FISHY OFF-FLAVORS IN POULTRY MEAT

A Japanese flavor chemist recently made the statement to me that fishy flavors in poultry meat are not considered objectionable in Japan. One would have difficulty imagining such a judgment being made in this country where fishy off-flavors in poultry meat have at times caused serious problems. It has long been known that feeding of fish oils to poultry can cause off-flavors in the meat. Fishy off-flavors in chickens fed cod liver oil were reported by Carrick et al in 1926. Asmundson et al (1938) at the University of California produced fishy flavors in turkeys by feeding fish oils. In the early 1950's, the USDA Poultry Laboratory at Albany, California, and the University of California cooperated in further studies on off-flavors in turkeys caused by feeding fish oils and other fats (Klose et al., 1951, 1952, 1955).

Fishy off-flavors are caused by certain highly unsaturated fatty acids which occur naturally in marine oils. These fatty acids are not limited to fish fats but also occur in the fats of marine mammals as, for example, the whale. Their ultimate origin appears to be the highly unsaturated fatty acids of the plankton in the sea, which are an important part of the diet of marine animals. In each case the fatty acids are incorporated into the fat of the animals which consume them so that when marine fats are fed, they finally end up in the fat of the birds.

Rations containing as little as 0.35% fish oil have produced off-flavors in turkeys. Since off-flavors have been reported so frequently from feeding of marine oils, it would seem fairly reasonable to follow the recommendation that no marine oils or animal fats containing marine oils be fed to poultry.

It is important to remember that fishmeal contains varying amounts of oil. Since the amount of fishmeal in poultry rations will vary with the price of fishmeal, it should be recommended that the upper limit for fishmeal be determined by the amount of oil in the fishmeal. Line weaver (1970) has recently restated the recommendation that the fishmeal should supply not more than 0.3% fish oil to the total ration fed to turkeys.

In some experiments, fishmeal has been fed to provide much higher levels of oil in the ration than that recommended above without causing off-flavors. The probable explanation of these results is to be found in research from England (Lea et al) and South Africa (Wostert et al). This work shows that if the oil in the fishmeal is allowed to oxidize by long storage or by heating for a short time, the oil no longer causes off-flavors when the oxidized fishmeal is fed. Heating is probably not to be recommended because it adversely affects the protein quality of the fishmeal. When oxidation of oil in the fishmeals was prevented either by storage in polyethylene or by addition of the antioxidant BHT, the fishmeals produced off-flavors.

(Cont.)
Marine oils are not the only fats which can produce fishy off-flavors in poultry. Linolenic acid (not to be confused with the essential fatty acid linoleic acid) is found in many vegetable oils but occurs in especially high concentrations in linseed oil. Feeding of linseed oil has produced fishy flavor in turkeys. The explanation for this effect may be found in the fact that animals have the ability to convert linolenic acid to the same, highly unsaturated fatty acids that are found in fish oils. These fish oil fatty acids are known among biochemists as the "linolenic acid family."

In spite of the large amount of research that has been done, the causes of fishy flavors are not completely understood. It now appears that other dietary ingredients besides marine oils may produce fishy flavors. Work from Denmark by Jensen (see also Petersen) showed that 1% tannin in the diet of broiler chickens caused a fishy flavor even when the diet did not contain fish products. Certain feed ingredients may contain high enough levels of tannin to present a potential problem. Milo contains variable amounts of tannin. The color of milo is a rough indication of its tannin content -- the darker the color the higher the tannin content. Grape pomace and rapeseed meal are fish feed ingredients with high tannin content.

A study on the influence of dietary ingredients containing tannins on the production of off-flavors in poultry meat is currently being made by the Avian Sciences Department at UC-Davis in cooperation with the USDA Poultry Laboratory at Albany.

(Note: An excellent review by Lineweaver on the effect of dietary fats on off-flavors in poultry appeared in Feedstuffs February 28, 1970.)

Summary of dietary factors related to fishy flavors in poultry:

1. Fish and other marine oils.
2. Possibility of fish oils in animal feed fat.
3. Fish oils in fishmeals.
4. Degree of oxidation of fish oils in fishmeals.
5. Antioxidants in diet may prevent oxidation of fish oils.
6. Linseed oil or fish oils containing high concentrations of linolenic acid.
7. Tannins present in feed ingredients.

References
Jensen, J.P., Broiler-Intevesxterns För-
enings Årsbok 5 Kalmar, June 1969.

D. W. Peterson
Dept. of Avian Science
Davis Campus

PUBLICATION PROGRESS

I have received some inquiries about a publication called "Incubating Eggs in Small Quantities" which was printed in the form of a One-Sheet Answer, although it was not assigned a number since it contained prices and did not qualify for penalty mail. Dr. Abbott and I are in the process of revising and updating this publication. As soon as this is completed.

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it will be reprinted. Current supplies may be exhausted or very limited from our Berkeley office. We still have a few copies here in Davis.

