SUBSCRIPTIONS.

One pound or equivalent ($5.00) annually in advance. This Review is free to all members of the World's Poultry Science Association in good standing. All subscriptions should be sent to the editor, Dr. B. J. C. te Hennepe, Rotterdam, or to the secretary, Dr. G. F. Heuser, Ithaca, N. Y., U.S.A.

:  
per year

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INTERNATIONAL REVIEW
OF POULTRY SCIENCE

OFFICIAL ORGAN OF THE
WORLD'S POULTRY SCIENCE
ASSOCIATION

300,000 MEMBERS

EDITOR:
Dr. B. J. C. TE HENNEPE
ROTTERDAM (Holland)
Professor Castelló studied Natural History at the University in Barcelona and Agriculture at Madrid and at the Agricultural School in Gembloux, Belgium, where he devoted himself especially to the study of zootechnic. During his three years’ study in Belgium, poultry farming and pigeon-sport enjoyed his special interest.

In 1894 he started a poultry institute on his estate in Arenys. In 1896 this was converted into a Poultry Breeding School, the first and only one in Spain.

His Majesty, the King of Spain, bestowed upon this institution the title „Royal” and the Government declared it the Official Government-Institution and has granted it an annual subsidy.

Students of this Institute can obtain a certificate for poultry-breeding and the degree of Poultry Breeding Master.

Further, this school holds courses throughout Spain and has also sent teachers to South-America. In 1904 and 1910 Prof. Castelló gave lessons in Mexico and Uruguay and in 1914 in Chili and the Argentine.

Prof. Castelló has given lessons to about 15,000 pupils. He belongs to a family who have counted famous professors among them for five generations.

In 1897 he instituted the first National Poultry Society in Spain and also edited the first Poultry Journal, which is now published under the name of „Mundo Avicola”.

In 1902 he organised a big agricultural exhibition at Madrid at which eight countries were represented.

During this exhibition an International Congress was held
at which the following countries were represented: Spain, France, Belgium, Holland, Italy, Germany, Switzerland and England. It was decided at this congress to establish the "Fédération Internationale d'Aviculture". This association has its headquarters in Brussels. It was re-organised in 1925. Prof. Castelló is Vice-President of this Association.

Prof. Castelló has written several books on Poultry Breeding and Pigeon Keeping, which are much read in Spain, Portugal and South-America.

For 30 years he has been Spain's official representative at all International Poultry Congresses and Exhibitions and in 1924 he, with Dr. Brown, organised the Second World's Poultry Congress, which was held in Barcelona, and at which 35 countries were represented.

At the Third World's Poultry Congress, held at Ottawa in 1927, Prof. Castelló was elected first Vice-president for Europe of the World's Poultry Science Association.
The preliminary arrangements for the World's Fourth International Poultry Congress, which is to be held in Great Britain in 1930, were discussed at meetings held in Paris last week by the European Members of Council of the World's Poultry Science Association and by the Fédération Internationale d'Agriculture, the Headquarters of which is at Brussels. The former Association, which is responsible for the initiation of World's Poultry Congresses, possesses a European Council of which Senor Castelló, Professor d'Aviculture at the Royal Poultry School, Barcelona, is President. Senor Castelló presided at the meeting in Paris last week, and representatives from Germany, France, Holland, Denmark and England were also present.

Displays of pure bred poultry, pigeons and rabbits from many countries will be made on a national basis at the Crystal Palace in 1930. There will be national exhibits showing the progress made in various countries in poultry, education and research and in the commercial development of the poultry industry. Manufacturers of poultry appliances and other requirements of the poultry industry will be invited to exhibit their goods, and papers written by the leading authorities all over the world will be read and discussed.

The first of these International Congresses was held in Holland in 1921; the second in Spain in 1924, both under Royal Patronage, whilst the last Congress took place in Canada in 1927, and attracted representatives from over forty different countries, while something like 140,000 people paid for admission to the Congress and Exhibition in Ottawa.

Considerable interest is already being shown by Overseas Countries in the arrangements for the 1930 Congress. This Congress is being organised by His Majesty's Government through the Ministry of Agriculture and Fisheries in coöperation with the Department of Agriculture for Scotland and the Ministry of Agriculture for Northern Ireland. Their Majesties the King and Queen and His Royal Highness the Prince of Wales have graciously consented to become Patrons of the Congress.

In response to the official invitation sent out to all overseas
countries, through the Foreign Office, many favourable replies have already been received from such far away countries as Peru, Nicaragua, Columbia, Guatemala, Lithuania and South Africa, and from nearer countries including the Irish Free State, Holland, Norway, Portugal, Hungary, Spain and Turkey. The United States and Canada are both actively engaged in organising their contribution to the Congress, which will probably take the form of large national educational displays and livestock, whilst many papers will probably be presented by Canadian and American Scientists.

Enquiries from overseas countries regarding the allocation of space at the Crystal Palace, where the 1930 Congress will be held are already on such a scale as to indicate that all available space at the Palace is likely to be occupied, as the Empire Marketing Board, the Agricultural Departments of England, Scotland and Northern Ireland, Agricultural Colleges and Research Institutions and Poultry Associations in this country all propose to take advantage of the opportunity to display the progress made in the science and practice of the poultry industry in this country.

The Congress promises to provide a unique gathering on an International basis of those interested in the poultry industry.
Present:

President F. C. Elford.
Secretary-Treasurer Dr. G. F. Heuser.
Prof. J. E. Rice, United States.
.. B. F. Kaupp.
.. W. C. Thompson,
Dr. M. A. Jull,
Prof. M. C. Herner, Canada.
Mr. W. A. Brown,
.. George Robertson,

Professor Thompson reported progress in the drive for membership in the United States and Canada, stating that he hoped to complete it by March 15th.

The revision of the Constitution and By-Laws was given careful and lengthy consideration. The adopted final draft was submitted for the approval of the European members of the Council, after which it will be sent to the membership for adoption.

President Elford reported on his European trip last fall. The Council expressed its approval of such goodwill missions and voiced the opinion that the trip this year to Southern Europe should also have an American delegate.

The following resolution was adopted:

Resolved, that the American members of the Council of the World's Poultry Science Association heartily endorse and urge the necessity for the United States government to send a delegate with representatives from other governments for a good-will visit to Southern Europe this summer (1929), for the purpose of promoting the Poultry Industry and World's Poultry Congresses. (This trip will be similar to one carried out by President Elford and representatives from several European countries to Northern Europe last fall. The
Council also expressed the opinion that the United States delegate should be the Federal Senior Poultry Husbandman, Dr. M. A. Jull.)

Motion duly carried that the Treasurer reimburse Dr. te Hennepe as soon as possible for expenses incurred on the trip with President Elford.

It was decided that the Association should be represented at such national meetings as the Poultry Science Association, American Poultry Association and International Baby Chick Association.

Some time was devoted to discussing the International Review of Poultry Science. The meeting spoke very highly of the place the Review was filling and congratulated the Editor upon the manner in which he was conducting it. A suggestion was made that it might be made pictorial or more illustrative.

The question was also raised regarding the desirability of making it more popular in nature with a view to increasing subscriptions.

Motion duly carried that the President appoint a committee to consider the future policies and nature of the International Review of Poultry Science. The following Committee was named:

Dr. M. A. Jull, Chairman,
Professor W. C. Thompson,
Dr. G. F. Heuser.

Meeting adjourned.

G. F. HEUSER,
Secretary-Treasurer,

Present:
President, Professor Castelló, Spain.
Mr. P. A. Francis, Mr. F. R. Robinson, England.
Professor Chas. Voitellier, France.
Prof. A. Schachtzabel, Germany.
Dr. L. Weinmiller, Germany.
Mr. W. A. Kock, Denmark.
Dr. B. J. C. te Hennepe, Holland.

Point 1 of the Agenda:

Opening and communications by Professor Castelló.

The chairman stated that a meeting of the "Fédération Internationale" had been held the previous day and that Mr. Francis had read out the plans for the congress to be held in London in 1930. Since the last meeting, in Hannover, the membership of the World's Poultry Science Association has increased considerably and now a great number of new members in Spain, Portugal and Italy, who gave their names to Professor Castelló, were to be accepted.

The Société Centrale d'Aviculture de France invited the President and Secretary for Europe to their annual banquet, which was held on Thursday the 24th. February, for which the council expressed their thanks.


Dr. te Hennepe gave a description of the activities during 1928 and the rapid growth of the Association. He stated that in several countries National Committees had already been appointed for the congress to be held in 1930.

Point 3: Discussion of the Preparations for the Congress in London in 1930 and the Post-Congress Tour.

Mr. Francis brought preliminary notes of the congress and exhibition with him and these were extensively discussed.
During this discussion it became apparent that there were several points which made further regulations in London desirable, so that it will probably be necessary for the council to meet again in London this year. As soon as all concerned are agreed on these various points the preliminary notes of the congress will be printed and distributed to all countries by the Foreign Office.

Point 4: Questions by the Chair.

Professor Voitellier stated that the Exhibition Committee of the International Show at Paris had placed tickets of admission at the disposal of the Council.

Dr. te Hennepe stated that during the meeting a draft of the Revised Constitution had been handed to him but that he thought it better to give the members an opportunity to study this at home before it was discussed. This was agreed to.

As there was nothing more on the agenda the meeting was closed.
NOTICE TO THE ASSOCIATION MEMBERSHIP.

March 15, 1929.

I wish to call your attention to the method of procedure in deciding upon the place where poultry Congresses are to be held. The following resolution was adopted at the meeting in Barcelona, 1924:

"In the future this association should decide on the actual country in which it desires the next Congress to be held. It should also select at the same time two or more other countries as alternative sites for the Congress and place them in the order of desirability. Further, the Association should then open up negotiations with these countries in rotation if necessary, but negotiations should be completed with one country before any other country is approached."

In order to provide for sufficient time for such negotiations to be completed so that the place of the Fifth Congress can be announced at London, it will be necessary to have this information in the near future. You will receive soon from the Secretary proper forms on which to indicate your choice.

Very truly yours,

GUSTAVE F. HEUSER,
Secretary and Treasurer.
FINANCIAL STATEMENT.

Receipts:
Balance in bank Jan. 1, 1928 .................. $ 164.66
Subscriptions .......................... ,, 644.66
Balance from President Brown .................. ,, 158.30

$ 967.62

Expenditures:
Printing 1928 Report .................. $ 55.00
Stationery and envelopes ....... ,, 32.00
International Review and Secretary for Europe ,, 550.00
Expenses — G. F. Heuser .................. ,, 59.80
— E. Brown .......................... ,, 25.00
Travelling Expenses for trip with President —
Dr. te Hennepe .......................... ,, 200.00
Postage .................................. ,, 23.40
Exchange on checks .................. ,, 3.73

$ 948.93

Balance in bank Dec. 31, 1928 ................. ,, 18.69

$ 967.62

FINANCIAL STATEMENT.
of Dr. te Hennepe.

Receipts:
From Dr. Heuser .......................... $ 550.00

Expenditures:
International Review.
No. 1. Printing and Shipping .................. $ 120.00
" 2. " " " .................. ,, 168.00
" 3. " " " .................. ,, 120.00
Poultry Journals .................. ,, 48.00
Correction work .................. ,, 10.00
Printing work .......................... ,, 2.00

$ 468.00

Secretary for Continental Europe.
Paper-envelopes etc. .................. $ 10.00
Stamps, telegramms etc. .................. ,, 40.00
Printing work etc. .................. ,, 56.00

Total: $ 524.00

Balance Dec. 31, 1928 .................. ,, 26.00

$ 550.00
THE WORLD'S POULTRY SCIENCE ASSOCIATION
1929.
MORE THAN 300,000 MEMBERS.

Patrons.
Countries enrolled as Patrons

Membership.
Individual Members
Affiliated Members
Total Membership

INDIVIDUAL MEMBERS.

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139 222 257 35
THE EXCHANGE OF PERIODICALS.

In order to be kept as well posted as possible in regard to all that happens in the poultry world I am doing my best to promote the exchange of the International Review for other Poultry and relative periodicals. This I am doing on the one hand in the interests of our International Review and on the other to make the work of our World's Poultry Science Association as well known as possible to all those in the various countries, who are interested in the science of poultry.

The following list gives a review of the periodicals which are at present being exchanged for the International Review. I should greatly appreciate it if my readers would send me the names of any periodicals which they consider suitable to be exchanged for the International Review.

I was wonderfully well pleased to receive the following letter, which proves the complete understanding of the object I am trying to attain, and which emphasizes this very clearly in a few words.

Vienna, 4th. March 1929.

"Dear Sir,

"We received your letter of the 28th. February and beg to inform you that we are perfectly willing to exchange our periodical for yours.

"We are pleased to consider this exchange an important step towards furthering the interests of international work."

We remain,
Yours faithfully,
Zentralblatt für Kleintierzücht,
Frisch Verlag.

I shall be pleased to receive any publications dealing with Poultry Science and earnestly request you to draw the attention of writers of scientific articles to the International Review.

Yours faithfully,

B. J. C. TE HENNEPE,
Editor.
The International Review of Poultry Science is exchanged with the following Journals. Who follows?

AUSTRIA. ZENTRALBLATT FUER KLEINTIERZUCHT, Riemergasse no. 6, Wien.

ENGLAND. EGGS, Rudgwick, Sussex. HARPER ADAMS POULTRY JOURNAL, Newport. POULTRY KEEPING AND RABBIT BREEDING, 7—9 Theobald Road, London. THE JOURNAL OF THE MINISTRY OF AGRICULTURE, 10 Whitehall Place, London.


HOLLAND. TIJDSDRIFT VOOR DIERGENEESKUNDE. DE BEDRIJFS-PLUIMVEEHOUDER, Doetinchem. DE KLEIN-VEETEELT, Heerenveen. SCHAKELS, Keizersgracht 250, Amsterdam.

SOUTH AFRICA. THE S. A. POULTRY MAGAZINE, Whiteco House, Box 286, Bloemfontein.

SPAIN. ESPANA AVICOLA, Valencia. MUNDO AVICOLA, Arenys de Mar, Barcelona.

SWITZERLAND, DIE TIERWELT, Zofingen.

UNITED STATES OF AMERICA. AMERICAN POULTRY JOURNAL, 523 Plymouth Court, Chicago, Ill. HATCHERY TRIBUNE, Mount Morris, Ill. POULTRY SCIENCE, L. E. Card, Urbana, Ill. POULTRY TRIBUNE, Mount Morris, Ill. POULTRY ITEM, Sellersville, P.a. RELIABLE POULTRY JOURNAL, Dayton, Ohio.
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Dr. L. Weinmiller (Germany)

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Total: 286,500
PATRONS

AUSTRALIA.

