Raising turkeys - A guide to breeding, feeding and management.

S. Froome

Follow this and additional works at: https://researchlibrary.agric.wa.gov.au/journal_agriculture3

Recommended Citation

This article is brought to you for free and open access by Research Library. It has been accepted for inclusion in Journal of the Department of Agriculture, Western Australia, Series 3 by an authorized administrator of Research Library. For more information, please contact jennifer.heathcote@agric.wa.gov.au, sandy.papenfus@agric.wa.gov.au, paul.orang@dpird.wa.gov.au.
RAISING TURKEYS
A Guide to Breeding, Feeding and Management

By S. FROOME

IT can be stated, with confidence, that few persons in Western Australia eat turkey meat more than once a year, and many have not tasted it for some years. The majority of households do not include poultry in their usual diet and turkey is on the menu for special occasions only. Although the demand for turkeys by the local market is small, it is seldom that sufficient turkeys are marketed to meet the demand. There are approximately 14,000 turkeys in this State. Only about 4 per cent. of these are found in the metropolitan area, and the remainder are spread fairly evenly over the farming areas.

The turkeys raised in the wheat belt area are, as a rule, allowed open range; the hens make their own nests and brood the young poults under natural conditions. A small number of farmers in the lower South-West have made a special feature of turkey raising and are producing a number of well fleshed birds which bring good market prices.

Little attempt has been made in this State to raise a large flock of turkeys under confined conditions, although this system is becoming popular in many countries where turkeys are raised in quantities.

At the present time the export market is capable of absorbing large quantities of turkeys and as the demand on the local market is seldom satisfied it would appear that further development of turkey raising is justified.

TURKEY STOCK VARIETIES
All turkeys have approximately the same body shape and, although there are a number of varieties, there is only one breed. There are many varieties of domesticated turkeys, all of which are descended from the wild turkey. In the U.S.A. many varieties have developed from the wild stocks native to that country, but the two most popular varieties are the Broad-breasted Bronze and the Beltsville Small-type White. The former has been developed, by careful selection, from the Standard-bred bronze and its increased size is due to more extensive fleshing on the breast and thighs. The latter was developed through cross breeding and selection at the Agricultural Research Centre at Beltsville to meet the needs of the average family.

In Western Australia the majority of the turkey stock is of the Standard-bred Bronze variety and a small number of the White Holland variety. A comparison of the weights of the varieties is given in Table 1.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Yearling Hen</th>
<th>Yearling Tom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad-breasted Bronze</td>
<td>20</td>
<td>38</td>
</tr>
<tr>
<td>Standard-bred Bronze</td>
<td>18</td>
<td>33</td>
</tr>
<tr>
<td>White Holland</td>
<td>16</td>
<td>30</td>
</tr>
<tr>
<td>Beltsville Small-type White</td>
<td>12½</td>
<td>24</td>
</tr>
</tbody>
</table>
A brief description of the desired shape in turkeys of both sexes is as follows:

**Head**—appears strong, wide, fairly deep but not coarse.

**Beak**—strong, medium length, and well curved.

**Dewbill or Snood**—(The tubular, fleshy appendage at the base of the beak).
- Of the male—Good size and very extensible (4 to 6 in. when fully extended).
- Of the female—Much smaller and not very extensible (not more than 2 in. when fully extended).

**Eyes**—slightly oval, set well out and appearing alert.

**Neck**—moderate in length.

**Beard**—(A cluster of coarse, hairlike feathers attached to the upper part of the breast).
- Of the male—commonly 5 to 7 inches long.
- Of the female—absence is preferred but occasionally reaches 3 in. in length.

**SIZE OF TURKEYS REQUIRED TO MEET MARKET DEMANDS**

Although the weights given previously are desirable for those varieties mentioned it is seldom that large birds are seen on the local market. The demand is for well fleshed birds, not over 12 months of age,
To provide financial assistance to the resourceful men and women who were pioneering the development of Western Australia, the Agricultural Bank was created by Act of Parliament in the year 1895. With its help, vast areas of the State yielded their wealth in wheat, wool, meat and timber, to our growing population.

In 1945 the Bank was given a far wider charter and since 1st October of that year has provided full banking facilities in more than sixty Branches and Agencies throughout the State. Now with a background of fifty years' service to our agricultural pioneers, the "R. & I." Bank has completed a further ten years as a Trading Bank during which it has played its full part in making available finance for agriculture, industry, housing and personal requirements.

The Rural & Industries Bank of Western Australia

Head Office: 555-573 Hay Street, Perth
Branches at 4-6 Forrest Place, Perth; 92 William Street, Perth; 14 Market Street, Fremantle, Main Street, Osborne Park; and in leading country towns throughout W.A.

Please mention the "Journal of Agriculture, W.A.," when writing to advertisers
EC (JOE) HANCOCK TRACTOR WORKS

159 LORD STREET, PERTH —— B 2556

W.A. Distributors of:

“Deutz” (Air and Water Cooled) Diesel Tractors
“Hanomag” Outstanding Diesel Tractors
“H.S.C.S.” (Steel Horse) Crude Oil Tractors

AVAILABLE FROM STOCK—LOW TERMS—TRADE-INS ACCEPTABLE—SPECIAL DISCOUNT FOR CASH

TAKE ADVANTAGE OF THESE SPECIAL ATTRACTIVE OFFERS

TRACTOR TUBES—NEW

12.75, 13.50, 14 x 28 ........................................... Only £4 each
12.75 x 24 ................................................................. Only £3/10/- each

IMPLEMENT RIMS

18” at £2/10/- 28” with Centre £8/10/- each.

FORDSON BELT PULLEYS ............................................. £7/10/- new

FORDSON FRONT WHEEL BEARINGS

2 inner and 2 outer (4) ............................................. Only £6/10/- complete

TYRE CHAINS
Heavy Duty Spring Loaded Centres ................................ Only £15 per set

CATERPILLAR “22” and “15” Pins and Bushes ................................ £40 per set

HOLT 2-Ton Pins and Bushes ........................................ £35 per set

CATERPILLAR RD4 Pins and Bushes ................................ £50 per set complete

GOOD RECONDITIONED TRACTORS FOR SALE

1—INTERNATIONAL T20 CRAWLER
1—CATERPILLAR “22” CRAWLER
1—HOLT CATERPILLAR “2-TON” CRAWLER
1—K.L. BULLDOG with P.T.O., Lights and Six Speed Gear Range
1—FIELD MARSHAL
1—ROTARY HOE, 4ft. 6in. English Fordson Fitting

Please mention the “Journal of Agriculture, W.A.,” when writing to advertisers

Journal of agriculture Vol. 4 1955
Fig. 4—Suggested design for sheds and yards for breeding pens. The double yards prevent the males fighting through the wire fences and assist in keeping the yards in a sanitary condition.

All yard fences 6 ft. wire netting.
the toms weighing 18 to 24 lb. and the hens 10 to 12 lb. This type of medium-sized bird can be produced by any good strain of the Bronze variety already in Western Australia. A turkey breeder in the metropolitan area reports that he has no difficulty in obtaining young turkey toms of 18 to 20 lb. weight at eight to nine months of age and that the hens are ready for market about six weeks earlier at an average weight of 10 to 11 lb.

An article by Mr. A. A. McArdle in the "Journal of Agriculture," South Australia, April, 1949, reports the success of a commercial turkey raising undertaking in that State. The owner originally commenced with Bronzewing turkeys and by selection over a period of years has evolved a hardy, smaller bird carrying ample breast meat. The toms weigh 22 to 23 lb. at about seven months of age when marketed and the hens weigh approximately 14 lb. at the same age.

