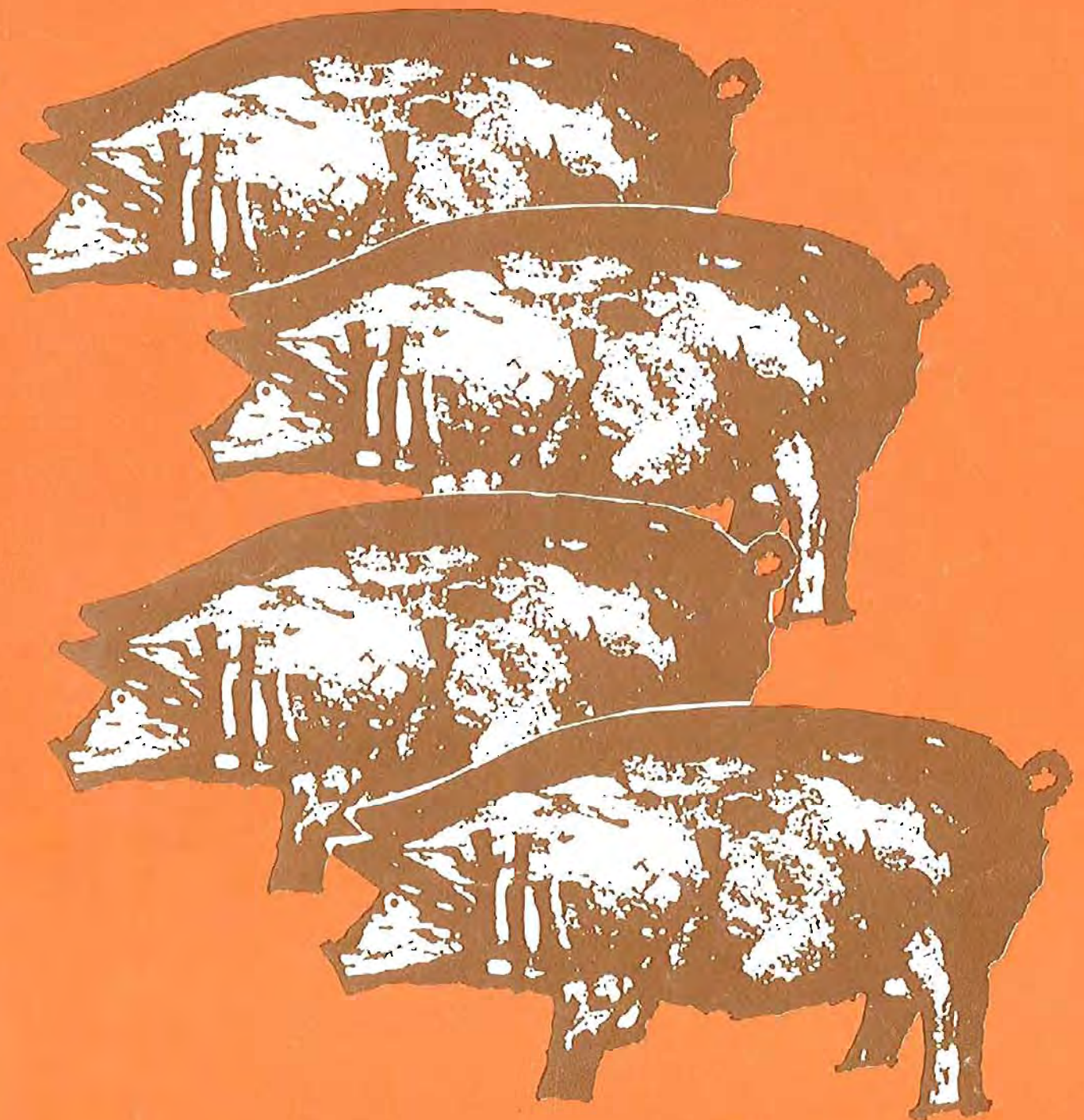


# The Northfield Pig Research Unit



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The Northfield Pig Research Unit which opened in December 1970 has now been in operation for four years. During this time many alterations have been made to both the basic production and isolation units. These alterations have enabled a much greater throughput of pigs, resulting in a wider range of research activities particularly in the fields of health and nutrition. In addition, all feed can now be compounded on the unit giving full control of all rations.



Mr. P.A. Heap, Officer-in-Charge.

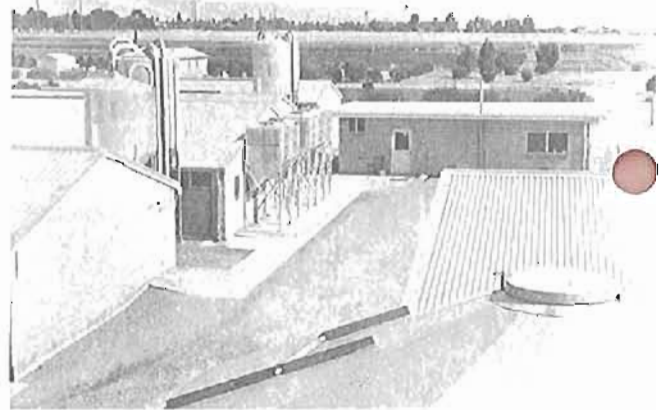
## Aims of the unit

The main purpose of the unit has not changed. It is to carry out research under conditions similar to those found on South Australian piggeries and at the same time develop management techniques in pig production.