CANADA.
Department of Agriculture of Canada, Ottawa.

SOUTHERN RHODESIA.
Department of Agriculture of Southern Rhodesia (Address) Secretary, Department of Agriculture, Salisbury, Southern Rhodesia, South Africa.

STRAITS SETTLEMENTS.
Department of Agriculture, Straits Settlements and Federated Malay States, (Address) The Secretary of Agriculture, Kuala Lumpur, F.M.S., East Asia.

NORTHERN IRELAND.
Ministry of Agriculture of North Ireland, Belfast.

SOUTHERN AFRICA.

SOUTH AUSTRALIA.

ENGLAND.
The English Ministry of Agriculture and Fisheries, (Address) The Secretary, 10, Whitehall Place, London, S. W. 1, England.

AFFILIATED SOCIETIES
International Baby Chick Association, 126 Wirthman Building, Kansas City, Missouri, United States of America.
National Poultry Council, East Greenwich, Rhode Island, United States of America.
Danmarks Tjerkroavler Forening, Vodrofsvej 9, Copenhagen, Denmark.
Bund Deutscher Geflügelzüchter, Elisabethstr. 32, Berlin, Lichterfelde, Germany.
Zwiazek Spoldzielni Mieczarskich i Jajczarskich ul. Hoza no. 51, Warsaw, Poland.
Canadian National Poultry Record Association, Department of Agriculture, Ottawa, Canada.
Société Centrale d'Aviculture, France.
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Mr. Pedro J. Hernandez, 111 Millagros St. Vibora, Havana.

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Mr. Ricondo de Escavriaza y del Valle, La Coruna.
Dr. Ricardo Zariquiey, Calle de Mal’lorca, Barcelona.

SWEDEN.
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Mr. William E. McDowell, R.F.D. 1, Greentown, Ohio.
Mr. B. W. Farnham, 122 North Avenue Northwest, Atlanta, Georgia.
Mr. John G. Hall, c/o Quaker Oats Company, New York City, N.Y.
Dr. O. B. Kent, Quaker Oats Co., 80 East Jackson St., Chicago, Illinois.
Prof. Wm. C. Monahan, Massachusetts Agricultural College, Amherst, Massachusetts.
Prof. L. F. Payne, Kansas Agric. College, Manhattan, Kansas.
Mr. Craig Sandford, c/o Quaker Oats Company, Foster Building, Utica, N.Y.
Mr. E. M. Whitney, c/o „Grain World”, 1018 South Wabash Avenue, Chicago, Ill.
Mr. J. H. Wolsieffer, R. F. D. 2, Millville, no. 7.

The function of the department.
To secure and democratise knowledge concerning the physiology of reproduction and of inheritance with special reference to the animals of economic importance.

Methods.
1. The genetical analysis of breeds and of present-day breeding methods.
2. The experimental application of principles and practices which have resulted from the study of laboratory animals to the case of the animals of the farm.
3. The search for new knowledge by means of planned experimentation with convenient material.

Page 23 gives a survey of many experiments made by Dr. F. A. E. Crew, Dr. A. W. Greenwood, Mr. A. C. Chaudhuri and Mr. J. Hashimoto.

Eighth annual Report, 1927—28.

Organisation.
The Animal Breeding Research Department has a twofold function to perform. It is an organisation where fundamental research into the problems of animal breeding is carried out. It is further an organisation where principles discovered by experimentation are tested by practice so far as its opportunities allow. These two divisions may be conveniently labelled Pure and Applied Science respectively. The former deals with Genetics and very largely with problems of sex physiology. The latter are being attacked both in the avian and mammalian animal kingdoms.

Avian sex physiology.
For this study the domestic fowl is used as being the best material, and a stock of some 330 birds is maintained.

During the year 1927—28, in addition to the head of the section and his assistant, three post-graduate workers were engaged in research in this section.

I. Experimental Induction of Sex Reversal. An experimental study on the effect of (a) Thyroxin and (b) Adrenalin upon the sexual differentiation in the Fowl.
II. Experimental Analysis of the Secondary Sexual Characters in the Fowl.
III. The Function of the Thymus Gland in the Fowl.
IV. Studies on Embryonic Mortality.
V. The Relation of Fertility in Fowls to the amount of Testicular Material and Density of Sperm Suspension.
VI. The Iodine Content of the Thyroid of the fowl.

The Effect of Inbreeding and Crossbreeding on Fowls by L. C. Dunn, Storrs Agricultural Experiment Station, Conn. Ver-
handlungen des V. Internationalen Kongresses für Vererbungswissenschaft, Berlin, 1927.

The practical lessons to be drawn from our present knowledge of inbreeding in fowls are sufficiently obvious to require little further discussion. It will be generally admitted that fowls in general probably react to inbreeding in much the same way as the quinea-pig and the maize plant, and the specific methods of inbreeding followed by crossing already proved to be successful in these forms can undoubtedly be put to profitable use in poultry breeding.


Discussion of the following questions.
A. Sex-reversal can be the direct expression of genetic action.
B. Sex-reversal can be the result of the overriding of the genotype by agencies which sufficiently disturb the general physiological conditions of the zygote at some stage or other of its development.
1. It can result from a disturbance of the physiological condition within the ovum before fertilization.
2. It can result from a disturbance of the general physiology of the individual during embryonic life.
3. It can result from a disturbance of the general physiology of the post-embryonic individual.


Results: In birds, kidney is the organ richest in arginase. Next to the kidney, testis stands high for the presence of the enzyme. No arginase was ever found in the ovary. As regards the function of the enzyme, very little is yet known except that it hydrolyses arginine into ornithine and urea.


The principles of animal breeding are as follows:
1. The definition of the ideal type in relation to habitas and destiny.
2. The definition of the shortcomings of already existing types in relation to the ideal.
3. The improvement of the already existing types by continued selection in the direction of the ideal.
4. The selection of animals for breeding as far as possible on the basis of the progeny test; individual merit and pedigree also to be considered.
5. The system of inbreeding to be followed to as great an extent as is practicable.
6. The system of outcrossing to be practised for the production of special types for purposes other than for further breeding.

Summary: A fowl with the left side of the body larger than the right is described. It is shown that, though the size difference is similar to that distinguishing male and female this bird was most probably not a gynandromorph. The lateral asymmetry is explained on the assumption that an autosome carrying white had been eliminated during the early cleavage divisions of a male zygote heterozygous for the characters white and yellow epidermal pigmentation.


Summary:
1. An attempt was made to determine in the developing fowl embryo whether injections of thyroxin into the incubating egg would lead to a modification of the processes of sexual differentiation.
2. The injections into the air space were made during the 3rd day of incubation, that is, at a time before the differentiation of the gonads in the two sexes can be demonstrated.
3. Of the 190 eggs injected with thyroxin, 39 embryos survived of which 12 were markedly affected, reduced size of embryos being regarded as an indication of a marked hyperthyroidism which has resulted in an increase in the metabolic rate.
4. No effect on the processes of sexual differentiation in either sex was found.
5. The effect of the injections was not apparent before the 11th day. It will be attempted in a further series of experiments to determine whether this is a specific reaction of the thyroxin or whether it is due to mechanical hindrances to the absorption of the thyroxin into the foetal circulation until a considerable time after the injection.
6. These experiments can not at present lead to any definite conclusion as to the relation between increased metabolism and the processes of sexual differentiation.


Introduction: It has been shown that iodine may be regarded as the active constituent in thyroid secretion. It is established that the iodine content of the thyroids varies with the diet, general health and season and that in addition there are individual differences.

Summary:
1. The iodine content of the thyroid of the sexually immature male fowl is lower than that of the thyroid of the sexually mature. The increase in iodine content is coincident with the attainment of sexual maturity as estimated by the histological picture of the testis.
2. In the case of the material used there was no indication of a sex dimorphism in the matter of iodine content.
3. The average percentage of iodine content of the thyroid of the bird is significantly higher than that of the mammal.

**The developmental Capon and Poularde** by F. A. E. Crew, Animal Breeding Research Department, University of Edinburgh.

Description of eleven sexually abnormal birds examined by the writer during the last five years. After having been kept under observation for two years or more, the birds were killed and examined. In all there was either complete suppression or else very considerable reduction of gonadic tissue.

**Studies on the Relation of Gonadic Structure to Plumage Characterisation in the Domestic Fowl.**


**Summary:** The cock-feathered laying hen is a female, normal in every respect save that her plumage becomes as that of the agonadic bird following the moult, as the result of a transient disfunctioning of the ovary (and/or of the thyroid) at this time.


**Summary:**
1. Four cases of successful implantation of testicular material from the hen-feathered strain of Campines into castrated Brown Leghorn males are described.
2. The grafts although producing the normal male head furnishings and behaviour did not lead to a change in the plumage character from cock to hen feathering.
3. These results are in accordance with those obtained by Roxas when testis from Sebright bantams was implanted into castrated Brown Leghorns and support his conclusion that the "hen-feathering" of the male in the hen-feathered breeds cannot be due to an endocrine difference between the two kinds of testes.
4. Successful implantation of a testis from a Leghorn male into a castrated hen-feathered Campine did not result in a change in the plumage from cock to hen-feathering as would be expected on the basis of the above hypothesis.
5. It is suggested that failure on the part of the graft to change the type of feathering was due to an insufficient amount of testis, since it was incapable of inducing a normal development of the head furnishings.


In order to test the validity of Pézard's conclusions a detailed study of the relation between size of comb and amount of gonadic tissue present in these cases has been made.
Summary: The law of "all-or-nothing" does not hold in the case of comb volume. The comb volume in the two individuals described remained intermediate in size.

The degree of development of head furnishings is dependent not upon the amount but on the state of the gonadic tissue. It appears to be related to the spermatogenic activity of the testicular fragment.


This book gives a review of the general science of inheritance and the special science of inheritance in hens, among other things, about the skeleton, formation of the comb, formation of the feathers, colouring of the feathers, distinguishing of sex in baby-chicks, colour of the egg shell.

The third part deals with herd-bookkeeping. The purpose is to keep the poultry breeder posted in a clear manner, with the results of the latest experiments in this field.
DISEASES

BACILLARY WHITE DIARRHEA


Nearly 200,000 samples were collected during the 1927–28 testing season. An average of 600 samples collected in a day by a bleeder was considered good. In the laboratory about 3000–3500 samples could be handled by one person in a day.

Two types of flocks are recognised: „bacillary-diarrhea-free” which have passed two successive annual tests with no infected birds and „tested-and-reactors-removed” flocks.


Description of a case of B.W.D. in pheasants. The chickens did not hatch and some of the pheasants gave a reaction with the blood agglutination test. In the ovarium of these reactors the same bacilli were found as in the chickens. This bacterium resembles much the Bact. pullorum.

A Comparison of the Pullorin Reaction and the Agglutination Test for Bacillary White Diarrhea by L. D. Bushnell and C. A. Brandly, Manhattan, Kansas Agricultural Experiment Station. Journal of the American Veterinary Medical Association 1929, p. 364.

Conclusions: Figure 2 of this article shows some relation between the two tests on the same flock, figure 1 shows that there is not a close correlation between the reactions in different flocks.

We must conclude from this study that the pullorin test in its present status is not so satisfactory in detecting carriers of B.W.D. as is the agglutination test. Since there is a fairly high correlation between the two reactions in the same flock, it is evident that there is a possibility of developing a pullorin which will be satisfactory for the purpose. Until such a product is developed, the agglutination test should be used. The rapid, slide-agglutination test is as effective as the tube test and may be used to replace it.

Summary:

The experiments of the author and careful analysis of previous experiments carried out at this laboratory indicate that there is no increase of infection in the yolks of eggs laid by a hen undergoing artificial immunization or even suffering from infection with poultry pathogens.

In no case were the organisms inoculated into the hens obtained from the yolks of their eggs.

In the author’s experiments all hens either fed or inoculated with living cultures of typical Bact. pullorum and autopsied showed an infection of the ovary by this organism. In each case it was recovered in cultures. None of the other introduced cultures, including 3 strains of fowl cholera, 2 strains of fowl typhoid, and 1 strain of Bact. pullorum B, was obtained from ovary, heart, or liver of the birds inoculated.

In case of all cultures, except fowl cholera, agglutinin was produced in the blood serum of the inoculated hens and also to a lesser extent in the albumen of eggs laid by such hens. Only one hen inoculated with fowl cholera showed marked increase in agglutinating power toward the culture introduced.

The blood serum was extremely variable in regard to germicidal power. In about one-half of the flock there was no indication of any germicidal power while in the other half the serum in a 1 to 4 dilution was strongly germicidal. This variation seems to show some relationship to the cultures used.

In most cases there was no change in germicidal power of blood serum during the process of immunization of the hens. The hens inoculated with fowl cholera culture 52, however, did show a definite increase in germicidal power of the blood serum. The blood serum of some hens was germicidal before inoculation but not afterwards.

The albumen from eggs of normal hens showed only a slight inhibitory effect on the growth of the bacteria when it was tested in a 1 to 4 dilution. There was no increase in the inhibitory effect during the immunization of the hens except in case of culture 52.

In these experiments there is no definite correlation between agglutination titre of blood serum or egg albumen and germicidal power.

Comparative Studies on Salmonella Gallinarum and Salmonella Pullorum by H. G. May and K. Goodner, Agric. Exp. Station, Kingston, Rhode Island, U.S.A. Bulletin 204

Summary:

A study of the carbohydrate fermentation of 52 strains of S. pullorum and 31 strains of S. gallinarum shows that the members of each group agree very closely in the production of acid from these substances. S. pullorum usually produces gas from fermentable carbohydrates while S. gallinarum never produces gas.

The titration of antigens from these strains against antisera from 8 representative strains of S. pullorum and 5 representative strains of S. gallinarum as well as one strain of Eberthella typhosa reveals no definite antigenic differences between the two groups of avian pathogens nor does it reveal any sub-groups with the exception of a slight differentiation within S. gallinarum.

Both pullorum and gallinarum are regarded as belonging to the genus Salmonella.

Since some strains of S. pullorum are more readily agglutinated than others it seems essential to select highly agglutinating strains for the routine test for ovarian infections in adult fowls.

