

SCIENCE

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CONTENTS

<i>The Engineer and Civilization</i> : PROFESSOR W. F. DURAND	525
<i>Biological Abstracts</i> : DR. J. R. SCHRAMM	533
<i>Harold William Nichols</i>	536
<i>Scientific Events</i> :	
<i>The American-Hungarian Foundation Library; The Carnegie Corporation Grants; Elections of the American Society of Agronomy; Notes on the Kansas City Meeting of the American Association</i>	536
<i>Scientific Notes and News</i>	538
<i>University and Educational Notes</i>	543
<i>Discussion and Correspondence</i> :	
"The Scientific Accuracy of the Sacred Scriptures": DR. W. W. KEEN. <i>The Propagation of Apple Varieties by Cuttings</i> : DR. CHARLES F. SWINGLE. <i>The Mackerel and Planktonic Organisms</i> : RALPH C. JACKSON. <i>Abstracting Old Botanical Works and Manuscripts</i> : DR. J. C. TH. UPHOF	543
<i>Scientific Books</i> :	
<i>Goldschmid's Entwicklung und Bibliographie der pathologisch-anatomischen Abbildung</i> : DR. F. H. GARRISON	545
<i>Special Articles</i> :	
<i>X-Ray Diffraction Patterns from Plant Materials</i> : DR. O. L. SPONSLER. <i>The Suction Force of Soils</i> : J. S. JOFFE and H. C. McLEAN	547
<i>The American Mathematical Society</i> : PROFESSOR R. G. D. RICHARDSON	550
<i>Science News</i>	x

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THE ENGINEER AND CIVILIZATION¹

IF we may accept the estimates of archeologists, it is now some hundred thousand years or more since man began to manifest, in some marked degree, those characteristics which have served as the foundation upon which the superstructure called civilization has been erected.

Throughout this long evolution, three great principles or lines of action have stood out as the determining factors. These are specialization, cooperation and the utilization of the resources of nature. These are, in fact, all interrelated. No one is independent of the other two.

So long as the unit of life is the individual, or at most the family, there can be but small progress toward a state of what we term "civilization." So long as a man or a family must do all the things necessary for his or its life, no one thing can be done with super-skill or super-excellence, and progress must needs be slow. The acquirement of super-skill or of super-excellence means specialization, concentration and the limitation of activity to a relatively narrow line of endeavor. Only by this pathway can progress be made. But if the individual is to limit his own activity to a narrow line of endeavor and give to this field of work his entire time and effort, he will obviously be in no position to provide for himself, at first hand, more than some of the things needful for life, and he must perforce depend on others for those things which he can not supply himself. This means that he must contribute from the results of his own skill to the needs of his neighbors and that he must count on receiving from them, in return, the products of their special skill to supplement his own lack. Thus is born the principle of cooperative effort, and out of this flows, of necessity, the commercial institution of barter and exchange.

THE BEGINNINGS OF MATERIAL CIVILIZATION

If we seek to place a finger upon the very beginnings of what we may term "material civilization," we shall find it at that point where some race or community of men of primordial stamp and character began to realize and enjoy the advantages accruing through the utilization of some combination product of human skill directed upon a raw material of the earth. For, with the growth of such a condition, there would come

¹ Presidential address at the annual meeting, New York, November 30 to December 4, 1925, of the American Society of Mechanical Engineers.

