3. The cross between both selected lines has higher egg production, rate of lay, total egg mass and feed efficiency than the two industry L x A crosses, but, due to its lower egg weight, is better than the industry Leghorn strain cross only in egg production and rate of lay.

4. The cross between both control lines is higher in egg production than, and similar in total egg mass and feed efficiency to, the industry L x A crosses, indicating that little or no genetic improvement has been made in these characters in some commercial breeding flocks in the past 10 years. This aspect of the above experiment in particular needs to be confirmed. If true, it will indicate an urgent need for industry to review and change selection criteria.

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SELECTION FOR EFFICIENCY OF PRODUCTION IN AUSTRALORP HENS

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In a preliminary study in 1973, the heritability of liver fat in crossbred layers was found to be 0.37. Based on this estimate and the correlation between liver fat and total body fat, three selection treatments were established in 1974 from an Australorp population of wide genetic base. These treatments involved selection for low liver fat, high liver fat and an unselected control. Two replicate lines of each treatment were established with 112 birds housed at 16 weeks of age in all replicates.

Data are presented for the low and high fat lines after four generations of selection. It has not been possible to this stage to measure the control birds, due to practical limitations. Trends have been similar for the two replicates, so for conciseness of presentation the results have been pooled over the two replicates.

There has been a significant reduction in liver fat in the low line as compared to the high line (10.3% V 17.7%), in carcass fat (35.3% V 41.8%) and in body weight at 40 weeks of age (2.31 kg V 2.46 kg). Growth rate to first egg was also reduced (13.7 gm/day V 14.1 gm/day) as was growth rate after first egg (0.8 gm/day V 1.8 gm/day). All these differences were significant at the 1% level except for growth to first egg which was significant at the 5% level.

There was a non-significant delay in age at first egg (166.1 days V 162.9 days) in the low fat line and a slightly higher mean specific gravity of eggs laid to 40 weeks of age (1.091 V 1.089).

Egg production to 40 weeks of age was not statistically different for the two lines (86.1 eggs for the low fat V 87.2 eggs for the high fat) and the total egg mass was also not different (4.235 kg V 4.272 kg).

Feed consumption per bird from 16 to 40 weeks of age was significantly lower ($P<0.01$) for the low fat line (17.37 kg V 18.17 kg) while for the period from first egg to 40 weeks of age the difference was even larger (12.25 kg V 13.18 kg).

This led to a marked improvement in feed efficiency (kg feed/kg egg) when expressed over a number of periods:

	Low Fat	High Fat	Significance
Sixteen to 40 weeks of age:	4.26	4.38	N.S.
First egg to 40 weeks:	2.95	3.12	$P<0.05$
First 50 eggs:	2.98	3.15	$P<0.05$
First 80 eggs:	2.84	3.04	$P<0.01$
First 10 weeks of lay:	3.09	3.20	$P<0.01$

The results show that selection to reduce liver fat has reduced feed consumption and improved feed efficiency when compared to a line selected for high liver fat.

Preliminary data from the fifth generation suggest that there will be little difference between the high fat line and the control line for most of these characters. It appears that rate of lay will be consistently higher for the low fat line from about 35 weeks to 68 weeks of age.

Further analyses suggest that similar results might be obtained in a practical situation by selection based on an index involving egg production and growth rate after first egg.

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