A method for the rapid identification of the two species consists in passing suspected avian pathogens (gram-negative rods) through glucose, dulcitol, lactose and saccharose.
Results of Bacillary White Diarrhea Testing in Kansas for 1927—

Considering the fact that in Kansas they do not deem a flock free from bacillary white diarrhea until it has passed two successive tests without a reactor, and also that 39 flock-owners reported from four different counties that they have raised over 90% of all chicks hatched, it appears that the work is well worth while and that its continuation is justified.

TUBERCULOSIS


Since the beginning of 1927 tuberculosis in flocks has been successfully combatted by the use of tuberculosan. Even very sick birds were cured. In most cases one injection was sufficient to cause the disease among the flock to disappear.


In an article Helm stated that investigators agree that human and bovine bacilli do not grow in a temperature higher than 40° C. whereas Avian bacilli develop well in a temperature of 45° C. It should therefore be possible to separate bovine and avian bacilli by cultivating them in a high temperature. Avian bacilli still continued to grow in a temperature of 47° C.

In tests made by Prof. Raebiger, in Halle, better growth of Avian bacilli was obtained in a temperature below 40° C. than in a higher temperature.

Tubercel-bacilli in Eggs. Untersuchungen über den Tuberkelbac teriengehalt des Hühnereies by Prof. Dr. Raebiger, Halle a.S.
Beiträge zur Klinik der Tuberkulose. Berlin 1929.

Literature:
Statement regarding cases of avian tuberculosis in human beings and a description of experiments made by the writer.

Conclusions:
In the egg of a hen infected with tuberculosis, tubercel bacilli were found both in early and later stages. After five minutes boiling the bacilli were dead.

In 1924 Löwenstein gave an extensive description of the synopsis of avian tuberculosis in human beings. The course of this form of tuberculosis is clinically a septic anemia. Spleen swelling is continually present while the bacilli show a preference for the bone marrow and kidneys. The fever can last for months. It is of great importance that both medical doctors and veterinary surgeons should make a closer study of this avian tuberculosis.
DIPHTHERIA AND POX

Vaccination against Diphtheria. Die Schutzimpfung gegen Hühnerpocken und Hühnerdiphtherie by Prof. Dr. W. Zwick, Dr. O. Seifried and Dr. J. Schaf, with 14 illustrations. Veterinärhygienisches und Tierseuchen-Institut der Landesuniversität Gießen. Zeitschrift für Infektionskrankheiten, parasitäre Krankheiten und Hygiene der Haustiere. Bd. 34, p. 300, 1928.

A very wide study of the whole subject with an historical review and extensive literature statements.

Summary: Cow-pox virus and chicken-pox virus differ from each other. Poultry vaccinated with cow-pox virus do not develop immunity against infection with chick-pox virus. Sheep-pox virus works very weakly. Mammalian-pox virus cannot be used as a vaccine against chicken-pox. No success attended experiments to change the character of chicken-pox virus by inoculating rabbits with it. An active vaccine can be prepared from rabbit-passage. Tests made on dogs gave no results. By the round-about way, through sheep and rabbits, success attended experiments to infect cattle with chicken-pox virus. This vaccinated Gallin has little value as a vaccine for hens against artificial infection. Satisfactory results were obtained in field experiments. By symbiotic cultivation of cow-pox virus and chicken-pox virus on cattle a very active vaccine was obtained. Pigeon-pox virus gives a very active vaccine. Various outbreaks of the disease were rapidly controlled both by vaccinated Gallin and pigeon-pox virus. Vaccination is best carried out by rubbing the vaccine into the feather-follicles of the leg.


Although avian and mammalian-pox differ morphologically and histologically, they are as regards tissue and cell-changes, similar. To obtain accurate conclusions the normal epithelium tissue was first studied in various stages of development. For this purpose the mucous membrane of the oesophagus was taken. In this are many nucleoli outside the nuclei and the image is very much similar to a cornea with Guarnieri's bodies. Some nucleoli divide themselves into two parts outside the nuclei. The hollowing out of the kernel is a result of the separation of the nucleoli and in this the writer sees a proof of the origin of the Guarnier's bodies in the kernel. The writer also distinguishes a second species of Guarnieri's bodies which are caused by a direct separation by epithel cell kernels. Kernel formation was also distinguished in normal horn building which was similar to Guarnieri's bodies. The pox-virus caused an abnormally rapid horn formation. The Guarnieri's bodies and the „fowl-pox-bodies” are similar as regards their origin.

Conclusions:
1. The growth of Jenner’s vaccine is difficult on pigeons and gives no immunity against pigeon-pox.
2. Jenner’s vaccine grows easily on hens but gives no immunity against pigeon-virus.
3. Pigeon-virus does not grow on hens.
4. In the case of cattle Jenner’s vaccine gives no immunity against pigeon-virus.
5. Rabbits are not suitable for the cultivation of pigeon-virus.
6. Jenner’s vaccine and pigeon-virus are two different entities.


After about two hundred passages by pigeons in five years time the writer prepared a vaccine which gave good results in thousands of pigeons, both in Belgium and other countries.

The immunity lasts at least a year. The vaccination does not work against the coryza contagieux. The vaccine should be stored in a temperature of 5° Celsius.


Some pigeon fanciers experience much trouble from torticollis among their birds. It occurs mostly in birds of from one to three months old. Very little about this disease can be found in literature.

In post-mortem examinations inflammation of the semi-circular canals was found.

Torticollis is probably a form of diphtheria among pigeons.


Much has been written regarding diphtheria-virus of hens but little attention has been paid to the question as to whether this virus is the same as that of pigeon-diphtheria. The writer believes that pigeon-virus is more virulent.

In tests it was proved that hens are sensitive to pigeon-virus but that pigeons are not sensitive to hen-virus.
The vaccine of de Blieck, van Heelsbergen, of Bassett, and of Panisett and Verge have no effect on pigeons. The writer has made a vaccine to which pigeons are sensitive. It gives immunity against both natural and artificial infection and has a curative effect.

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**PARASITES**


History and description of the four species of Prosthogonimus (ovatus, cuneatus, pellucidus, intercalandus).

Butterflies contain the cercarles of the prosthogonimus and are, just as snails, the intermediaries of the parasites.


Spirillosis occurs and causes heavy losses in the southern provinces of Italy and in Sicily and Sardinia. It is also very frequent in Tripolis among hens, turkeys, geese and ducks. This disease could quite well be called "pernicious spirochaete-anaemia. The first symptoms are fever and loss of appetite followed by symptoms of anemia. The movements of the joints become stiff and diarrhea often occurs. The death rate amounts to from 40% to 50%. Good results are obtained by using Afoxyl as a medicine.


From these experiments is the result that it is quite evident that the administration of tetrachlorethylene as a vermifuge to the hens had no ill effect on the hatchability of the eggs.


A study was made concerning the life history of the parasite. Many insects were examined without finding any larval forms of the parasite. Finally larvae were found in the thoracic and abdominal cavities of the cockroach. These observations confirm the findings of J. W. Fielding that the roach is the intermediate host for Manson's eye worm.
GENERAL

Range Paralysis. Ueber die Mareksche Geflügelähme (Polyneuritis gallinarum) by Dr. Becker, Tierarzt, Bevensen (Hannover). Tierärztliche Rundschau, 10 Febr. 1929.

Author describes Range paralysis as an avitaminosis. He saw many cases and got good results by injections of A. O. I. Bengen.

Tumors (Adenosarcomata) of the Kidneys of Chickens by F. P. Mathews, Dep. of Veterinary Science, Purdue University, Lafayette, Indiana Journal of the American Veterinary Medical Assoc. Jan. 1929, p. 238.

Summary: A study of twelve renal tumors in chickens has been made. These tumors were found to belong in the class known as adenosarcoma, Wilm's tumor, mixed renal tumors, etc.

The primary growth was located in the region of the left kidney in all cases, in one case metastatic tumors were found in the muscles of the left thigh, the left lung and the right kidney.


Descriptions of Bacillary White Diarrhea, Typhoid, Enteritis Breslau and Enteritis Gärtner, colibacillosis and other causes.

On the poultry section of the Potchefstroom School of Agriculture two exceptionally interesting and instructive experiments are being conducted. The values of meat-meal and fish-meal as foodstuffs for poultry are being determined. The meat-meal feeding experiment has been in progress since November, 1927, and the egg-production for the last five months is as follows:

- 20 per cent, meat-meal fed, 295 eggs laid;
- 12½ per cent, meat-meal fed, 235 eggs laid;
- 5 per cent, meat-meal fed, 197 eggs laid;
- 0 per cent, meat-meal fed, 175 eggs laid.

During the period November, 1927, to August, 1928, the egg production was 1,144, 1,030, 936 and 954 respectively. It is, however, only during the winter months that the suitability of a foodstuff actually becomes apparent. The figures show clearly that meat-meal is an essential constituent of the ration during this period. Of course, all the fowls received sufficient quantities of the respective rations. This experiment, and the information obtained in other places, indicate that the best balanced ration is that which contains about 12½ per cent, meat-meal.

In the fish-meal feeding experiment, it is being determined how much fish-meal can be successfully fed without imparting a flavour to the eggs. A fishy flavour can be transmitted in two ways: (1) through the hen to the egg during its formation in the hen’s body, or (2) the egg can be tainted after it has been laid if the food is placed too near the nests. The latter is more probable than the former. Five pens, each with five hens, are being used in the test and the following quantities of fish-meal are being fed: 20 per cent., 15 per cent., 10 per cent. and 5 per cent. In the case of one pen, the food is supplied at the nest, but with the other pens it is fed away from the nests. The experiment has been in progress for only about a month and a half. Interesting results are expected. The egg production was as follows: 152 eggs with 20 per cent. fish-meal; 131 eggs with 15 per cent. fish-meal; 125 eggs with 10 per cent. fish-meal and 129 eggs with 5 per cent. fish-meal.


In feed-tests on rats with fish-meal, abattoir-waste and blood-meal, the vitamin content of A. and B. was insufficient by an addition of 8 % to the feed ration.


Description of the preparation of fish-meal in California from the waste matters of the Sardine Factories. After cooking the waste matters are pressed to free them from oil. Afterwards they are dried either directly by coal-gas heat or in a current of hot air. The meal obtained from the latter process is white and odourless. The Nitrogen content is therefore greater.

(Although this article deals with the feeding of pigs it is, with a view to the taste and smell of the eggs and meat of poultry fed on fishmeal, of great interest.)

In the environs of Hamburg much pork has been rejected owing to its tasting of fish. It appeared however that this was owing to the pigs having been fed on fish-waste and not on fish-meal. The feeding with fish products must be divided under the following headings:
1) Fish-meal, 2) Herringmeal, 3) Fresh fish, 4) Waste from the Fish-Industry.

The fishmeal, manufactured from fish which are not fatty, varies according to origin and method of preparation:
- Albumen 47—60 %, phosphoric acid calcium 18,5—29,4 %;
- Fat 2—7—14 %, Salt 0,7—4,5 %.

Herringmeal can be made from fresh herrings or from pickled herrings. The fat content can rise to 29,45 % and the salt content to 39,98 %.

If the birds or animals are fed with herringmeal from which the fat has not been extracted, the meat will have an oily taste and smell. Good fishmeal is harmless. The writer asks for official control on the manufacture of fishmeal and that all factories should have a registered trademark.


Since 1921 the writer has fattened pigs with food that contained from 250 to 300 grams of herringmeal. When killed no abnormal smell or taste was noticed. The Iodine figure in bacon from pigs which had been fed with herringmeal was only a little higher than that of other bacon. (As it is often stated that herring-meal is harmful for poultry, as regards smell and taste, I have made special mention of these important tests on pigs. Further I have personally made extensive tests on ducks and hens and have come to the conclusions that fresh herringmeal is not in any way harmful, when fed to an amount of 15 % in the mash. Dr. t. H.)


*General Discussion of two years experiments.*

The experiment of 1928 has confirmed the satisfactory results of 1927. The figures obtained in the two years compare in most cases very favourably. The weights of the pullets under the all-mash system for 1927 and 1928 are almost identical and there is a similar food consumption in the two years.

Although, under experimental conditions, the newer system has been satisfactory, it has yet to be tested on a larger commercial basis before it can be advocated generally. The system has only been given a limited trial in this country, despite the fact that it has probably received more attention during the last two years than before the first experiment was started.

It is by close cooperation between the commercial poultry farmer and those responsible for research work that progress can be made and fresh knowledge accumulated.
Relation of Feed Consumption to Egg Production by E. M. Funk.
The Poultry Item. Febr. 1929.

Recent studies made by the Poultry Department of The Pennsylvania State College show that there is a very high degree of correlation between the feed consumed and the egg production of a flock. Accurate feed records kept show that an increase in feed consumption is accompanied by an increase in egg production. There is almost a perfect correlation between these two factors showing that in practically every case an increase in feed consumption is associated with an increase in egg production.

The practical significance of this study is that poultry producers should manage their flocks to secure maximum feed consumption when eggs are most desired. Sufficient hopper space, with dry mash available at all times, cannot be too strongly emphasized. Increasing feed consumption should encourage and not discourage the poultryman.

The studies involve eight pens of White Leghorn pullets containing fifty birds each. The birds received a grain and mash ration. The average feed consumption per bird per month was as follows:

<table>
<thead>
<tr>
<th>Feed Per Bird</th>
<th>Feed Per Bird</th>
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<tbody>
<tr>
<td>Pounds</td>
<td>Pounds</td>
</tr>
<tr>
<td>November</td>
<td>4.4</td>
</tr>
<tr>
<td>December</td>
<td>4.7</td>
</tr>
<tr>
<td>January</td>
<td>5.5</td>
</tr>
<tr>
<td>February</td>
<td>5.2</td>
</tr>
<tr>
<td>March</td>
<td>6.4</td>
</tr>
<tr>
<td>April</td>
<td>6.8</td>
</tr>
</tbody>
</table>

The feed consumption per bird per month varies from 4.4 pounds in November to 6.8 pounds in April. These months are also months of low and high egg production respectively.


The meat and meat extract of an ox, calf, pig, sheep, horse, goose and codfish were examined. There is a remarkable similarity in the products of the hydrolyse of the various kinds of meat. The meat extracts show great variations in their composition.


In 100 grams protein.

