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SOME ASPECTS OF MODERN SPECTROSCOPY¹

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SEVENTEEN years ago, at the meeting in New York, some of us had the pleasure of listening to an address entitled "Fact and theory in spectroscopy," given to this section by its retiring chairman, Professor Henry Crew. It included a comprehensive and enlightening survey of atomic theory and of the requirements imposed upon any successful atomic model by the facts of spectroscopy known at that time. In the light of more recent work on this subject, it may be interesting to look at this same field, and consider in part the contributions of spectroscopy to atomic theory in this interval.

Your first reaction to such a proposal is perhaps a very natural fear that the territory to be covered is so vast that you must suffer an exhausting experience in being dragged over the whole of it, or be whisked about from point to point at a speed that will not allow you to enjoy the comforts of leisurely travel. Let me say at once that we shall view but a small corner of this domain, and, since I am to choose the route, it shall be from a standpoint with which until quite recently comparatively few were acquainted, but which nowadays is starred in the atomic Baedeker, and has suddenly achieved an enormous popularity.

It is with a certain sense of satisfaction that the experimental spectroscopists may legitimately regard their labors in the recent past. Twenty-five years ago there were those who said that the spectra of all the elements had been "done" by Kayser and Runge, and that there remained in this field nothing more attractive to seek than the next decimal place in wavelengths. In spite of such pessimism, important advances began to be made, of which a few might be mentioned at this point. These years brought us the best part of the work of that gifted and brave spirit, Walter Ritz, whose early death was a very real loss to science. He gave us his famous combination principle, which first demonstrated the importance of spectroscopic "terms," now translated into energies by the Bohr theory. Then came a steady growth in our knowledge of the series structure in the simpler spectra, including the interpretation of the "spark" spectrum as that due to the ionized atom, and the

¹ Address of the vice-president and chairman of Section B—Physics—American Association for the Advancement of Science, Cincinnati, Ohio.

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