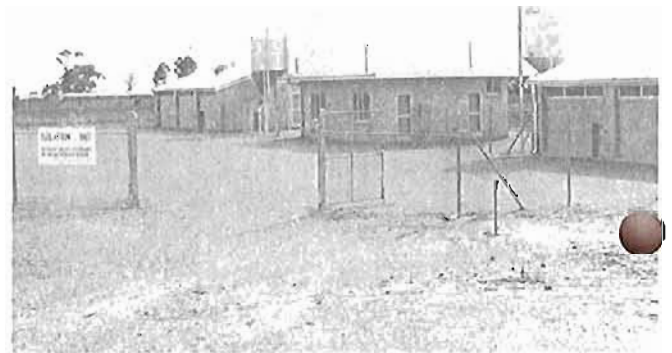
## Facilities available

Buildings at the production unit include two farrowing sheds, a grower shed, breeder shed, feed shed, office and laboratory.

The isolation unit buildings include two similar pig sheds, an office/laboratory and a fumigation/post-mortem room.



Production unit building and silos.



Isolation unit showing the two experimental sheds separated by office/laboratory.

Each of the units is surrounded by a security fence for quarantine reasons, particularly to maintain the minimal disease status of the Production Unit.

## Establishment

The original buildings of the Northfield Pig Research Unit were jointly financed by the Swine Compensation fund and the State Government. Since that time the Australian Pig Industry Research Committee and State funds have enabled the installation of numerous facilities including a feed



shed, eight grain silos, five experimental silos, feed processing machinery and laboratory equipment. A sum of \$10,000 per annum is provided for research purposes from the Swine Compensation Fund, and proceeds from the sale of pigs assist in running the unit.

### Special features

All buildings except for the feed shed are constructed of concrete block walls with concrete floors and aluminium roofing. The feed shed is made of steel, timber, galvanised iron and concrete floor.

Every pig shed is equipped with adjustable louvre windows, and time switch-controlled misting nozzles.

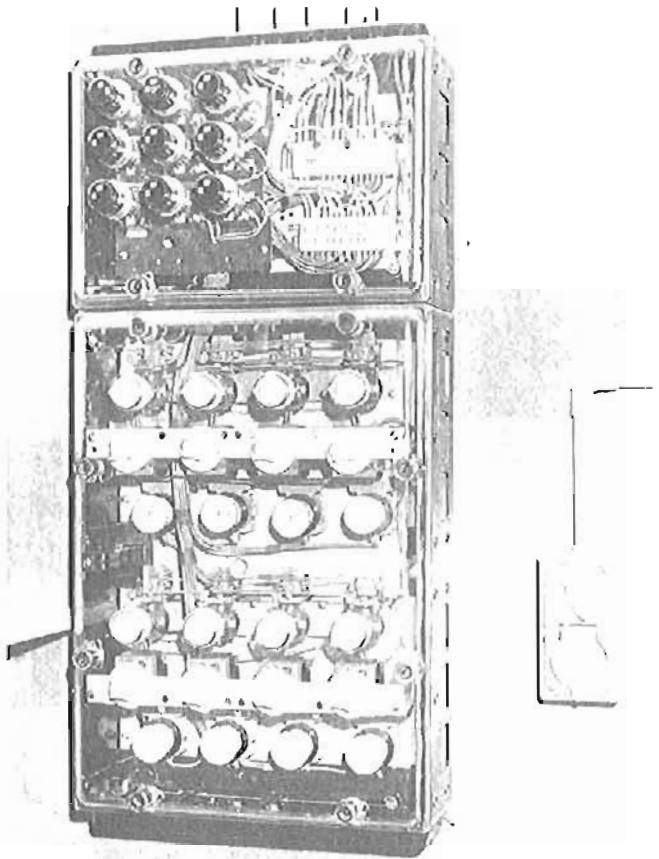
Each of the farrowing sheds at the production unit contains eight pens with covered creep areas equipped with both underfloor and overhead heating units. Provision is made for crate farrowing.

The grower shed is one area where numerous alterations have been made. Originally only eight pigs could be individually fed in each of the eight pens. Each pen has now been subdivided and the same feeder is used in two shifts permitting 128 pigs to be individually fed. There are now seven feed silos which discharge into this shed, supplying a wide range of diets for nutritional experiments.