Most of you have probably received a copy of a publication by Ralph Pfoert, Fred Price, and Ed Yearly "A Guide for Lenders and Producers on Financed Broiler Growing." Supplies of this are temporarily short, but additional copies of this material will soon be available from the Kearney office.

Bob Parsons and Fred Price are currently developing a publication on the design and operation of manure lagoons for poultry. They have indicated that this will be published as a county publication in Stanislaus County.

Stan Coates informed me recently that he is beginning work on a plan for a back-yard poultry house. The exact means by which this may be published has not yet been determined.

Dr. Ogasawara and I are revising AXT-219 "Plastic Tube Method of Artificial Insemination." The publication AXT-72 "Fly Control on Poultry Ranches" is also under revision by its authors.

If anyone is working on a publication revision or new publications other than these, it would be most helpful if you would notify us of this fact so that we can avoid any possible duplication of effort.

R. A. E.

Poultry Parade

The Avian Sciences Department will be holding their annual picnic on June 19 at 4:30 P.M. at the Woodland Fairgrounds. Charcoal Bar-B-Que Chicken will be served. Farm advisors are welcome. Please notify us in advance if you plan to attend. Adults $1.50 - Children 50¢.

WHERE DO WE STAND ON SALMONELLOSIS?

A joint committee on salmonella problems was formed several years ago between the Poultry and Egg National Board and the Communicable Disease Center in Atlanta, Georgia. You may recall that, at the time, eggs were being implicated in salmonellosis outbreaks in hospital. It was the objective of the committee to avoid future scare headlines and bring press releases into proper perspective. Dr. Wade Brant, Extension Food Technologist on the Davis Campus, as a member of the PENB committee has provided the following information from a recent meeting:

According to Dr. Steele from the Communicable Disease Center, poultry and eggs have extremely well in 1969. During this time no salmonellosis outbreaks were traced to eggs or egg products, and only one incident was attributed to barbecued chicken. Four of 16 salmonella outbreaks were thought to be associated with turkey.

The salmonella surveillance program instituted by the feed industry has not completely eliminated the problem in feed, but certainly it has been extremely helpful in reducing contamination. Pasteurization of liquid and dry egg products, which is not currently compulsory, has nevertheless been effective since about 65% of the total product is being produced in about 100 plants which use pasteurization.

The industry representatives on the committee suggested:

1) When investigations concerning eggs are made, it would be helpful to identify egg products as to whether they were pasteurized or produced in a USDA-inspected plant and to identify shell eggs as to grade and cleanliness. In recent years in the three reported shell-egg outbreaks, none of the eggs were cleaned and graded.

2) In future investigations on chicken or turkey meat, where possible, it should be (Cont.)
be noted whether the product was purchased fresh-killed, frozen, or thawed.

Most salmonellosis outbreaks have been traced to improperly processed or handled food in homes or commercial kitchens. A continuing effort should be made by the industry to instruct the users of poultry and egg products on how to thaw, prepare, and cook these products in an approved, safe manner. Dr. Steele indicated that the distributor of turkey products is morally and possibly legally obligated to provide proper thawing and cooking instructions with his product. Certainly, illness associated with poultry products is something that everyone in the industry would like to avoid.

The California Turkey Industry Federation is presently working with Dr. A.W. Brant, U.C. Davis, and Dr. Anne Lineweaver, USDA Laboratory, Albany, to establish and publicize uniform cooking recommendations for turkeys. I think this is a worthwhile effort and deserves everyone's support.

R. A. E.

# AVOID PESTICIDE RESIDUES IN POULTRY FEED

Many of you know that present government regulations have not established any definite minimum allowable residue of DDT or its analogues in poultry meat or eggs. This means that the allowable residue is zero and that products discovered to have any residue could be impounded and removed from the market. At this point, regulatory officials are realistically aware that if all food products containing any residue of DDT were removed from the market, there would be little food left. This is another way of saying that essentially there are low levels of DDT or its metabolites, DDE and DDD, in almost everything in our environment. Therefore, regulatory officials have chosen to take a realistic view and not confiscate products containing a trace (under 1.25 ppm) of chlorinated hydrocarbons.

Under present regulations, we would suggest that poultry feeders should become extremely concerned if they have any evidence that finished feed contains more than 0.05 ppm of chlorinated hydrocarbons. It would certainly be very desirable to maintain a level below .01 ppm at all times. Research has shown that these materials accumulate in poultry fat at levels which may be 10 to 20 times higher than the level in the feed.

State and federal agencies are randomly sampling feed ingredients at various times and checking these for chlorinated hydrocarbons. However, it might be advisable for feed manufacturers to occasionally sample feed ingredients which are potential sources of chlorinated hydrocarbons and have these samples analyzed. While this would involve some expense, it could prevent a disastrous financial loss.