Table 2 shows the desirable weights to suit local demands at 28 to 30 weeks of age of the varieties of turkeys already mentioned:

<table>
<thead>
<tr>
<th>Variety</th>
<th>Female (lb)</th>
<th>Male (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad-breasted bronze</td>
<td>15</td>
<td>24</td>
</tr>
<tr>
<td>Standard-bred bronze</td>
<td>13</td>
<td>20</td>
</tr>
<tr>
<td>White Holland</td>
<td>12</td>
<td>29</td>
</tr>
<tr>
<td>Beltsville Small-type White</td>
<td>10</td>
<td>16</td>
</tr>
</tbody>
</table>

When the turkey breeder is selecting his breeding birds he should keep in mind that the consumer requires a medium sized turkey with a well-proportioned body and carrying plenty of meat on the breast and thighs. In a well finished turkey of about 28 weeks of age the edible meat on the breast and thighs amounts to about 65 per cent. of the total edible meat. The large framed bird which is unfattened and carrying little meat on the breast and thighs is not attractive to the consumer and consequently is priced much lower in the markets.

**SELECTION OF BREEDERS**

The type of bird required by the consumer has already been described but the breeding stock in addition to having good type bodies that are well fleshed must also possess the following characteristics:—Rapid growth and good egg production. These characteristics are inherited, and even in cases where neither time nor facilities are available to carry out a breeding programme it is possible to improve the quality of the progeny produced from year to year by basing the selection of the breeders on these three requirements.

1. **Body Type and Fleshing.**—The best time to select the future breeding stock is when they are 28 weeks of age and when the majority are ready for marketing. At that time they must be up to the weights given in Table 2 and as the width of the breast appears to be the most important factor determining the amount of breast meat it would be advisable for the grower in Western Australia who breeds standard-bred bronze turkeys, to endeavour to obtain the weight given in Table 2 for the Broad-breasted Bronze. The young toms and hens selected should have relatively broad and deep bodies with a good length of keel running parallel with the back and relatively short shanks. The desirable measurements of a young tom, 28 weeks of age and weighing about 24 lb. should be approximately:—Maximum shank length 8.2in. minimum keel length 7.8in. and maximum body depth 9.6in. The corresponding figures for a hen of the same age and weighing 15 lb., are 6.5in., 6.3in. and 7.3in. respectively. The figures given should be used as a guide to desirable conformation but in addition the
bird must be well balanced. That is, the legs should be strong, not knock-kneed or bowed, and placed squarely under the body and not so far back that the body tilts forward.

The width and fullness of the breast flesh and the leg fleshing can be determined by handling. The breast should be broad and full along the entire length of the breastbone. The thigh should be plump, well meated towards the hocks and of sufficient size to produce a well-balanced carcass.

Birds that have any serious defect such as pendulous crop, spraddle or crooked legs, deformed back, crooked keels, deformed beaks and crooked toes should be rejected.

2. Rapid Growth.—To make a success of turkey raising it is necessary to market the birds as early as possible, therefore, birds and family groups which show a reasonably fast rate of growth should be marked as future breeders. A practical method of obtaining some information on this point is to examine poults each year at about 16 weeks of age. The best developed males and females should be marked. Many more than will eventually be required should be selected because it is most probable that at least 40 per cent. will not qualify as breeders when they are examined just prior to marketing. If the rapid rate of growth shown at 16 weeks has not been maintained the bird should be rejected as a breeder and sent to market.
3. Egg Production.—No attempt is made in this article to describe pedigreed breeding work as it is relatively expensive and time consuming, and many turkey raisers do not keep sufficient turkeys to justify the time and expense involved. However, where pen mating is practiced it is possible to keep some records which will assist in the selection of good layers. The hatching period for turkeys in Western Australia is the months of August, September and October. It is difficult to obtain sufficient eggs earlier in the season, and poults do not grow quickly if hatched after the end of October. The turkey raiser should therefore be most interested in the number of eggs the hens lay, in the period June 1 to October 31. Pen records can be kept showing when the hens commenced to lay, the number of eggs laid each day and the number of times any hen became broody.

By marking the poults from each pen, comparing the pen records, and by mating them in family groups the following breeding season, some improvement in egg production may be achieved.

The average egg production, during the period mentioned, of a young hen in her first laying season would be 40 to 50 eggs. The progeny of a hen which goes broody frequently should not be used in future breeding operations, because broodiness is an inherited characteristic and each broody period reduces egg production.

It is not economical to use broody turkey hens to incubate eggs. The object of the hens in the breeding pen is to produce as many fertile eggs as possible during the short hatching season.

**BREEDING PRACTICE**

**Age of Breeding Stock.—**Reference has been made to the marking of young turkeys for future breeding stock. For the production of fertile eggs and vigorous poults, well-grown young toms and hens are quite satisfactory. Poultts hatched from young turkey hens grow as fast as those from older hens, but it must be realised that the young breeding hens are untested for livability, hatchability and egg production.

Turkey hens usually lay best in their first laying year and as the eggs are produced exclusively to secure poults the higher egg production of young hens results in lower cost per poult hatched. Provided broodiness is discouraged by placing the broodies, as soon as they go broody, in coops with slatted floors, the expected egg production from young hens would be approximately 50 eggs per hen during the hatching season (June-October inclusive).

During the second laying period one would expect 35 to 40 eggs and in her third laying season approximately 30 eggs. Good fertility is usual when well-matured males of about 8½ months of age are mated to selected 8 months old females. If second season hens are used as breeders it is advisable to mate them with young toms as older males are frequently sterile.

Breeding from young stock has the advantage that the majority of the breeding stock can be marketed immediately after the end of the hatching season.

**Pen and Flock Matings.—**With either type of mating the objective is to secure good fertility as every infertile egg means a loss of money. In pen matings it is usual to use one young tom to 12 hens but better fertility can be obtained by using two toms, that is, use each one every other day. When changing the males the one in the pen should be removed before the second male is introduced. It is advisable to put the toms with the hens about one month before the hens commence laying, as matings appear to be less frequent after laying has commenced. To prevent injury to the backs of females the toe nails of the toms should be clipped every three or four weeks during the breeding season. Although fertile eggs will be secured a day or two after matings have taken place, eggs should not be saved for incubation until 7 days have elapsed. Good fertility will be maintained for two weeks after the toms have been removed and some fertile eggs may be produced for as long as 6 to 8 weeks but fertility decreases rapidly after 14 days. Flock mating is successful when the birds have plenty of range. If they are restricted, the toms spend too much time fighting each other. In a large flock of Bronze turkeys, one tom to 12 to 15 hens can be used provided the males are active birds and not too large and clumsy. At the commencement of the breeding season a reserve of males.
EXPERTS CAN HELP YOU

- The pages of "The Chronicle," South Australia's leading agricultural weekly, are packed with news and advice on dairying, poultry, animal health, farm machinery, orchard and vineyard, answers to farmers' questions and the home garden. Better farming is our aim.

- Features are conducted by experts with University or Agricultural College degrees.

- As farmers in the two States share many similar conditions, "The Chronicle" should be equally valuable to you. Hundreds of former South Australians already know its worth.

For the rest of the family there are special features every week: a section for women, with readers' recipes, mothercraft advice, household hints and letters from readers; pages and pages of pictures; fiction and magazine articles; a pen friends' page, a children's page and replies to medical, legal and general queries.

SEND FOR "THE CHRONICLE" AND SEE!

Let us have your name and address and we will forward you a complimentary copy and would welcome your comments.

"THE CHRONICLE,"
BOX 392, G.P.O.,
ADELAIDE.

TYPICAL W.A. COMMENTS:

Mr. J. Forrester,
KOJONUP, W.A.
We follow your agricultural information with great interest, as methods are of a very practicable nature which adapt themselves to this country also.