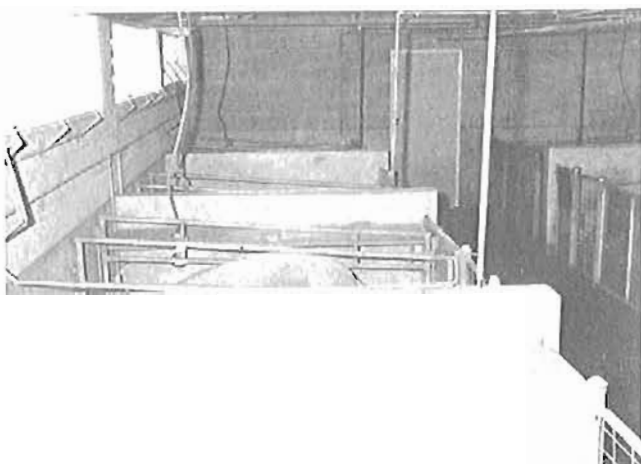
Features of the isolation unit pig sheds include roofing of a double aluminium sheeting with a 5 cm fill of polystyrene. There are also variable speed exhaust fans and underfloor heating. These features allow a greater control of the environment in this shed. Outside shelters and runs give a further choice of environment for the pigs. Temporary farrowing facilities have been installed and used for specific trial work.

Screened effluent from both units is discharged into a sewer main which runs through the unit grounds.

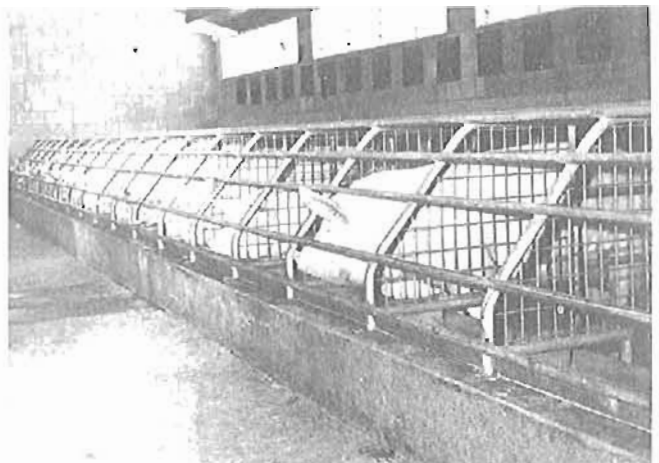
The only entry into each unit is through the office. Here, all personnel and visitors must change into protective clothing and boots before entry to the pig section. Showers are also available in each office unit to minimise the risk of the spread of infection.



Control panel for creep lamps — also indicator lights and control switches for creep floor heaters.



Interior of farrowing shed with remote control louvre windows and rendered concrete divisions.



Dry sows in stalls fronted by feed and water trough.

Figure 1: Production Unit.

