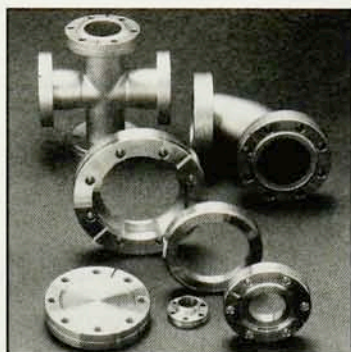


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See Index in
Optics Guide 4.

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for anticipating the discovery of the third generation in their model of CP violation.

Though it can be read in an evening, this slim volume does manage to teach a great deal of physical theory. More important, it gives a useful perspective on the tangled history of a central subdiscipline of modern physics. It is recommended reading for anyone with an abiding interest in that field.

Instruments and Experiences: Papers on Measurement and Instrument Design

R. V. Jones

Wiley, New York, 1988. 485 pp.
\$79.95 hc ISBN 0-471-91763-X

There are at least two things notable about this book. The first is that it represents the initial volume in the Wiley Series in Measurement Science and Technology. The chief editor of the new series, Peter H. Sydenham, has convinced the publisher, quite correctly in my opinion, that instrument and measurement science deserves recognition as a field with its own scholarship, techniques and skilled practitioners.

The book is a compendium of one man's work, including some of his original papers, along with his own up-to-date commentaries introducing each of the ten chapters. An enterprise of this kind usually works best when the author is highly distinguished and respected. R. V. Jones, the author of *Instruments and Experiences*, is such a man; it is he who represents the book's second point of distinction. Jones is noteworthy not only for his mastery of the field—as demonstrated by his research papers—but also for his contributions to education, his work in scientific intelligence during the Second World War and his authorship of the international best-seller *The Wizard War* (published in 1978 in London as *Most Secret War*), which describes Jones's experiences in scientific intelligence during World War II.

Twenty-six of Jones's papers are distributed among the first eight chapters; together these papers form a representative sample of his contributions to instrument design. The first of these papers, "Infrared Detection in British Air Defence, 1935-38" appeared in 1961 in the very first volume of the journal *Infrared Physics*. The delay in its publication was due to security reasons.

From that work on copper-constant-

tan thermopiles, galvanometers and photoelectric amplifiers, the versatile Jones went on to optical levers (three papers), elastic movements such as optical slit mechanisms and antidistortion mountings for instruments (seven papers), microbarographs (five papers), measurements of "aether drag" (three papers) and capacitance micrometers. In a paper published in 1973, Jones described the use of these micrometers in gravimeters, seismographs and tiltmeters. In *Instruments and Experiences*, he comments that such instruments made it possible to observe a tilting of the east coast of Scotland with an angular amplitude of about 10^{-6} radian. This turned out to be due to the extra pressure on the bed of the North Sea at high tide.

I found equally interesting his commentary preceding some of his works on optical radiation pressure (four papers). He describes a lecture demonstration in which radiation pressure from a 5-mW He-Ne laser could be observed without the use of electronic amplification. He also discusses his measurements of the momentum of a photon in a refracting medium and the effect of the results on theoretical work by Rudolf Peierls and Otto Frisch.

The final two chapters consist of some 40 pages of fascinating commentary on instrument design and on trends in instrumentation, preceding three papers and the texts of two lectures—whose entertainment quotient I judged to be quite high. For example, in the text of his lecture "Importance and Achievement in Physics and Technology," Jones writes: "[Frederick] Lindemann [Lord Cherwell] quotes the futility of trying to describe the smell of nitric oxide, which is changed to nitrogen peroxide when it is drawn with air into the nose of the observer. Such a process is a self-frustrating one, and it can have similar results to impotence; and so, before considering principles of impotence, let us look at self-frustration.

"Self-frustration can arise very easily in military security. An example which I remember particularly well occurred in the German Air Force towards the end of 1940, when Goering realized that by some means we often knew in advance where his night bombers were going to attack. He therefore ordered an intense search throughout the Luftwaffe for the means by which information was leaking out. Fortunately for us, the search failed—the radio beam stations for guiding the bombers, which were the actual source of the leak,

were at that time so secret that they were specially exempted from the scrutiny of the investigating officers."

The combination of the author's technical expertise, his writing skills and his wit, which owes much to his eye for the ludicrous in human relations at the highest levels of science and government, is particularly on display in this part of the book.

I highly recommend this book to readers, regardless of their specific areas of expertise. I congratulate the publisher in making such a splendid start in its new series, and suggest that the book's appeal may be to a wider audience than originally envisioned.

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