<table>
<thead>
<tr>
<th></th>
<th>whale</th>
<th>cod</th>
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</thead>
<tbody>
<tr>
<td>Glycocol</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Alanine</td>
<td>4.66</td>
<td>3.33</td>
</tr>
<tr>
<td>Valine</td>
<td>6.25</td>
<td>3.88</td>
</tr>
<tr>
<td>Leucine</td>
<td>3.54</td>
<td>2.46</td>
</tr>
<tr>
<td>Proline</td>
<td>1.51</td>
<td>1.68</td>
</tr>
<tr>
<td>Phenylalanine</td>
<td>2.59</td>
<td>2.31</td>
</tr>
<tr>
<td>Asparaginacid</td>
<td>1.47</td>
<td>0.61</td>
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</tbody>
</table>
Growth Values of Proteins from commercial Animal Products.


Discussion:

Digester tankage has been defined as follows, "the residue from animal tissues, exclusive of hoof and horn manure and stomach contents, especially prepared for feeding purposes by tanking under live steam and by suitable drying and grinding.

It shall not contain more than 10 per cent. phosforic acid (P₂O₅)."

There was a high mortality in the lots receiving tankage.

It is possible that the high percentage of mortality was due directly or indirectly to the tankage in the ration as in nearly all lots receiving tankage protein there was an excessive death rate. More extensive tests would have to be conducted to attribute definitely the high mortality to the tankage; although the evidence points in that direction. This high percentage of mortality may possibly be due to some toxic products in the tankages, which might be determined by feeding various extract of tankages. Such work is planned for the future. In the manufacture of tankage, concentrated meat extract or "stick" is used in considerable quantities. This material may be of poor biological feeding value. Hoagland and Snider state: "The total nitrogen compounds in beef extract were found to have a very low value for maintenance and growth in rats." In view of this statement and the fact that "stick" is a water extract of meat, it seems logical to assume that tankage contains some material that is of low biological value.

Considerable dried blood is also used in the manufacture of digester tankages. Ox-blood was used by Hoagland and Snider who state: "Dried blood and hemoglobin was very distateful to rats and food consumption was so low that no statement concerning the nutritive value of the protein in these products is warranted." Perhaps the same is true for young chickens and might possibly account for the slow growth obtained.

It may be possible however to obtain rapid growth by supplementing digester tankage with some other protein concentrate.

The fact that tankage gives satisfactory results when fed to mature chickens may indicate that the qualitative protein requirements may be higher for growth, than for egg production or possibly the palatability of tankage may be different for young and for mature chickens.

Although we did not obtain satisfactory results with the two brands of tankages used, we do not infer that all tankages are unsuited for feeding young chickens. It is also possible that other samples of tankage secured from the same two manufacturers, which made the tankages used in these experiments, would give different results.

Summary:

1. Tankages from two different manufacturers, gave very slow growth with our basal ration, even when fed in an amount equivalent to 15 per cent of animal protein in the rations.
2. There was a consistently high mortality in the lots receiving tankage.
The Knowledge of Poultry-Feeding, Beiträge zur Kenntnis der Ernährung des Geflügels by Dr. Paula Kauffmann, Institut für Tiernährungslehre der Universität Göttingen. Archiv für Geflügelkunde 1928, no. 1.

Fattening Ducks. The quick fattening of ducks is profitable. The birds should be fattened as young as possible as the youngest birds form flesh the quickest. The food should be rich in albumen. Large quantities of albumen shorten the time necessary for fattening.

Fattening Cockrels. The younger the birds the more favourable are the results. This has long been the practice by the so-called Hamburger Chickens. Metabolism Tests on Cocks. The purpose of the experiments was to investigate in how far the albumen in various kinds of food could effect a saving in the consumption of the albumen in the body. During various periods cocks were put on a nitrogen free diet in order to control the loss of albumen which the body suffered.

During the above-mentioned periods the birds were fed on potatomeal, palmine, mineral salts and fennel.

During the test periods various kinds of albumen were fed to the birds but care was taken not to overstep the albumen minimum. The following were analysed: 1) dried yeast, 2) cod-fish meal, 3) beans, 4) peas, 5) skimmed-milk, 6) semi-solid buttermilk.

A calculation was made to estimate the number of grams of body nitrogen that were saved by 1 gram of food nitrogen. In the cases of Nos. 1, 2, 3 and 4 this amounted to 50 %, in the case of No. 5 to 99 % and No. 6 80 %. The greatest saving therefore was obtained in milk albumen while skimmed-milk protein is more effective than buttermilk protein.


Experiments with 380 hens.

Conclusions:
1. The total quantity of food necessary depends on the intensity of the egg laying.

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2. The quantity of albumen depends on the number of eggs. The minimum quantity of albumen is somewhere about 110—115 grams of albumen per unit of food. The most favourable results were obtained by 120—130 grams per unit of food. Quantities of 145 grams or 80—90 grams per food unit gave less satisfactory results.

3. The quantity of minerals necessary was 50—60 grams per kilogram of food.

4. An increased ration of albumen does not lead to an increase in the size of the eggs.

Conclusions:
1. If too much vitamin B is administered the forming of tumors is accelerated.
2. A natural sensitiveness to lack of vitamins can also influence this.
3. Unbalanced feeding of vitamins causes a loosening of the connection between the cells of the tissues especially that of the reticule-endothelial apparatus.
University of Louvain, Journal de la Société Centrale d'Agri-
culture de Belgique 1928, p. 162.

Description of: Economic importance of the poultry industry, egg-con-
sumption, export of eggs, poultry-industry before and after the war, conser-
vation of eggs; the future of the industry.

Poultry Extension Work. Department of Agriculture South-Africa.

The officers under the control of the principal poultry officer have ren-
dered excellent service throughout the year: 171 lectures were given to diploma
students at the schools of agriculture, while 178 lectures were delivered to short
course students. In addition two special courses in poultry were held, one
of four months' duration at Cedara, and one for six months at Potchefstroom.

Five poultry „drives” or extension tours were conducted during the year
in the Transvaal and Free State, Natal and the eastern and western Cape
Province, with excellent results. During the year 547 lectures and demonstrations
with a total attendance of 23,705 were given to members of farmers' associations,
aricultural societies and poultry clubs, and 2,262 farms and poultry plants
were visited.

One officer is specially employed on itinerant work in connection with
Government settlements.

The interest in commercial poultry-keeping is on the increase and the
existing staff is quite unable to cope with public demands, and it is plain
that steps will have to be taken to meet this demand in the immediate future.

The Central Egg-laying Competition at Glen yielded good results, despite
the unfortunate outbreak of „red mite”. There have been certain misunderstan-
dings in regard to the conducting of this competition, but it is pleasing to state
that these have now been removed to the satisfaction of all concerned.

The Department has worked in connection with poultry matters in con-
sultation with the Executive Board of the S A. Poultry Association, and although
there have been at times differences of opinion, the most cordial relations prevail.
I would take this opportunity of recording my appreciation of the work of the
Association and of the valuable advice and assistance which is at all times
freely rendered to the Department by its Executive.

1927—1928.

The Test ground is situated at Seafield, Rosler's, Midlothian and lies at
an altitude of about 530 feet, within easy access of Edinburgh.

Each pen is comprising 6 birds, accommodation is provided for 100 pens
of pullets and 19 pens of ducks. The average number of eggs laid per bird
was: hens 193.69, ducks 184.58. A White Leghorn pullet laid 312 eggs in 52
weeks. This is the best performance officially recorded in Scotland.

The Register of Records in Laying Trials, recognised by the Na-
The National Poultry Council issues an official annual Register of Laying Trials Records. The Register is restricted to entries in Recognized Laying Trials and to birds which attain the following minimum standards of production.

**Poultry:**
- a) for W.L., W.W., B.L., R.I.R., B. Rocks and Anconas. Either 200 First Grade Eggs or an average egg-weight of 2 ozs. over all eggs recorded, with a minimum total number of 200 eggs.
- b) for other Breeds; either 180 First Grade Eggs.

**Ducks** for all Breeds: either 200 First Grade Eggs or an average egg-weight of $2\frac{1}{4}$ ozs. over all eggs recorded, with a minimum total number of 200 eggs.


During the winter months experiments have been made with Ultra-Violet Rays on food. Two pens of 5 hens each got the same food but in one case it was treated with Ultra Violet Rays. This pen laid 128 eggs from the 1st January to the 15th February and the other only 63.
**Introduction:**

The progress of Poultry Breeding and Production, in every part of the world, during the last half century, has been truly phenomenal. Poultry Breeding was, indeed, practiced on more or less systematic lines even before the Christian era, but as a rather negligible branch of food production. Its importance to-day is world-wide, either as husbandry in connection with agriculture, or on a specialist basis.

For more than half a century, Dr. Edward Brown has devoted himself to the development of Poultry Breeding and Production, on which he is universally recognised as a leading authority. In connection with his work he has visited almost every European country, including Russia, and travelled over the greater part of the United States and Canada. The results of the observations that he has thus made and the wide experience, that he has gained are here set out in full. Owing to rapid changes and developments, his previous works on this subject are partially obsolete, and have been allowed to go out of print. These volumes which he has now completed are absolutely up-to-date, and embody the very latest knowledge and practice of Poultry Breeding and Production.

**Contents of Vol. I.**

Chapter I. Origin, History etc. of domestic Poultry. II—XI. Races of Fowls, Asiatic, Italian, French, Spanish, Belgian, Dutch, German, Other European, British, American, XII. Races of Bantam, XIII. Evolution and Classification of Breeds, XIV. Laws of Breeding and their application, XV. External Characters of Poultry and their values.

**Contents of Vol. II.**


This book, containing 155 pages and richly illustrated is a report by the German Study Commission on the Condition of Poultry keeping in the United States and Canada. The study-trip was made in connection with the World’s Poultry Congress in Ottawa. The following subjects are successively treated: The Economic Significance of Poultry Keeping in the United States and Canada; Poultry Breeds; Houses, Feeding, Incubators, Rearing, Utility, Poultry-Breeding, Business Breeds, Profit Calculation, Duck-Breeding and Fattening, other kinds of Poultry, Combatting Poultry Diseases, Teaching.

Runner Ducks, a practical and instructive Book on the new Type of Duck for Egg Production by E. A. Taylor. Published at the Offices of „Country Life”, 20 Tavistock Street, Covent Garden, W.C. 2, London. 60 pages, 12 illustrations.

Contents: All about the runner duck, the type of duck desired, its value as a forager, making a start, natural and artificial incubation, rearing the ducklings, advice of breeding, housing the ducks, feeding the ducks, notes on diseases of ducks, fifty „don’t’s” for duck-keepers, fifty „do’s” for duck-keepers.


The oviduct can be divided into three departments: The oviduct proper is about 40 cm. long, the folds running lengthwise. The isthmus is 4—6 cm. long and very thin. Then follows the uterus which is 8 to 10 cm. long and is flaked, not folded. The mucous membrane of the uterus contains many glands. In the last third part the chalk-shell is formed. The egg membrane is formed in the isthmus. The egg remains in the uterus at least 6 hours. Part of the uterus flakes attach themselves to the egg, another part forms the chalk-shell. Through the egg a number of involved processes take place in the mucous membrane of the uterus.


46 ducks were used in the tests. These were killed and the eggs which were still in the oviduct were examined.

The liquid of the white of the egg is formed in the uterus, where simultaneously the forming of the shell also takes place. This same conclusion was arrived at by Pearl and Curtis (1912) in their tests on hens. Along osmotic ways the liquid penetrates the egg membranes and the shell, which is in process of formation: simultaneously albumen and minerals also force their way in. The white is in two different layers. The membranes are formed in the isthmus and are ready when the egg comes into the uterus. Many minerals are also formed in the egg membranes in the uterus.
In the case of ducks the egg stays in the isthmus about 3—4 hours. The formation of the membranes takes about 1—2 hours. The formation of the shell in the uterus takes about 13—14 hours and the formation of the liquid of the white about 6 hours, so that the total length of time necessary for the formation of an egg is 24 hours.


This book treats the data which have been collected during long years of control on the egg trade and gives much advice concerning the controlling of eggs. The build of the egg and the examination are described. Further the qualities of various kinds of eggs.


Description of various methods, used to bring poultry-products, eggs, table-poultry etc. in the best condition for marketing.


The changes, which in turkeys are described as secondary sexual characteristics, must be looked upon as characteristics which are dependent on the sex gland.


Much deception is practised with pigeons by changing or removing the rings etc. This led the writer to make a study of the anatomy and the physiology of the lower part of the leg of the pigeon.

A description is given of the bones, joints, muscles, sinews, blood-vessels, nerves and skin. The description is illustrated by drawings.


The identification card should contain the following particulars:
1. Nationality and year of birth.
2. Provincial number.
3. Name and address of owner.
4. Full description.
5. Finger impressions of the two feet.

A number of male pigeons were castrated. The plumage underwent no change. When fully castrated tho male instincts disappeared.


**Conclusions:**
1. The trans-planting of testicular tissue between the skin and muscles is easily performed and is not dangerous.
2. By this method old, valuable breeding birds can be made capable of impregnation again.
3. The rejuvenation lasts at least a year.
4. By this operation both the physic and the physical qualities are greatly improved. The favourable symptoms appear about three weeks after the operation has been performed.
SUBSCRIPTIONS.

One pound or equivalent ($5.00) annually in advance. This Review is free to all members of the World's Poultry Science Association in good standing. All subscriptions should be sent to the editor, Dr. B. J. C. te Hennepe, Rotterdam, or to the secretary, Dr. G. F. Heuser, Ithaca, N. Y., U.S.A.

: per year
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For affiliated societies to .................................. ,, 5.0.0
½ page advertisement costs ................................ ,, 3.0.0
Full page advertisement costs ................................ ,, 5.0.0
INTERNATIONAL REVIEW
OF POULTRY SCIENCE

OFFICIAL ORGAN OF THE
WORLD'S POULTRY SCIENCE
ASSOCIATION

500,000 MEMBERS

EDITOR:
Dr. B. J. C. TE HENNEPE
ROTTERDAM (Holland)
Dear Sir,

I am sending you under separate cover a copy of the Preliminary Announcement regarding the next Congress. From this Announcement you will see that considerable progress has been made in the necessary organisation, but the success of the Congress will very largely depend upon the energy and enthusiasm which members of the World’s Poultry Science Association devote in their respective countries to propaganda action on behalf of the Congress. A supply of copies of the Announcement has been sent through diplomatic channels to all overseas countries and, at the same time, the special attention of all countries has been drawn to the importance of setting up national committees at an early date so that a worthy participation in the Congress may be organised on a national basis by each country.

