of scientific ideas, was delivered at University College, London, on May 12, 1920. Its author, one of Emerson's "monks of Oxford," was a captain in the Royal Army Medical Corps during the recent war. Its object is to bridge over the embarrassing gap between the history of Greek science and that of modern science. It is a commonplace to deride the Middle Ages for sterility in science; the thing is to ascertain just how, where and why they were sterile. This department of historical investigation Singer defines as "the pathology and embryology of human thought"; for, in the Middle Ages, Greek science did slowly and surely die, and strange as it may seem, our modern scientific methods were actually engendered, by lengthy and painful travail, out of medieval restrictions.

Of this view of things, Dr. Singer's lecture gives a clear and intelligible account. The argument is as follows: It is one of the vainest delusions of the modern mind to imagine that we can entirely enter into the modes of thought of the ancient Greeks. This fact, which Singer has frequently insisted upon in private correspondence, was already emphasized long ago in the verses of one who was very close to them, the Roman Lucretius.

> Nec me animi fallit Graiorum obscura reperta
> Difficile inlustrare Latinis versibus esse,
> Multa novis verbis præsertim cum sit agendum
> Propter egestatem linguae et rerum novitatem.

But it is at least reasonably certain that the Greeks based their scientific system upon Egyptian, Minoan and Assyro-Babylonian tradition, that this pre-Hellenic material was an anonymous, socialistic, collectivistic product; while the Greeks thought as individuals, not as a people, stamping their work, each one of them, with his own individuality, thus giving to science the eponymous character which it has since retained. We have only to think of Diophantine algebra, Euclidian geometry, the *corpus Hippocraticum* of Galenical remedies. Credulous and facile of generalization as were the Greeks, they had yet an abiding intuitive conviction that "order reigns in nature"; that behind the observed and observable phenomena there is an ascertainable law which correlates them and is their *raison d'être*. It is just this sense of law in nature and of the necessity for personal scientific investigation that is their most valuable heritage to posterity. This is what Sir Henry Maine meant when he said that "Nothing moves in the modern world which is not Greek." In the Middle Ages, the reckless freedom in speculation as to the causes of things which the Greeks enjoyed was suppressed by prince and prelate as subversive of the feudal theory of the state and of the theological view of the universe. But, in spite of the harm it has done, there was, in Singer's view, a distinct advantage in all this. It got the practical scientific worker away from sterile speculation and down to brass tacks; so that gunpowder, printing, the mariner's compass, spectacle lenses were immediately taken up, and the outcast, outlawed medieval