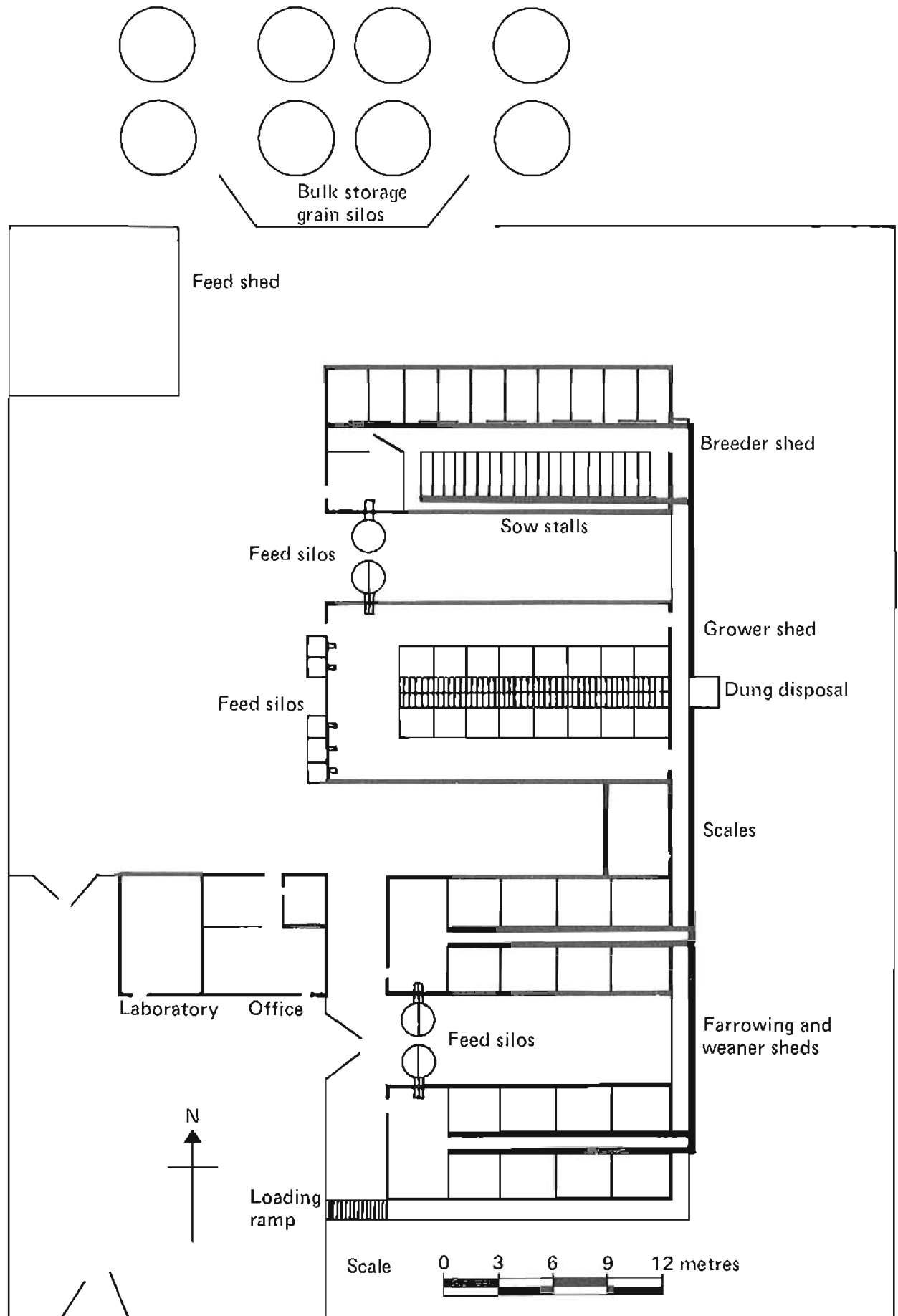
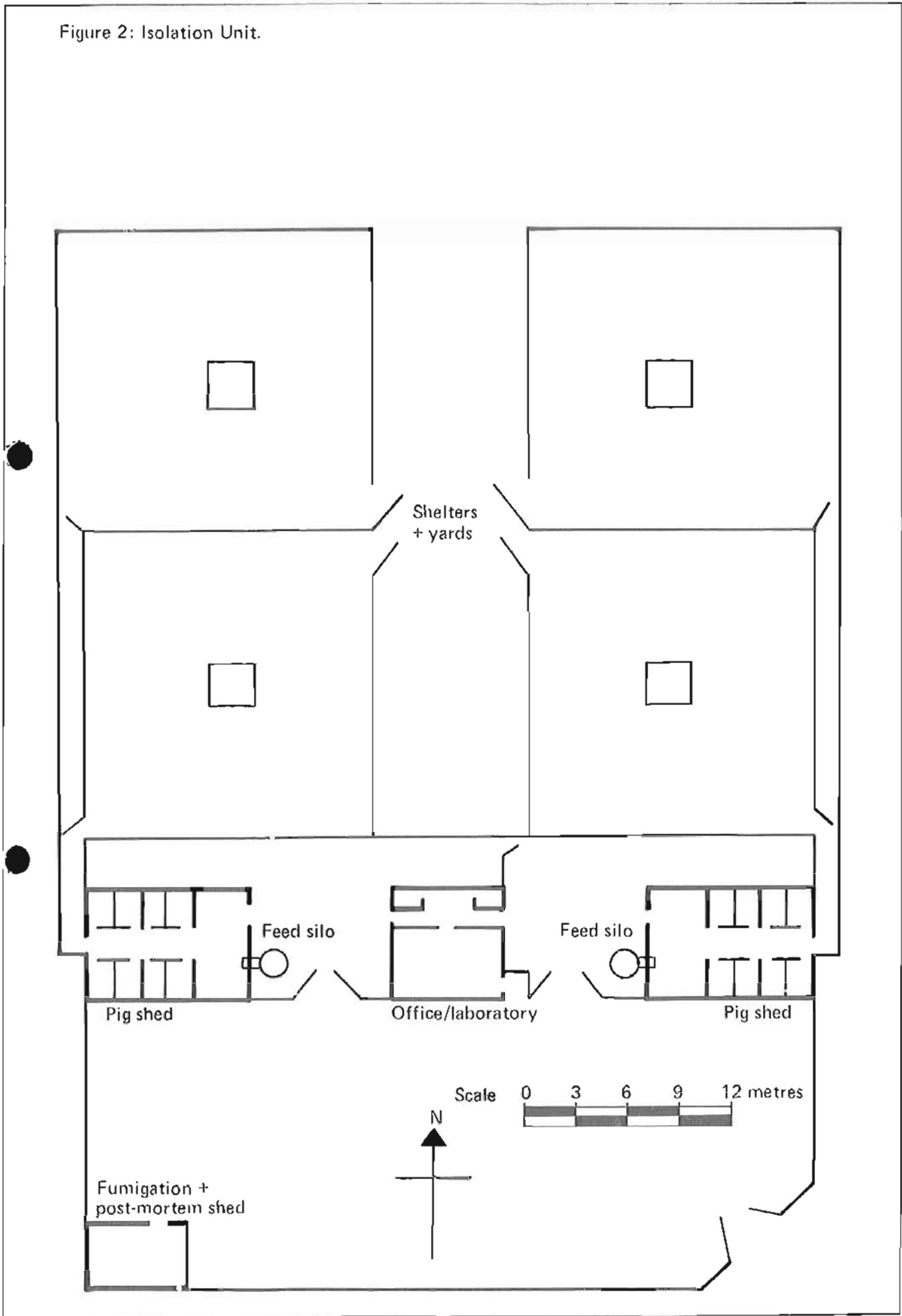
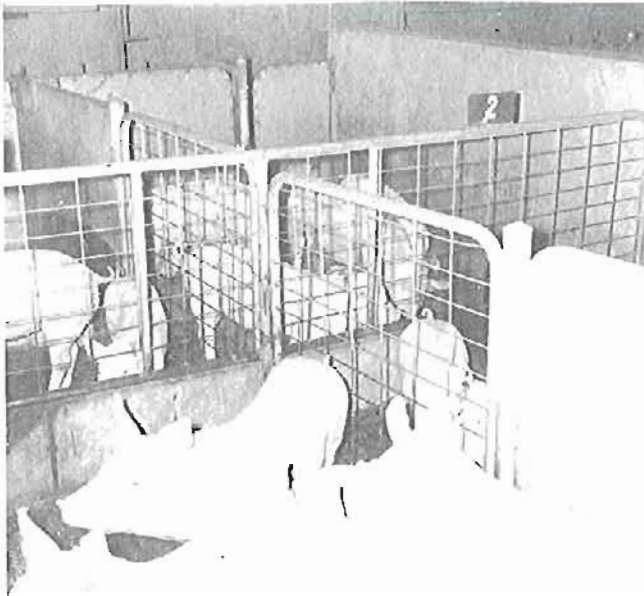


