A plausible explanation for the relative magnitude of the two coefficients in New England is that crossbreeding is often a subsidiary activity. In only one case dealt with in the analysis is "crossbreeding" entirely second crossbreeding, while in another two cases crossbred ewes exceed a third of the total. For the rest, crossbreeding is predominantly joining cull merino ewes to longwool rams. These ewes are normally at least 4 years old, and might require less attention at lambing than a flock with a fair proportion of maidens. This is essentially a device to retain stock without damaging the quality of fine woolled breeding flocks and, being an after-thought, the crossbreeding activity often receives less attention.

Generally, the labour requirements for ewes and other sheep derived by regression analysis based on observations of 24 New England farms coincide quite closely with those derived by the synthetic approaches used by Tyler to examine the sheep enterprise on wheat-sheep farms on the adjacent North Western Slope. They are also in general accord with intuitive expectations—"other sheep" (predominantly wethers, but with some weaners) appear to require somewhat less than half as much labour as breeding ewes, be they crossbreds or merinos.

These differences in labour requirements would presumably reflect, in particular, the higher labour requirement of ewes at lambing. This suggests that the regression constant computed would not be very reliable as an indicator of overhead labour requirements.

A COMPARISON OF TWO APPROACHES TO ESTIMATING LABOUR REQUIREMENTS FOR SHEEP

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Agricultural economists are generally resigned to the fact that estimates of most parameters differ widely, dependent on the particular sample, the approach or technique used in the estimation. It should be a matter of rejoicing, therefore, when two different approaches adopted for two different samples in two different areas give estimates which are extremely close and do not differ significantly from each other. The two studies concerned are one by Taplin and Moffatt[1] and one by this author[2].

Taplin and Moffatt used multiple regression analysis on whole-farm data to estimate the annual labour requirements of sheep in New England. I obtained estimates of labour requirements in the North Western Slope by synthesis of the estimates for individual sheep operations. Comparability between the two sets of estimates depends, therefore, on the number and

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[1] J. H. E. Taplin, and D. H. Moffatt, "Labour Requirements for Sheep in Southern New England", this *Review*, this issue.

[2] G. J. Tyler, "Labour Requirements on Wheat Farms in the North-Western Slope of New South Wales", this *Review*, Vol. 31, No. 2 (June, 1963).

type of operations associated with the sheep enterprises in Southern New England. As no information is given by Taplin and Moffatt the comparison below is based on the following assumptions:—

EWES AND LAMBS

(i) 70 per cent lambing percentage

(ii) Ewes crutched and shorn once annually

(iii) Lambs marked once

(iv) Ewes dipped once

(v) Ewes and lambs together drenched twice and ewes drenched alone a further two times

(vi) Half the labour required for shearing supplied by outside labour.

(The above assumptions are the ones given on p. 89 of my article) Further, that

(vii) Taplin's and Moffatt's estimates for ewes include lambs up to weaning.

WETHERS (OR ANY DRY SHEEP)

(i) Crutched and shorn once

(ii) Dipped once

(iii) Drenched once

Under these assumptions and converting to Taplin and Moffatt's units of man-months (on the basis of 275/12 man-days per man-month) the annual labour requirements are synthesized from the operational data given in Table 7 of my article, yielding the following estimates:—

Ewes plus their lambs[3] $0.55 + 0.00711$ X (X = No. of ewes)
(0.00074)

Wethers[3] $0.40 + 0.00428$ X (X = No. of wethers)
(0.00057)

The "fixed" element of labour requirements (discussed in my article on pages 86-87) in these formulae (0.55 and 0.40 respectively) is presumably included in the constant term of 7.372 of Taplin and Moffatt's equation, which however also includes the "overhead" requirement for the whole farm. Comparability of the two sets of estimates is effected if we confine attention to the *additional* labour required for *additional* sheep. This is estimated from the relevant regression coefficients.

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[3] The standard errors of the regression coefficients are shown in parentheses and have been computed from the standard errors for the individual sheep operations, assuming independence of the error terms in the equations.

ESTIMATES OF ADDITIONAL LABOUR REQUIREMENTS PER ADDITIONAL SHEEP

Type of Sheep	Taplin and Moffatt's man-months	Tyler's man-months
Merino ewes × Merino rams	0.00829 (0.00275)	0.00711 (0.00074)
Ewes utilized for Crossbreeding ..	0.00753 (0.00221)	0.00711 (0.00074)
"Other Sheep" (mainly wethers) ..	(0.00350) (0.00142)	(0.00428) (0.00057)

The differences between the two estimates for each type of sheep are not statistically significant. *This is of considerable academic and practical importance.*

Taplin and Moffatt state that their estimates are similar to mine but it is the purpose of this note to indicate quantitatively just how close the estimates are. It should also have shown that their reference to my study not differentiating labour requirements for various types of sheep is not entirely true. It is true that I have not differentiated between labour requirements for any particular *operation*. For example, I have assumed that drenching takes the same time for a Merino ewe, a Crossbred ewe, a wether or a lamb. Differences in total labour requirements for different types of sheep thus arise solely from differences in the number and type of operations carried out. Further, from the above discussion it follows that their comparison (p. 245) of an "aggregate" coefficient of 0.00500 for all classes of sheep in New England with my coefficient of 0.00711 is unnecessary and misleading.