Mr. J. D. Johnston,
BOKAL, W.A.
We have been receiving "The Chronicle" for over 30 years and find it a boon to all farmers.
**RIGITRUSS HAY BARNS**

- Immediate Delivery

**AUSTRALIAN G.C. IRON COVERING!!**

**COMPARE THESE PRICES AND NOTE LARGE DIAMETER TUBULAR COLUMNS TO STAND UP TO WIND PRESSURES OF 80 M.P.H.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>36 x 20 x 11ft. 6 in., on 3in. diameter columns</td>
<td>40 Tons Hay</td>
<td>91 8 0</td>
<td>22 7 10</td>
<td>10 13 4</td>
<td>48 3 1</td>
<td>£177 16 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48 x 20 x 13ft. 6 in., on 3½in. diameter columns</td>
<td>64 Tons Hay</td>
<td>130 0 0</td>
<td>29 2 7</td>
<td>14 5 7</td>
<td>61 18 3</td>
<td>£241 16 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36 x 30 x 13ft. 6 in., on 4½in. diameter columns</td>
<td>72 Tons Hay</td>
<td>156 12 0</td>
<td>24 13 0</td>
<td>11 14 1</td>
<td>73 4 0</td>
<td>£271 7 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Manufactured by

MILLS & HASSALL ENGINEERING CO. - OSBORNE PARK

Distributed by

Wesfarmers, Dalgetys, Elders, Goldsbroughs, Sandovers

Please mention the "Journal of Agriculture, W.A.," when writing to advertisers.
should be kept as a proportion of the breeding males will be sterile or will not mate for one cause or another. Testing the eggs for fertility after they have been incubated for 9 days, should give an indication of possible fertility, and any male that is likely to produce a low percentage of fertile eggs should be removed and replaced by another.

Fertility is likely to decline in the latter half of the breeding season and a second set of toms should replace the first if good fertility is required late in the season. As with pen mating, the double set of toms could be used alternatively every three days throughout the breeding season. This arrangement should give good fertility for the entire season.

Fertility varies considerably under different conditions and throughout the season, but should not be lower than 83 per cent. Ninety per cent. or better should be the required standard. The hatching season in Western Australia is from the middle of August to the end of October, and it is not uncommon for fertility to be 90 per cent. during this period.

Yards and Houses for the Breeders.—
When the system of breeding consists of mating one male with 12 hens, and several such matings are required, it is necessary
Care of Hatching Eggs.—Improper care of fertile eggs lowers their hatchability and increases the cost of each poult. Therefore, the selection and care of the eggs to be incubated is important. The weight of individual turkey eggs show a very wide variation, some hens lay eggs which average only 2½ oz. while others average 3½ oz. A desirable range for hatching eggs is a minimum weight of 2½ oz. per egg and a maximum of 3½ oz. In shape, turkey eggs are similar to hen eggs except that the small end is more pointed and as egg shape and weight are inherited it is advisable to select for incubation those eggs which conform to the normal.

Reject all eggs the shells of which are thin or rough and those which have a chalky white porous appearance because, as a rule, they give poor hatchability.

Hatching eggs should be collected in wire baskets three or four times daily and immediately deposited in a cool place. Turkey eggs deteriorate rapidly in hatchability after 14 days holding if the temperature is too high or too low. Temperatures below 35° F. and above 65° F. appear to be most injurious if the eggs are held for more than 10 days before being placed in the incubator. The ideal holding conditions are a temperature of 55° F. with a relative humidity of about 80 per cent. Storing eggs in the well known “Coolgardie Cooler” will be most satisfactory.

Eggs can be stored on their sides or with the small end down and should be turned daily during the holding period.

NATURAL AND ARTIFICIAL INCUBATION

Natural Incubation.—The natural incubation of turkey eggs by using a broody hen or turkey hen is not sound practice, because the broody is out of egg production during the brooding period. However, a short description of the method of setting a broody may be useful. It must be stressed that artificial incubation should be practised wherever possible as it is not always possible to secure broodies at the proper times, and broodies may be carriers of disease to the young poults.

The incubation period for turkey eggs is 28 days. It is advisable therefore to use hens of the heavier breeds which have been broody for at least two days to ensure them sitting for the full period. A nest should be made in a secluded spot by scooping out the soil to make a saucer-shaped depression. A small amount of nesting material is then placed in the hollow. Cover the nest with a suitable box or coop. A nest for a turkey hen should be much larger than one for a fowl and should be about 2ft. square. A broody hen of one of the heavy breeds will cover 8 to 10 turkey eggs but a turkey hen will take 15 to 18 eggs. Broodies should be freed from lice by dusting them with sodium fluoride at the time they are set otherwise the lice may irritate the broody to such an extent that she will desert the nest. If possible two hens or turkey hens should be set at the one time and when all the poults have hatched out they can be given to one of the two.
broodies and the other can be returned to the laying pen. A good sized hen will easily mother 12 poults and a turkey hen can be given 20 to 24.

Water and grain should be always available to the setting hen so that she may feed whenever she leaves the nest.

When the eggs begin to "pip" the front of the nest should be closed to prevent the broody leaving the nest before the hatch is complete. If the bird is quiet the empty shells can be removed from the nest during the hatch. Those eggs not hatched by the end of the 29th day should be discarded.

**Artificial Incubation.**—Hatching poults in incubators has become the normal method. Among the advantages obtained over natural hatching are:

1. The poults can be hatched at the correct time of the year.
2. There is less labour involved in relation to the number of poults hatched.
3. Less danger of the poults contracting disease.
4. The hatching season can be reduced to a shorter period, in which more poults can be produced.

Many types of incubators have been successful in hatching poults and generally the operating conditions for turkey eggs are the same as for hen eggs. In all types of incubators the temperatures suggested by the manufacturer should be closely followed. As a general guide the temperatures in a small incubator should be 100.5° F. for the first week, 101.5° F. for the second week, 102.5° F. for the third week, and 103° F. for the fourth week when the bulb of the thermometer is level with the top of the turkey eggs. With the majority of cabinet-type, forced-draft, incubators the temperature is maintained throughout the 28 days at 99.5° F.

When a separate hatching compartment is used the eggs are transferred on the 24th day and the suggested temperatures vary from 97° F. to 99.5° F. depending on the make of the incubator.

Correct humidity is most important for the successful hatching of turkey eggs. Although the eggs remain in the incubator a week longer than hen eggs they lose slightly less moisture and the poult when hatched weighs about 66 per cent. of the original weight of the egg. To provide optimum conditions for the growth of the embryo the eggs must not lose too much moisture and best results in Western Australia are obtained when the relative humidity is about 60 per cent. during the first 24 days and about 69 per cent. during the last four days. The reader will note this is not in entire agreement with the figures given in Table 3. This is because the figures given above are practical recommendations based on the results of experiments and the table was published by the Smith Incubator Company as a general guide for the incubation of turkey eggs.

The relative humidity should be checked by the wet and dry bulb thermometer readings, but if these facilities are not available a practical guide to humidity is the relative size of the air cell in the egg at different times during the hatch. The air cell being too large at any stage will denote that more moisture is required in the incubator and the reverse will indicate that excess moisture is being maintained. Should the relative humidity of the atmosphere be low during the last four days of a hatch, it may be necessary to lay damp cloths on the top of the hatching trays to obtain the optimum conditions for hatching.

Provided the manufacturers' directions are followed practically all incubators provide adequate ventilation. Any incubator which has given good hatches with hen eggs should give sufficient ventilation for the hatching of turkey eggs.

Experiments have shown that turkey eggs require more turning than hen eggs, in fact in a test, optimum results were obtained when the eggs were turned every three hours day and night for the first 21 days. In practice, turning the eggs five times daily will give good results. The first turning being done early in the morning and the last late at night so that the eggs do not remain unturned for more than about eight hours. Turning after the 21st day does not appear necessary and they must not be turned after the 24th day.