R. A. E.

# COMING EVENTS

<table>
<thead>
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<th>Date</th>
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<td>May 20</td>
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<td>University Commons, Riverside</td>
</tr>
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<td></td>
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<td>Campus</td>
</tr>
<tr>
<td>May 22</td>
<td>Poultry Institute</td>
<td>Auditorium, County Center</td>
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<td>Modesto, California</td>
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<td>June 16</td>
<td>Turkey Housing Workshop</td>
<td>Library, County Center</td>
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<td>Aug. 31</td>
<td>Poultry Science Association</td>
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<td>University of Tennessee</td>
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<td>Knoxville, Tennessee</td>
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<td>September</td>
<td>World Poultry Congress</td>
<td>Madrid, Spain</td>
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<td>6-12</td>
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<td>November</td>
<td>Western Poultry Congress</td>
<td>San Diego, California</td>
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HERE AND THERE

May 13, 1970

-- Specialists Ernst and Swanson have been given the added title, "Associate in the Experiment Station." Policy and appointment disagreements between Agricultural Extension and Agricultural Experiment Station were recently adopted by the administration. Request for granting the title is initiated by the Experiment Station department with which the specialist is associated. Specialists holding Associate in the Experiment Station titles "are expected to pursue their primary responsibilities in Agricultural Extension but, under supervision of the department chairman, are accorded rights of cooperative participation in departmental research programs, including use of research facilities, service on research committees, and project leaders of Agricultural Experiment Station projects."

-- although only farm advisors who spend essentially full time on poultry were involved in the Poultry Workshop held at Davis, January 13-15, copies of the Workshop report have been sent to all farm advisors listed in the official Extension roster as having responsibilities for poultry. Many directors have also received copies. After reading the report, you are encouraged to discuss it with your director and to forward any comments or questions you may have about it to the specialists.

-- Milo Swanson will be taking a three-month sabbatical this summer, starting July 1, to visit research centers and commercial poultry and egg operations in Western Europe. Countries on his schedule include England, Scotland, Netherlands, Scandinavia, France, Germany, Switzerland, and Spain. He expects to observe first-hand the latest and best technology being developed in that part of the world. His particular interests are in problems associated with environmental housing, lighting programs, disease control, egg quality, nutrition, waste disposal, and equipment associated with automation. Western Europe has had a very rapid expansion of commercial egg and poultry meat production the past decade and many operations employ the latest innovations in housing, equipment, and management.

Visiting these operations will provide an opportunity to learn of new approaches to solving many of the same problems faced by California poultrymen. A highlight of the sabbatical will be attending the World's Poultry Congress to be held in Madrid the week of September 6-12.

-- A slide series on career opportunities in the poultry industry has been developed by the Agricultural Extension Service in cooperation with Pacific Egg and Poultry Association and the California Poultry Association. Leaders of the project were Milo Swanson and Jack Chambers, Poultry and Visual Aid Specialists at the Riverside Campus. Forrest Creese, Agricultural Science Writer at UC, wrote the script which was narrated on tape by Terry Jay, Information Specialist for radio and TV at Davis. The series is designed for showing to teenagers, particularly to senior high school students who are faced with making a career choice. The first part of the story, using interest-getting cartoons and art work, emphasizes the importance of this decision and some of the considerations involved. Among the choices suggested is a career in the food industry and, more specifically, in the poultry industry. For the boy or girl who cannot go on to college for one reason or another, opportunities for on-the-job training in production and processing of eggs and poultry meats are described. This is followed by examples of job possibilities for those who go on for college training. The series has been developed in two forms. One has 80 slides and can be shown with a single projector with a slide tray of that capacity. The second has 141 slides and requires two projectors connected with a dissolve unit. The same taped narration is used for both, with a running time of approximately 15 minutes. For the present, only the 80-slide series will be placed in the film library at Berkeley -- available for use by farm advisors, 4-H, vocational agriculture teachers, school counselors, and others. PePa will also be promoting its use by its own membership in bringing the story on careers to local youth groups. Title of the series is "You Are Needed in Today's Poultry Industry."

H. H. S.
RECENT PUBLICATIONS

A Guide for Leaders and Producers on Financed Broiler Growing, Univ. of Calif. AES Mimeo (13 pp).

Typical Cash Flow Budgets for Contract Broiler Growers, Auburn University, CES Mimeo (7 pp).


Growing Blue Ribbon Pullets (4-H), EC 758, AES, University of Tennessee (15 pp).

Laying House for Poultry, Plan No. 6062, USDA Misc. Publ. 1161 (2 pp).

Bird Mites and Chicken Ticks, USDA #238, University of Calif. (2 pp).

The Foul Tick - How to Control It, USDA Leaflet No. 382 (6 pp).


Participants in the National Turkey Improvement Plan, ARS 44-8, Rev. March 1970, USDA (19 pp).

Analysis of Demand for Meat Atlanta Consumer Panel, Res. Bul. 72, University of Georgia (21 pp).

Inter and Intra-State Movements of Light and Heavy Fowl in Georgia, Res. Report 67, Univ. of Georgia (22 pp).


