became *persona grata* in many quarters—not least in his own native country, the Republic of Dubrovnik, which he cleared of an alleged breach of neutrality towards the British Crown. His intuition of the contingent dominance of Euclidean geometry is only one example of his astonishing insights.

Since the book includes eight further articles on different aspects of Boscovich's scientific work, space does not permit of even listing them; I am able to give them no higher praise than to record that many evenings spent in reading them were followed by days of commerce with many of the original authors referred to. There are an admirable bibliography of Boscovich's works and of numerous relevant secondary sources; also a helpful index of proper names, and of topics dealt with by Boscovich.

Publishers, printers, editor, and Sir Harold Hartley (for his engaging foreword and the part he has played in re-awakening interest in Boscovich) all deserve thanks for a very attractive volume. A few errors—typographical and orthographical—were noted: in the transcription (p. 115) of extracts from Child's translation of the *Theoria* the reference to Newton should be in square brackets, 'found' should read 'bound', and in the next paragraph 'terms' should be 'powers' (*potentias* in the original).

WILLIAM P. D. WIGHTMAN

OEUVRES COMPLÈTES—AND NOTES FOR POSTERITY

Oeuvres Scientifiques Complètes

Par Frédéric Joliot-Curie et Irène Joliot-Curie. Pp. viii + 916 + 10 planches. (Paris: Presses Universitaires de France, 1961.) 100 N.F.

TWO years after the death of Pierre Curie in 1906, his collected works were published by la Société de Physique. In 1924, Marie Curie added a biographical sketch of her husband as preface when this collection was reprinted. Thirty years later, and twenty after her own death, Marie Curie's scientific publications, collected by her daughter, were published as an act of homage by Polska Akademia Nauk in Warsaw. Irène Joliot Curie, in her preface to that volume, wrote: "For the most part these publications no longer have more than an historical interest, such has been the rapidity with which our knowledge of radioactivity has [recently] advanced".

Irène Curie died in 1956, and Frédéric Joliot in 1958; now, in the volume under review, we have the *Oeuvres Scientifiques Complètes* of this second generation of Nobel prize-winners. The preface is signed jointly by their children. Again, in a sense, what is collected is of no more than historical interest—for the rapidity of advance of knowledge has not slackened in the past decade—but the collection is different from its forerunners in one respect which must be mentioned, and its interest is greater in consequence. The novelty is that the present volume contains material that has not previously been published. Let us look first, however, at its main content, at the papers which appeared in the scientific journals over a period of some thirty-five years, and greatly advanced our knowledge, and then return to the rest.

The whole impact of the published work, as all physicists must surely know, is impressive in the extreme. If we look for the highlights they are there: the joint work which resulted in the discovery of 'artificial' radioactivity, and the work of Frédéric Joliot and his collaborators, both before the fall of France and after the liberation, on fission. Equally substantial is the work of Irène Joliot Curie and Savitch, on the radioelement of 3·5 hr. lifetime, which for eighteen months before the discovery of fission held the secret of that process at so short a distance from their grasp. Earlier, there is the note of January 18, 1932, entitled "The emission of protons of high velocity from hydrogenous materials irradiated with very penetrating γ-rays". That, too, was epoch-making. Indeed, the whole corpus is monumental: here is recorded the work of two experimenters of genius.

The unpublished material consists in part of extracts from the *Notices de Titres et travaux* which Irène and Frédéric Joliot Curie wrote in retrospect concerning their published work. Precise dates are not given, but from internal evidence the interval between experiment and gloss must sometimes have been as great as ten years. The result is not uniformly satisfactory, though respect must naturally be accorded to an investigator's personal views of origins and significance when his own work is in question. In the preface to the Warsaw volume, Irène Curie wrote of her mother's early papers, composed in her native language, "That is why it has seemed preferable to publish them without translation—so as to preserve their character as [original] documents". If a similar restraint had motivated the editors of the present volume, the testimony of the original documents here collected would not, in places, have been obscured by the gloss. In his account of the discovery of the neutron (pp. 351–3), Frédéric Joliot comments: "We started to repeat the experiments [of Bothe and Becker]. . . . We learned later that Webster . . . at Cambridge was carrying out experiments by the Wilson method (however without success). . . . This effect escaped Webster's observation . . . which explains why Chadwick did not take up his crucial experiments until we had published our account of the projection of nuclei [by the penetrating radiation]". It is only honest to record the fact that the original documents in the present collection provide convincing evidence in themselves of the inadequacy of the first statement (concerning Webster's experiments) and of the ingenuousness of the plural usage 'nuclei' in the last sentence of this quotation. It is unfortunate that any such rebuttal of witness should be necessary—as it is necessary—in the present context.

The unpublished material is of further interest to the historian in that it includes the full text of the five applications for patent in relation to nuclear reactors and nuclear explosives which Joliot and his collaborators made in May 1939 and April and May 1940. Over the space of a generation the attitude of scientists towards the exploitation of their discoveries had sharpened. In the preface to the Warsaw volume Irène Curie had written, "Pierre and Marie Curie had had no desire to take any patent on the method of extraction of radium. Industry had taken over the process which they had developed almost without modification. . . ." So we have the draft patents of 1939 and 1940—but not the judgment of the law on their validity.

N. FEATHER