It is usual to test the eggs on the 10th day and remove the infertiles and dead germs. A second test on the 21st day will

721

Journal of agriculture Vol. 4 1955
reveal eggs containing embryos which have died after the 10th day. These should be removed and the remaining eggs transferred to the hatching compartment of the incubator.

It may be necessary when the hatch is partly completed to remove some of the pouls and the empty shells to make room for the other pouls which are hatching out. Small type incubators usually have a removable strip at the front of the egg tray to allow the pouls to drop into the nursery tray but this strip should not be removed until about one half of the pouls have hatched. The nursery tray should be covered with rough surfaced material as pouls may injure themselves on a smooth surface.

An incubation chart for turkeys published in "Hatchery Management," by R. C. Hartmen and G. S. Vickers gives concise information on the troubles which occur in incubating turkey eggs and this information is given in Table 3.

**BROODING METHODS**

**Natural Brooding.**—If a relatively small number of pouls are raised each year it is possible to use hens for brooding purposes. This method has certain advantages as the hen will look after the pouls, shelter them from sudden rain storms and in most cases, protect them from attacks by pests. As a rule, the pouls have more room than those raised under a brooder and do not develop the vices of feather

<table>
<thead>
<tr>
<th>Type of Trouble</th>
<th>Probable Causes</th>
<th>Indicated Remedies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eggs clear after eight to 10 days of incubation</td>
<td>(1) Eggs held too long</td>
<td>(1) Do not hold eggs for more than 10 days before setting.</td>
</tr>
<tr>
<td></td>
<td>(2) Inferior toms</td>
<td>(2) Use vigorous young toms, one for each 12 hens.</td>
</tr>
<tr>
<td></td>
<td>(3) Toms too heavy</td>
<td>(3) Toms should weigh not more than twice as much as hens.</td>
</tr>
<tr>
<td>Eggs showing blood traces, or very small embryo when egg is opened</td>
<td>(1) High incubator temperature</td>
<td>(1) Watch incubator temperature.</td>
</tr>
<tr>
<td></td>
<td>(2) Chilled eggs</td>
<td>(2) Keep eggs above freezing.</td>
</tr>
<tr>
<td></td>
<td>(3) Breeding flock out of condition</td>
<td>(3) Proper care and feeding of breeding stock.</td>
</tr>
<tr>
<td>Dead Germs. Embryos well developed but dead before pipping shell</td>
<td>(1) Extremes of temperature: either too low or too high</td>
<td>(1) Keep incubator temperature adjusted, avoid overheating.</td>
</tr>
<tr>
<td></td>
<td>(2) Lack of ventilation</td>
<td>(2) Provide fresh air in building, and through incubator.</td>
</tr>
<tr>
<td></td>
<td>(3) Close inbreeding</td>
<td>(3) Avoid Brother-Sister matings.</td>
</tr>
<tr>
<td>Too many Help-Outs. Pouls well formed but not getting out of shell</td>
<td>(1) Low humidity at hatching time</td>
<td>(1) Increase humidity to 88° on wet bulb when eggs pip.</td>
</tr>
<tr>
<td></td>
<td>(2) Temperature too high in hatching trays</td>
<td>(2) Adjust ventilation so heaters are on very little while eggs are pipping.</td>
</tr>
<tr>
<td>Sticky or Drowned Pouls. Eggs pipped, but pouls smeared with albumen or drowned in egg liquids</td>
<td>(1) Eggs not properly dried down</td>
<td>(1) Keep wet bulb temperature at not over 82° during first 24 days.</td>
</tr>
<tr>
<td></td>
<td>(2) Average incubation temperatures too low</td>
<td>(2) Hold temperatures at 99° on master thermometer.</td>
</tr>
<tr>
<td>Hatching too early</td>
<td>(1) Average temperature too high</td>
<td>(1) Hold at 99° throughout hatch.</td>
</tr>
<tr>
<td>Delayed Hatching</td>
<td>(1) Average temperature too low</td>
<td>(1) Watch operating temperatures.</td>
</tr>
<tr>
<td>Rough Navels. Blood on hatching trays</td>
<td>(1) Temperature too high during fourth week</td>
<td>(1) Avoid overheating from any cause.</td>
</tr>
<tr>
<td>Crippled and spraddled legs</td>
<td>(1) Extremes of either high or low temperature, especially during first week</td>
<td>(1) Operate at 99° temperature and 82° wet bulb during first 24 days and 99° temperature and 88° wet bulb during last 4 days.</td>
</tr>
</tbody>
</table>
When the heat's on...

**REX**

**PUMPS**

never let you down

When you're out fighting fires . . . that's when a Rex pump's matchless reliability really pays off. You just start the motor and forget about Rex. It primes itself and goes on pumping till there's no water left in the hole or tank. There's a Rex model for every firefighting job that needs a pump 4,000 to 45,000 g.p.h. capacity. Every Rex pump has these advantages:

**SIMPLICITY.** Rex pumps have only six simple, rugged basic parts all easily accessible. Rex just can't break down.

**WILL HANDLE SOLIDS.** Anything passing the strainer will go through the pump.

**ALWAYS WORKS LIKE NEW.** Simply adjust the exclusive patented air peeler to keep up efficiency.

**REX RANGE INCLUDES:**

<table>
<thead>
<tr>
<th>Model</th>
<th>g.p.h.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4MP</td>
<td>4,900</td>
</tr>
<tr>
<td>4SP</td>
<td>6,000</td>
</tr>
<tr>
<td>10MP</td>
<td>10,000</td>
</tr>
<tr>
<td>15MP</td>
<td>18,500</td>
</tr>
<tr>
<td>25MP</td>
<td>23,500</td>
</tr>
<tr>
<td>35MP</td>
<td>35,000</td>
</tr>
<tr>
<td>45MP</td>
<td>45,000</td>
</tr>
</tbody>
</table>

Top Left: Rex 4MP, pumps 4,900 g.p.h. Fully portable with built-in carrying handle. Price (complete as firefighter) only £95.

Top Right: Rex 25MP, pumps 23,500 g.p.h. Portable on rubber tyred wheels as shown.

Below Right: Rex 10MP, pumps 10,000 g.p.h. Portable medium capacity unit, ideal for firefighting. Price only £175.

Please mention the "Journal of Agriculture, W.A.," when writing to advertisers.
Breeders . . . AUSTRALORP, W/LEGHORN and 1st CROSS

Wish their many customers Happy Seasonal Greetings and A Prosperous New Year, 1956

HATCHERY:
Cnr. EPSOM AND SMITH AVENUES, REDCLIFFE PARK - - - - ML 543

more growers are changing to MALATHION

More and more growers are turning to MALATHION as an all-purpose insecticide against a host of insects on fruit, vegetable and ornamental crops:

Described as “one of the safest insecticides to handle,” MALATHION is now made in England and is available to growers and agriculturalists from Commonwealth sources, for solving many insect problems. MALATHION kills flies too—even those resistant to the chlorinated hydrocarbons. MALATHION TECHNICAL is supplied to insecticide manufacturers for making emulsifiable liquids, wettable powders and dust formulations for sale to growers, horticulturalists, sanitation authorities, etc. Consult your usual insecticide supplier about MALATHION.

*O, O—dimethyl dithiophosphate of diethyl mercaptosuccinate

CYANAMID PRODUCTS LTD
AGRICULTURAL CHEMICALS DEPARTMENT
BUSH HOUSE . ALDWYCH . LONDON . W.C.2

Please mention the “Journal of Agriculture, W.A.,” when writing to advertisers
and toe picking. Because they are raised under natural conditions and not in a heated brooder room the poults appear to be hardy and are more resistant to disease.

A hen which has been sitting on turkey eggs and has hatched out a number of poults can be given extra ones to make up her total to 12.