We are anxious to secure:

(1) a representative delegation at the Congress from a large number of countries;

(2) comprehensive livestock displays, representing breeds from all parts of the world;

(3) national exhibits, in which by attractive displays the various national committees may present important features of their national development as well as the progress made in their poultry industry.

Great Britain affords a particularly attractive centre to many countries for a display of this character, since eggs are imported by Britain from countries all over the world whilst table poultry are also imported in considerable quantities. So far as the livestock display is concerned the Congress will provide opportunities for a number of countries to display breeds of poultry which are little known in Great Britain or in many other parts of the world, and the possibilities for creating a demand for a new breed of real economic merit are, at the present stage of development in the poultry industry, very considerable.
I need scarcely dilate upon the facilities which the Congress will provide for obtaining the latest information in the science and practice of poultry keeping or upon the opportunities which will be offered for meeting prominent people in the industry from other countries. To those countries where the development of the poultry industry has been slow but where more rapid progress is desired, the rapid developments made in recent years in the British poultry industry cannot fail to be of outstanding interest.

Several countries have already applied for space for the purpose of staging national exhibits and displays of livestock. We have decided not to allocate space definitely until 30th June next, but it is very important that we should know as soon as possible which countries desire space to be reserved.

May I therefore, ask you as a member of the Association which is responsible for initiating these Congresses and also in the interest of your own country to take early action and to do everything in your power to make the contribution of your country to the Congress one which shall be worthy of your nation.

Yours sincerely,

PERCY A. FRANCIS.

Congress Director.
THE WORLD'S POULTRY CONGRESS, 1930.

SPECIAL ATTRACTION.

NATIONAL EGG LAYING TEST
(England).

The Test promoted by the "Daily Mail" and the National Utility Poultry Society to be held at Milford, Surrey, England, and to commence on the 1st October, 1929, includes a Two Years' International Section.

This Section is open to all poultry-keepers throughout the world—one half of the penning accommodation provided is reserved for breeders resident in Great Britain and the other half for entrants resident in Foreign Countries and British Dominions.

A pen to consist of seven pure bred pullets of the same breed and variety of the breed.

The promoters of the Test reserve the right to mate up all, or any, of the pens during the second year of the Test, and to sell sittings of eggs.

The following prizes are offered:
For the highest scoring pens during the period of the Test—First, Gold Medal. Second, Silver Medal. Third, Bronze Medal. £ 50 Gold Cup given by the "Daily Mail" for the highest scoring pen.

One half of the net proceeds of the sale of sittings to be divided amongst the competitors in the Section in proportion to the number of first-grade eggs laid by their birds during the period of the Test.

The "Daily Mail" also offers £ 200 Cash Prizes to be awarded in respect of the first year's records as follows:
(1) To the five highest scoring pens owned by competitors resident in Great Britain:
(2) To the five highest scoring pens owned by competitors resi-
dent in Foreign Countries and British Dominions:
ENTRIES CLOSE 1st JUNE, 1929.
Full particulars of the Test, together with entry forms, can be obtained on application to

THE MANAGER,
NATIONAL EGG LAYING TEST,
MILFORD, SURREY,
England.
THE WORLD'S POULTRY SCIENCE ASSOCIATION
1929.
MORE THAN 500.000 MEMBERS.

Patrons.
Countries enrolled as Patrons ........... 8

Membership.
Individual Members ............. 289
Affiliated Members ............. 470500
Total Membership .......... 470789

INDIVIDUAL MEMBERS.

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| Total | 139 | 222 | 289 | 67 |
The International Review of Poultry Science is exchanged with the following Journals. Who follows?

AUSTRIA. ZENTRALBLATT FUER KLEINTIERZUCHT, Riemergasse no. 6, Wien.

AUSRTALIA. THE AUSTRALIAN VETERINARY JOURNAL, The Veterinary School, University of Sydney.

BELGIUM. BULLETIN OFFICIEL, Les Colombes, Heide-Calmpthout.

CANADA. THE BRITISH COLUMBIAN, New Westminster.
THE CANADA POULTRYMAN, Bekins Building, 500 Beatty Str., Vancouver.
THE CANADIAN POULTRY JOURNAL, Toronto 12.
THE CANADIAN POULTRY REVIEW, 184 Adelaide Str., W., Toronto.

ENGLAND. EGGS, Rudgwick, Sussex.
HARPER ADAMS POULTRY JOURNAL, Newport.
POULTRY KEEPING AND RABBIT BREEDING, 7—9 Theobald Road, London.
THE JOURNAL OF THE MINISTRY OF AGRICULTURE, 10 Whitehall Place, London.

FRANCE. LA REVUE AIRCOLE, 34 Rue de Lille, Paris.

DEUTSCHE LANDWIRTSCHAFTLICHE GEFLUEGEL-ZEITUNG, Steinmetzstr. 2, Berlin.
EIER-BOERSE, Nürnbergerstr. 28, Berlin.
GEFLUEGEL—WELT, Georgstraszze 38/33, Hannover.
GEFLUEGEL—BOERSE, Solomonstr. 16, Leipzig.
ZUECHTUNGSKUNDE, Nikolausberger Weg 9, Göttingen.

HOLLAND. TIJDSSCHRIFT VOOR DIERGENEESKUNDE.
DE BEDRIJFS-PLUIMVEEHOUDER, Doetinchem.
DE KLEIN-VEETEELT, Heerenveen.
SCHAKELS, Graaf Florisstraat 1a boven, Amsterdam.
SOUTH AFRICA. THE S. A. POULTRY MAGAZINE, Whiteco House, Box 286, Bloemfontein.

SPAIN. ESPANA AVICOLA, Valencia. MUNDO AVICOLA, Arenys de Mar, Barcelona.

SWITZERLAND, DIE TIERWELT, Zofingen.

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Wire Floors for Brooder Houses by C. S. Platt, New Jersey Agriculture, Febr., 1929.

Illustrated description of a 10- by 12-foot suburban Unit Poultry House with half inch mesh floor. Two hundred and fifty chicks were placed in the house and the cockerels removed at four weeks. The pullets were kept confined to the house until 10 weeks old. The mortality was 5 per cent during this period. The chicks grew normally and appeared in good health at all times. No green food was fed.


Illustrated description of experiment with eleven hundred chicks which were placed in the battery brooder about the middle of January and the pullets removed when 8 weeks old. The mortality among 1100 chicks was about 6 percent. Light should shine on the feed pans and water pans as much as possible, but not directly into the pens. If too much light shines into the pens the birds will be quite apt to start picking. The ration used was an all-mash mixture and was not supplemented in any way with grain, milk or green food.

A Statistical Study of Egg Production in four Breeds of the domestic Fowl, in four Parts. Part. IV, Egg Production of White Leghorns by L. C. Dunn, Storrs Agricultural Experiment Station, Storrs, Connecticut.

A summary and analysis of the records of nine international egg laying contests held at Storrs agricultural experiment station 1911-1919 under the direction of W. F. Kirkpatrick, professor of Poultry Husbandry in the Connecticut Agricultural College.

Contents: Introduction, Variation in Annual Egg Production, Comparison with other Leghorn Data, Differences in Annual Egg Production of White Leghorns in Storrs Contests, The general Trend of Egg Production through the nine years. The monthly distribution of Egg Production. Egg Production in the four major Seasons, Cycles of Egg Production, The seasonal cycle of high, low and medium-producing fowls, Changes in the seasonal distribution of Egg Production.


Conclusions:

In this study of hatchability and chick mortality involving Barred Plymouth Rocks, Rhode Island Reds, and White Leghorns, the following conclusions seem justified.

Antecedent egg production, at least for the four or five months preceding the hatching season, does not affect hatchability.
Antecedent egg production does not affect chick mortality up to four weeks after hatching.
There is no correlation between fertility and hatchability.
Causal factors affecting hatchability do not significantly affect chick mortality up to four weeks after hatching.
Causal factors affecting embryo mortality up to the seventeenth day of incubation and chick mortality up to four weeks after hatching nor is there any relation between embryo mortality during the last three days of incubation and chick mortality up to four weeks after hatching.

_Heredité de la couleur chez les pigeons_ by M. J. G. Szumann, Experimental Institute University of Poznan, Poland.

Study of the heredity in Rheingauer Farbenschwanz Möwchen.
Crossing between yellow-tail and black-tail pigeons proves that the colour of the tail feathers, according to the type Pisum inherits, in which black dominates over yellow.


When the eggs were subjected to Ultra-Violet Rays the increase in hatching amounted to 17.7 %. The best results were obtained by a daily treatment of 15 minutes. The vitality of chickens from eggs which had been subjected to Ultra-Violet Rays was much higher than that of chickens from eggs which had not been treated. In the former the mortality amounted to 20.8 % and in the latter to 57.8 %.

_The composition of the air in the Incubator._ Etude sur la composition de l’air dans la couveuse artificielle by M. J. G. Szumann, Experimental Station at the Zootechnical Institute of the University of Poznan, Poland. Académie d’Agriculture de France, séance du 8 déc. 1926.

Conclusions:
The difference between hatching results in natural and artificial hatching does not depend on the amount of carbonic acid in the air.
The cause is probably due to the current of air in the incubator. In natural hatching the content of carbonic acid in the air is much higher (1.4 per hundred) and in artificial hatching 0.04—0.52 per hundred.
DISEASES

BACILLARY WHITE DIARRHEA

The Need of accepted scientific standards and rigid adherence to them in Pullorum Disease Control by L. F. Rettger, Agric. Exp. Station, Storrs. Journal of the American Veterinary Medical Association, March, 1929, p. 453.

Description of the Pullorum-Controlling system in Connecticut.
Eradication of pullorum disease from poultry flocks is a practical and feasible thing and the adoption sooner or later of a definite standardized and scientifically and reliably operated system of control based upon accepted tests will be found quite generally to be the real solution of the pullorum disease problem. Such a system should not be made compulsory, however, at least for some time to come.


Summary:
We may summarize the above discussion by saying that bacillary white diarrhea is a serious disease of baby chicks which is disseminated to a large extent through the air of the incubator. The brooder pneumonia so common in young chicks is caused in most instances by S. pullorum infection of the lungs. The disease may be controlled by use of the agglutination test and proper sanitary conditions surrounding the flock. The pullorin test, in its present state of development, cannot be commended for this purpose. The pullorin test which has given the closest correlation to the agglutination test is an „Ecto” pullorin prepared from young cultures of the organism. The reactions to this product are not sufficient to make the readings easy and in some cases it is difficult to tell whether a bird should be considered as showing a positive or negative reaction. With the „Alkali-digest” pullorin the reactions are more pronounced although the correlation to the agglutination test is no higher than with the „Ecto” product. This latter product seems to retain its reactive properties but a few hours, even in the ice-box.

For this reason it cannot be recommended for general use until some method of stabilizing it has been determined. The use of methods to cure sick chicks should not be recommended.

The breeding of the birds and selection for disease resistance will not be practical for the general flock owner, but it will be of value to develop certain flocks from which disease-resistant stock can be purchased.

After three year’s work a circular letter was sent to all flock-owners who had had their flocks tested. Replies were received from a high percentage and these indicate that in the judgment of the flock-owners the general health and egg production of their flocks had been improved, the livability of the chicks increased and the hatchability of the eggs bettered.

**Standardization of Bacillary White Diarrhea Control Methods in New England** by W. R. Hinshaw, Amherst, Massachusetts, Agricultural Experiment Station. Journal of the American Veterinary Medical Association, March, 1929, p. 434.

**Conclusion:**

Briefly, the outcome of this conference of laboratory workers in bacillary white diarrhea control, was a mutual agreement to adopt as far as possible a standard technic which was agreed upon at the conference. No hard and fast rules were adopted, and all those agreed upon were flexible enough to allow changes another year. But the real good that came out of this meeting was the start made towards the adoption of standard methods of control of bacillary white diarrhea. True, there were differences of opinion, but at least five groups of laboratory workers in bacillary white diarrhea control in United States now have a better understanding of each other than ever before.

Plans are already under way for a similar conference to be held at the end of the 1928-29 testing season. Instead of being confined to New England, the 1929 conference will invite all of the Northeastern States to participate. The success of this first conference warrants our recommending this method of attacking the present situation regarding bacillary white diarrhea control.

**Fowl Typhoid in South Africa** by G. Martinaglia, Division of Veterinary Research, Onderstepoort, Pretoria. The South African Poultry Magazine, March 1929.

There is no data available as to when fowl typhoid was first introduced in South Africa, but it appears that the disease has been smouldering for years, and is on the increase at present.

Our present knowledge of this disease in South Africa is based on the careful clinical, pathological and bacteriological study of five epizootics occurring within a 500 mile radius, involving the Transvaal, Natal and East Griqualand.

**Recommendations for combating the disease.**

1. Sanitation is of primary importance in controlling any epizootic poultry.
2. Have fowls penned off from free range at the time of the outbreak.
3. All in-contact fowls should be segregated, sick birds killed off, and all carcases burned.
4. The droppings should be collected daily and burned.
5. Spray the walls, floors and perches of the fowlhouse with any efficient disinfectant.
6. Remove all shade-producing vegetation from the old runs; harrow in unslaked lime about two inches deep and allow them to remain unoccupied until after the winter.
7. A plentiful supply of pure, fresh water should be given at least twice daily.
8. All receptacles for food and water should be scalded with boiling water while the epizootic rages.
9. Spreading of the disease by rats, sparrows or any other probable vectors should be guarded against by efficient netting.
10. Birds returned from shows, or stock birds purchased from another breeder, should be isolated in a separate pen, removed as far as possible from the fowl runs, for a period of two weeks.

11. Take the temperature of sick birds, as a high temperature would help in arriving at an early diagnosis.

Fowl typhoid vaccine.

Vaccination is still in the experimental stage, but the results obtained so far have been exceedingly promising. It seems that epizootics were checked by the prompt vaccination of all apparently healthy birds.

Vaccines are issued only to the owners, where the disease has been definitely diagnosed, and under following conditions:

1. That only 50 per cent, of the birds be inoculated and marked in such a way that they can be identified for three months.
2. That a record of mortality from the marked and the unmarked lots be kept.
3. That all the birds which die be forwarded to the Laboratory for post-mortem.
4. That the birds under test are not disposed of for a period of three months after inoculation.
5. That a report on the test be submitted to the Laboratory at the end of three months.

Dose: 1 c.c. per fowl.