Figure 2: Isolation Unit.

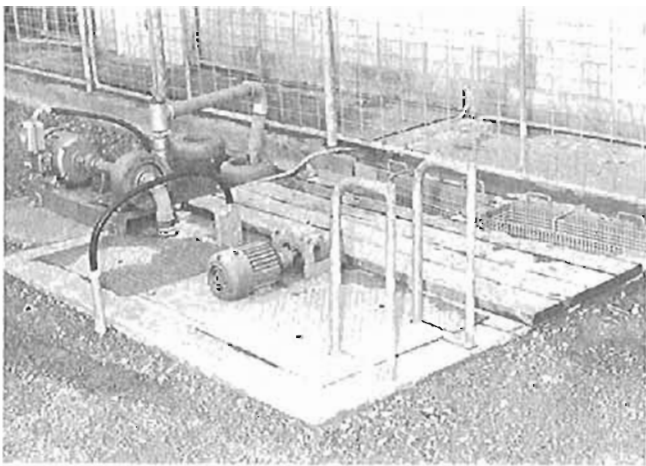




Pigs in the grower shed are housed in groups but fed individually.



Field Assistant Mr. E. Zacher feeding pre-weighed experimental rations.



Dung disposal pit with agitator and pump. Contents are discharged into the main sewer line.

Visitors in parties not exceeding ten people are welcome, but prior arrangement must be made with the Officer-in-Charge (Telephone 262 3880). No visiting is permitted on a Wednesday.

### Feed preparation

All feed is compounded on the unit. A portable roller mixer mill is used to process feed and deliver it either directly to the silos serving the sheds or to a pelleting machine installed in the feed shed. Most experimental feed is pelleted, whilst other feeds are fed as meal.

Apart from experimental feeds, four basic rations are in use. They comprise a creep ration of 18 per cent crude protein, a grower diet of 17½ per cent

crude protein, a finisher diet of 15 per cent crude protein and a breeder diet of 16.5 per cent crude protein. The formulation of these rations is available from the Department of Agriculture.

Piglets are changed from creep to grower at about seven weeks of age, and the change to finisher takes place when pigs reach 45 kg liveweight.

### Stock

The foundation stock comprised 20 minimal disease gilts and three boars introduced from New South Wales. Since then boars have been brought in from two other minimal disease units and one litter of pigs was brought in after isolation at birth.

There is now a basic herd of 32 sows plus spares and replacements at the production unit. This herd provides experimental pigs for both the production and isolation units.

### Management

The sows at the production unit are divided into two groups of sixteen for batch farrowing. Both natural mating and artificial insemination are used.

Piglets are weighed and their teeth clipped on the first day; they receive an iron supplement and tails



are clipped on the third day. Castration is carried out at about one week of age and a second iron supplement is given on the tenth day.

The piglets are again weighed at three and six weeks of age. Those required for experimental work are then weighed at weekly intervals, whilst the remainder are weighed each fortnight. Batch weaning is carried out when the piglets are about five weeks old.

Routine backfat measurement is carried out by sonar testing after each pig reaches 70 kg liveweight.

## Marketing

Most pigs are carried through to 75 kg liveweight and are marketed either by sale on hooks, meat auction or live auction. Wherever practical the pigs are checked at slaughter for freedom from disease, abnormalities and carcass quality.