A convenient way to house the hen and her poults for the first seven to ten days is by means of a coop which is approximately 3ft. x 3ft. in area and has a slatted front. A small run is attached to the front of the coop to which the poults have access between the slats of the coop. The hen remains in the coop all the time. The coop and run should be moved to fresh grass each day. Young poults should not be allowed out on to wet grass until they are at least two weeks of age. Transfer the hen and poults to a larger run when the poults are about three weeks old. A shed equipped with perches should be provided as some poults will commence to perch as early as three weeks of age.

Alternative accommodation to the coop method is a yard enclosed with small mesh netting in which is a shed capable of holding the hen and poults confined for the first three or four days. If a large grassed yard is available poults can remain in it until they are two and one half months of age before going on range.

A point which must be stressed is that turkey poults cannot be raised successfully with chickens, and poults should not be raised on land which has been occupied by fowls because the cecal worms which inhabit the fowl’s ceca produce eggs which contain the parasites which cause “blackhead.”

**Artificial Brooding.**—Artificial brooding normally follows the hatching of turkey eggs in an incubator, as it is unlikely that broody hens would be available to brood a large number of poults. Artificial brooding allows a large number of poults to be started at one time which results in a saving of time and labour and a more even flock at marketing time.

Brooder houses and brooders similar to those used in chicken brooding are quite satisfactory, but poults are more difficult to brood than chickens. Brooder management is similar to that used for chickens but with adjustments made to suit poults. It is usual to allow 10 to 12 sq. inches of floor space per poult under the brooder and one sq. foot of brooder house floor space. Poults chill and die more easily than chickens so it is necessary to maintain adequate heat under the brooder. The best test of temperature is the behaviour of the poults. If the poults are comfortable they will be active and contented during the day time and at night will be found sleeping around the edge of the brooder. Poults are more subject to fright and crowding than chickens and for this reason it is more satisfactory to brood in small units of not over 100.

Poults will often take fright at any change in equipment and it is advisable to round off each corner of the brooder house with boards or other material to prevent the poults piling up in the corners.
The floor of the brooder house should be covered with dry sawdust to a depth of 4in. which should be stirred every day to keep it in a dry condition, and more sawdust added when necessary.

Wire or slatted wood platforms should be placed under the brooder and under all watering and feeding equipment. Poults require heat for approximately six weeks, the length of time depending on the time of the year and the weather conditions. Early in the brooding season the poults will require heat for a longer period than later in the season when warm conditions prevail.

Perches should be placed in the brooder house when the poults are about two weeks of age and by the time the poults leave the brooder house they should all be perching.

When the poults are ready to leave the brooder house they should be transferred to large grassed yards containing adequate shelter and equipped with perches, feeding and drinking utensils. If the yards are not laid down to permanent pastures it will be necessary to grow a green crop in preparation for the poults.

MANAGEMENT DURING THE REARING PERIOD

There are three distinct systems of rearing turkeys:

(1) Confinement rearing.

(2) Limited range or semi-confinement.

(3) Free range.

(1) Confinement Rearing. — Requires fairly costly equipment but gives better control of soil-borne diseases. It somewhat resembles the intensive system of poultry farming and has similar high capital costs. The equipment consists of a roosting shelter with a rearing platform attached. The platform is exposed to the weather and the turkeys can get into the sunlight. The floors of the shed and platform are built two to three feet above ground level and are made of wooden slats or heavy gauge wire netting to allow droppings to fall through and to give free circulation of air. Six to eight square feet of floor space per bird is required. This includes the roosting shelter and rearing platform. Three sides of the roosting portion are of solid build and feeders and watering equipment are attached to the walls so that they can be serviced from the outside. The sides and roof of the sun platform are ordinary 2in. mesh poultry netting.

Feather picking is usually prevalent with this system of rearing and has to be controlled by special devices. The upper beak may be “tipped,” that is, about 4in. of the tip of the beak is cut off with a knife. A pig ring may be inserted between the upper and lower beaks and into, but not through, the nostrils; or a patented “turkey bit” that holds the beak slightly open may be inserted. The confinement method of rearing should be considered where it is desired to rear a large number of turkeys on a small area of land.

(2) Limited Range.—This type involves the use of roosting shelters in fenced yards which are large enough to provide most of the green feed. Many adaptations are possible within this system. A portion of a large paddock containing growing green feed can be enclosed by a portable fence; roosting shelters built on skids so they can be easily moved; and feeding and watering equipment made in such a manner that it can be moved every four or five days. An acre of land is required for
200 poults for approximately three to four weeks when the birds should be moved to an adjoining area of the paddock. If the vegetation recovers, the birds can return to the same section of the paddock for another period later in the season, but at least a month should elapse before their return. The watering and feeding equipment should be moved every few days to avoid the vegetation being destroyed and to prevent soil contamination.

Another adaptation of the limited range system of rearing is to build a permanent roosting shed, with a slatted or wire floor and attach to it two, three or four permanently fenced yards. The yards are all laid down to permanent pasture, or sown with green crops and are used in rotation.

When the rearing season is finished the shed and yards should remain empty until they are required the following season. The sheds should be thoroughly cleaned and sprayed, and if the yards are not laid down to permanent pasture they should be ploughed and cropped.

By careful management of the permanent yard system it is possible to rear 400 turkeys on one acre of land each year and maintain the pasture in good condition for the flocks. One shed with roosting facilities for 100 poults should be built on each quarter of an acre of land. Table 4 shows the advantages of the multi-yard system with regard to total yard space per bird:

<table>
<thead>
<tr>
<th>No. of Yards</th>
<th>Period in each Yard.</th>
<th>Yard Space per Bird per Yard.</th>
<th>Total Yard Space per Bird per 4-week Period.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4 weeks</td>
<td>54.5 sq. ft.</td>
<td>54.5 sq. ft.</td>
</tr>
<tr>
<td>3</td>
<td>2 weeks</td>
<td>36.3 sq. ft.</td>
<td>72.6 sq. ft.</td>
</tr>
<tr>
<td>4</td>
<td>9-10 days</td>
<td>27.2 sq. ft.</td>
<td>81.6 sq. ft.</td>
</tr>
</tbody>
</table>

In each case the poults return to the original yard after it has been rested for four weeks.

(3) Free Range.—In the wheat growing areas many poults are reared on open range but some restriction is usually provided to protect the birds and keep them from straying. Roosts are provided near the farm buildings and may be protected by a surrounding fence of poultry netting. If the feeding and watering equipment is placed in the enclosure it will induce the birds to assemble for the evening feed and they can be shut in the enclosure for the night. When a flock of poults roam over a large area they find a proportion of their feed and limited feeding can be practised for part of the rearing period. The feed should be given to the birds in the evening for the reason stated previously. Allowing the birds to roam at will without feeding and protection is not a satisfactory method of rearing except under the most unusual conditions.

Poults can be reared successfully on free range by the use of a small-unit method. A simple shed is provided, sufficient in size to protect 100 poults until they are three and one-half months old. Roosts are then built near the shed and a portable netting fence erected to enclose the shed, roosts, and feeding equipment. If feed and water are always available to the birds the units can be placed as close together as 250 yards depending on the amount of green feed growing on the land. The birds are shut up at night but can roam freely during the day.

**SOME POINTS OF GENERAL MANAGEMENT**

Shade is necessary for turkeys of all ages during hot weather. Where sheds are in use they will give sufficient shade provided they are large enough and can be opened up to allow a good circulation of air. Birds on limited or free range can obtain ideal shade from scattered trees and scrub. A dense area of trees is not desirable as the sun cannot dry out and disinfect the soil, but a scarcity of shade causes the birds to crowd into a small area which is conducive to the development of disease and vicious habits such as feather picking.

