TABLE 1. EXPERIMENTAL FEEDER HEIGHT

| Day number of height change | | Feeder height inches* | Approx. pig weight lb. |
|---|---|---|---|
| Preliminary period | Experimental period | | |
| 0 | | 38 | 115–130 |
| 2 | | 34 | 115–135 |
| 3 | | 26 | 115–135 |
| | 21 | 30 | 150–170 |
| | 32 | 32 | 165–180 |

* Measured from the surface on which the hind feet of pigs rest while eating to the top of the front feeding lip of the feeding compartment.

used in a second trial now in progress. Pigs weighing 60 to 70 lbs. each stood to eat from these modified feeders the first day. Further research is expected to more clearly define the relationships involved in these preliminary findings.

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TABLE 2. RESULTS, STANDING PIG EXPERIMENT
(49 day period, 10 barrows per group)

| | Controls | Standing pigs |
|---|---|---|
| Initial weight, lb. | 118.4 | 123.6 |
| Average daily gain, lb. | 1.83 | 1.54** |
| Average daily feed, lb. | 7.39 | 6.64 |
| Feed per unit of gain | 4.04 | 4.31 |
| Ham, % of carcass | 17.9 | 18.9** |
| Ham, lb. | 28.7 | 28.9 |
| Ham and loin, % of carcass | 31.9 | 33.0* |

* Difference statistically significant ($P < .05$).
** Difference statistically highly significant ($P < .01$).

"Confined" hogs given 20 square feet of space each, gained weight more rapidly than those allowed 5 or 10 square feet each, in recent tests at Davis. However, the cost of extra space must be balanced against net returns for optimum profit.

# Space Allowances for Hogs Grown in Confinement

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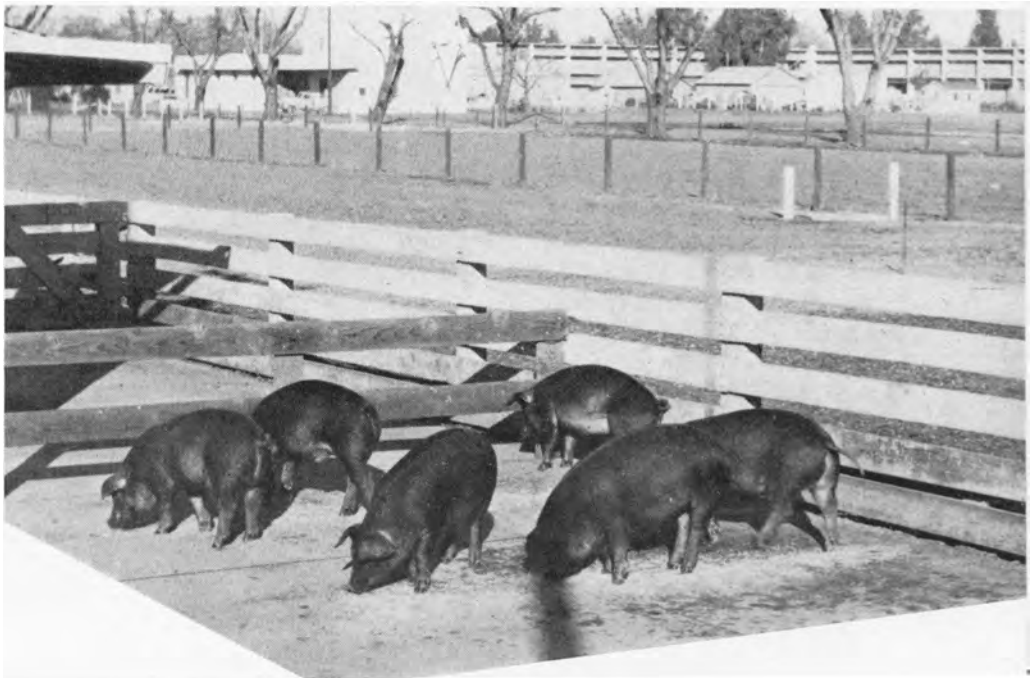
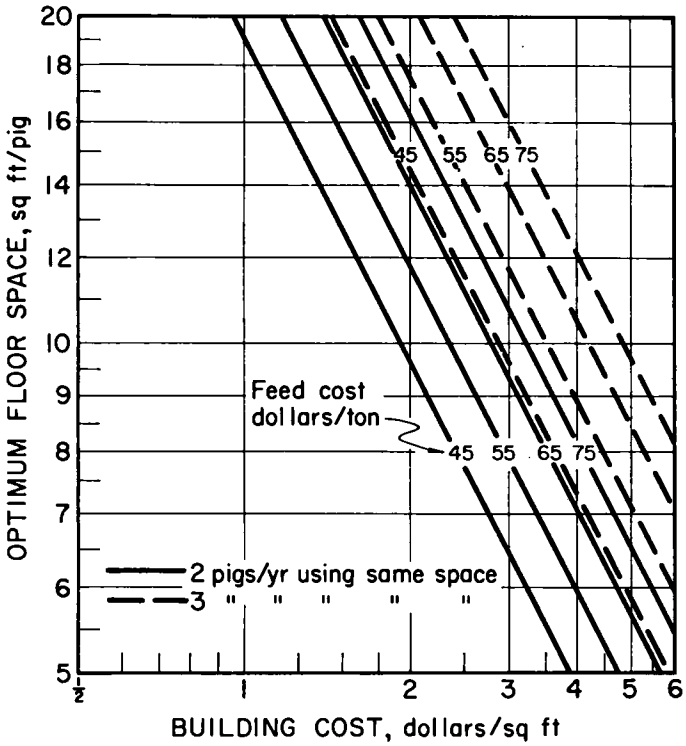
Space allowance tests for confinement hogs at Davis included pens with 5 sq ft, to left; 10 sq ft, center; and 20 sq ft per head in photo below (with pigs taken outside for picture in simulated test space).

