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THE LAW OF DIMINISHING RETURNS

By Dr. JOEL STEBBINS

WASHBURN OBSERVATORY, UNIVERSITY OF WISCONSIN

In the Encyclopaedia Britannica under the heading, "Law of Diminishing Returns," we find that this law was first stated in relation to agriculture:

An increase in the capital and labor applied to the cultivation of land causes in general a less than proportionate increase in the amount of produce raised unless it happens to coincide with an improvement in the arts of agriculture.

In economics, then, the law of diminishing returns is merely a precise statement of what is ordinarily recognized in the affairs of the working world. Everybody knows that, after a certain point, work in given conditions yields a diminishing return unless a better method is invented applicable to those conditions.

We in this society naturally include astronomy in the affairs of the working world, and it may be instructive to trace some of the applications of the law of diminishing returns in our own field. To begin with, this law took hold of the increasing size of refracting telescopes and brought further development to a close with the completion of the 40-inch refractor some fifty years ago. True, it was the rediscovery of the possibilities of the reflecting telescope that turned the construction of new instruments into the other form. But even if there had been no reflectors it was obvious from geometrical and optical principles, not to mention atmospheric limitations, that each increase in size of the objective of a refractor was accompanied by less than a proportionate increase of power.

The same law is now holding for reflectors even if the 200-inch, as we hope, should turn out to be a complete success. I understand that at Mount Wilson the 100-inch reflector cost about four times as much as the 60-inch, while the 200-inch will cost ten times as much as the 100-inch. No one thinks for a moment that the resulting gain in power will be proportional to the outlay. These facts are elementary to astronomers but to the laymen we might quote the simple