Urbanization of Land in the Western States, ERS 428, USDA ERS (30 pp).

Milo H. Swanson
Extension Poultry Specialist
Riverside Campus

Ralph L. Ervin
Extension Poultry Specialist
Davis Campus
COUNTY EGG AND POULTRY STATISTICS FOR 1965

June 26, 1970

Our annual summary of county statistics as compiled from Agricultural Commissioners' reports for 1969 is presented in this issue of Poultry Parade. For comparison purposes you may wish to refer to the 1968 summary which appeared in the November 14, 1969, edition of P&P.

As usual, the accuracy of individual county data is subject to question, but these are the best estimates available for most areas of the state. The table below indicates that county figures for layer numbers are on the high side, whereas those for fryers and turkeys are somewhat underestimated, according to USDA Crop Reporting Board statistics.

<table>
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<th>County Published</th>
<th>Layers</th>
<th>Fryers</th>
<th>Turkeys</th>
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<tr>
<td>USDA Total</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>40,926,375</td>
<td>36,817,900</td>
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<tr>
<td>Total</td>
<td>70,644,535</td>
<td>76,757,000</td>
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<tr>
<td>Totals - Calif.</td>
<td>12,009,700</td>
<td>14,383,000</td>
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The table at the bottom of this page shows rankings for the top ten counties for number of layers, fryers, and turkeys. Although there have been some commodity shifts in rankings from 1968, there has been a minimum change in rank based on total dollar income. However, gross income for 1969 was 17.5% above 1968 for the top ten counties.

M. H. S.

Milo N. Swanson
Poultry Specialist
Riverside Campus

Ralph A. Ernst
Poultry Specialist
Davis Campus
<table>
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<tr>
<th>County</th>
<th>Poultry head</th>
<th>Turkey head</th>
<th>Total Poultry:</th>
<th>Layers head</th>
<th>Eggs 2/</th>
<th>Gross Income dollars</th>
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<td>169,500</td>
<td>1,095,000</td>
<td>1,942,000</td>
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<td>395,800</td>
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<td></td>
<td>**</td>
<td>11,200</td>
<td>150,000</td>
<td>355,000</td>
<td>908,900</td>
</tr>
<tr>
<td>Tulare</td>
<td>4,716,000</td>
<td>1,052,000</td>
<td>7,793,000</td>
<td>475,500</td>
<td>3,309,000</td>
<td>11,102,000</td>
</tr>
<tr>
<td>Tuolumne</td>
<td></td>
<td>**</td>
<td>170,000</td>
<td>300,000</td>
<td>520,000</td>
<td>868,800</td>
</tr>
<tr>
<td>Ventura</td>
<td></td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>Yolo</td>
<td>**</td>
<td>**</td>
<td>32,000</td>
<td>2,159,200</td>
<td>16,415,000</td>
<td>16,645,000</td>
</tr>
<tr>
<td>Yuba</td>
<td></td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
</tr>
</tbody>
</table>

* None reported  
** Not reported separately.

1/ Dressed poultry meats including chickens, turkeys, pleasant, duck, etc. Does not include chicks or poults.
2/ Includes market eggs and hatching eggs.
3/ Includes turkey hatchling eggs.
4/ Includes turkey hatchling eggs & turkey pullets.
5/ Includes roosters.

Source: Agricultural Commissioners' Reports, June, 1970
The following article was written by O.W. Charles, Extension Poultry Specialist, University of Georgia, and appeared in their Dune newsletter. I believe this is an excellent summary.

R. A. E.

Two years ago Shane and Young reported on the harmful effects of high calcium diets in pullet rations. While this work has been widely reported in both technical and general news media, it still represents a problem area. This work is of such immediate value that it should gain immediate acceptance. For many years it has been the practice to feed pullets a growing ration containing 1.0 to 1.2% calcium until they were housed. Some producers felt that it was correct to begin the feeding of calcium at the rate of 2% to 3% of diet at a much earlier age in order to prepare the pullet for the onset of lay. However, it has been shown that at least some strains of birds are able to mobilize sufficient calcium for storage from low calcium diets upon reaching 20-21 weeks of age. This is thought to be activated by the production of estrogen in the maturing pullet. Therefore, the necessary storage of calcium would occur regardless of dietary calcium.

In the Cornell experiments it was found that pullets receiving either 2.4 or 3.0% calcium in the diet with available phosphorus of 0.4% experienced slower weight gain and a delay in sexual maturity. Mortality ranged from 10 to 20% higher in the high calcium diets. Autopsy of the kidneys of the dead birds showed extensive lesions in the lobes of the kidneys. However, only one pullet fed the 1.2% calcium ration showed kidney lesions and no birds were so affected while consuming a 0.6% calcium diet.