Clipping the wings to prevent flying is undesirable but may be necessary to keep the birds confined to their yards. Any tom which is to be used for breeding purposes should not be clipped but the breeding hens can be clipped. The usual practice is to clip about one-half of the outer primary feathers of one wing but an alternative method is to clip the inner seven
Fig. 11.—“A” and “B” are well-fleshed carcasses which would be graded “prime.”
“C” and “D” are poorly fleshed and below normal.
[S. J. Marsden, Bureau of Animal Industry, U.S. Department of Agriculture, 1940.]

Pig on the right is a well-fleshed carcass which would be graded “prime.”
“C” and “D” are poorly fleshed and below normal.
[S. J. Marsden, Bureau of Animal Industry, U.S. Department of Agriculture, 1940.]

The sex of a poult can be distinguished with reasonable accuracy at any age from day-old but as the young males do not interfere, to any extent, with the growing females there appears to be little advantage in separating the sexes during the rearing period. Day-old poults can be sexed by the examination of the portion of the sex organs which can be seen in the vent and the same technique is used to sex older poults. As mentioned under the heading “Selection of Breeders” it is desirable to examine the poults for rapid growth at approximately 16 weeks of age when the sex can be determined by the colour of the adult breast feathers which will be partly grown at that age. Females of the Bronze variety will have the breast feathers tipped with white, but those of the males will have dark tips. The body of the male appears to be more angular than the female and has the characteristic male shape. The hocks of the males are broad and flattened and those of the female are narrow and rounded. If the beard is present on the female it is usually smaller, shorter and finer than on the male.

Driving turkeys from place to place on the farm is the best method of transportation provided the birds have been wing clipped to prevent them flying. It involves less labour and is easier on the birds than crating and carting.

Feeding and Watering Equipment.—Poor results will be obtained if feeding and watering equipment are not correct. Pouls do not take readily to feed and water and it is necessary to teach them to eat and drink. It is good practice to dip the beak of each poult in water and then in mash as they are put under the brooder.

The first small feed troughs and water vessels should be placed close to and under the edge of the brooder.

These feeders can be open troughs, 2in. wide with 1in. high sides and should be numerous enough to provide 2in lineal feeding space per poult. After the first week larger feeders can be used and by the time the poults are four weeks of age the dry mash trough as used for adult hens will provide satisfactory feeding arrangements.

To maintain the area used for feeding and watering in a sanitary condition it is most desirable to place all the equipment on wire covered platforms, and move to a new position at intervals of a few days.

Feeding Requirements

The feeding of turkeys closely follows the principles recommended for the feeding of chickens, growing stock, and laying hens. Pouls show greater relative gains in weight than chickens during the growing period which must be catered for by larger amounts of some of the nutrients in their diet. The objects in turkey nutrition are to produce marketable turkey meat as cheaply as possible or to produce the greatest number of hatchable eggs from the breeding stock. Referring to the first of these objectives the question immediately arises “What is the rate of growth and the feed requirements of poults?” Table 5, which was prepared by L. E. Cline, University of Nevada, shows the average live weights of individual birds at different ages, the amount of feed consumed and the approximate amounts of feed required to produce one pound of gain in weight. The figures are based on
There is NO SUBSTITUTE for genuine

APEX BLOOD & BONE

Registered Analysis:—

Nitrogen .................. 6%
Phosphoric Acid .......... 15%

Price—Per Ton ........... £41 10 0
Per 160 lb. Bag ........... £2 19 6

W.A. PRODUCE

113 Oxford Street, 6 Newcastle Road,
LEEDERVILLE MIDLAND JUNCTION
W1680 :: W 3354 UJ 215

Please mention the "Journal of Agriculture, W.A.," when writing to advertisers.
FINE stuff this 'PHENOVIS' . . . yes "fine" is the right word. No ready-to-use worm drench on sale in Australia contains phenothiazine more finely ground than 'PHENOVIS.' For the treatment of gastro-intestinal worms in livestock, there is nothing as good as 'PHENOVIS,' containing extremely fine ground phenothiazine particles.

ORDER

'PHENOVIS'
LIQUID or POWDER
from your supplier

IMPERIAL CHEMICAL INDUSTRIES
OF AUSTRALIA AND NEW ZEALAND LIMITED

Please mention the "Journal of Agriculture, W.A.," when writing to advertisers
experiments in which the poult received an adequate ration of starting mash, growing mash, mixed grains and green feed. The table shows the uniform gains in weight and food consumption. In actual practice there will be variations but the average for a given period should approximate the figures given.

Points of special interest in the table are:
(a) A six weeks old turkey weighs 2.45 lb. and has consumed 4.2 lb. of feed.
(b) A 12 weeks old turkey weighs 7.4 lb. and has consumed 18.3 lb. of feed.

<table>
<thead>
<tr>
<th>Age in Weeks</th>
<th>Average weight of toms and hens combined.</th>
<th>Gain in weight Pounds for Period.</th>
<th>Feed consumed each week.</th>
<th>Pounds total cumulative feed required.</th>
<th>Successive weekly or monthly feed required per pound of gain.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day old</td>
<td>1.12</td>
<td></td>
<td>1.1</td>
<td>1.6</td>
<td>1.6*</td>
</tr>
<tr>
<td>1st</td>
<td>1.32</td>
<td>1.2</td>
<td>1.1</td>
<td>1.6</td>
<td>1.5</td>
</tr>
<tr>
<td>2nd</td>
<td>1.58</td>
<td>1.25</td>
<td>1.2</td>
<td>1.6</td>
<td>1.5</td>
</tr>
<tr>
<td>3rd</td>
<td>1.93</td>
<td>1.47</td>
<td>1.5</td>
<td>1.6</td>
<td>1.4</td>
</tr>
<tr>
<td>4th</td>
<td>1.4</td>
<td>1.28</td>
<td>1.6</td>
<td>1.6*</td>
<td>1.33</td>
</tr>
<tr>
<td>Total</td>
<td>1.4</td>
<td>1.28</td>
<td>1.6</td>
<td>1.6*</td>
<td>1.33</td>
</tr>
<tr>
<td>5th</td>
<td>1.9</td>
<td>0.5</td>
<td>1.1</td>
<td>2.7</td>
<td>2.2</td>
</tr>
<tr>
<td>6th</td>
<td>2.45</td>
<td>0.55</td>
<td>1.5</td>
<td>4.2</td>
<td>2.6</td>
</tr>
<tr>
<td>7th</td>
<td>3.1</td>
<td>0.65</td>
<td>1.8</td>
<td>6.0</td>
<td>2.8</td>
</tr>
<tr>
<td>8th</td>
<td>3.86</td>
<td>0.76</td>
<td>2.3</td>
<td>8.3</td>
<td>2.9</td>
</tr>
<tr>
<td>Total</td>
<td>3.86</td>
<td>2.46</td>
<td>6.7</td>
<td>8.3*</td>
<td>2.6</td>
</tr>
<tr>
<td>9th</td>
<td>4.7</td>
<td>0.84</td>
<td>2.3</td>
<td>10.6</td>
<td>2.7</td>
</tr>
<tr>
<td>10th</td>
<td>5.6</td>
<td>0.9</td>
<td>2.4</td>
<td>13.0</td>
<td>2.7</td>
</tr>
<tr>
<td>11th</td>
<td>6.5</td>
<td>0.9</td>
<td>2.6</td>
<td>15.6</td>
<td>2.9</td>
</tr>
<tr>
<td>12th</td>
<td>7.4</td>
<td>0.9</td>
<td>2.7</td>
<td>18.3</td>
<td>3.0</td>
</tr>
<tr>
<td>Total</td>
<td>7.4</td>
<td>3.54</td>
<td>10.0</td>
<td>18.3*</td>
<td>2.8</td>
</tr>
<tr>
<td>13th</td>
<td>8.3</td>
<td>0.9</td>
<td>3.0</td>
<td>21.3</td>
<td>3.2</td>
</tr>
<tr>
<td>14th</td>
<td>9.2</td>
<td>0.9</td>
<td>3.3</td>
<td>24.6</td>
<td>3.4</td>
</tr>
<tr>
<td>15th</td>
<td>10.2</td>
<td>1.0</td>
<td>3.5</td>
<td>28.1</td>
<td>3.5</td>
</tr>
<tr>
<td>16th</td>
<td>11.2</td>
<td>1.0</td>
<td>3.7</td>
<td>31.8</td>
<td>3.7</td>
</tr>
<tr>
<td>Total</td>
<td>11.2</td>
<td>3.8</td>
<td>13.5</td>
<td>31.8*</td>
<td>3.4</td>
</tr>
<tr>
<td>17th</td>
<td>12.1</td>
<td>0.9</td>
<td>3.9</td>
<td>35.7</td>
<td>4.2</td>
</tr>
<tr>
<td>18th</td>
<td>13.0</td>
<td>0.9</td>
<td>4.2</td>
<td>39.9</td>
<td>4.6</td>
</tr>
<tr>
<td>19th</td>
<td>13.9</td>
<td>0.9</td>
<td>4.2</td>
<td>44.1</td>
<td>4.6</td>
</tr>
<tr>
<td>20th</td>
<td>14.8</td>
<td>0.9</td>
<td>4.3</td>
<td>48.4</td>
<td>5.1</td>
</tr>
<tr>
<td>Total</td>
<td>14.8</td>
<td>3.6</td>
<td>16.6</td>
<td>48.4*</td>
<td>4.6</td>
</tr>
<tr>
<td>21st</td>
<td>15.7</td>
<td>0.9</td>
<td>4.4</td>
<td>52.8</td>
<td>5.1</td>
</tr>
<tr>
<td>22nd</td>
<td>16.5</td>
<td>0.8</td>
<td>4.4</td>
<td>57.2</td>
<td>5.1</td>
</tr>
<tr>
<td>23rd</td>
<td>17.3</td>
<td>0.8</td>
<td>4.8</td>
<td>62.0</td>
<td>5.7</td>
</tr>
<tr>
<td>24th</td>
<td>18.1</td>
<td>0.8</td>
<td>5.2</td>
<td>67.2</td>
<td>6.2</td>
</tr>
<tr>
<td>Total</td>
<td>18.1</td>
<td>3.3</td>
<td>18.8</td>
<td>67.2*</td>
<td>5.5</td>
</tr>
<tr>
<td>25th</td>
<td>18.9</td>
<td>0.8</td>
<td>5.6</td>
<td>72.8</td>
<td>6.8</td>
</tr>
<tr>
<td>26th</td>
<td>19.7</td>
<td>0.8</td>
<td>6.1</td>
<td>78.9</td>
<td>7.5</td>
</tr>
<tr>
<td>27th</td>
<td>20.5</td>
<td>0.8</td>
<td>6.4</td>
<td>85.3</td>
<td>8.0</td>
</tr>
<tr>
<td>28th</td>
<td>21.3</td>
<td>0.8</td>
<td>6.8</td>
<td>92.1</td>
<td>8.5</td>
</tr>
<tr>
<td>Total</td>
<td>21.3</td>
<td>3.2</td>
<td>24.9</td>
<td>92.1*</td>
<td>7.7</td>
</tr>
</tbody>
</table>