"CONFINEMENT" HOGS are fed on a dry-lot basis in a small area and have no access to pasture. At one extreme of this growing system, hogs may be held in a pen with minimum shelter, while at the other extreme, they are restricted to an enclosed, insulated building with complete environmental control. Production of market animals is rapidly changing toward confinement production of one degree or another. Recommendations for space allowances per pig have been based largely on opinion, and only recently have formal tests been conducted to relate space to rate of gain or feed utilization.

Space allotment can be varied by changing the physical size of pens of equal-size groups of hogs or by varying the number of hogs per group in equal-






Graph shows floor space resulting in highest profit per pig. If initial or replacement cost of building is $3/sq ft and feed costs $55/ton then optimum floor space is 8 sq ft per pig when 2 pigs/year use the same space, and about 11¾ sq ft/pig when 3 pigs use the same space.

size pens. Both methods were tested at Davis during the summer of 1959 and the winter of 1959–60. Hogs were allotted 5, 10, and 20 sq ft each with 3, 6 and 12 hogs per pen.

The animals were housed in concrete-floor pens for 70 days during the summer test and for 68 days during the winter test—with no access to outside pens. The 16%-protein ration fed in the tests included: barley, 80%; dehydrated alfalfa meal, 5%; soybean meal, 3½%; cotton seed meal, 3½%; meat and bone scraps, 7½%; salt, ½%. To each 100 pounds were added 10.2 gm of zinc sulphate and 7.2 gm of Quadrex-10, which contained 10,000 U.S.P. units of vitamin A and 1,250 U.S.P. units of vitamin D per gram. The ration was fed using one self-feeder opening for every three pigs. The space allotments did not include the space occupied by the self feeders. Each pen also had an automatic drinking cup.

## Combined results

The combined results of the two tests are shown in the table. Pigs with 20 sq ft of space each gained weight more rapidly than those confined to 5 or 10 sq ft per pig. When confined at three pigs per pen, they consumed more feed daily than at either 6 or 12 pigs per pen. Pigs given 5 sq ft of space and pigs in groups of three per pen, used more feed per unit of gain than those with either 6 or 12 per pen. There were no differences in backfat measurements.

Faster gains and better feed utilization can, therefore, be expected with larger space allotments. The cost of extra space, however, reduces net benefit that may result from the larger area. There is an optimum balance point between increased costs and returns at which profits will be the greatest.

Feed and building replacement costs should be correlated with optimum space for growing-finishing hogs while they increase from 50 to 200 lbs. Feed accounts for 70 to 75% of total cost in raising pigs and makes feed utilization an extremely important criterion for comparing management practices. Buildings and equipment account for about 10% of production costs. Labor accounts for another 10%, but it was difficult to assess and was not included in the profit maximization process. With newer management practices such as slatted floors over manure troughs or mechanical cleaning and feeding, labor differences due to space allotment become less important.

AVERAGES OF TWO SWINE SPACING TESTS AT DAVIS DURING 1959–1960

| | Gain | Av. daily feed | Feed per unit gain |
|---|---|---|---|
| Square feet | Lb | Lb | Lb |
| 5 | 89.1 | 5.34 | 4.09 |
| 10 | 92.9 | 5.23 | 3.86 |
| 20 | 98.5 | 5.22 | 3.69 |
| Number of pigs/pen | | | |
| 3 | 94.3 | 5.66 | 4.15 |
| 6 | 93.7 | 5.13 | 3.79 |
| 12 | 93.1 | 5.00 | 3.71 |
| Test | | | |
| 1* | 92.7 | 5.20 | 3.92 |
| 2** | 94.2 | 5.32 | 3.84 |

* Test 1 (summer, 70 days), June 22 to August 24, 1959. Pig weights: 69.8 to 162.5 lbs. Average temperature, 76.6°F (92.3 max.; 64.6 min.). Average relative humidity, 51.7% (71.8 max.; 29.0 min.).

** Test 2 (winter, 68 days), December 21, 1959 to February 27, 1960. Pig weights: 81.2 to 175.4 lbs. Average temperature 55.2°F (59.1 max.; 51.0 min.). Average relative humidity, 73.4% (81.1 max.; 63.7 min.).

## Building costs

Ten per cent of the initial building cost was used as the fixed annual charge to buildings to cover costs of interest (2½ to 3%), depreciation (2 to 5%), taxes (1 to 1½%), insurance (½%) and maintenance and repair (1 to 3%). Depending on the system of production, either two or three pigs per year may use the same building space in growing from 50 to 200 pounds. The larger number of pigs per year, per unit of space, decreases the annual space charge per pig and increases the space per pig.

The graph shows the amount of floor space necessary for the maximum return from each pig. Knowing the initial or replacement cost of the building and the cost of feed, a producer can determine from the graph the floor space needed per pig. However, the swine producer is really interested in *total* profit. The analysis is most directly applicable to new buildings where highest profit per pig also brings the highest total profit. If, however, he is now using *less* than optimum space per pig he would have to reduce the total number of pigs to obtain enough space and in so doing may actually reduce his total profit, even though the profit per pig will be the highest. The producer would always be better off to build a second building if needed to maintain the production to which his present management is geared.

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