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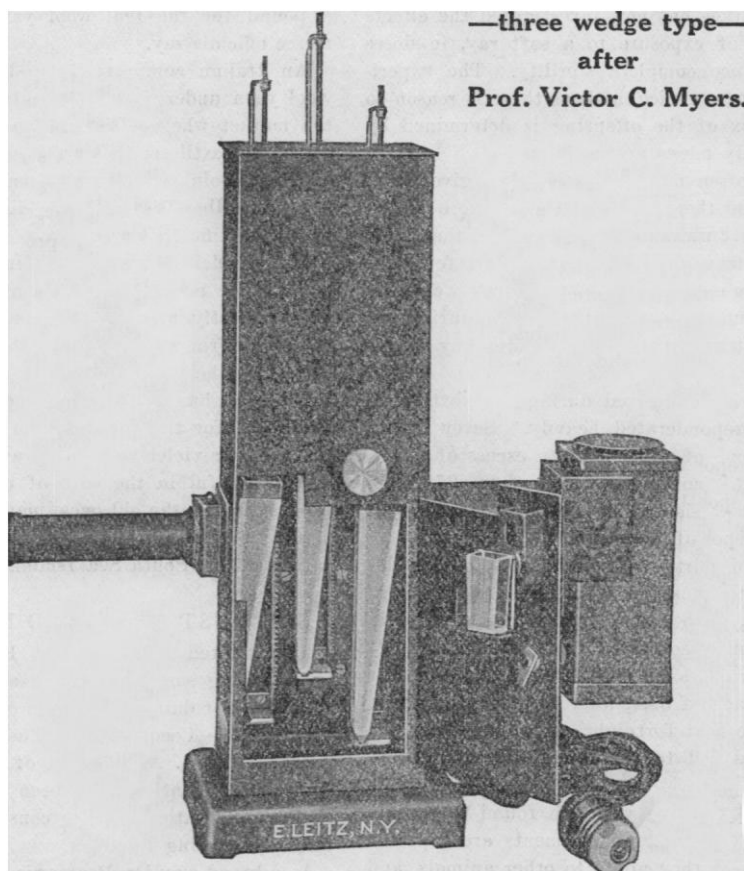
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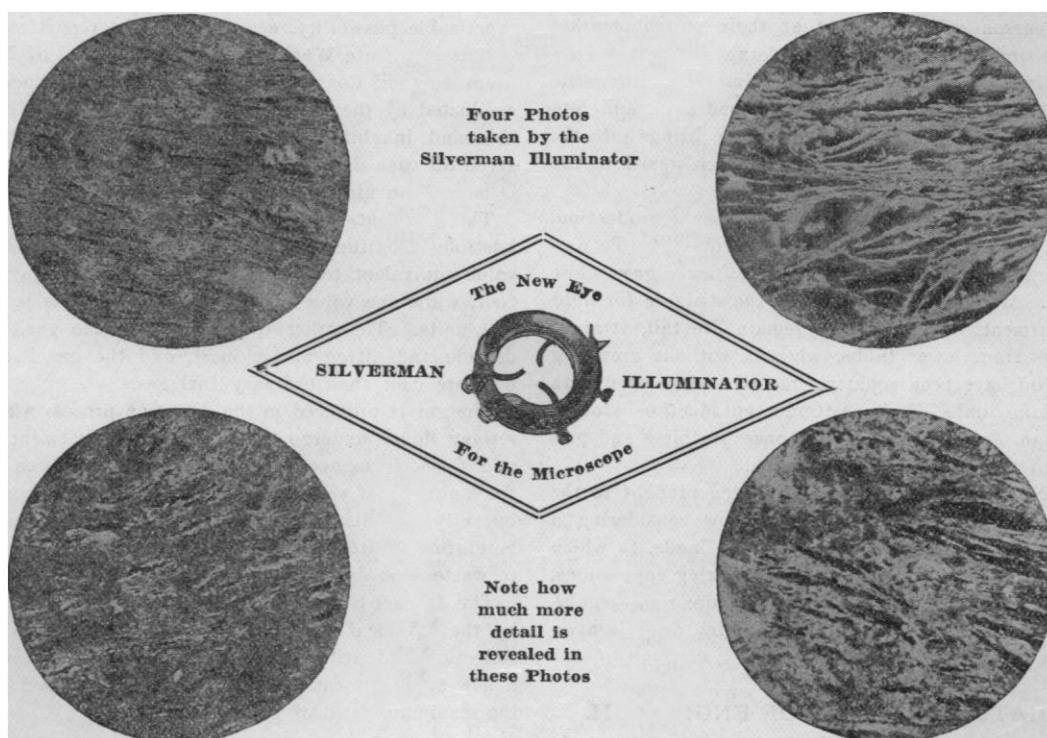
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