resolvable, can be obtained direct from the optimum 6×2^2 and 10×2^2 designs by using a single cut.

6. USE OF PBIB DESIGNS

In any asymmetrical factorial design, the use of the associated BIB design usually results in a large number of replications. It is, therefore, necessary to use the associated PBIB designs for obtaining partially balanced asymmetrical factorial designs which lead to a marked reduction in the number of replications required for a completely balanced design. Thus, for instance, the partially balanced 6×2^2 design obtained by doubling the 3×2^2 design, requires only three replications instead of five replications required for the completely balanced optimum design. It is noticeable that in this partially balanced design, BC is unconfounded. Similarly, partially balanced designs for $q \times 2^2$, where $q = 4p$ $(p \geqslant 2)$, in three replications are obtainable from the completely balanced 4×2^2 design in three replications; and the partially balanced $q \times 3^2$ design, where $q = 3p$ $(p \geqslant 2)$, in two replications are derivable from the completely balanced 3×3^2 design in two replications. This technique, which has been given by Kishen and Srivastava,[2] thus enables a large class of practically useful partially balanced asymmetrical factorial designs to be constructed.

7. DESIGNS OF THE TYPE $q \times t \times s$, WHERE $t = s^m$

In this case, the $t \times s$ treatment combinations are divided into s sets corresponding to $s - 1$ degrees of freedom for the interaction BC. Then the problem of construction of optimum balanced designs in blocks of qt plots reduces to that of construction of optimum balanced designs for $q \times s^2$ in blocks of qs plots, methods of construction of which have already been discussed. Thus, for the $3 \times 4 \times 2$ design in blocks of 12 plots each, a balanced design is available, as in the case of the 3×2^2 design, in three replications. If, however, balance is desired on each of the three degrees of freedom belonging to the interaction BC, 9 replications would obviously be required.

1. Kishen, K. and Srivastava, J. N., *Curr. Sci.*, 1959, **28**, 98.
2. — and —, *J. Ind. Soc. Agric. Stat.*, 1960, **11** (1 and 2), 73.
3. Kishen, K., *Curr. Sci.*, 1960, **29**, 465.
4. Rao, C. R., *Sankhya*, 1961, **23 A**, 117.

THE INDUSTRIAL SPECTROSCOPE

IN the pavilion of the German Democratic Republic at the Second Indian Industries Fair being held from the 14th of November 1961 until the 1st of January 1962, VEB Carl Zeiss JENA is exhibiting amongst other products of their extensive production programme the Industrial Spectroscope which deserves special mention.

The Industrial Spectroscope has been designed in a way which permits its application in the various fields of industrial material testing, primarily for rapid spectrochemical analyses for all kinds of metals. The principal field of application for the Industrial Spectroscope is in the small and medium-sized industrial and research inspection laboratories, *e.g.*, in metal and semi-finished product stores, in annealing and tempering plants, in scrap yards and scrap reclaiming depots, foundry laboratories, metallurgical, metallographic and mining experimental stations and similar inspection points where the speedy recognition of the material quality is frequently of great economic importance. The following technical data will indicate its optical performance: high dispersion by two double-effective flint-glass prisms, D = 0·9 Å/mm. at 5,000 Å; the resolving power $\lambda/\Delta\lambda = 17{,}000$ at 5,000 Å means that 0·3 Å can still be discerned; large aperture ratio of 1 : 11; two different magnifications: × 8 for low-power viewing and × 22 for exacting observations; direct wavelength determination to ± 2 Å; the coarse motion ensures a rapid survey of the spectrum—precise setting with the aid of the fine motion; izochromatic photometric evaluation with a neutral wedge of high pitch, thus no loss in light-intensity by polarising filters; convenient reading of wavelengths and extinction on frosted screens; two attached spark stages within easy reach from the operator's place; rapid change of the counter-electrodes; self-contained rigid design.