Procedure:

1. Before the operation, the syringe and needles must be sterilized by boiling for 15 minutes. During the operation dip each needle in a 75 per cent. alcohol or 2½ per cent. carbolic solution before the next bird is vaccinated.
2. Innoculate under the skin of the inside of the thigh or under the wing.
3. A second vaccination after an interval of a week may be advisable. It is recommended that, to start with, only a small number of the birds be inoculated; if no untoward results are observed within three days, the remainder may be done.


Summary:

A study of three commercial hypochlorite preparations and of ordinary bleaching powder failed to show any effectiveness of these materials in reducing mortality of chicks artificially infected by Salmonella pullorum and Salmonella gallinarum.

These substances show no apparent germicidal action in the alimentary tract. They do, however, act as efficient disinfectants of the drinking water, and apparently will prevent the spread of the intestinal diseases by this route. The incubation period seems to be the same for both Fowl Typhoid and Bacillary White Diarrhea. This appears to be from four to seven days after infection.

Salmonella pullorum and Salmonella gallinarum are destroyed in the same time period by equal concentrations of hypochlorite solution. The hypochlorites are recommended as a means of preventing the spread of Fowl Typhoid and Bacillary White Diarrhea through the drinking water.

Effect of Bacillary White Diarrhea infection on egg production by V. S. Asmundson and J. Biely, Dep. of Poultry Husbandry,
University of British Columbia. Poultry Science, 1928, p. 293.

Summary:
Data are presented in this paper on first year egg production (Nov. 1 to Oct. 31) of 358 hens of six different breeds. Of these, 58 reacted positively and 300 reacted negatively to the agglutination test for Bacillary White Diarrhea. The evidence submitted shows that the average egg production of reactors is lower than that of non-reactors. The difference, based on data for all birds studied, was $53.43 \pm 5.34$ eggs. This difference of over 53 eggs is ten times as great as the probable error of the difference, hence can be considered statistically significant.

The proportion of the reacting and the non-reacting hens in different fecundity classes was: 149 eggs or less—36.2% of the reactors, 7% of the non-reactors; 150-224 eggs—48.3% of the reactors, 39.0% of the non-reactors; 225 eggs or over—15.5% of the reactors, 54.0% of the non-reactors.

There was somewhat greater variation in the egg production of reactors than of non-reactors as measured by the standard deviation and the coefficient of variation. The difference in the standard deviations was $10.58 \pm 3.78$ eggs, while the difference in the coefficients of variation was $13.10 \pm 2.46$ per cent. Moreover, the range in the first year egg production was nearly, though not quite, as great in the case of the reactors (9 to 283 eggs) as in the case of the non-reactors (4 to 305 eggs). This variability in the eggs production of reacting and non-reacting hens would indicate that Bacillary White Diarrhea reactors could not ordinarily be eliminated from an infected flock by culling out the low producers.


During recent years Bacillary White Diarrhea has been repeatedly discovered at the Institute of Prof. Miessner. Poultry breeders state that the feeding of semi-solid buttermilk is harmful. The writer advises against the use of sour milk on infected farms. It is possible that lactic acid irritates the intestines.

Summary:
In Germany the bacillary white diarrhea of chicks is also produced by a gas-forming and a non gas producing type of Bacterium pullorum. There are also hens the sera of which agglutinate this organism to a high titre. The rapid spread of the disease is apparently caused by unnatural-raising in incubators and artificial brooders, by small scratching-rooms, bad pastures and dense filling of the boxes, which increase the disposition for the disease. Moreover the purchase of infected hens eggs and day old chicks forwards spreading of bacillary white diarrhea. Therefore away with infected hens and chicks! For control of the disease is suggested: limitations of the number of chicks in a box serological test for carriers, elimination of suspects, sanitation of premises, thorough cleaning and disinfection of hands and boots on leaving a box, ever fresh drinking water mixed with intestinal antisepts, vaccination. Take care when purchasing hens and chicks! Take care in feeding baby chicks with sour skimmed milk or Ha-Bu! To obtain a survey on the occurrence and progress of bacillary white diarrhea in the different flocks and on all things which might be connected with the disease the flock-owners are requested to fill up the subjoined form and to send it to the Hygienischen Institut der Tierärztlichen Hochschule in Hannover. It is desirable that such an inquiry should be started in the U.S.A. too.

An illustrated treatise on the disease. Contains an historical review. Own tests on chickens. Success was attained in killing chickens with subcutaneous injections of aerogene and non-aerogene tribes. In feeding, only those chickens died, which received non-aerogene tribes. Both kinds were fatal for mice. Hens were not sensitive to intramuscular injections.

Tests to immunise chickens failed. The tests also included older hens and hatching eggs. At the end is extensive literary data.


Since 1922 acute and mild epidemics have occurred in Korea. The symptoms agree with those of the Klein disease. Vaccination is fairly active, serum treatment is useful. Bacteria carriers should be disposed of by agglutination.


One breeder had 30 pigeons die of wing paralysis, which was caused by para-typhoid bacilli in the elbow joint. The bacilli appeared to agglutinate with Para Typhoid Breslau. The bacilli were also found in the front eye chamber of some pigeons.

It was not possible to discover how the pigeons had become infected. The disease can become acute and chronic.


The small white points in the lungs of the chickens remind one of tuberculosis. Dr. Coulaud has made an extensive study of these changes and describes them in this article. These protrusions are caused by pullorum bacilli.

TUBERCULOSIS

In festerings in the mouths of human beings Tubercle Bacilli of the Typhus Gallinaceus were found. The festerings remind one of those of Aphthae and show an inclination to cure. The disease is not rare. It has the appearance of a good natured infection.

**Vaccination against tuberculosis.** *Essai de vaccination contre l'infection tuberculeuse par le B. C. G. d'origine aviaire* by Harrnach, Revue-générale, Mars, 1928.

The vaccine in doses of 2.5 m.gr. under the skin of chickens of 11 days old, and in doses of 5 m.gr. under the skin of full grown hens, did not cause any reaction.

The administration of 10 to 20 m.grs. kills many chickens of 2 days old. The eggs, laid 15 days after the vaccination, when injected into guineapigs and rabbits, cause positive tuberculine reaction after three weeks.

The vaccinated hens are immune against 2 m.gr. avian tubercle bacilli administered through the mouth.

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**DIPHTHERIA AND POX**

**Chicken-Pox Vaccine.** The South African Poultry Magazine, May, 1929.

The following information has been forwarded to us from the officer in charge of the Allerton Laboratory, Pietermaritzburg, regarding the use of chicken-pox vaccine in the Union:

- The vaccine is issued in glass bottles and should not be used later than seven days after receipt.
- The vaccine should not be allowed to stand in the vertical position, as sedimentation occurs, forming a cake at the bottom of the bottle which is difficult to displace by shaking.
- Before using, the bottle should be well shaken to get any sediment into suspension. The cork is then withdrawn and the spare cork with the class rod piercing it is placed in the neck of the bottle. The depth to which the rod dips into the vaccine should be regulated, so that on being withdrawn only a small drop adheres to it.
- The age of the birds is from six weeks upwards. Good results have been obtained with birds two to three months old. In younger chicks, especially of Game varieties, the results may be severe.
- The bird is held on its right side by an assistant, feet being towards the operator. The top foot is grasped, pulling the leg out straight. The feathers over the outside of the upper thigh are raised to expose the unfeathered-portion in this position. This is then cleaned and disinfected with a rag moistened in alcohol or methylated spirits. Antiseptics must, on no account, be used.
- When the alcohol has dried off, a small area, the size of a threepenny piece, on this unfeathered portion is scratched in vertical parallel lines with the point of a needle, or any other suitable scarifier, so as just to tear the skin. The end of the glass rod with the drop of vaccine adhering to it is rubbed gently on this scarified area and the feathers allowed to fall over the area operated on. After every five chicks, the needle should be cleaned with alcohol and dried.
- The whole process is similar to vaccination of the human against small-pox. No further treatment is necessary.
In reacting cases pustules form about the fourth day, and these form a yellow, and later, a firm brown scab, which falls off in about fourteen to sixteen days.

Any opened bottles must be used on the same day. The vaccine must be stored in a cool place and not exposed to direct sunlight.

**Important.**—The vaccine is issued free of charge, on an experimental basis, subject to the conditions that five per cent of the birds are left unvaccinated, and records are kept of reactions and evidence of resulting immunity.

Vaccination is done entirely at the owner’s risk. The Department accepts no liability for mortality which may occur.

The vaccine protects against chicken-pox, and also those forms of roup (contagious catarrh) which are due to chicken-pox infection.


Authors vaccinated fowls with a vaccine prepared from comb scabs from cockerels. One gram of the powdered pox scabs was thoroughly mixed with four cubic centimeters of a glycerin-phenol-solution, composed of 50 parts glycerin, 1 part phenol and 49 parts water. In one experiment four methods of vaccination were used: scarification of a defeathered portion of the skin; plucking of one feather, of five feathers, of ten feathers.

**Results:** The feather follicle method in this test appeared to produce an immunity equally satisfactory to that of cutaneous scarification.


Three kinds of fowl pox virus have been studied of which two were pathogene for hens alone, and one also for pigeons. None of these three were pathogene for rabbits, rats, calves and ducks. Each virus makes the hen immune against the other two. In the case of the pigeon only the virus which is pathogene for the pigeon makes it immune.

In the hen an immune serum is formed which makes the virus non-pathogene. In the case of the virus that is also pathogene for pigeons, it only stops the action in hens.

No crossed immunity occurs in the hen between the vaccine virus and fowl pox virus. The virus of the fowl pox passes easily through the Berkefeld filter while the vaccine virus is almost completely held up, even after several passages by the hen.

Nothing, therefore, indicates a close relationship between vaccine virus and fowl pox virus.


Virus from pigeon pox becomes adaptable to rabbits by several passages in the testes of rabbits. By this the pigeon virus totally loses its original qualities and obtains the qualities of cow pox. Avian, mammal and human pox are based on the same virus.

An increase of avian pox virus is obtained by cultivating a stew of the hide and brains of 12 to 15 days old chicken embryos with the filtrate of fowl pox material for four days in fowl plasma. Without chicken embryonal tissues or with embryonal tissues of rats and mice no increase of the virus is obtained.

PARASITES


Summary:
The author gives a description of Tracheophilus sisowi (Skrjabin, 1913) 5 specimens of which were encountered in the trachea of a tame duck.
The animal had died showing symptoms of distress.

The writer succeeded in infecting chickens with coccidies of rabbits. These results are contested by C. Corcuff in Annales de Parasitologie humaine et comparée, 1er octobre 1928.

Description of the literature on the combattting of coccidiosis.

Conclusions:
1. Cresol, formaldehyde, katechu, Semen Arecae, Naganol and Yatren had no curative affect on young chickens.
2. Lactose feeding has perhaps a favourable influence on the course of the disease in cases of slight infection.
3. A rectal treatment of the coecumcoccidiosis is impracticable.

In a gut gland of Planorbis Corneus L. the typical larvae of a blood trematoda was found. By infection tests it was proved that this new cercaria, which is perhaps identical with the Cercaria Ocellata de la Val discovered by Ercolani in 1881, belongs to the Bilharziella polonica Kow, found in the blood of ducks. This parasite is more widely distributed than was known up to the present.

In these cercaria were found numerous very interesting symptoms adaptable to the life in ducks. There is great certainty, thus, that the parasite will infect ducks which swim in infected water. It is also possible that in the cercaria of the trematodes living in the blood of human beings similar adaptable symptoms exist.


Description with photos of the parasites in the blood of poultry. The writer brings the parasite into relationship with Trypanopsis malignus which was discovered in human beings in French Guyana by Léger.

The writer advises that more attention be paid to examining the blood of fowls.


Füllerborn and Mayer, confirmed by E. Brumpt, proved the transmission of Sp. Gallinarum by Ornithodorus Moubata.

The writers made tests with Sp. Gallinarum of a duck. No success was booked in trying to transmit parasites with Ornithodorus Savignyi from an infected cock to healthy hens. Although canaries are very sensitive to this spirochaetes no success was attained in tests on canaries to prove them in the blood of test hens.


Description of a worm disease in the gland stomach of swans. Only one case is described in the literature by R. Klee. The disease is more frequent in geese and ducks. The parasite is transmitted by Daphnia Pulex.

GENERAL

Deals with Bacillary White Diarrhea (Uniform Procedures, Sanitarian, Standardization of Test) Avian Tuberculosis, Biological Products and Proprietary Remedies.

Summary:
1. A program of research elimination of reacting breeding fowls and the application of sanitary measures are regarded as fundamental in the control of Bacillary White Diarrhea.
2. Persons conducting agglutination tests should be approved by proper state officials. Testers should report periodically to approving or appointing bodies. Veterinarians are urged to enter this field of work in which they are unusually well qualified by their previous training and experience.
3. It is recommended that the agglutination test be considered as the official test, the rapid or slide test being permissible and that official testing be conducted on a uniform basis. A study of the dilutions used in the agglutination tests in different states shows that a majority use a dilution of 1.25 or less. It is suggested that a dilution of 1.25 be given a trial by those using higher dilutions and that a standard antigen be made available through proper channels to safeguard the testing work.
4. Testing from flocks in the corn belt for avian tuberculosis has yielded valuable information regarding the extent of the disease. As a diagnostic agent avian tuberculin has proved valuable in the removal of reacting fowls that have been slaughtered under inspection. The elimination of reacting fowls has been followed by disinfection of premises. Your committee recognises the value of the tuberculin test, as well as systematic disposal of fowls in the suppression of this disease.
5. The promiscuous sale of cure-all remedies and biological products for combatting poultry diseases is recognised by your committee as an unnecessary tax on the industry. Your committee recommends that claims be made for remedies to be carefully scrutinised by proper federal and other state officials in the protection of the poultry industry.
6. The outstanding need in the control of bacillary white diarrhoea is a uniform method of procedure. Terminologie is important standardisation of the test is also a matter of concern, but most important of all is the inauguration of a plan under the supervision of federal authorities that will serve in the upbuilding of the industry on a proper basis. In a comprehensive plan of this character it seems logical that live stock sanitary authorities should be best qualified to decide questions of terminology relative to disease control. Your committee therefore recommends to this association that the word „accredited” be confined to official disease control or health programs and not used to indicate culling or other phases of breed improvement work.


Writers have made extensive tests in connection with the contagiousness of the disease and have also made histological and hämatological studies.

Attempts at infection by feeding and by avian mites gave negative results. By injection with mites-blood 21 positive cases resulted.