The parathyroid glands are extremely small bodies embedded in the tissue surrounding the thyroid glands in the neck of the chicken. These small bodies secrete a hormone which is responsible in part for maintaining the serum calcium level in the hen. Those pullets receiving 2.4 or 3.0% calcium in the diet showed more connective tissue in the parathyroids indicating a decreased ability to regulate the necessary blood calcium for eggshell formation. The femur bones also showed marked differences in those pullets fed high or low calcium. Pullets consuming a ration containing 0.6% calcium level exhibited a lower bone matrix density than did those consuming diets containing 2.4 or 3.0% calcium. Developing pullets were also sensitive to changes in a calcium diet when infected with bronchitis. The following results are indicative of the harmful effects of high and low calcium:

<table>
<thead>
<tr>
<th>3% Calcium in Rearing Diet</th>
<th>Nephrosis</th>
<th>Renal Lesions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality from</td>
<td>A</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>42</td>
<td>78</td>
</tr>
</tbody>
</table>

(continued)
For many years it has been a general practice to increase the dietary calcium a few days before the onset of lay. Generally this recommendation has been to increase dietary calcium at least 7 to 10 days prior to the first egg. The reason for this being that calcium storage in the medullary bone was necessary for proper eggshell development. It has been shown that calcium drawn from the medullary bone is replaceable but calcium drawn from the distal end is not replaced and may result in permanent damage to the hen. This permanent damage may be exhibited in the so-called cage fatigue syndrome.

Probably the danger here lies in the possibility that the practice may be abused by adding calcium at a much earlier date. This then results in the addition of excess calcium so that parathyroid development is impaired.

It would appear that dietary calcium should be in the order of 1.0 to 1.2% of the diet until just prior to the onset of lay. It also appears that should it be inconvenient, for some reason, to supply higher calcium (3.0% or more) until the actual onset of lay, the damage will not be as great as if it is supplied very early (16 to 17 weeks). It is imperative, however, that the dietary calcium level be raised to 3% or more in the very early stages of egg production (no later than 5%).

OILING REDUCED TREMULOUS AIR CELLS

Eggs with tremulous air cells are downgraded if the movement of the cell exceeds certain minimal amounts. To meet AA quality, the USDA grade standards allow 1/8" movement. California grade standards for AA quality allow movement in any direction up to 1/8".

The exact cause of tremulous air cells is uncertain although it is generally thought to result from rough handling. Field observations have revealed a high incidence of tremulous air cells in eggs from certain flocks which caused them to be downgraded.

Researchers Cowen, Dodge, and Whitman of the Agway Research Laboratory, Ithaca, N. Y., have studied the effects of certain factors on air cell tremulousity. They reported that albumin quality was not lower in eggs with tremulous air cells. Oiled eggs, stored for 29 hours had significantly fewer tremulous air cells (2% vs. 18%) and significantly higher average Haugh unit scores (70 vs. 86). Eggs were oiled soon after gathering and were stored in either a fan cooler, for 29 hours or in a laboratory cooler for 12 hours followed by 7 hours at room temperature. (Reference: Poultry Science, Vol. 48: No. 4; pp. 1401; July 1969).

FARM ADVISORS' CONFERENCE 1971

We are definitely planning a conference in Davis early in 1971. You may wish to inform your county director in advance to help him plan his budget.

ANIMAL INDUSTRY CONFERENCE

The 1970 Animal Industry Conference will be held on October 5 and 6 at the Holiday Hotel in Fresno. The conference program is not yet available but will feature informal discussion sessions with speakers. Farm advisors are invited to attend and will not be required to pay the registration fee.
USDA PROPOSES POULTRY REGULATIONS

The U.S. Department of Agriculture today proposed new regulations designed to serve as guidelines in poultry marketing. The proposal, submitted by USDA's Packers and Stockyards Administration, would provide guidelines for packers and live poultry dealers and handlers in their dealings with poultry farmers.

USDA said the regulations would provide a better understanding between farmers and integrators and improve the competitive situation at the grower level.

The regulations would require each packer, live poultry dealer, or handler, who enters into a grow-out (feeding) contract with a poultry grower to provide the grower with:

1) A written contract which includes all significant details, including duration, termination conditions, and payment terms;

2) Settlement sheets with all information necessary to compute payments due to the grower;

3) Condemnation and grading certificates;

4) Grouping or ranking sheets which show the grower's precise position with other growers during the settlement period;

5) A purchase invoice if live poultry is being bought. The invoice would contain all information necessary to compute payment due to the seller.

The regulations would also require packers, live poultry dealers, and handlers to:

1) Maintain for two full calendar years all books, records, documents, or papers involving poultry transactions under the P & S Act;

2) Use scales for weighing live poultry that are installed, maintained, and operated so as to insure accurate weights;

3) Use scales for weighing live poultry that are tested at least twice each calendar year;

4) Use scales equipped with a device for printing or stamping the weight values on scale tickets;

5) Issue scale tickets showing names of all principals involved;

6) Employ competent persons of good character and known integrity to operate scales for weighing live poultry.

