Pigs on concrete had approximately 15 square feet of floor space each while those on slats had approximately 8 square feet of floor space each. Both groups of pigs were selected complete meat ration number 8-32. The ration formulation is listed in Table 28. Both groups drank from automatic water fountains and there was one mist-type fogging nozzle over each pen. Each pen was partially under roof.

Table 27 summarizes the average performance of pigs in each pen. Pigs on the slotted floor were always clean. All manure went through the floor and no cleaning was ever necessary. Pigs on the concrete floor were always dirty, even though the pen was sprayed each day. The whole area was sprayed regularly to control flies.

During hot weather pigs on the slotted floor suffered noticeably from the heat and/or humidity. One pig became overheated and died August 6. Maximum temperature that day was 98°F, with high relative humidity. In contrast, pigs on the wet, dirty floor showed little evidence of discomfort from heat even on the warmest days. Apparently the concrete floor helped cool the pigs.

Since feed efficiency figures are similar for the two groups, it is suggested that differences in weight gain were due to differences in feed intake due to temperature effect. It would be possible to overcome this effect in a properly designed slotted floor unit.

Table 27

<p>| Performance of pigs on a concrete floor vs. those on an elevated wooden, slotted floor. |</p>
<table>
<thead>
<tr>
<th>June 1, 1962, to September 14, 1962</th>
<th>99 days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Concrete Floor</td>
</tr>
<tr>
<td>No. pigs</td>
<td>12</td>
</tr>
<tr>
<td>Ration no.</td>
<td>8-35</td>
</tr>
<tr>
<td>Av. initial wt., lbs.</td>
<td>214</td>
</tr>
<tr>
<td>Av. daily gain, lbs.</td>
<td>1.61</td>
</tr>
<tr>
<td>Standard error</td>
<td>0.04</td>
</tr>
<tr>
<td>Av. feed eff., lbs.</td>
<td>3.23</td>
</tr>
<tr>
<td>Feed cost per cwt. gain</td>
<td>$10.60</td>
</tr>
</tbody>
</table>

*One pig died August 6. Post-mortem examination indicated heat prostration.*

Core vs. Sorghum and Pellets vs. Meal for Growing-Finishing Swine (Project 119).

B. A. Koch

This is a continuation of feeding trials comparing the feeding values of corn and sorghum meal under Kansas conditions.

Experimental Procedure
Forty feeder pigs, 12 Poland Chinas and 28 Durocs averaging 55 pounds each, were randomly divided by breed and sex into four groups. All pigs had been previously vaccinated for cholera and swine fever and wormed with pyrantel.

The pigs were fed and housed on concrete where each pig had 15 square feet of space. Those on an electrically heated concrete floor were always clean. Each group of 10 pigs had access to an automatic water fountain. Each pen was partially under roof. The concrete floor was slotted and manure went through the floor and no cleaning was ever necessary. Pigs on the concrete floor were always dirty, even though the pen was sprayed each day. The whole area was sprayed regularly to control flies.

Diet formulation is listed in Table 28. Ration 8-44 and 34A contained corn while 35 and 35A contained sorghum meal. Sorghum meal replaced corn on a pound-for-pound basis with no other changes in formulation. In each case one ration was fed as meal and one as pellets. Individual pigs were removed from test as they reached market weight. Carcasses were examined on the rail after slaughter.

Observations
Table 28 summarizes performance and cost data for the study. There was no significant difference between average daily gain figures for the various lots. In a previous study, pigs eating pelleted rations gained somewhat faster than those eating meal rations. The pigs eating the pelleted rations were more efficient than those eating meal. This was also true in a previous study.

Pigs performed as well on sorghum as on corn whether the ration was pelleted or in meal form. The corn and sorghum mix used in this study had similar protein levels, thus the choice in grain did not change the crude protein level of the rations.

Under prices at the time of the study the sorghum grain rations produced cheaper gains than the corn rations. Pelleted rations produced gains significantly faster than meal rations in both comparisons even though the cost per pound of the pelleted rations was higher.

Carcasses from the various lots did not differ significantly in USDA grade.

Table 28

<table>
<thead>
<tr>
<th>Sorghum grain.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Feeding period began December 10, 1961)</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Ration no.</td>
</tr>
<tr>
<td>Ration no.</td>
</tr>
<tr>
<td>Av. % crude protein</td>
</tr>
<tr>
<td>Av. % crude protein</td>
</tr>
<tr>
<td>Grain</td>
</tr>
<tr>
<td>Grain</td>
</tr>
<tr>
<td>Preparation</td>
</tr>
<tr>
<td>Preparation</td>
</tr>
<tr>
<td>No. of pigs</td>
</tr>
<tr>
<td>Av. initial wt., lbs.</td>
</tr>
<tr>
<td>Av. daily gain, lbs.</td>
</tr>
<tr>
<td>Standard error</td>
</tr>
<tr>
<td>Av. feed efficiency, lbs.</td>
</tr>
<tr>
<td>Av. feed cost per cwt. gain</td>
</tr>
<tr>
<td>Feed cost per ton</td>
</tr>
</tbody>
</table>

*See Table 27 for ration formulation.*

Swine Breeding Investigations (Project 212) (Progress Report).

B. A. Koch

A crossbred boar and a Duroc boar (University Farm 16758), and out of a Poland China sow (Pringle's Mill 2002/108), was first place crossbred boar at the 1962 Kansas State Fair. The boar produced the champion carcass when slaughtered.

Carcass data follow:
- Carcass length: 29.8 inches; lumbal, 1.66 inches; loin eye area, 5.50 square inches; lean cuts, 55.67% of carcass weight and 39.1% of live weight.

Vitamin A Levels for Growing-Finishing Pigs (Project 311).