The infection is only effective with material of acute forms. 40 tests with material of chronic cases showed a negative result. Infection was successful with material which had been passed through the Berkefeld filter.

Writer divide leucaemia into two groups.
A. by which the bone marrow is affected, the leucaemia with pri-
THE CRYSTAL PALACE

GENERAL VIEW

Photochrom Co. Ltd. London.
THE CRYSTAL PALACE

THE NORTH NAVE

Photochrom Co. Ltd. London.
mitive blood corpuscles (cellules sanguines primitives) the commencing stadia of red blood corpuscles, the so-called anaemic leucaemia of Ellerman.

B. by which the bone marrow is not affected, the so-called leucaemia with leucoblasts (the lymphatic leucose of Ellerman).

A typical feature in leucaemia in fowls is that all the lymphoid cells, and probably the binding tissue cells also, are changed into lymphoid germ cells. It is these latter which breed.


In 1926 the writer proved that the cells of the sarcome of Rous which have dried up can live again, and that the Berkefeld filtrate of this sarcome contains sarcome cells. This was confirmed by Haagen in 1927. Sarcome cells, steeped in plasma, cause the sarcome of Rous in hens. The old theory of Carrel and Fischer with regard to virus which can be filtered, is destroyed by this discovery. (Ref. Recueil de Médecine Vétérinaire, 1929, p. 176.)


Leucaemia is continually increasing in Bavaria. The pathological-anatomy of the disease is described, and illustrated by 9 photos. Attempts to cause infection by feeding the organs had no result.

_Leucaemia of Poultry. La malattie dei polli-la linfoadenosi o leucomielosi_ by Santagostino, la Clinica veterinaria, 1928, p. 519.

Cholera, coryza, diphtheria, and pest are continually found in Lombardy. Pullorum and fowl typhoid are seldom met with. These diseases are more frequent in Piémont.

It often happens that when fowls die of leucaemia the veterinary surgeon is consulted with regard to the suitability of the flesh for human consumption. The disease can be mistaken for tuberculosis. Leucaemia is frequent among noble breeds (Wyandottes) and may cause great losses. The disease lasts two to three months and is always fatal. The article is illustrated by photos.

_Immunisation against Fowl-Pest. Immunisierungsversuche bei Hühnerpest_ by Dr. W. Frei, Veterinär-pathologisch Institut der Universität Zürich. Centralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten, Originale, 1929, p. 448.

Jouan and Staub of the Institute Pasteur in Paris have succeeded in preparing an active vaccine against pest. This is, however, not yet suitable for practice.

The writer has tried to dilute the vaccine with carbolic acid and aether. No favourable results were obtained.
Experiment with Lead. Fütterungsversuche mit Blei by Prof. Dr. H. Miessner, Hygienisches Institut der Tierärztliche Hochschule, Hannover. Deutsche Tierärztliche Wochenschrift, 1927, p. 297.

Summary:
The tests proved for the first time the harm caused by lead found under natural circumstances. Tests were made with pure lead, lead-oxide (PbO), PbS and PbSO₄.
1. Hens and ducks die after administration of 65 grams of pure lead.
2. PbO is 2 to 3 times more poisonous than lead. 20 grams is fatal to hens and ducks.
3. PbS is fairly harmless. After administration of 90 grams, hens, and after 150 grams, ducks, showed no externally noticeable symptoms of sickness.
4. PbSO₄ is harmless.

Polychromasia and basophil granulations are noticeable in the blood of birds suffering from lead poisoning. Abscesses, such as can be seen in human beings, are often found in the abdominal wall.

A fish bone in the beak of a hen. Ein Fremdkörper im Schnabel eines Huhnes by Dr. A. Steinberg, Münster in Westfalen. Tierärztliche Rundschau, 1928, p. 915.
Description of a case in which a fish bone remained fast, crossways, in the beak of a hen for eight days. The head swelled considerably and the symptoms pointed to diphtheria. After the bone had been removed the hen recovered.

Infection with B. enteritidis breslaviense causes the majority of infectious diseases among pigeons. The disease is acute and chronic and met with all over Germany. In chronic cases wing paralysis is caused. The flesh of the pigeons may not be sold for human consumption.

The writer succeeded in immunising hens by administering 1 to 5 grams cholera culture, killed by being heated at 60° for a period of two hours. The hen became immune against a fatal dose but remained sensitive to subcutaneous injections.

On a market in Hungary Csontos found sporotrichosis in 20 % to 25 % of the eggs, which was very similar to that of Beurmann, Matruchot
Conducting Experiments to Determine Cause of Paralysis in Poultry. „The British Columbian”.

To investigate poultry paralysis which has been causing considerable losses in Fraser Valley poultry flocks during the past few months, an official of the provincial department of agriculture is carrying out a series of experiments. The investigation was arranged by J. W. Berry, M. L. A. for Delta riding, immediately following an interview with a delegation consisting of E. E. Sendall, Gregg McCoy and N. C. Abercrombie representing a number of Langley poultrymen. The deputation pointed out that the losses of birds which are being sustained by various poultrymen emphasized the necessity for prompt action being taken by the government to attempt to cope with the situation.

About 20 birds that had contracted paralysis were obtained by the department of agriculture official, who is carrying out a number of experiments to determine, if possible, the cause of the disease and a remedy. It has been suggested that paralysis is a nutritional disease and some of the tests will be undertaken to ascertain if such is the case.


It is the purpose of this report to offer a summary of outstanding discoveries in the beginnings of avian pathology, following with a brief review of noteworthy scientific accomplishments of the present day in that domain, and including a statement relating to important poultry diseases which have but recently come prominently to the attention of pathologists, or concerning which, for some other weighty reason, further research seems urgent or eminently desirable.


Poultry Division of Laboratory in Halle. Zweijahres Bericht über die Tätigkeit des Bakteriologischen Instituts der Landwirtschaftskammer für die Provinz Sachzen zu Halle a. S. für 1924—25 und 1925—26 by Prof. Dr. H. Raebiger, Direktor.

977 head of poultry were examined. Compared with other years there was an increase of cholera caused by the importation of infected birds. The diseased birds were killed and the healthy ones treated with serum and vaccine. Tuberculosis was most frequent. It is desirable that an association for combatting this disease should be instituted.

Tuberculinating and inoculation with cold-blooders-bacilli is advised. Inflammation of the oviduct played a great part. There were many cases of coccidiosis among the chickens. There were no cases of pullorum. Paratyphoid was found.

In one case of a high death rate among chickens Swine Eresipelas Bacilli were discovered.

Description of the damage caused by tuberculosis among fowls and pigs. Tuberculosis has increased recently. Symptoms and distinguishing are discussed. For the purpose of combatting the disease it is advised to keep only young birds on fresh ground.

Destruction of the mites (Dermanyssus avium) takes place by spraying the houses with a compound of carbolic and petroleum in equal parts.

In order to kill the ecto-parasites the birds should be bathed for $\frac{3}{4}$ hour in a 0.5% solution of Fluor Natrium.

An extensive description of pullorum and coccidiosis is also given.

Poultry Diseases in different Seasons. Üeber das jahreszeitliche Auftreten einiger Geflügelseuchen by Dr. F. Schmidt-Hoensdorf, Bakteriologisches Institut der Landwirtschaftskammer, Halle (Saale), Archiv für Geflügelkunde, II, 4.

Different diseases occur in certain seasons. There is no accurate data to be found in literature. Tuberculosis is most frequent in the province of Saxony. This disease causes the highest death rate during winter. In a tuberculination on 17,000 head 10% proved to be infected.

Besides tuberculosis many cases of disease of the laying organs were discovered. Diphtheria takes third place. The number of cholera cases is very low. The import of fowls from abroad is prohibited. Fowls from abroad, and especially formerly, brought much cholera into Germany.

The most frequent diseases among chickens are Bacillary White Diarrhea, Coccidiosis and worms.


Madness in cocks is rare. Dr. Haim Naim of Constantinople describes two cases in which children were bitten by mad cocks.

The writer describes successively:

1. Transmission of the virus of a mad dog to a cock by a bite in the comb.
2. Transmission from cock to cock.
3. Various forms of madness in cocks.
4. Post mortem examinations.

Conclusions:

Cocks are sensitive to madness virus. The disease manifested in two forms. (1) Forma Furiosa, (2) Forma Paralytica. The cock can transmit madness to other animals. Cocks can be cured of the disease.

Report of experiments with feeding glass cylinders, $\frac{1}{2}$ in. long and $\frac{1}{4}$ in. in diameter to fowls. After few days the cylinders were broken. In all the cases referred to, grit was present in the gizzard and the birds were all adults. It was thought desirable to ascertain whether the gizzards of younger birds were equally efficient and whether this crushing of glass beads was possible in the absence of grit. For this purpose chicks were reared under as near grit free conditions as possible.

These experiments clearly show that the gizzard of the bird forms a very efficient mill and that comparatively tough materials, such as glass, are broken into pieces by the contractions of the gizzard muscles. Glass beads similar to these crushed required a direct pressure of 40 lbs., whereas those recovered intact required a pressure ranging from 49 to 59 lbs.

Valley Poultrymen find clean clam shell just as efficient as oyster Shell. The British Columbian. Statement of J. R. Terry, chief provincial poultry instructor:

"I have found that the shell is softer, and can be assimilated more quickly by the fowls than oyster shell. Now that through selective and pedigree breeding we are getting such good laying, you can quite see the superiority of clam shell over oyster shell when I state that I have fed clam shell very heavily overnight to fowls, and on killing them in the morning found no trace of clam shell in their gizzard or crop; this has not been the case with oyster shell.

"For particular reasons I have always recommended the use of clam shell. In addition it can be bought cheaper than other shell, and in my opinion gives such good results.

"In my opinion there has been more waste in oyster shell, as compared with clam. I have always found a far higher percentage of dust in oyster shell, and this, when fed in hoppers has gradually clogged them up; also, if there has been any moisture, I have found it to harden, similar to cement."

Effect of grit on Poultry. Some factors which increase digestibility by the Editor of "Eggs", May 29th, 1929, Reprint from an article in Poules, Pigeons and Lapins.

The birds which have been deprived of gravel present a series of disorders which, in a general way may be attributed to faulty nutrition.

The first manifestations of general disorder in hens were an abrupt cessation of laying when this latter was in full activity. From the moment laying ceased the birds lost weight. The last days of the experiment the birds were
so weak that they did not consume more than 15—20 grams of grains, whereas in the beginning of the experiment the ration of 100 grams was not sufficient but had to be supplemented by meat and greens.

The results of suppression of gravel in the feeding of pigeons were also bad.

The author of „Eggs“ adds to this article: We propose to leave it for the consideration of our readers, merely remarking that with the intensively kept birds on the Experimental Farm, no grit of any kind been fed for a period of five years, only oyster shell being supplied for the purpose of shell-forming material. The birds on the farm have remained in perfect health; they are of normal weight and their production has been extremely good, individual birds having laid as many as 290 eggs.


Two lots of 10 chicks each were kept confined from May 2, 1925, to January 1, 1926, at the Kentucky Experiment Station, for making a study of the need of growing chicks for grit. The feeds of the two lots, which were similar, included buttermilk, a grain mixture, mash, green feed, and cod-liver oil. Sand at first and later gravel was supplied as grit to one lot. The biweekly weights of the individual chicks showed that there was no significant difference in the growth rate of the males and females in the two lots or in the egg production of the pullets.

Analyses of the droppings for ash and residue insoluble in hydrochloric acid showed that larger amounts of both were present in the droppings from the birds receiving grit. The nature of the hydrochloric acid-insoluble residuc showed that considerable sand was passing through the birds receiving it. Ash determinations of the contents of the gizzards at the conclusion of the experiment showed that there was a very small amount of ash present and nothing which could have served as a grinder in the gizzards of the birds which had received no sand. The gizzards of this lot were also slightly heavier than those of the other lot, indicating a possible enlargement to overcome the lack of grit for grinding. It thus seems that grit is not essential to the growth and egg production of White Leghorn chicks up to 8 months of age.


The results of three experiments are reported from the Ohio Experiment Station in which chicks were successfully raised for from 12 to 28 weeks without access to grit.

In the first experiment 2 lots of 18-day-old chicks, receiving coarse ground and fine ground feed, respectively, but without access to grit, averaged 346.6 and 395.3 gm. in weight at the end of the 12 weeks. Two comparative lots having free access to granite grit averaged 353.0 and 373.5 gm. respectively, at the same age. No abnormalities or-nutritional disorders were observed aside from the fact that all birds showed a tendency toward constipation.

In a second experiment 2 lots of chicks were used for comparing liquid skim milk fed ad libitum with 15 per cent. dried buttermilk added to the basal
ration, but no grit was fed to either group. At the age of 12 weeks, up to which time growth had been particularly successful on the liquid skim milk ration, all birds from both lots were divided into 2 groups, one of which was allowed access to grit up to 23 weeks of age. It is reported that both lots made normal growth with no signs of digestive or nutritional disturbances, and that laying was started between the eighteenth and nineteenth week in each lot. At the conclusion of the experiment the birds were killed and the digestive tracts examined. No differences were apparent except that the gizzards of the grit-fed birds were from one-fourth to one-third filled with grit, while from 2 to 10 particles of hard granular material were present in the gizzards of the other birds.

In a third experiment 2 lots of chicks were fed on muslin cloth during the first 2 weeks and om 0,5 in. mesh hardware cloth up to 28 weeks of age. Grit was furnished to one lot but not to the other. a coarse ground mixture of yellow corn and whole wheat was fed during the greater part of the experiment. The rate of growth and mortality was similar in the 2 lots, and the pullets started laying in both lots between the nineteenth and twentieth weeks. No grit was found in the gizzards of cockerels killed at the end of the sixteenth week which had received no grit during the experiment, and there was no apparent variation in the thickness or firmness of the gizzard musculature.

From the results of these experiments the authors conclude that grit is of no benefit to the birds for grinding purposes, the natural craving being due to the chickens' desire for minerals. These results are in agreement with those of Buckner, Martin, and Peter noted above.


General Discussion of results obtained in 1928.

Generally speaking satisfactory results were obtained with the all dry-mash system. While not giving better results than the Control Pen the all-mash pullets were as good as those of the control. In cost of feeding the all dry-mash system had a very slight advantage, while although costs of labour could not be kept, it is safe to say that the more simple system would have an advantage where a large number of pullets are being reared. Experiments are now being conducted as the National Institute of Poultry Husbandry to compare the laying ability of pullets raised by the all-mash and the mash and grain systems of feeding. Each of these groups of pullets will be fed during their first laying year under the same system as that on which they were originally reared.