Packers, live poultry dealers, or handlers would be prohibited from making, issuing, or circulating false or misleading reports concerning live poultry prices or conditions.

The proposed regulations cover aspects affecting marketing including contracts, accounting, records, and weighing.

Any person who wishes to submit written data, views or arguments concerning the proposed amendments may do so by filing them in duplicate with the Hearing Clerk, U.S. Department of Agriculture, Washington, D.C. 20250, no later than September 19, 1970.

Copies of the proposed amendments may be obtained from the Information Officer, Packers and Stockyards Administration, USDA, Washington, D.C. 20250.

R. A. E.

AN INTERESTING NEWSLETTER

If you don't receive the ASL newsletter you might want to consider trying to get placed on their mailing list. Recent issues have contained very interesting reports on national legislation of interest to the poultry industry. Circulation may be limited so I would suggest you check with your local ASL representative or write to American Scientific Laboratories, Box 1988, Madison, Wisconsin 53701.

R. A. E.
ARE U. S. FOOD PRICES HIGH?

Emil Malinovsky, Ohio State University Extension Poultry Specialist, suggested in a recent newsletter that American food prices may not be as high as some consumers think. The table below comes from the February 1970 issue of Foreign Agriculture. The figures given are the dollars or minutes of work needed to purchase 1 kg. (2.2 lbs.) of food.

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bread, white</td>
<td>0.55</td>
<td>13</td>
<td>0.23</td>
<td>13</td>
<td>0.36</td>
<td>25</td>
<td>0.43</td>
<td>23</td>
</tr>
<tr>
<td>Roasting Beef</td>
<td>1.96</td>
<td>45</td>
<td>2.11</td>
<td>119</td>
<td>2.70</td>
<td>188</td>
<td>2.90</td>
<td>157</td>
</tr>
<tr>
<td>Pork Chops</td>
<td>1.10</td>
<td>25</td>
<td>1.56</td>
<td>89</td>
<td>2.21</td>
<td>154</td>
<td>2.13</td>
<td>115</td>
</tr>
<tr>
<td>Chicken, frozen</td>
<td>0.70</td>
<td>16</td>
<td>0.96</td>
<td>49</td>
<td>1.13</td>
<td>79</td>
<td>0.77</td>
<td>42</td>
</tr>
<tr>
<td>Turkey, frozen</td>
<td>0.65</td>
<td>15</td>
<td>0.92</td>
<td>52</td>
<td>2.16</td>
<td>150</td>
<td>1.16</td>
<td>63</td>
</tr>
<tr>
<td>Milk, 1 liter or</td>
<td>0.30</td>
<td>7</td>
<td>0.20</td>
<td>11</td>
<td>0.16</td>
<td>11</td>
<td>0.21</td>
<td>11</td>
</tr>
<tr>
<td>1.06 quart</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large eggs, 1 dozen</td>
<td>0.75</td>
<td>17</td>
<td>0.60</td>
<td>34</td>
<td>0.70</td>
<td>49</td>
<td>0.75</td>
<td>41</td>
</tr>
</tbody>
</table>

* Work time based on average rates of take-home pay for industrial manufacturing workers (male and female) in April, 1969. French prices converted to Aug. 10 rates.

RECENT PUBLICATIONS


Spray Equipment for Poultry Pest Control, Circ. 512, Clemson Univ., Clemson, South Carolina (17 pp).

Operating Practices and Selected Costs of 40 Commercial Egg Packing Firms, Georgia 1964, Res. Rpt. 74, Univ. of Georgia (17 pp).


Duck and Goose Raising, Pub. 532, Ont. Dept. of Agri. & Food, Toronto (52 pp).

Raising and Propagating Japanese Quail, AAT-918, Univ. of Calif. (10 pp).


Our 31,000 Largest Farms, Ag. Econ. Rpt. 175, Econ. Res. Serv., USDA (64 pp).

CONTRACT EGG PRODUCTION

Last summer the office of PDBR made a national survey to get estimates by states of the number of egg-type hens under contract. Results are still incomplete, but a preliminary report reveals some interesting points. State data, where available, are given below.

A total of 415 probable contractors were identified, and these operations involved over 50 million layers or 18% of the national flock (estimated to be 285 million on an adjusted basis). Present information puts Florida in the lead in contract production with 81% and Indiana second with 60%. Contract production is strong also in Georgia, Arkansas, North Carolina, and Texas, but information on these states is incomplete.

In contrast to the South and Midwest, contracting for egg production by vertical integrators is very limited in California and the West Coast. This possibility is true, at least in part, because farming in our area tends to be specialized rather than diversified. Much of the contract egg production in the eastern states is carried out by general purpose farmers for supplementary income.

There is no indication at present that contracting for egg production will become a significant part of the California industry in the near future. A more likely possibility is a continuation of the trend toward fewer and larger organizations with fully-owned production, processing, and marketing facilities. If any new contract production ventures were to be started, they probably would be initiated by some of our independent feed mills which may be forced into contracting for survival.

