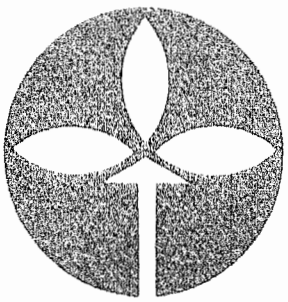

DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA

Agronomy Branch Report

AERIAL AGRICULTURE IN SOUTH AUSTRALIA 1968

P.R. Birks

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AERIAL AGRICULTURE IN SOUTH AUSTRALIA

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South Australian Agriculture

South Australia is a large area of flat dry country. Some 83% of the State receives less than 10 inches of rain p.a. and where "rainfall is so erratic that it may be regarded as almost accidental". Most of our agriculture is carried out on the 27 million acres (1/9 of total area) which receives 13 or more inches of rain p.a. We have little more than 2 million acres receiving 25 to 30 inches p.a.

Present utilization of these 27 million acres includes 3 to 4½ million acres of cereal crops (nearer to 6m this year) of which approx. 60% is wheat, 30% barley and 10% oats. Some 200,000 to 300,000 tons of superphosphate are applied to 3½ to 5 million acres of pasture, a similar quantity is applied to cereal crops, and we grow over ¾ million acres of lucerne. By general Australian standards this represents fairly intensive land use.

In the 10 years immediately post-war there was a considerable expansion of the State's agriculture through both War Service Land Settlement and private development of large areas of virgin scrub, especially in the Upper South East, on Kangaroo Island, and in later years on Eyre Peninsula. There remains little scope for this sort of expansion in the future. Increases in agricultural production must come from intensified production on existing holdings through the use of new varieties and improved management practices - using these terms in their widest senses.

It is significant and relevant to aerial agriculture that in 1965 the Department of Agriculture initiated an extension programme aimed at increasing production from the 1 million or so acres of **barely** arable, volunteer pasture "hill country" which occurs from the Adelaide Hills to the Mid-northern agricultural areas.

The Development of Aerial Agriculture

The flat dry conditions of S.A. don't particularly favour aerial agriculture. There are few jobs which cannot also be done by ground machinery. Aircraft have a definite advantage and are virtually indispensible in the limited areas of very steep "hill country", on wet ground (generally not a major problem), and for spraying mature or almost mature crops. And yet in spite of these circumstances, our aerial agricultural industry has increased from very small beginnings just after the war, to the stage where we now have 8 operating companies employing 18-19 pilots, operating 27 aircraft and treating about 1¼ million acres each year.

It is only during the last 12 years that statistical records of any significance have been kept. An examination of these for S.A. shows how the industry has grown, some of the problems encountered and something of what may be expected in the future.

The simplest and most complete statistic is that of flying hours. This shows a close relationship to total area treated. There has been a 25 fold increase in the area treated during the last 12 years, (50,000 acres in the late 1950's to 1¼m. acres now). Most of the increase comes from topdressing while there has been a 6 fold increase in spraying (40,000 to 250,000 acres). There was a large increase in efficiency - acres treated per hour, in the late 50's due largely to the introduction of larger aircraft for both topdressing and spraying.

Topdressing in S.A.

A closer examination of topdressing statistics show that practically all the work is spreading superphosphate. Only during 1963-65 was aerial seeding of any great significance, and this is thought to have been mainly pasture seeding of newly cleared land on Eyre Peninsula. It is surprising to see that according to statistical records, there has been no application of seed plus super since 1960-61.

The large increase in super-spreading from 1961 coincides with the introduction of both bulk handling of super and the introduction of contract services including cartage. An operation competitive both in price and service with ground contractors was attractive to farmers.

Ignoring the 1967/68 decrease due to drought there has been a general decrease of about 8% per year in aerial topdressing since the 1963/64 peak. This is considered to be mainly a reflection of farmer dissatisfaction with application patterns, especially where minor elements are included in the topdressing. This lost acreage will be difficult to recapture.

Spraying in S.A.

