and *R.S.I.*, **7**, folded insert facing p. 1199; Dec. 1923). I particularly object to naming it "Priest's leucoscope" as is done in the index of Dr. Walsh's book. It is a special form of the Arons' chromoscope (Leo Arons: *Ann. der Phy.* (4), **39**, 545-568; 1912), and its embryonic form may be seen in Zoellner's colorimeter (J. C. F. Zoellner: "Photometrie des Himmels," Berlin, 1861. G. Mueller: "Photometrie der Gestirne," pp. 244-254; Leipzig, 1897). My connexion with this instrument has been to develop the theory and practice of its use in the colorimetry and photometry of incandescent sources and daylight, and to design an instrument especially suited to these purposes.

(3) In principle, manner of use, and specific purpose served, the two instruments are very different. About all that they have in common is the fact that they both contain nicol prisms and quartz plates and the circumstance that I have written papers dealing with each of them separately.

It seems unnecessary to occupy space by setting forth in detail the distinctions between these two instruments. All confusion may be removed by consulting my papers which deal respectively with the two different instruments, namely, "A New Study of the Leucoscope . . ." (*J.O.S.A.*, **4**, pp. 448-495; Nov. 1920), and "Colorimetry and Photometry . . . by the Method of Rotatory Dispersion" (*J.O.S.A.* and *R.S.I.*, **7**, pp. 1175-1209; Dec. 1923).

IRWIN G. PRIEST.

Department of Commerce,
Bureau of Standards,
Washington, June 21.

MR. IRWIN G. PRIEST has been good enough to send me a copy of the above letter concerning the description, in my recent book "Photometry," of the instrument developed by him for heterochromatic photometry (pp. 244-5).

While agreeing, of course, that his instrument is in no wise identical, either in principle or in use, with Helmholtz's 'Leucoscope,' it still appears to me that 'Leucoscope Photometer' is a not inappropriate description of the instrument, which is, in essence, a photometer in which a colour match is obtained by means of the rotatory dispersion of quartz, and a brightness match by means of polarisation prisms. Nevertheless, it is clear that as Mr. Priest is the inventor of the instrument, he must necessarily be entitled to object to having any name attached to it which, in his opinion, is liable to lead to misunderstanding. I can therefore assure him that should a further edition of my book be called for, the alteration will certainly be made. In the meantime I feel sure Mr. Priest will agree that the *description* of the instrument which I have given in the text of my book is in no way misleading.

JOHN W. T. WALSH.

The National Physical Laboratory,
Teddington, Middlesex,
July 6.

The Dissociation of Carbon Dioxide at High Temperatures.

WHEN mixtures of carbon monoxide and air in varying proportions are exploded in a closed vessel under similar initial conditions of pressure, temperature, and moisture content, experiments show that the greatest explosion pressure occurs when the proportion of carbon monoxide to oxygen in the mixtures is greater than 2. Messrs. Fenning and Tizard, in their paper on the dissociation of carbon dioxide at high temperatures in a recent number of the *Proc. Roy. Soc.*, assume that chemical equilibrium is established by the time the maximum pressure is reached in explosions and attribute this phenomenon entirely to temperature dissociation of carbon dioxide. They then proceed to make estimates of the dissociation of carbon dioxide as a function of temperature from explosion experiments in which the 'airs' used were enriched with oxygen so as to develop higher temperatures.

The assumption that chemical equilibrium is attained at the maximum pressure in explosions is, I believe, erroneous and dissociation values calculated from explosion experiments upon this basis are much too high.

Some earlier experiments of mine in which measurements of heat loss were made during explosion convinced me that chemical equilibrium is not attained at maximum pressure—at any rate in explosions of complex mixtures like those of coal-gas and air. Recently we have been working in Leeds with pure gases (carbon monoxide and hydrogen) and have come to the conclusion that even with such gases chemical equilibrium is far from being attained at maximum pressure. One of the methods employed is, on the experimental side, precisely similar to that adopted by Messrs. Fenning and Tizard, but the range of our experiments is wider in that we have made investigations at explosion temperatures so low that dissociation is insignificant as well as at higher temperatures. Thus Mr. R. A. Smith, a research student, has experimented with carbon monoxide explosions, varying his 'airs' so as to investigate the temperature range 1600° C. to 3000° C. His experiments prove that the amount of uncombined gas at the maximum pressure in 'complete combustion mixtures' is *at least* 10 per cent. of the original charge when the explosion temperatures are below about 2000° C., but as the explosion temperatures are increased the amount of uncombined gas increases. The explanation would appear to be that below 2000° C. the uncombined gas is due to incomplete combustion and that above 2000° C. dissociation adds to this. It seems clear, then, that the assumption of chemical equilibrium at maximum pressure is unjustifiable.

Mr. Smith's explosion vessel consists of a sphere 6 inches in diameter, and the gaseous mixtures before explosion were at atmospheric temperature and density. Our work suggests the desirability of experimenting with vessels of various sizes and shapes and also at various densities, and we propose to arrange for this before publishing our results in detail.

W. T. DAVID.

Engineering Department,
The University, Leeds,
July 16, 1927.

Polyploidy within a Species.

THE importance of taking chromosome characters into consideration in the study of genetical problems is becoming increasingly more apparent, particularly in relation to the species problem, and any peculiarity in this respect requires careful attention. The study of large genera and of the occurrence of polyploidy within their limits, as exemplified by Rosa and other genera, has thrown considerable light on the origin and interrelationships of the various species. In investigating Silene and the neighbouring genera from this point of view, the actual base number of chromosomes is itself of considerable interest, since in Saponaria and Dianthus it may be 14 or 15, whereas in Silene, etc., it is invariably 12. So far, however it is these latter genera, Silene, Melandrium, Lychnis,