* Average.
A 24 weeks old turkey weighs 18.1 lb. and has consumed 67.2 lb. of feed.

The average food consumption for 1 lb. gain in weight in the first six-weeks period is 1.7 lb.; in the second six-weeks it is 2.8 lb. and the average for the two periods taken together (first 12 weeks) is 2.47 lb. From the 13th to the 24th week (second 12 weeks period) the food intake shows a rapid increase and 1 lb. gain in weight is obtained from 4.58 lb. of feed.

The different rates of growth in the periods a, b, and c, must be catered for and the proper nutrients must be included in a ration for young growing turkeys.

**Recommended Nutrient Allowances for Turkeys.**—As previously stated the nutritional requirements of turkeys closely follows those of the domestic fowl and as this subject is adequately covered in the leaflet “Nutritional Requirements of the Domestic Fowl,” by R. H. Morris, Department of Agriculture, Western Australia, no good purpose can be served by repeating his work. However, it is necessary to note where differences do occur between the nutritional requirements of hens and turkeys.

**Protein Requirements.**—Considerable research work has been done to determine the optimum protein content of feeds for growth in turkeys. Table 5 illustrates that as a young turkey increases in age its rate of growth gradually decreases and following along those lines most experiment stations recommend the use of high-protein rations during the first six weeks, but report that satisfactory growth and finish were obtained during later periods on a lower protein level. It would appear that economical gains in weight throughout the growing season can be obtained by feeding a ration of 24 per cent, protein level during the first six weeks, a 20 per cent. level during the second six weeks, followed by a 16 per cent. level until the birds are marketed. It will be noted that the relatively expensive high protein ration is fed when small amounts of feed are consumed and the cost of the ration is reduced as the quantity of feed is increased.

A satisfactory system of feeding is obtained by feeding a 24 per cent. protein starting mash as an all-mash ration for the first six weeks. At the commencement of the second six-week period the protein content of the mash is reduced to 20 per cent. and when the poult are 10 weeks of age the mash is supplemented by gradually increasing amounts of wheat as grain. By the end of the second six-week period the poult should be receiving a ration consisting of 60 parts of mash and 40 parts of wheat which will result in the total intake containing approximately 16 per cent. of protein.

**Vitamin “A.”**—The following are the Vitamin “A” requirements for the various classes of stock:

- Chickens—2,000 Int. units of Vit. A per lb. of food.
- Turkey poult—4,000 Int. units of Vit. A per lb. of food.
- Breeding hens—4,720 Int. units of Vit. A per lb. of food.
- Breeding turkeys—4,720 Int. units of Vit. A per lb. of food.

Young turkeys should be given twice the amount of Vitamin “A” per lb. of food than that required by chickens, but breeding hens and turkeys can be treated alike.

**Vitamin “D.”**—Poults have a high Vitamin “D” requirement and will show a deficiency of Vitamin D sooner than chickens. Poults hatched from parent stock deficient in Vitamin D will show a rachitic condition within a few weeks.

**Riboflavin.**—The symptoms of riboflavin deficiency in poults are different from the symptoms shown by chickens. Poults develop a dermatitis consisting of incrustations at the corners of the mouth and thickened eyelids which tend to stick together. The birds are listless, unthrifty and the growth is very slow.

The recommended amounts of riboflavin which should be fed to poultry are:

- Chickens—290 gamma per 100 grammes of food.
- Turkey poult—350 gamma per 100 grammes of food.
- Breeding hens—230 gamma per 100 grammes of food.
- Breeding turkeys—300 gamma per 100 grammes of food.
CUT OWN CHAFF

... it's more economical
... stock benefit more
... it increases results

"Leeuwin" BLOWER
CHAFFCUTTERS

NO NO chaff-dust-laden waste working conditions

The "BLOWER" operates at any angle and immediately whisks chaff away from cutter to loft or storeroom

Length of cut can be altered without upsetting the centre, gears are scientifically arranged. All bearings have covered oil cups and the rigid construction means many years of satisfactory chaffcutting. Supplied with or without Engine

"LEEUWIN" Chaffcutters are also available in bagger and elevator types

Grind Own Grain

... it's more profitable
... avoids food shortage
... ends loss of production

"Eclipse" FEEDMILLS

Grind all grains fine, medium or coarse

The main shaft of an "ECLIPSE" Feedmill is of highest grade steel to withstand any strain

NO parts to get out of order

All metal construction. High or Standard legs

WILLIAM ST. PERTH and cnr. SPENCER AND CROSS STREETS, BUNBURY

Please mention the "Journal of Agriculture, W.A.,” when writing to advertisers
AJAX Centrifugal Pumps are available in various types, sizes and capacities.

