MODEL STARS*

BY HENRY NORRIS RUSSELL

The distinguished record of the Willard Gibbs Lecture is more than enough to place a newcomer upon his mettle. In accepting the kind invitation of your President to add my contribution to the list, I must warn my hearers, as I warned him, that you will not hear today such a masterly discussion of major contributions made by your speaker as you have heard when the topic was "*Relativity and Thermodynamics*", or "*Resonance in the Solar System.*" My humbler task must be to report upon the work of others in a field which I have only lightly touched.

The field itself is important enough, and the advances of knowledge in the past twenty years are sufficiently impressive. At that time we knew little, and dared not venture to guess much more, concerning the internal constitution of the stars; and some of the guesses which then looked best were wrong. Now we know enough to have interpreted some of the facts which then appeared hopelessly puzzling, and we still know little enough to afford room for very lively and enlightening controversy. Astronomy, physics, and mathematics have contributed to the advances. The astronomers contributed the observational data, and had already provided a great part of these, two decades since. Modern atomic theory laid the foundations for the new structure, while mathematical analysis—of a kind simple enough to the mathematicians, but little used previously in astronomy,—built it up.

So far has the work already progressed that it would far exceed the limits of this lecture, or of the time available for your lecturer's preparation—not to speak of those of your patience—to give a detailed critique of the present situation. I will attempt only to give a general account of the problem, and deal in a sketchy fashion with some aspects of the solutions so far attempted, which elucidate something regarding the inner nature

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