

PRISMATIC AND DIFFRACTION SPECTRA

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Prismatic and Diffraction Spectra by Joseph von Fraunhofer

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JOSEPH VON FRAUNHOFER

**PRISMATIC AND
DIFFRACTION
SPECTRA**

HARPER'S SCIENTIFIC MEMOIRS

EDITED BY

J. S. AMES, Ph.D.

PROFESSOR OF PHYSICS IN JOHNS HOPKINS UNIVERSITY

II.

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MEMOIRS BY JOSEPH VON FRAUNHOFER

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PREFACE

THE spectrum of the sun was first observed, in 1666, by Newton, who allowed light coming from a small round opening in a shutter to pass through a glass prism. This spectrum was most impure ; and a pure spectrum was not obtained until, in 1802, Wollaston repeated Newton's experiment, replacing the round opening by a slit parallel to the edge of the prism. He observed several dark lines crossing the spectrum, which limited, as he thought, the different spectral colors. His description of this discovery is given at the end of this volume.

Working independently of Wollaston, Fraunhofer, in 1814, rediscovered the lines in the solar spectrum, which now bear his name. He at first used a slit and prism ; but, later, he discovered that the same phenomena could be obtained by means of gratings made up of wires or ruled on glass. The papers of Fraunhofer in which he describes these results are printed in full in this volume. The great merit of Fraunhofer's work is the systematic, logical method by which he proceeds from investigation to investigation.

The most important contributions of Fraunhofer to the science of Spectrum Analysis are :

1. The application of the objective prism to the study of spectra of the sun, the stars, flames, etc.
2. The discovery of the principle of plane gratings.
3. The discussion of the effect upon spectra of
 - a. Periodic errors in the ruling of gratings.
 - b. The shape of the groove.
 - c. The relative widths of opaque and open spaces.
4. The first measurements of the wave-lengths of various solar lines.

PREFACE

5. The discovery of the agreement in wave-length of lines in the spectra of flames and of certain stars with those in the solar spectrum.

All modern work in spectroscopy is based upon that of Fraunhofer, and a brief bibliography of the most important contributions is appended to this volume.

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DETERMINATION OF THE REFRACTIVE AND THE DISPERSIVE
POWER OF DIFFERENT KINDS OF GLASS, WITH REFERENCE
TO THE PERFECTING OF ACHROMATIC TELESCOPES.

Denkschriften der königlichen Akademie der Wissenschaften zu München, V.,
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