expected to find this plea condemned by a reviewer in the columns of NATURE.

Nevertheless, Sir George Watt makes a legitimate criticism when he says that our proposals "do not seem to resolve themselves into the promulgation of a concrete scheme of increased and improved production." I would like to explain why we deliberately avoided advancing such a scheme in this report.

The consideration of actual steps to be taken in cotton production is the next stage in the Committee's work, to which it has already settled down. When this report was issued we were penniless, and could not with any utility consider how money should be spent until we were assured of:—(*a*) Annual financial support from Lancashire. (*b*) Regular financial support from H.M. Government. (*c*) Approval of policy from the Governments of the Dominions, Colonies, and Protectorates.

Since our report was issued (*a*) the home industry has agreed to make a voluntary annual levy on itself; (*b*) our maintenance charges are assured, so that our executive can be built up, while the question of further support is under consideration; and official information as to (*c*) is awaited. A large income is already in sight, and the way is becoming clear for practical planning and guidance as distinguished from the enunciation of principles. It should be noted that the capital required actually to grow the cotton which this country now purchases outside the Empire is of the order of 250,000,000*l*., being more than a thousand-fold the sum asked for in our report.

But those principles had to be settled first, and I for one regret that Sir George Watt should have missed their significance through misunderstanding the present stage of our development and our inability to be anything else hitherto but a "committee," if we were to represent the native peoples abroad as well as the operatives at home, with all the intervening stages of industry, of administration, and of knowledge.

W. LAWRENCE BALLS.

Edale, Derbyshire, March 8.

I AM obliged for the opportunity given me to read Dr. Lawrence Balls's reply to my review in NATURE of February 26 of the report issued by the Committee on Cotton-Growing, within the British Empire, appointed by the Board of Trade. Dr. Balls seems to me, in the main, to admit my contention, namely, that the Committee's report, as it stands, does not resolve itself into a concrete scheme of increased and improved production of cotton. In fact, it may be said to be unfortunate that the Committee did not anticipate such criticisms as mine by giving the public some hint of the possible future stages of its operations. The public were anxiously awaiting a full scheme, and one that would give distinct prospect of success, but in place of getting such we are now told we have only seen (as it were) the first instalment, and must look for better results in the future.

But, turning to some of Dr. Balls's observations on my review, I do not find that I have stated that the report contemplates the staffing of the central research institution by committees of voluntary workers. It is surely self-evident that there would have to be permanent officials appointed to the central research institution, as also to the branch institutions. But what I did object to was that these officials should be put under a panorama of six committees, as seemed contemplated by the authors of the report. I am old enough to recollect the great Cotton Commission in India. Indeed, my official connection with that country might be said to have commenced with having to try to pick up the dishevelled threads of that futile expenditure of public money. The late Mr. C. B. Clarke, in the preface to his edition of Roxburgh's "Flora of India," alludes to the issue of one of the Commission's reports as follows:—"We have had plenty of Government and other reports, some very large and expensive ones, it is true, but we have very little economic work by persons competent as botanists; and with reference to one large and expensive report lately issued on an Indian economic plant it was discovered after it was printed that the Commission never learnt what the plant was."

The result of the great Cotton Commission of India was officialism, Cotton Frauds Acts, and other such futilities. It is the knowledge of past failures having very largely proceeded from officialism that makes me urge with all the earnestness I possess that the staff of the central and branch research institutions should be as free and independent as the professors of a university. They need no supervision more than is exercised by Departmental control in the allocation of funds and in the laying down of general rules and political instructions. Official control should be with the principal or principals of the college or colleges of cotton, but with no one else.

I am at a loss to understand Dr. Balls when he says I have missed "our main thesis, concerning the need for knowledge, based on pure science, as the essential to progress in this matter." The Committee, as I understood the report, recommends that certain universities should be asked to establish lectureships and readerships; my scheme was that the research institution or institutions, in addition to conducting research, should undertake the entire education of both the experts and the practical planters, and thus have their own professors of plant physiology, plant genetics, mycology, entomology, and the like.

My recommendation is thus to concentrate all effort in the hands of a body of highly trained scientific and practical experts, to place all the funds available in their hands, and to hold them responsible not only to increase the supply, but also to improve the quality of the cotton produced within the British Empire.

GEORGE WATT

(Formerly Reporter on Economic Products with the Government of India).

Annandale House, Lockerbie, March 13.

The Separation of Isotopes.

IN a recent discussion (*Phil. Mag.*, vol. xxxvii., p. 523, 1919) of a number of methods of separating isotopes Prof. Lindemann and Dr. Aston have shown that there is little prospect of effecting by the methods considered a separation which will yield pure samples of the isotopes in a reasonable time. Dr. Aston has recently announced the discovery that chlorine consists of a mixture of at least two isotopes having atomic weights 35 and 37. It appears that there is here a possibility of effecting a separation of the isotopes by a direct method which does not seem to be applicable in the case of most other elements. The method proposed depends on the assumption that in the absorption spectrum of chlorine, which contains a vast number of narrow lines, there is a difference between the wave-lengths of the absorption lines due to molecules containing different isotopes.

Supposing that ordinary chlorine contains the isotopes Cl_{35} and Cl_{37} in the ratio 3 : 1, the molecules will consist of $Cl_{35}Cl_{35}$, $Cl_{35}Cl_{37}$, and $Cl_{37}Cl_{37}$ in the ratio 9 : 6 : 1. It follows that if white light traverses a column of chlorine of such a length that the radiations absorbed by $Cl_{37}Cl_{37}$ are reduced in intensity by a factor $1/10^3$, the corresponding factors in the case of $Cl_{35}Cl_{37}$ and $Cl_{35}Cl_{35}$ will be $1/10^{18}$ and $1/10^{27}$ respec-