PERCENTAGE OF EGG-TYPE HENS UNDER CONTRACT

<table>
<thead>
<tr>
<th>SE Region</th>
<th>SE Region</th>
<th>MC Region</th>
<th>SC Region</th>
<th>West. Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Pa. 28</td>
<td>Fla. 81</td>
<td>Ill. 48</td>
<td>Ark. 25*</td>
<td>Calif. 3</td>
</tr>
<tr>
<td>Me. 27</td>
<td>Ga. 20*</td>
<td>Ind. 60</td>
<td>La. 47*</td>
<td>Wash. 2</td>
</tr>
<tr>
<td>Mass. 11</td>
<td>Miss. 50</td>
<td>Ia. 35*</td>
<td>Mo. 25</td>
<td></td>
</tr>
<tr>
<td>N.J. 10</td>
<td>Va. 7</td>
<td>Minn. 10*</td>
<td>Okla. 15</td>
<td></td>
</tr>
<tr>
<td>N.Y. 15*</td>
<td></td>
<td>Nebr. 30</td>
<td>Tex. 20*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ohio 40</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>S Dak. 10*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wis. 10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Information incomplete

December 4, 1970

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS, U.S. Department of Agriculture and University of California cooperating
DR. ADLER RECEIVES CPC AWARD

Dr. Henry Adler, Professor of Pathology at UC Davis, was granted the Corn Products Award at the annual meeting of the Poultry Science Association. This is given as an achievement award for distinctive contribution to poultry science during a period of not more than the seven preceding years.

Dr. Adler was cited for his outstanding research to develop tests for M. gallisepticum, for studies on the control of salmonellas and Arizona paracolon infections, and for research on mixed infections of poultry. Most recently, Dr. Adler’s work has been directed towards elucidation of factors associated with autoimmune diseases.

Dr. Adler’s research has been outstanding and has made significant contributions toward disease control in commercial poultry flocks. We would like to extend our congratulations to him for this well-deserved award.

# WATCH THOSE WITHDRAWAL TIMES!

The USDA Consumer and Marketing Service is routinely collecting random samples of animal products for analysis. If excessive residues of drugs or pesticides are found, future shipments of poultry from that processor or production unit are held up until samples have been analyzed and found to be free of excessive residues. It is the producer’s responsibility to establish that his product is free of excessive residues.

Remember the specified withdrawal period for drugs and antibiotics should always be carefully followed! Insecticides should be used with care and only as recommended.

University of California publications which may be useful are: (1) Fly Control on Poultry Ranches—AXT 72; (2) Control of External Parasites of Chickens and Pigeons—AXT 293, and (3) Control of External Parasites of Turkeys—AXT 292. All of these are available free of charge from your county farm advisor’s office. R.A.E.

DR. SADLER HEADS AVIAN MEDICINE

Dr. W.W. Sadler, Professor of Veterinary Public Health, has been appointed chairman of the Department of Epidemiology and Preventive Medicine at UC Davis. This department now includes the former department of avian medicine. Dr. Sadler started his education at Texas A & M where he was granted a degree of Doctor of Veterinary Medicine in 1939. He was employed as a meat inspector, sanitarian, and city veterinarian before entering private practice in Texas. In 1949 he began graduate study at Colorado State University and in 1950 moved to Davis as a graduate student and research assistant. In 1958 he was granted the degree, Master of Public Health, from UC Berkeley and was appointed Associate Professor of Veterinary Public Health at UCD.

Dr. Sadler is a long-time friend of the poultry industry and has conducted extensive research on poultry diseases, particularly as they relate to the wholesomeness of poultry meat. We are pleased with his appointment as chairman of the Department of Epidemiology and Preventive Medicine and wish him his great success in his new position.

# LONG-TAILED FOWL

Dr. Frank Ogawara of the UC Davis Department of Avian Sciences recently completed a short visit to Japan to study the long-tailed fowl. Frank was the recipient of a National Geographic Society grant to support this study. He has written the fascinating story of the long-tailed fowl in an article which appeared in the December, 1970, National Geographic. The article is illustrated with beautiful color photographs of long-tailed fowl culture in Japan. If you have not seen this, we think you will find it very interesting reading.
TURKEY DRESSING

When I was on the staff of the University of Minnesota, a colleague of mine, Dr. W. H. Stilling, Encyclopaedia Britannica published a turkey dressing recipe for which he became quite famous. We are reproducing it here in case you have not seen it. You may want to pass it on to your wife and your home advisor.

M. H. S.

HOW TO MAKE AN "EDIBLE" TURKEY DRESSING

It is now several years since I took it upon myself to do something about this turkey dressing business. I love turkey, but I can't go for the filler that is usually served with it. I used to wonder why the turkey dressing was always skily hid under a thin slab or two of turkey, but there was a reason....they were ashamed of it, I guess. So I finally set about to develop a dressing recipe to end all other dressing recipes. After literally thousands of trials, I think I have succeeded, but the verdict rests with you.

