

# SCIENCE

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FRIDAY, JULY 5, 1901.

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## SOME ADVANCES MADE IN ASTRONOMICAL SCIENCE DURING THE NINETEENTH CENTURY.\*

IN glancing over the field of astronomical achievement during the century recently closed, the most striking feature is undoubtedly the rise and growth during the past fifty years of an entirely new department, one totally unknown and almost undreamed of before the first half of the century had passed, that called by Professor Langley the new astronomy, more technically known as astrophysics. In considering the restrictions which must be regarded in case this address is to be kept within manageable limit, perhaps it would be well to confine my remarks to this new branch of the science. I shall, however, give the chief place to the older astronomy, touching briefly upon the newer phase.

Near the close of the seventeenth century appeared Newton's immortal work called by him 'The Mathematical Principles of Natural Philosophy.' In this treatise the law of universal gravitation as the controlling and governing principle of the planetary system was established by a rigorous course of mathematical reasoning. It was many years, however, before these conclusions were universally accepted. On the continent of Europe particularly, the

\* Annual address delivered before the University of Pennsylvania Chapters of the Society of Sigma Xi, June 13, 1901, by C. L. Doolittle.

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