

yet comprehensive study of natural and artificial fuels. Here are described the gas, tar-distilling and petroleum-refining industries, together with various kinds of producers and furnaces. The theoretical treatment is very thorough.

In the second volume are set forth the different inorganic chemical industries. The author first describes the liquefaction of air, the separation of its components and their uses, the production of oxygen, ozone and inorganic peroxides. The numerous processes for the preparation of industrial hydrogen are then discussed, while a subsection is devoted to the purification of water. The three following chapters, which deal respectively with the industries derived from nitrogen, sulphur and common salt, are probably

the most important in this volume, covering as they do the bulk of the heavy chemical manufacture. They are excellently written, being models of terse description, although the theoretical considerations underlying the different processes receive adequate treatment. The remaining sections deal with fertilizers, with cements and with the glass and ceramic industries.

In view of the utility of these two volumes, it is a pity that they are but indifferently bound in paper covers and have uncut pages. Apart from the question of durability, even a mere chemist takes pleasure in the appearance of his library, and likes sometimes to say with Samuel Pepys, "My book is brought home handsomely bound, to my full content".

G. R. D.

## General Smuts

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By Sarah Gertrude Millin. Vol. 1. Pp. xv + 394 + 12 plates. Vol. 2. Pp. xi + 496 + 11 plates. (London: Faber and Faber, Ltd., 1936.) 18s. net each.

FEW careers provide such a romantic story as that of General Smuts, and a biographer could scarcely fail to give a fascinating narrative from such a wealth of material. Yet with a man so versatile and manysided as General Smuts, that very wealth of material may prove the biographer's undoing, and while the scientific worker will appreciate the picture Mrs. Millin gives of the statesman, he can scarcely fail to lay down these volumes with a feeling of disappointment that so little justice has been done to the philosopher. One searches these volumes in vain for any comment upon the selection of General Smuts by the British Association to fill the office of president in its centenary year, and the philosophical views which Smuts has expounded under the name of holism receive scanty treatment.

Here as elsewhere Mrs. Millin fails in her interpretation, and gives rather a series of brilliant snapshots than the intimate and discerning study for which one had hoped. The book undoubtedly gives an arresting picture of the soldier and statesman, but Mrs. Millin's opinions are scarcely held sufficiently in check and at times she seems to lack the essential sympathy with her subject. Nor does she show full appreciation of some of the most significant of his contributions in the field of statesmanship. Only the briefest quotation is given from his outstanding Sidgwick Memorial

Lecture on "Democracy" in which probably even more than in his later rectorial address on "Freedom" at St. Andrews, General Smuts gave the fullest expression to his political thought and his vision of the way in which the scientific and technical expert might be associated with the task of government in a democracy. That conception may well prove to be one of Smuts's outstanding contributions to political thought if civilization proves able to weather the storms which immediately beset it. So, too, one might have expected a more generous account of Smuts's share in the shaping of the League Covenant and of the mandates article in particular, of his views on native policy and the relations between black and white races in Africa and of the contribution of science in the administration of the backward races.

The scientific worker cannot but regret that so little justice has been done to Smuts's constructive thought in such matters. None the less, he will appreciate to the full the moving picture which Mrs. Mullin has given us of one who throughout his varied experiences has brought steadily to bear on life a spirit of adventure, of willingness to face change, to abide by the results of scientific inquiry—a genuine capacity to see life steadily and to see it whole. These are of the spirit of science, and no one can lay aside the book without reflecting that in a like union of character and the capacity for generous co-operation and scientific insight may well lie our hope of leadership adequate to save the world from the dictatorships which threaten its noblest heritage of liberty and culture.

R. BRIGHTMAN.