B. A. Koch

Vitamin A supplementation recommendations vary considerably from station to station. Most research indicates that supplementation recommendations are generally much higher than actually necessary. This
study was designed to determine performance response to low-level vitamin A supplementation of an otherwise adequate diet.

**Experimental Procedure**

Twenty-five crossbred (Duroc x Poland China) feeder pigs were randomly divided into two groups. They had previously been vaccinated for cholera and coryza, and treated for worms with pyrethrins. The pigs were confined on concrete with water and feed before them at all times.

Ration formulations are listed in Table 20. One ration contained 100 L.U. of added vitamin A per pound and the other 400 L.U. Analysis of the rations indicated that essential minerals, vitamin A, and provitamin A were coming from other sources.

Individual pigs were removed from the pens as they reached slaughter weight. Decreases were evaluated on the tail after slaughter.

**Observations**

Increasing the vitamin A content of the diet from 100 to 400 L.U. per pound did not change the average daily gain or the feed efficiency of the pigs. Both groups did as well as similar pigs consuming diets with much higher vitamin A content. Differences from pigs receiving the lower level (100 L.U.) of vitamin A tended to carry more weight than those from pigs on the higher level.

Stomachs were recovered at slaughter and examined by Dr. W. J. Griffling as part of a School of Veterinary Medicine study of stomach ulcers in swine. No difference in incidence or severity of ulcer symptoms was noted between the two groups.

Table 20

| Vitamin A levels for growing-finishing pigs. (Started on feed, December 15, 1961) |
|-----------------------------------|-----------------|-----------------|-----------------|-----------------|
| RATION NO. | 29-D | 29-D |
| Av. % crude protein | 15.8 | 15.8 |
| L.U. vitamin A added/lb. | 100 | 100 |
| No. of pigs | 12 | 15 |
| Av. on feed wt., lbs | 52 | 48 |
| Av. off feed wt., lbs | 232 | 222 |
| Av. daily gain | 1.62 | 1.50 |
| Standard error | ±0.10 | ±0.08 |
| Av. feed efficiency, lbs | 242 | 222 |
| Av. feed cost per ewt. gain | $19.70 | $19.42 |
| Feed cost per ton | $32.60 | $32.50 |

Arsamne Acid in Growing-finishing Swine Rations (Project 110)

B. A. Koch and Tran Nam

Arsamne acid is one of the many feed additive approved by the Food and Drug Administration for use in swine rations. Results from an uncontrolled feeding demonstration suggested that arsamine acid effectively increased daily gain and improved feed efficiency. This study was designed to check further the value of dietary arsamine acid.

**Experimental Procedure**

Thirty head of Poland China and Duroc weanling pigs were randomly divided by breed and sex into three groups. Each group was started on feed, December 16, 1961. Before the trial started all pigs had been vaccinated for coryza, and aches and had been wormed with pyrethrines.

Two groups were confined on concrete; the third had access to winter rye pasture. Individual pigs were removed from test pens as they reached market weight.

Table 30

<table>
<thead>
<tr>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 30 summarizes the performance of the three groups. There were no statistically significant differences in average daily gain. However, pigs fed in confinement and supplemented with arsamine acid had the highest average daily gain. Pigs on rye pasture required the most feed per pound of gain. They spent considerable time on pasture, but still had the poorest feed efficiency of any group. The rye pasture was an old leg-pasture, apparently increased incidence of roundworms in the group of pigs. They threw more roundworms when all groups were treated with pyrethrin 90 days after going on test. They also gained more than the pigs in confinement pigs. Feed costs per 100 pounds of gain were highest on the rye pasture because of poorer feed efficiency. Although pigs receiving no arsamine acid in confinement gained slightly less per day than confined pigs receiving arsamine acid, highest efficiency and lowest cost per 100 pounds of gain were from nonarsamine acid, confined pigs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of pigs</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>RATION NO.</td>
<td>10</td>
</tr>
<tr>
<td>Av. % crude protein</td>
<td>15</td>
</tr>
<tr>
<td>Arsamne acid</td>
<td>10</td>
</tr>
<tr>
<td>Rye pasture</td>
<td>5</td>
</tr>
<tr>
<td>Av. off feed wt., lbs.</td>
<td>48</td>
</tr>
<tr>
<td>Av. feed efficiency, lbs.</td>
<td>1.50</td>
</tr>
<tr>
<td>Standard error</td>
<td>0.07</td>
</tr>
<tr>
<td>Av. feed cost per ewt. gain</td>
<td>$10.44</td>
</tr>
<tr>
<td>Feed cost per ton</td>
<td>$41.81</td>
</tr>
</tbody>
</table>

(See Table 21 for ration composition)

Some Effects of Dietary Nitrate and Nitrite on Growing-finishing Pigs (Project 311)

Srirupong Sukhouncharoent, D. B. Parrish and R. A. Koch

The presence of nitrates and nitrites in feed and drinking water of farm animals apparently has caused some serious nutritional problems. This study was to establish more clearly some ways the nitrates interfere with normal processes in the animal body.

**Experimental Procedure and Observations**

A pilot study using two pigs per treatment was initiated in June, 1962. Table 31 shows the general design of the study plus average results of data collected. Either sodium nitrate (NaNO₃) or sodium nitrite (NaNO₂) was mixed into the ration at the indicated level.

The pigs were fed on concrete from a self-feeder and were watered by hand. A few packs of grass were given to each pig on the outside of the shed or shade areas. Blood samples were taken from the anterior vein each area.

Results shown in Table 31 indicate that the two levels of dietary NaNO₃ caused an increase in the methemoglobin level of the blood, a decrease in serum vitamin A level and some decrease in growth rate.