## Records

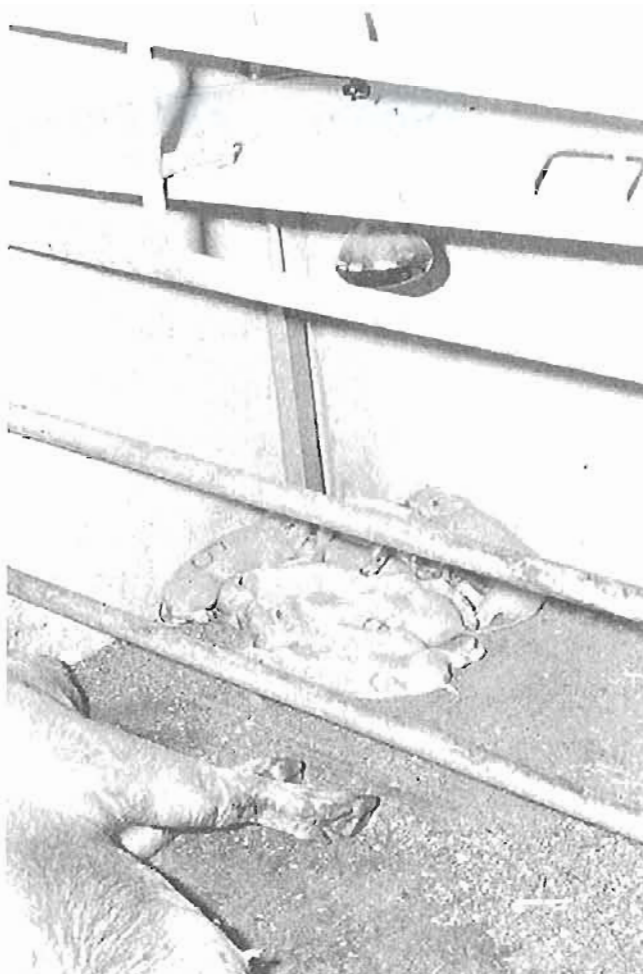
In addition to experimental records, details are kept on all phases of pig production from mating through to marketing. Temperature and humidity readings are also recorded.

## Personnel

At the present time five research officers are engaged on projects at the unit. The day to day operations are conducted by the Officer-in-Charge together with a Field Assistant and three Farm Assistants.



All boars held at Northfield are trained for semen collection.



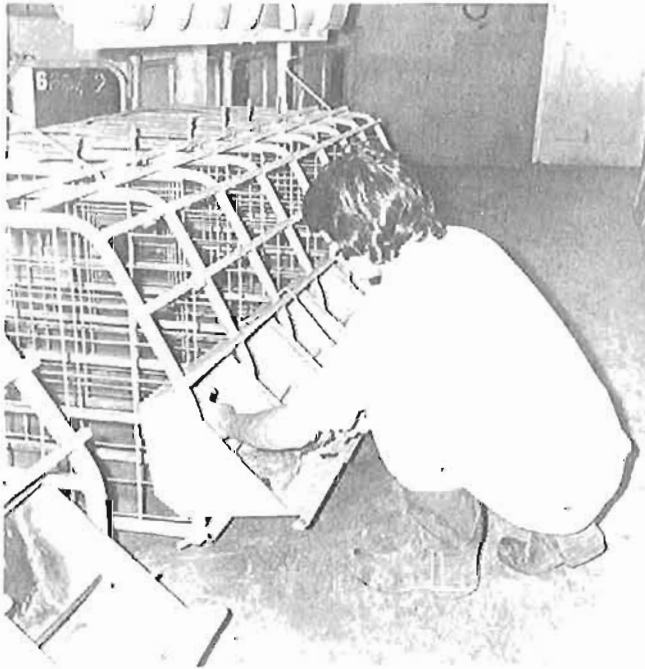
Piglets appreciate a warm creep area; they are identified by number from day of birth.



Regular weighing and sonar backfat readings play important roles in experimental work.

## Liaison and research committees

In order that communication be maintained with the pig industry, a liaison committee has been set up comprising two representatives from the United Farmers and Graziers, Pig Section, one from the Australian Pig Society, together with representatives from the Animal Health and Livestock Branches of the Department of Agriculture. The Committee meets at least four times annually. It gives industry representatives the opportunity to discuss new research projects and to examine results from those recently completed as well as providing an opportunity to discuss other current industry matters.



During experiments, any feed not consumed is removed, weighed and recorded.

A research committee of departmental personnel has been formed and meets every second month. This committee co-ordinates research projects being put forward by research officers, to ensure the best use of research facilities.

## Research work

Experimental work over the past three years has been carried out by research officers of the Animal Health and Livestock Branches of the Department of Agriculture. In addition pigs from the Unit have been used for research projects by CSIRO, the Institute of Medical and Veterinary Science and the Waite Institute.



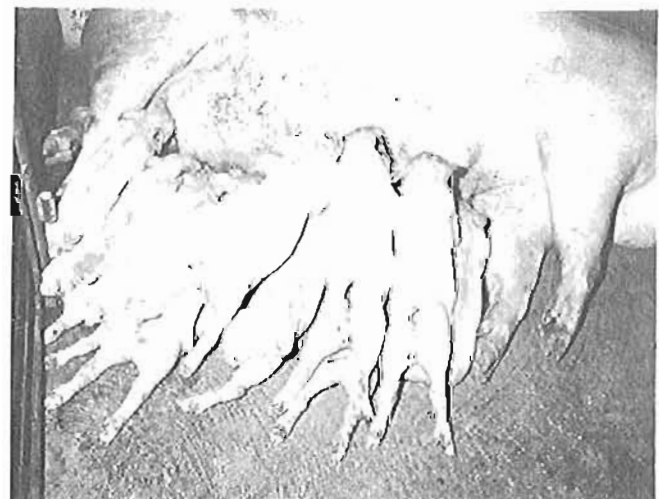
Dr. K.J. Dobson, Acting Principal Veterinary Research Officer.