So many people have asked for this recipe lately, we will repeat it for the benefit of those who came in late. I warn you that since this recipe has become so popular, there are many, many imitators. Some jealous souls even go so far as to claim it as their own.

Every year, usually at holiday time, most magazines and newspapers print acads of dressing recipes. Most of them use bread as a base and then start throwing in everything they can find around the kitchen, including oysters, pork, beans, celery, raisins, giblets, chestnuts, prunes, sausage, apples, etc., etc. Several years ago I recall finding a piece of someone's bridgework. This sort of mixture, they call a "dressing"....it comes out of the bird a dark, sticky, soggy mess that lays like a ton of brick in your stomach. This may be an excellent way to get rid of kitchen leftovers, but as a dressing....ugh! We've had New Deals in nearly everything, so why can't we have a new deal in dressing. It's way past due now. After all, the dressing is only a "chaser" for the turkey, not a complete dinner in itself.

Here's the recipe....even a child could make it. (1) Take enough of YESTERDAY'S bread (unsliced, if possible) and cut off the outside crust. Now, cut the trimmed loaf into HUNKS just big enough to make a good handful. With a fairly coarse grater the bread is now finely crumbled into a big dishpan. This will give you a handful of nice fluffy crumbled bread. It will take about three small loaves for a 15 to 18 pound turkey. (2) Have someone who does not cry easily chop a medium-sized onion into very fine particles. One onion is usually PLENTY....it won't hardly taste, but gives the dressing a certain amount of what we men call "oomph." (3) Stir the chopped onion evenly into the grated bread and (4) add just enough salt to taste right. (5) Then add the POWDERED sage....shaking it on lightly as you stir it into the bread. And, PELEASEE, do not use too much sage....just enough to taste TANGY, but not to GAG you. (6) This next step will test your generacity. Melt up one-half to one pound, depending on size of turkey, of GOOD butter (don't be Scotch here) and have your helper pour the melted butter slowly over the mass while you stir it in evenly throughout. That's all there is to it....the dressing is now all made. Don't add another single solitary thing. Do not moisten with water. The finished product will appear a golden color, still light and fluffy although it is slightly moistened by the butter. It's so tasty, you can almost eat it as is.

How to put this dressing into the old bird:

This is where some fall down. The procedure is very simple. Have someone tip the helpless turkey up on the back of his neck with the opening upward. Now, you will SPOON the dressing into the bird, shaking the carcass SLIGHTLY to settle the dressing. DO NOT PACK THE DRESSING DOWN....don't even push it down with your spoon. Merely spoon in all the bird will hold and you there and sow up the incision. That's all there is. People who eat pie for breakfast probably won't like this dressing....others love it. Good luck to you.
P.S. This dressing won't go as far as that OTHER soggy stuff because everybody will be hollering for more. Should you have some "making" left after you have filled the bird, you could place this in a casserole and on top, lay the neck, gizzard, liver and heart. Slide this into the oven toward the end of the turkey roasting period and you will have a bit extra for the second helpers. It won't be as good as the dressing inside the bird, but it will come in handy.

W. A. Billings
Agricultural Extension Service
University of Minnesota

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CONFERENCES ON WASTE HANDLING

The 1971 Cornell Agriculture Waste Management Conference will be held at Syracuse, NY, February 10-12. On April 19-22, 1971, the International Symposium on Livestock Wastes is scheduled for Ohio State University. The proceedings from these two meetings should be valuable references on the subject. Forms are available for those wishing to submit papers to the International Symposium.

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A HINT ON MAREK'S DISEASE VACCINATION

When it comes to protecting birds against Marek's disease, there are several things which should be borne in mind. Many procedures are being tried currently, but two are being used rather widely and sometimes rather indiscriminately. One of these is the injection of turkey blood and the other is the use of tissue-culture-propagated turkey Herpesvirus. Early results suggested that turkey blood properly handled and tested to be sure there were no dangerous contaminants (fowl cholera and erysipelas have both been reported following the use of infected turkey blood) gave promising results. Recent information indicates that in sufficient cases to make us concerned, this simply puts off the fatal day so that the rather severe losses occur in vaccines at 30-40 weeks, whereas the controls have normal viability.

Turkey Herpesvirus properly prepared and tested to be sure no contaminants are present and that there is enough immunizing virus shows considerable promise. The target for federal licensing, which may or may not be met, is somewhere shortly after January 1, 1973, at which time it is hoped that federal licensers will have available Marek's disease vaccines tested for purity, safety, potency, and efficacy. Meanwhile patience and the use of material experimentally with controls rather than wholesale is advocated.

A. S. Rosemond
Extension Poultry Pathologist
Davis Campus

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HAPPY HOLIDAYS!

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Milo H. Swanson
Extension Poultry Specialist
Riverside Campus

Ralph A. Ernst
Extension Poultry Specialist
Davis Campus