During the last 12 years aerial spraying has increased steadily, and except for drought conditions, it appears to be still increasing. However in contrast to topdressing, spraying is a much more complex operation - many different pesticides are used on many different pests on many different crops. Since 1960/61 statistics have recorded crop spraying and pasture spraying separately, and although most recent figures are not available,

they show that most of the spraying is on crops while pasture spraying reached 60,000 to 70,000 acres during 1963 to 1966. For the years available, the area of crop sprayed can be used as an estimate of herbicide use on cereals, while the pasture sprayed can be estimated as insecticide used on pastures. Increasing use of herbicides on pastures and increased early spraying of cereal crops will make this classification meaningless in the near future. Spray drift hazards associated with the use of herbicides and residue hazards associated with insecticides suggest that a split on this basis would be more meaningful, more useful, and have a more direct bearing on the purpose for which the work is done.

Herbicides

While the area of cereal crops in S.A. has been steadily increasing (3m to 4½m - 56/57 to 67/68) there has also been an increase in the proportion of crop sprayed with herbicides. Three years ago it was estimated that 4/10 of all cereal crops were sprayed (i.e. 1¾m acres). Now we estimate that overall, 5/10 of the crops are sprayed (i.e. about 2½m. acres). The increase in aerial crop spraying during this time represents little more than aircraft holding their own in an expanding market.

Another significant change has been occurring during the last 2 or 3 crop spraying seasons. New herbicides have been coming onto the scene. These are prometryne ("Gesagard 50"), linuron ("Linuron 50" and "Afalon"), barban ("Carbyne"), diallate and triallate ("Avadex" and "Avadex B.W.") and bromoxynil plus MCPA ("Buctril M.A."). "Avadex", "Avadex B.W." and "Gesagard 50" are not applied by aircraft at all. With the exception of "Buctril M.A." they are all wettable powders which are hard on equipment, difficult to apply, particularly in small volumes of water, hence not particularly suitable for aerial application. All are applied at an earlier stage of crop growth so that ground equipment can be used with less chance of crop damage. This will largely remove one of the aerial operators' "selling argument". Finally all are expensive chemicals - costing $1-90 to $4-25 per acre, a factor which will incline farmers to look for the cheapest method of application - particularly one involving no further cash outlay.

At this stage it appears that aircraft are nearly holding their own with these new chemicals. This year something like 130,000 acres was sprayed with these new chemicals. We estimate that about 13,000 acres of this was applied by plane - i.e. 1/10 of the spraying with new chemicals (Aircraft spray about ⅛ of all crop spraying). For the reasons listed above it is unlikely that aircraft will continue to hold the same proportion of these new sprays.

Detailed examination of one local company's records for 1968 showed that the average crop spraying job was 96 acres, amine 2,4-D is now used over an equal acreage to ester 2,4-D although amine was used on nearly twice as many jobs. Nearly $\frac{1}{8}$th of the acreage sprayed was treated with one or other of the new herbicides while just over 1/6th of the jobs were done with the new herbicides.

Insecticides

Insecticide useage might be expected to be particularly variable as insect populations fluctuate very widely. The "pasture sprayed" acreage appears rather more uniform suggesting that the insects take turns year about - apparently the work is there but it may be a different pest in a different district each year and you have to chase the work.

The large increase in pasture spraying in 1963/4 to 1965/6 is mainly due to large scale spraying of redlegged earthmite at low application costs per acre, a development most evident in the Upper South East. In all areas the use of ground misters for pasture pest control has provided extremely severe competition for aircraft. At one stage it appeared that the advent of ultra low volume (ULV) application would put the plane well ahead of ground equipment, but now ground equipment is available which can be used at least as satisfactorily as aircraft for ULV application. Using his own equipment a farmer can now spray at least 100 acres an hour. It is problematical whether a plane spraying 25 acres a minute can compete with this.

A further problem facing aerial application of insecticides relates to the observation of stock-withholding periods, a matter receiving increasing attention due to insecticide residues. While this is essentially a farmer's responsibility, I would like to sound a warning that any aerial application which leaves no room for observing stockwithholding, will also bring discredit upon aerial operations. Aerial operators have a responsibility in this direction; otherwise I can see a situation coming, comparable with aircraft and herbicide spray-drift where aircraft are almost automatically linked by the press, the public and the law, with spray drift damage.