## Animal health research

Animal health research projects are many and varied. Several are supported by funds from the Australian Pig Industry Research Committee. Recent interesting projects include –

### Evaluation of runt pigs

This work attempted to correlate the birth, weaning and market weight of pigs with either piglets born as runts or with those suckled on a particular teat. The experiment involved daily recording of the teat that each piglet selected for suckling. Weight of piglets was recorded at birth, 42 days and 150 days. Investigations confirmed that within a few days and certainly by two weeks of age, most piglets had established claim to a teat which in most instances was adhered to up to the time of weaning. However, it was found that neither the weight of the piglet at birth nor the selection of a particular teat at birth was strongly correlated



Eager piglets feed from their selected teats.



with the weight at weaning. These findings tended to discount the theory that piglets on front or back teats do not thrive as well as piglets on middle order teats.

### Vitamin A toxicity

A previous field investigation had shown that when piglets under the age of one week were given one million units of vitamin A orally as a single massive dose, there was gross deformity of the limb bones associated with lameness in pigs between five weeks of age and slaughter at bacon weight. A small trial which attempted to reproduce this effect in pigs at Northfield was unsuccessful.

### Coumarin poisoning

A field outbreak of poisoning associated with a warfarin-type rat poison was thought responsible for 15 deaths in a small piggery when used as a tracking powder to kill vermin. Toxicity trials with pigs at Northfield showed that an amount that would fit on a one cent piece (0.25 mg per kg live-weight) if consumed daily for seven days could be fatal. It was found that a single injection of vitamin K anticoagulant resulted in rapid improvement of affected pigs.

### Coliform vaccines to prevent scours

A preliminary evaluation was made of a commercial coliform vaccine. Sows were vaccinated 14 and seven days prior to farrowing in an attempt to produce immunity and pass it via the colostrum to piglets. No scouring of significance occurred in piglets less than five weeks of age. However scouring requiring treatment occurred in most treatment and control litters at six weeks of age indicating that this vaccine was of no value for scours in piglets of this age group.



Dr. C.F. Cargill, Acting Senior Veterinary Research Officer (Pig Diseases).

### Farrowing fever

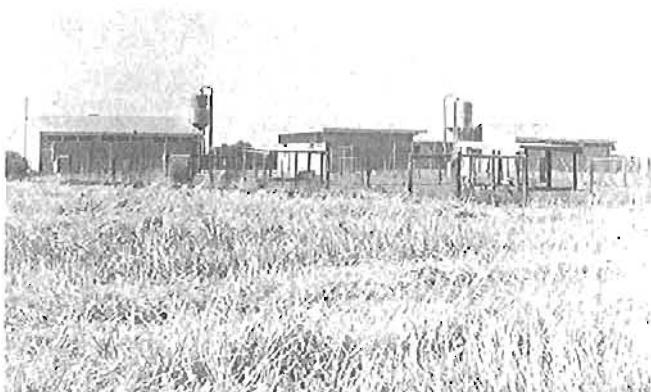
Trial work has been carried out in an attempt to obtain a better understanding of the nature and cause of farrowing fever (toxic agalactia or lack of milk after farrowing). Bran has been used to replace half the normal ration of sows during the week prior to farrowing for a number of farrowings. Quantities of feed offered have been at normal levels and at rates considerably in excess of normal in an attempt to precipitate the disease. However, farrowing fever has not occurred in either of the groups of sows so that a positive evaluation of bran as a preventative cannot be made at this stage. However, much useful clinical and laboratory information has been collected. One interesting aspect was that pigs given large amounts of bran tended to farrow up to three days earlier than normally expected.

### Sarcoptic mange

The main Animal Health project at Northfield has been the study of mange. Matched groups of mange-infected and mange-free pigs have been compared clinically and in terms of growth rate and feed conversion. Under intensive conditions there have been mean differences in feed conversion in excess of ten per cent. It does appear that these differences arise from a few severely affected pigs rather than all pigs being equally affected. There is field evidence that under extensive management conditions mange is more severe. Present studies are continuing in this direction. Other aspects under study include field incidence of mange, pathogenesis, immunity studies and methods of treatment and control.

### Leptospirosis

Work has been carried out to establish the degree and duration of antibody titres (levels) in the blood



Shelters and yards permit pigs to run outside the isolation unit.

serum of pigs that have been vaccinated against leptospirosis. It has been found that a preliminary vaccination followed by a booster six weeks later with one brand of vaccine gave positive titres which persisted up to 16 weeks in one pig. Work is continuing to establish whether these antibody titres are correlated with the protected ability of the vaccine.

### Gastric ulceration

Overseas findings supported by field evidence in South Australia has shown that wheat in rations is more likely to cause gastric ulcers than barley, that finely ground grain predisposes pigs to ulcers and that the steam pelleting process used in commercial production of pellets is more likely to be associated with ulcers. An experiment has been set up to attempt to examine the affect of these factors on ulcers in pigs. Findings are expected to be available in 1975.



Mr. R.L. Davies, Livestock Research Officer (Pigs).