Designed for efficiency in agricultural, industrial and domestic pumping.

There's an Ajax Pump, Hand or Power, for every purpose. Designed by experts, built by specialists. AJAX PUMPS are known throughout Australia for reliability, efficiency and economy.

Particulars from local distributors or

McPherson's Ltd.
532 Murray Street, PERTH

AJAX PUMP CATALOGUE gives full descriptions, ask for copy.

AJAX Piston Pumps for Higher Pressures, Self-oiling, Several Sizes.

Please mention the "Journal of Agriculture, W.A." when writing to advertisers
Hatchability is markedly affected when the riboflavin intake of breeding stock is below the figure stated.

**Calcium and Phosphorus.**—In order to prepare a starting mash containing 24 per cent. of protein it is necessary, under Western Australian feeding material supply conditions, to use fairly large quantities of meat meal which makes it difficult to keep the ration sufficiently low in phosphorus for safety from a perosis standpoint. Good quality meat meals containing 55 per cent. or more protein are usually relatively low in phosphorus and should be used if obtainable. A starting mash containing not more than 2 per cent. of calcium and 0.5 per cent. of phosphorus is considered to be safe but under favourable conditions (when the Vitamin “D” content of the feed is above 160 A.O.A.C. chick units) levels of 0.6 per cent. calcium and 0.6 per cent. phosphorus have given good results.

The level of calcium for breeding turkeys should be 2.25 per cent. and the phosphorus allowance is 0.75 per cent.

It must be emphasised that the above notes on nutrient allowances for turkeys must be read in conjunction with the leaflet previously mentioned.

### METHODS OF FEEDING TURKEYS

Rate of growth is not increased when young turkeys range over grassed paddocks or are given an ample supply of green feed, but there is usually a saving of from 10 to 20 per cent. in the total feed cost. Therefore when green feed or pasture is available it should be utilised. Turkeys can be successfully raised on an all dry mash system. The appropriate mash is placed in hoppers or troughs and is available to the birds at all times. Adequate feeding space should be provided; 50ft. of hopper space per 100 turkeys after they are 12 weeks of age will be sufficient.

Complete control of the feeding can be maintained by this method:—The 24 per cent. protein starting mash is placed in the hoppers for the first 6 weeks period; it is then changed to a 20 per cent. mash for the second 6 weeks period, and from the 13th week to marketing the birds are given a 16 per cent. protein mash.

The texture of mash fed to turkeys should not be too fine as very fine mashed tend to clog in the beak and cause sore mouths. Poults appear to grow and develop better when the ingredients of the mash are coarsely ground. The very fine textured mash is not readily eaten by poults and rapid growth cannot be expected if the food intake is insufficient.

The mash and grain system of feeding appears to be popular, with mash and grain kept in hoppers available to the turkeys all the time. In this system the grain is withheld until the birds are about 9 weeks of age when the mash contains 20 per cent. of protein and as the birds grow they tend to balance their diet. Research work shows that during the growing period poults will consume 40 to 50 per cent. of their total food as grain. The grain can be wheat or oats or both grains fed in separate hoppers. The ration given below could be fed as a starting mash for the first 6 weeks period but it must be noted that a high grade meatmeal or whale meal must be used to keep down the phosphorus content of the mash.

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>lb.</th>
<th>Protein</th>
<th>Calcium</th>
<th>Phosphorus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bran</td>
<td>20</td>
<td>2.80</td>
<td>0.014</td>
<td>0.120</td>
</tr>
<tr>
<td>Wheatmeal</td>
<td>20</td>
<td>2.00</td>
<td>0.008</td>
<td>0.044</td>
</tr>
<tr>
<td>Pollard</td>
<td>20</td>
<td>2.70</td>
<td>0.010</td>
<td>0.064</td>
</tr>
<tr>
<td>Gristed Oats</td>
<td>10</td>
<td>0.90</td>
<td>0.005</td>
<td>0.022</td>
</tr>
<tr>
<td>Whalemeal (60% protein)</td>
<td>22</td>
<td>13.20</td>
<td>1.100</td>
<td>0.660</td>
</tr>
<tr>
<td>Dried Buttermilk</td>
<td>10</td>
<td>3.20</td>
<td>0.130</td>
<td>0.080</td>
</tr>
<tr>
<td>Oyster Flour</td>
<td>2</td>
<td>0.760</td>
<td>0.860</td>
<td>0.952</td>
</tr>
<tr>
<td>Total</td>
<td>104</td>
<td>24.80</td>
<td>2.027</td>
<td>0.990</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>23.84</td>
<td>1.949</td>
<td>0.952</td>
</tr>
</tbody>
</table>

At the end of the first 6 weeks period the protein content of the mash can be reduced to approximately 20 per cent. by reducing the meatmeal by 8 lb., that is, to 14 lb. and the dried buttermilk can be reduced from 10 to 4 lb.

The content of the mash would then be:—Protein 20.09 per cent. Calcium 1.721 per cent. and Phosphorus .780 per cent. which can be considered as being within safe limits.

When grain feeding is introduced on the basis of 40 per cent. of the total feed it would be necessary to add 3 lb. of bone meal and 2 lb. of oyster flour to each 100 lb. of the mash to maintain the level of calcium and phosphorus.
MARKETING

No definite date can be fixed for marketing turkeys, but they should be held until they are in a fit condition to market. Well grown turkeys seven to eight months old should be in excellent condition for dressing, without feeding a fattening ration provided they have been reared on a well balanced growing ration. The turkey grower, having reserved the birds he requires for breeding, should examine the remainder of the flock when they are seven months old and market those birds which are in prime condition. The characteristics of a turkey which would be graded as "prime" are as follows:

(1) A wide breast carrying plenty of firm flesh. The fleshing must not taper off markedly towards the rear of the keel.

(2) It must be well finished, that is, carry a fair amount of fat in the skin. To determine this it is necessary to examine the skin at a point halfway down the side of the breast just above the front point of the keel and in the sparsely feathered area between the two feather tracts of the breast. A fold of the skin, taken between the thumb and forefinger of each hand, should appear creamy and be approximately \( \frac{1}{2} \)in. in thickness.

(3) The feathering on the underside of the wing, on the breast and on the drumsticks should be examined. Short pinfeathers cannot be picked clean and with dark coloured plumage part of the feather pigment may remain in the skin. Long pinfeather can be removed fairly easily and will not discolour the carcass. A prime bird should have only a moderate number of long pinfeathers and a few short ones, practically none on the breast.

(4) The flesh on the drumsticks should be well rounded and of normal size. The fleshing should extend well down towards the hock.

(5) No deformities, such as crooked breast, pendulous crop, etc., should be present.

The above requirements are placed rather high in order to give the breeder an ideal to endeavour to obtain. In a well managed turkey flock there are many variations from the normal in breast and leg fleshing. Those birds which are narrow in the breast and are deficient in breast and leg fleshing should be marketed separately from the well fleshed birds as they could not be graded "prime" and their value per lb. would be relatively low.

Care must be taken in the catching, crating and transport to market of the birds as abrasions and bruises lower their value.

ACKNOWLEDGMENT

I wish to thank Mr. C. Balmer (Government Photographer) for the original photographs in this article.

Grateful acknowledgment is given to the Chief Draftsman, Lands and Surveys Department for completing the designs from drawings submitted by the author.

REFERENCES


Marsden, S. J. and Martin, J. H.: "Turkey Management."

Morris, R. H., Ag. Adviser, W.A. Department of Agriculture: "Nutritional Requirements of the Domestic Fowl." (Departmental Leaflet No. 995.)

Jull, M. A.: "Raising Turkeys."


(Reprinted from "The Journal of Agriculture," Vol. XXVII (Second Series), No. 4, December, 1950.)