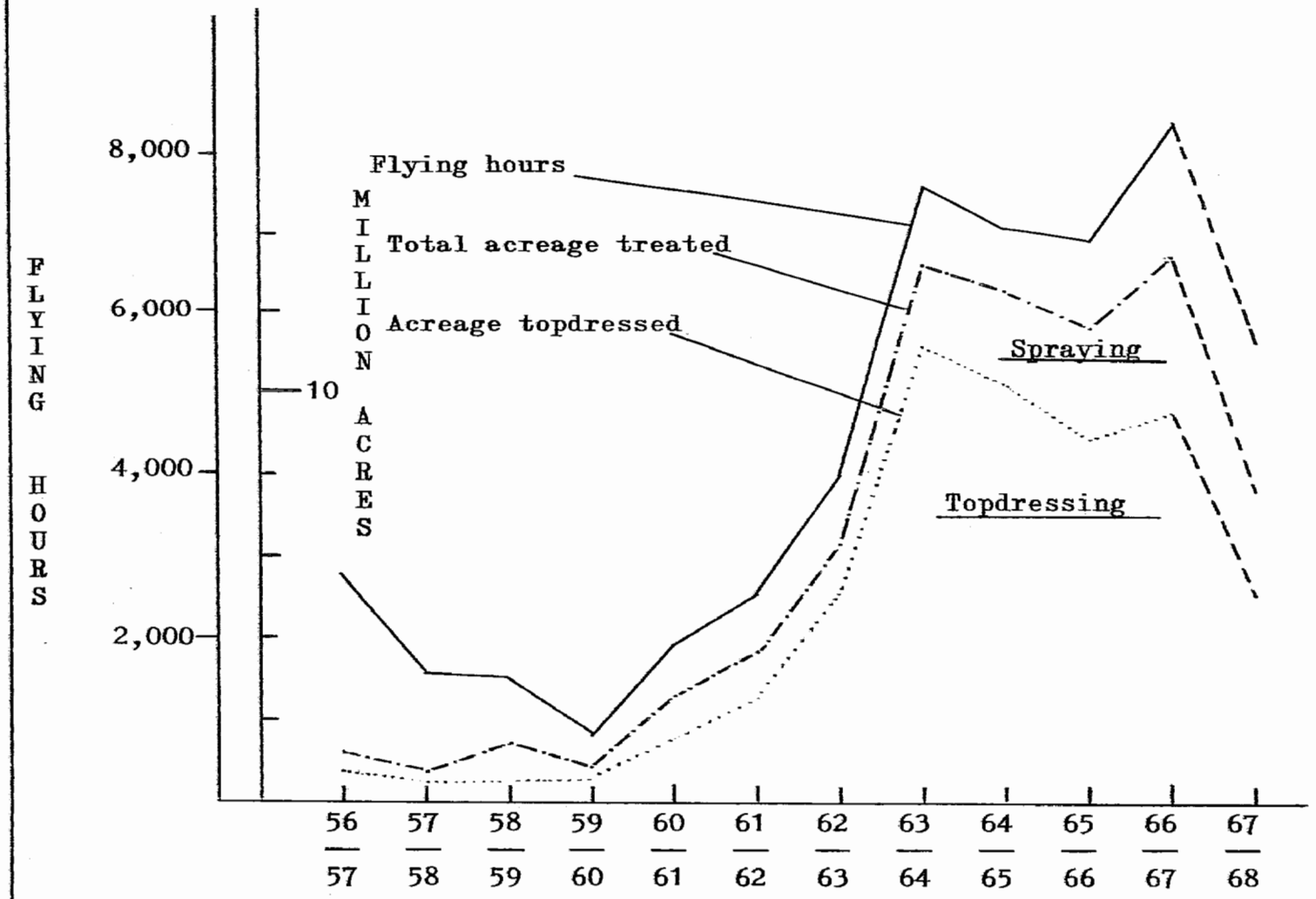
Other Aerial Operations

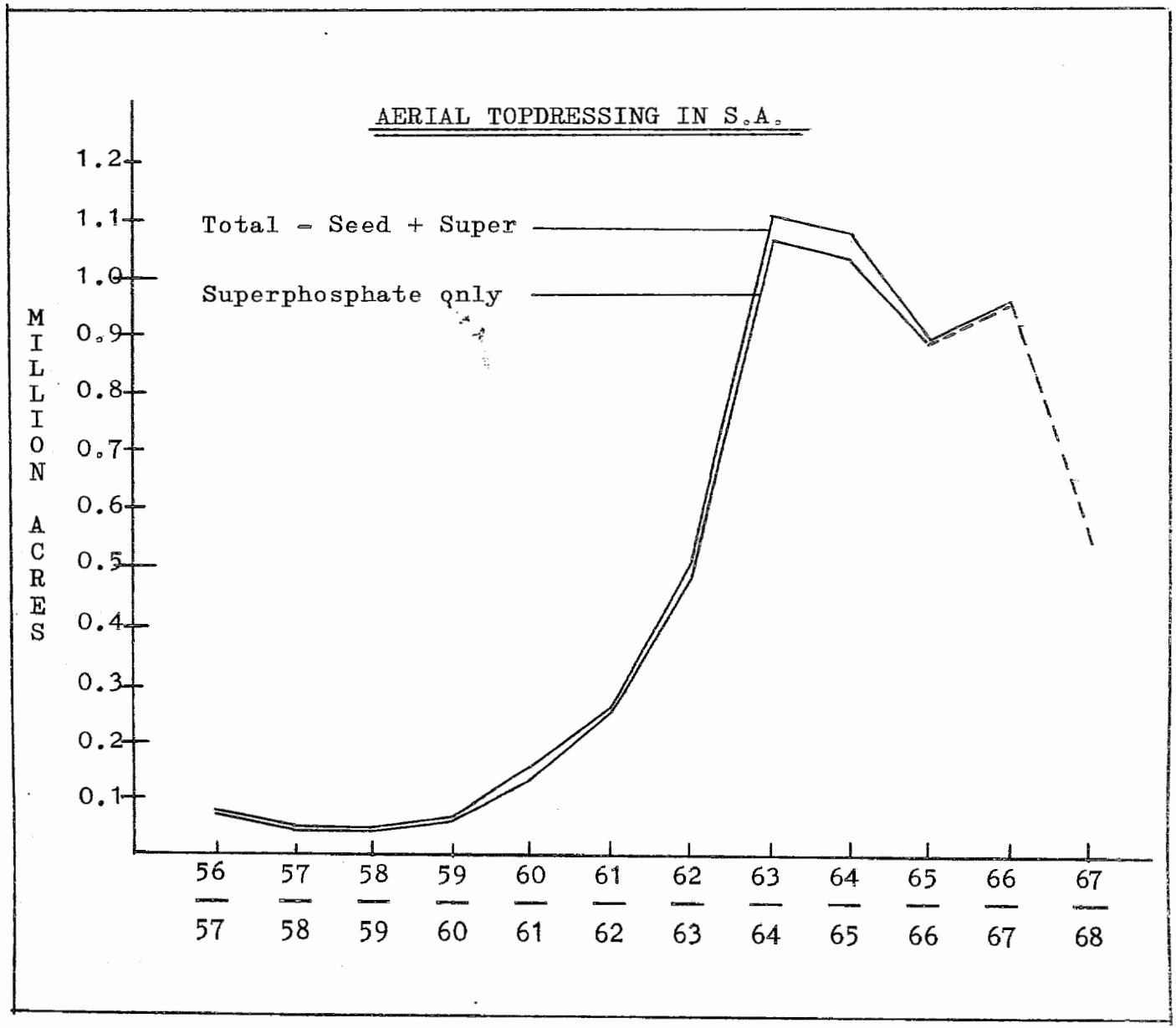
If it is an agricultural operation - cloudseeding warrants a mention. This year the Department of Agriculture conducted a cloudseeding experiment involving some 184 hours of flying. The 1968 results are still being analysed.

Conclusions

While this is far from an exhaustive study of the aerial agriculture industry of S.A., it is rather a thumbnail sketch with brief comments on some broad issues. At all stages the industry has had to face strong competition from ground equipment. Its ability to compete in the topdressing market will, I think, depend on its ability to provide an attractive service of the "package deal" variety, more even application at an attractive price - a challenge of organisation, technology and economics. Aerial application of herbicides is growing apace with demand but operators must prepare to face the challenge of new herbicides. Insecticide application faces an entirely new set of circumstances through ULV application and I cannot guess what the outcome of these will be. Agricultural development in this State will be mainly a matter of intensification of production which will make available more work of the sort that can be done by aircraft, but increasing economic pressures will also be emphasising the need to cut farm production costs and I expect that this will generally favour the operator of ground machinery; at every turn the same major challenge confronts the aerial industry.

ALL AERIAL OPERATIONS IN S.A.




