

BOOK REVIEWS

Optics, light and optoelectronics

Sunsets, Twilights and Evening Skies

Aden and Marjorie Meinel 1983 Cambridge: Cambridge University Press x+163 pp price £17.50 ISBN 0 521 225220 2

This is an intense and sometimes idiosyncratic account of the authors' favourite sky phenomena. On the whole the physics is clearly explained, but I was disappointed to see a diagram showing light travelling from the eye to the sun, and the implication that the angle of the setting sun's path depends only on latitude and not on season, and that there was no reference to Minnaert's classic *Light and Colour in the Open air* (Dover 1954). The book's main attraction is the collection of beautiful photographs of sunsets, noctilucent clouds, the Zodiacal light etc. Many of these were taken in Arizona and show features visible only in the clear desert skies. Recommended for physics libraries and the personal collections of lovers of nature's optics.

Michael Berry

The Optical Papers of Isaac Newton: Vol I The Optical Lectures 1670–1672

Alan E Shapiro (ed) 1984 Cambridge: Cambridge University Press xix+627 pp price £75 ISBN 0 521 25248 2

This majestic work of 627 pages, edited by Alan E Shapiro, brings Newton's lectures and writing into a form where they can edify and delight present-day scientists of all ages.

Most of the book presents the *Lectioes Opticae* and the *Optica* with the original Latin on the left and the translation, duly annotated and cross refer-



One of the many lovely photographs of sunsets in *Sunsets, Twilights and Evening Skies*: in colour, the El Chichón glow is seen here at La Jolla, California, 21 July 1982

enced, on the right. Great care has been taken so that it is never necessary to turn a page whilst following a diagram, to the extent of presenting the diagram twice when necessary.

The book begins with a synopsis of the *Lectioes Opticae* and the *Optica* and their major differences. In the synopsis and the texts, footnotes record and explain changes which Newton (and sometimes others) made in the precise wording. Such changes occurred sometimes because of the reaction in earlier deliveries, sometimes in the light of further evidence. For example, they explain such details as why Newton changed the adjective in a particular discussion from 'orbicular' to 'round'; and, indeed, wherever there are shades of meaning ('leek-green') which might not be too clear to

the modern reader, they are discussed and clarified by the editor. The reader looking for discussion on a specific topic will be guided by the marginal notes.

The diagrams are a delight, and a model of what can be achieved in black and white. A few plates allow us to see Newton's original longhand; basically clear and tidy, it is made more fascinating by various kinds of deleting (squiggles, heavy crossings out – one can sense his mood!), and by insertions and his own marginal notes.

Newton's works start with evidence that 'light's rays differ from one another with respect to the quantity of refraction'. Straight away, because of the style and manner of the writing, the reader feels as though he were present in a lecture room, being addressed enthusiastically by Newton himself. 'I will at once present the reasoning and experiments that support these things, lest you think that I have set forth fables instead of the truth.' Newton tells the student clearly and exactly how to repeat the experiments with minimum difficulty, in the light of his own experiences: 'When you see that, stop the prism and fix it in that position. I say you are done. Namely, in that position, the sum of the refractions made on both sides, or the inclination of the emergent to the incident ray, proves to be least of all; and when this happens, the refractions on both sides are equal, as will be demonstrated later.' (Would that modern texts were

An illustration from *The Optical Papers of Isaac Newton*, showing 'a way . . . whereby everything we view with our naked eyes can be as tinged with colors as if a prism were interposed, although they are much less evident'.

