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RECENT PROGRESS IN OUR KNOWLEDGE OF THE UNIVERSE¹

IN his address at the dedication of the Yerkes Observatory in 1897, Simon Newcomb said, "If it be true that in nature nothing is great but man, in man nothing is great but mind, then may knowledge of the universe be regarded as the true measure of progress." Without discussing the validity of the premises which Newcomb himself casts in the conditional mood, let us boldly accept his conclusion and take time this evening to consider the progress we have made in the last thirty-five years by reviewing the increase of knowledge of the universe within that period. The time and the occasion are propitious for such an inquiry, for we are assembled to dedicate another great observatory; and this year, 1923, marks the 450th anniversary of the birth of Copernicus, whose book, "De Revolutionibus Orbium Coelestium," set the feet of men for the first time firmly on the road leading to knowledge of the universe and opened a new epoch in the development of the human mind.

The doctrine of Copernicus was more than epoch-making; it was revolutionary. The earth had been to men, in substance, the entire universe; the heavens a canopy drawn close about the earth; the sun, the moon, the planets and the stars merely greater or lesser lights set in that canopy for the comfort and delight of the dwellers upon the earth. Now they were asked to regard that earth as but a little planet, one of several revolving about a distant sun, and the stars, by implication, as vastly distant bodies that might rival with the sun in actual brilliance. No wonder that such heresy met with the most strenuous opposition; no wonder that only the boldest intellects became converts to it before Galileo, in 1609, turned the first small telescope upon the splendors of the sky and saw in the moons revolving about Jupiter a system, in miniature, resembling the one Copernicus had described.

I must resist the strong temptation to trace in detail the progress of astronomy through the centuries that followed. It is a brilliant story and one that has been told many times in prose and in verse. No one who has read it can have failed to note that advance in civilization closely paralleled the growth of man's knowledge of the universe, or to realize that this growing knowledge, by bringing man an ever-widening

¹ Address at the dedication of the Steward Observatory of the University of Arizona, April 16, 1923.

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