AERIAL TOPDRESSING IN S.A.
Total = Seed + Super
Superphosphate only
MILLION ACRES
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
56/57
57/58
58/59
59/60
60/61
61/62
62/63
63/64
64/65
65/66
66/67
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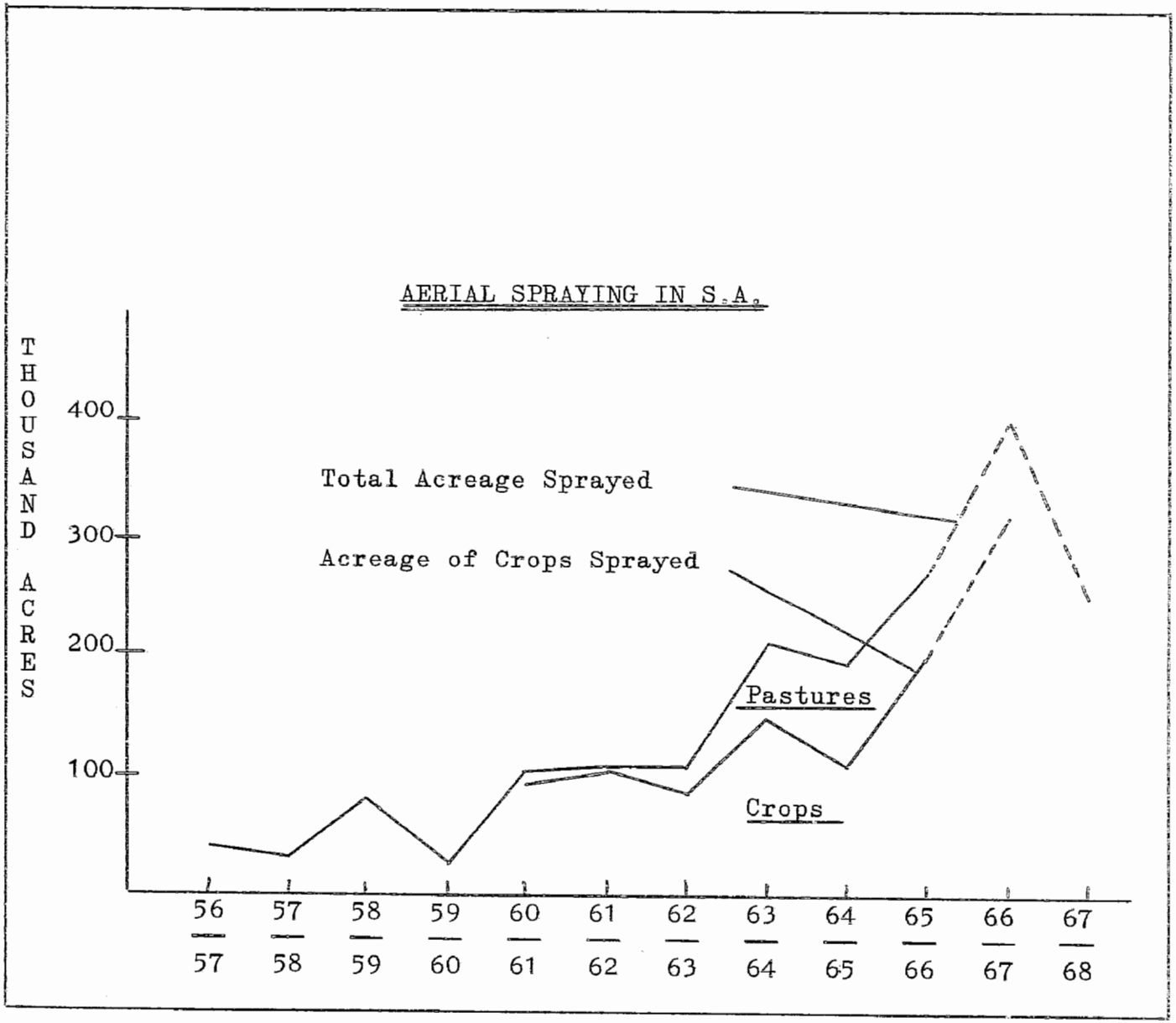
AERIAL SPRAYING IN S.A.
THOUSAND ACRES
400
300
200
100
Total Acreage Sprayed
Acreage of Crops Sprayed
Pastures
Crops
56/57
57/58
58/59
59/60
60/61
61/62
62/63
63/64
64/65
65/66
66/67
67/68