## Livestock research

### Field peas

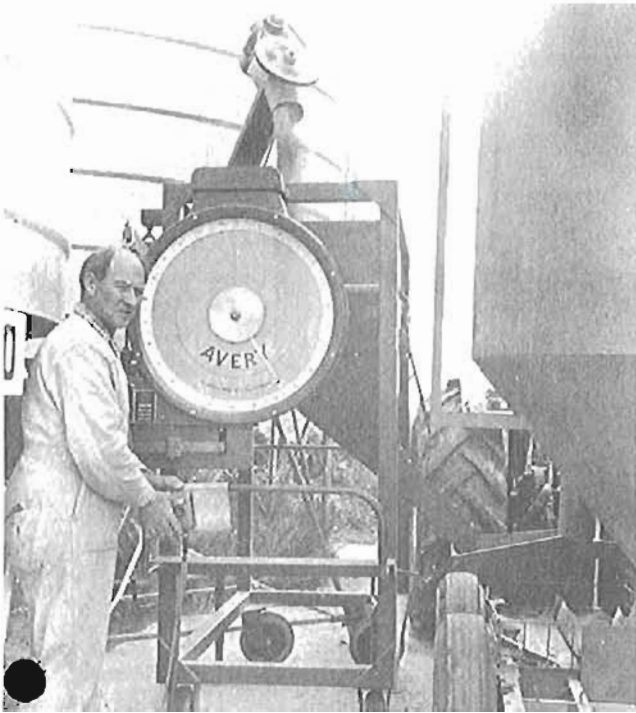
Two experiments carried out to evaluate peas as a food ingredient have indicated that peas can replace all the meat meal in both the Northfield grower and finisher feeds. In the grower feed, replacement of meat meal with peas gave similar performance; in the finisher feed, replacement of meat meal with peas improved performance. Further work will examine why this difference occurred, and will look at replacement of fish meal with peas, comparisons between peas and lupins and comparisons between Early Dun and Derrimut pea varieties. The suitability and level of calcium and phosphorus supplements on high vegetable diets may also have to be examined. At the same time an extensive survey of protein and amino acid levels of peas will be carried out.

### Blood meal

Work carried out indicates that damage from heat in the processing of blood meal is relatively unimportant provided there is reasonable control of the drying process. It also appears that blood meal is no less palatable than other ingredients provided it is used correctly. Blood meal shows promise as a lysine supplement to medium quality protein rich foods, but is isoleucine deficiency means that blood meal will give poor growth if used at high levels. Further work is planned to establish how blood meal can be used to best advantage.

### New grain

With increasing interest in feed grains, it seems likely that some promising material will be available within the next two years or so. Two such grains of particular interest are high lysine barley and



All feed components are weighed before milling and mixing.

Triticale. The current work is limited to analytical screening, but some pig work is likely when sufficient quantities of promising material become available.

### Suitability of Clipper barley for growing pigs

During the latter half of 1971, field advisers of the South Australian Department of Agriculture received complaints from commercial pig producers that Clipper, was nutritionally inferior to other well established varieties of barley, and that it caused skin irritation in pigs. When Clipper and Noyep barley were used as the grain components of a balanced ration, there was no significant difference in either feed consumption, liveweight gain, feed conversion or carcass quality. There was no evidence of itching in any of the pigs.

We concluded that the allegations regarding the unsuitability of Clipper barley as a feedstuff for pigs were unfounded and that it was equally as good as other current varieties in this respect.



Mr. A.D. Hughes, Senior Livestock Research Officer (Nutrition).

### Sonar testing

A series of experiments were conducted to determine the best sites on the pigs back to achieve reproducible readings on the sonar testing machine and to determine which of these sites reliably predicted the actual backfat thickness at slaughter. Reproducible results with the sonar testing machine were obtained along the back between the rear edges of the shoulder blades and a line forward of the line joining the hip joints, extending between 2 and 10 cm either side of the mid line. In view of the fact that the 'C' and 'K' positions as used by the pig industry lie within the general areas defined by our study, it was decided to continue with these measurements. They are located just off the mid line over the last rib.



Experimental rations are carefully weighed before feeding each pig individually.



## Dried egg pulp

An experiment using dried egg pulp as a protein supplement with grain was carried out. The objects were to see whether egg meal could be used as a source of standard supplementary protein (reference protein). It was concluded that egg meal was comparable with good quality fishmeal. Its nutritive value for young pigs was also examined and found to be satisfactory.



Mr. B.A. Stone, Livestock Research Officer (Pigs).

## Artificial insemination

Artificial insemination was first used in the Northfield Pig Research Unit herd in 1972. Recent developments in semen dilution and storage are currently being investigated to develop a suitable practical technique for local use.

## Pregnancy diagnosis

Investigations into infertility problems occurring in commercial pig herds are at present hindered by the lack of functional techniques available for pregnancy diagnosis. A vaginal biopsy technique is being examined. This method claims to give an overall accuracy of 95 per cent at 18 to 21 days of pregnancy.

## Seasonal effects

Most local producers will be aware that the reproductive performance of their pig herds is lower during the summer months.

A series of experiments at Northfield will examine the effects of seasonal climatic variation on boar semen quality and boar sex hormone levels.

This investigation will comprise part of a complete study on seasonal variation in reproductive performance in pigs.