This will test the stamina of the pullets in each group and show whether the all-mash method is a suitable system for producing pullets likely to stand up to the strain of heavy egg production.

General Discussion of the two Experiments in 1927 and 1928.

The experiment of 1928 has confirmed the satisfactory results of 1927. The figures obtained in the two years compare in most cases very favorably. The weights of the pullets under the all-mash system for 1927 and 1928 are almost identical and there is a similar food consumption in the two years. The mortality of the chicks was increased in 1928, but since both groups show an equal increase, this point has no significance.

Although under experimental conditions the newer system has been satisfactory, it has yet to be tested on a larger commercial basis before it can be advocated generally. The system has only been given a limited trial in this country, despite the fact that it has probably received more attention during
the last two years than before the first experiment was started. It is to be hoped that those who have given the system a thorough trial commercially will make public the results they have obtained. It is only by close co-operation between the commercial poultry farmer and those responsible for research work that progress can be made and fresh knowledge accumulated.

**Vitamin E (reproductive vitamin) did not improve Hatchability of Eggs.** Canadian Poultry Review, 1929, p. 186.

There has recently been discovered a new vitamin which is known as vitamin E, or the reproductive vitamin, because it has been shown to have direct influence upon the fertility or reproductive ability.

To determine whether this vitamin would have any beneficial effect on the fertility of hen eggs, the Poultry Husbandry Department of the University of Illinois have recently conducted an experiment with two lots of 20 White Leghorns each. These lots were fed the following ration: ground yellow corn 60 parts, wheat bran 15 parts, wheat middlings 15 parts, meat scrap 9 parts and salt 1 part.

An oil made from wheat germs is the richest known source of vitamin E; therefore the ration of one of these lots received 2% of wheat germ oil in it. Lot 2 started laying about 4 weeks sooner than lot 1, but both lots produced about the same number of eggs in 20 weeks, the length of time the experiment lasted.

From the results of this experiment the conclusions were that:

1. The addition of 2% of wheat germ oil to a mixed grain ration made no improvement on the fertility of the eggs;
2. The addition of the wheat germ oil in the amounts used in this test did not improve the hatchability of the eggs.

**Feed Chicks Soon After Hatching.** Canada Poultryman, March, 1929.

**Best results obtained when not starved more than twenty-four hours.**

Experimental work carried on at the Poultry Division, Experimental Farm, Ottawa, to determine the amount of time that should elapse between the completion of the hatch and the giving of the first feed has shown some interesting results. An experiment carried on during 1925 gave rather indefinite results, but showed no greater mortality on feeding after twenty-four or thirty-six hour periods than when the birds were starved for a longer time.

**Greatest Gain.**

A continuation of this experiment during 1926 showed the greatest gain in weight up to three weeks of age to be made by chicks fed twenty-four hours after the completion of the hatch. The weight gains decreased gradually until forty-eight hours, after which point decrease in weight gains was more marked. Mortality was equal for all lots excepting the last fed, in which lot there was a slight increase.

**Experiment Continued.**

This experiment was again continued during 1928. In this case the greatest gain was made by the birds fed sixty hours after hatching, followed by those fed seventy-two, twenty-four, forty and ninety-six hours after hatching, respectively. Mortality was equal, and greatest for the birds fed forty and seventy-two hours after hatching, with those fed sixty and ninety-six hours next in order. There was no mortality among those birds fed twenty-four hours
after hatching. In no case did the birds starved until ninety-six hours after hatching compare favorably with the earlier-fed lots.

**Early Fed Best.**

The results obtained to date would seem to indicate that chicks may be fed as early as twenty-four hours after hatching with no harmful results either upon weight gains or mortality. It is just possible, however, that there is a happy medium in the neighbourhood of from thirty-six to forty-eight hours after hatching. These results seem to indicate that the fact that chicks will go as long as on hundred hours or more before receiving their first feed is to be looked upon more as a fortunate circumstance which permits of shipping over great distances, rather than the best method of husbandry.


**Summary:**

1. The meat meal used did not give satisfactory growth when used as a protein supplement to our basal ration.
2. The proteins of this product are inferior in quality.
3. Gelatin does not supplement this meat meal, evidently on account of the existence of similar amino acid deficiencies.
4. The results presented indicate that the amino acid deficiency, of the meat meal may be tryptophane.
5. This paper presents a biological method for determining deficiencies of certain commercial meat concentrates.


**Summary:**

A very brief review of Katayama’s monograph on the digestibility of feeding stuffs by chickens is given. Modifications of Katayama’s formulae for computing the fecal nitrogen and the percentage of fecal organic matter in samples of chicken’s excrement are suggested.


**Conclusions:**

The addition of 112 mg. of cystine daily to the ration of one lot of 21 S. C. White Leghorns hens produced no beneficial or detrimental results when compared with a check lot of 20 S. C. White Leghorn hens on the same ration, as evidenced by the egg record, body weight, or rate of shedding and growth of the primary flight feathers.
The quantity of cystine fed may have been too small, or the original cystine content of the ration too high, to produce any effect. While a lack of cystine in the diet may prolong the duration of the molt, it is unlikely that the addition of cystine above the minimal requirements of hens can hasten the completion of the molt.

*The anti-rachitic value of Salmon Oil* by D. E. Davis and J. R. Beach, University of California, Berkeley Poultry Science, 1928, 216.

These results indicate that the salmon oil used contained the anti-rachitic vitamin and that it would be a satisfactory substitute for cod liver oil in preventing leg weakness in growing chickens. As stated at the outset, this oil was extracted from cannery refuse, a considerable portion of which is the viscera of the fish. These results, therefore, cannot be construed as indicating that oil extracted from muscle tissue of salmon would be an equally good source of the anti-rachitic vitamin.

*When should Chicks be given first feed?* by Roy E. Roberts, Agric. Exp. Station, Purdue University, Poultry Science, 1928, p. 220.

**Summary:**
1. From the data presented it appears that chicks may be fed as soon as they are fluffed out without influencing either the rate of growth or the mortality.
2. It appears that early feeding of chicks such as was carried out in these experiments has no advantage over the old method of withholding feed for 48 hours or longer.


**Discussion:**
Meat scrap and meat meal have been defined as follows: "the ground residue from animal tissues, exclusive of hoof and horn, and contain less than 10 per phosphoric acid (P₂O₅)."

The particular brand of meat meal used in these experiments, when fed at protein levels of 15, 10 and 5 per cent, did not give satisfactory growth as compared to lots receiving similar amounts of protein from meat and bone scraps. However, the growth of lots receiving this meat meal was proportional to the amount of protein in the ration, and it is possible that rapid growth might be secured if this meat meal were fed at higher protein levels. In feeding practice this would not be feasible because of the cost.

Data reported in a previous paper indicated this particular brand of meat meal was deficient in the amino-acid tryptophane. It is possible that this particular meat meal could be economically supplemented with some other protein concentrate, such as dried buttermilk, wheat bran, ground soybeans, etc. This, however, offers a field of investigation which is not in the scope
of this paper. The basal ration used in these experiments may not have been suitable to use with this product, and perhaps satisfactory results could be secured on a different type of basal ration, particularly one containing more wheat bran or other ingredients yielding richly in tryptophane.

A still better solution of the problem could possibly be made if the manufacturers would add some other ingredients which are rich in the factors lacking in this meat meal.

These experiments point out definitely that N × 6.25 is not an index of protein value. They also illustrate that the value of a protein concentrate depends much upon the quality of proteins present in other ingredients of the basal ration. It is hardly practical, therefore, to assume that the amount of protein concentrate found either satisfactory or unsatisfactory would give similar results when used with another basal ration.

**Summary:**

1. The meat meal used in these experiments failed to give satisfactory growth, even when fed in sufficient amounts to supply the ration with 15 per cent of protein in addition to such proteins as was already present in the basal ration.

2. The meat meal, even when fed to young chicks in large amounts, gave no harmful effects.

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**The anti-rachitic Value of Cod Liver Meal** by F. E. Mussehl, Roscoe Hill and C. W. Ackerson, University of Nebraska, Lincoln. Poultry Science, 1928, p. 239.

**Conclusions:**

I. Cod liver meal made entirely from dried and ground liver tissue contains some Vitamin D, but not as much as is associated with an equal amount of fat in cod liver oil.

II. Five per cent of cod liver meal did not provide sufficient Vitamin D to prevent rickets on a ration complete in all but the rickets preventing essential.

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**Summary and Conclusion:**

Curves were fitted to the feed-growth data and the age-growth of a group of White Pekin ducklings.

It was found that the relation between live weight and feed consumption was expressable by the law of diminishing increment, and that the relation between live weight and age was described rather well by Robertson's modification of the equation which describes the course of an autocatalytic monomolecular chemical reaction.

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**Does a mixed Grain Ration meet the vitamin B requirements of chicks brooded on wire?** by R. W. Bethke and D. C. Kennard, Ohio Agric. Exp. Station, Wooster. Poultry Science, 1928, p. 287.
Summary:

A ration containing 63 per cent or more of ground whole grains (corn and wheat), and 10 per cent of other seed products (soybean oilmeal and wheat bran), and 20 per cent of either meat scraps or dried buttermilk, with adequate mineral and fat-soluble vitamin supplements, was found to meet the vitamin-B (antineuritic and growth-promoting), requirements of growing chicks kept for 10 weeks on wire floors.

The biologic function of lactic acid. Neue Erkenntnisse über die biologischen Wirkungen der Milchsäure by Dr. F. Froboese, Heidelberg. Deutsche Tierärztliche Wochenschrift, 1928, p. 574.

The favourable influence of lactic acid on the growing organism has not yet been fully explained scientifically. The question is whether the lactic acid influences the gut bacteria or whether the vitamins are protected, or the absorption of minerals is favoured. Tests by Brehme on children and by Vollmer on rats, have proved that lactic acid has a favourable influence on the growth, both the lactic acid which is formed in the blood and that which is given by way of food. Semisolid and dried buttermilk also worked favourably.

In the tests made by Vollmer there was a great difference noticeable between the feeding with sweet milk and the feeding with sour milk.

Lactic acid increases production, is favourable to growth, keeps the birds healthy and is curative.


An anti-rachitical Vitamin-Unit is the smallest quantity of an anti-rachitical working matter, which is capable of curing rickets in a rat within 21 days.

The test is made on rats. These are put on McCollan's diet for 14 days after which a Röntgen photo of the hind legs is made. The split of the metaphyse must be at least 2 m.m. wide and at the most 2.5 m.m. Then the animals are fed with the matter to be tested for a period of 21 days, and another Röntgen photo is made.

The tests are made according to the formula \( x + r_1 - r_2 \) in which \( x \) is the amount sought, \( r_1 \) the width in the first Röntgen photo and \( r_2 \) in the second. The content of Vitamin D is sufficient if \( x \) is greater than 1.8 and insufficient if \( x \) is less than 1.8.

The caeca in fowls, geese, ducks and swans, are long, wide and double, in pigeons rudimentary (only a few m.m. long). In birds of prey they are almost entirely absent, but in owls they are present. Ellenberger proved that in the horse, and Zuntz and Ustianzew that in the rabbit, the caeca are active in the digestion of the cellulose. In 1909 already Völtz pointed to the difference between the dark secretion of the caeca from the hen and the lighter coloured secretion in the gut.

The very exact study by Röseler includes the mechanical proportions of the caeca (situation, size, filling and discharging) and further the discharge of the caeca and the rest of the intestines, when feeding wheat, barley and maize, and the significance of the caeca in the resorption of the nutriment in the various foods, also after the caeca have been removed by operation. The caeca of fowls discharge once in 24—28 hours a dark brown, shiny and unpleasantly smelling secretion, which is easily distinguished from the other secretion. The proportion to the ordinary secretion is from 1 to 6.6 to 1 to 16.68. The caeca absorb much water and, moreover, ammonia containing compounds, amides. Further they serve for the digestion of the cellulose with the aid of bacteria, by which, however, it is apparent that the raw fibre of barley, in comparison to that of wheat, oats, maize, potatoes and grass, is indigestible.


Demonstration of a cockerel which had been shut up in the dark for half a year and fed on food which was poor in vitamines.

The general appearance of the bird was good, comb and wattles a healthy red, appetite good. The principal symptoms are rickets, big bone tumours on the joints.

The discussions resulting from this experiment are also given in this article.


A review of the literature on this subject. Tables by Jacobi and Ray regarding the occurrence of grit in wild birds. From this it is seen that grain eating birds have the most grit in their gizzards. Crows take more grit on a vegetable diet than on an animal diet.

From various tests it has been proved that grit is not essential but tests must be made as to whether the grit does not have a favourable influence on the digestion. In order to get hens without grit in the gizzard a method was worked out by which all grit was removed by operation. The hens stood the operation excellently.

The speed of the abdominal contractions in hens depends on the nature
of the food and these reactions also take place in the gizzards of hens without grit. The grit, therefore, has no influence on the abdominal contractions. This, however, appears to be the case with birds of prey.

With grain feed alone the gritless hens cannot be kept in good feeding condition. It appeared that the hens without grit needed much more food to be kept in good feeding condition than the hens with grit. In wheat with grit this amounted to 60 grams and without grit 90 grams. A microsopical examination of the secretion shows that the grain is better digested when grit is present in the gizzard.

Built in the form of three long laying houses that are connected at one end by an enclosed walk, the new Passaic County Egg-Laying Contest buildings at Paterson are a departure from the usual housing facilities of such projects. They are called the only contest buildings of their kind.

The novel features of construction embodied in this contest plant were decided upon only after a thorough study was made of many egg-laying trials and modern poultry houses.

Pens in the new contest are 8 feet by 10 feet, and a 4-foot alley runs through the back of each long house. Each pen has a sliding frame, equipped with a glass substitute, to keep rain and snow out of the house. The pens are also equipped with shutter ventilators, eight metal trapnets, a metal feed hopper, wired perches, egg scales, and other necessities. Dropping boards may be cleaned from the alley, and arrangements have been made for extra ventilation in summer. Doors are provided with windows so the interior of the pens may be viewed without disturbing the birds. The entire plant is electrically lighted, and at the present time the contest flock is working on a uniform 12-hour day.


The statistics refer to a period of 4 years and 344 farms. The average number of hens per farm was 50 so that the statistics cannot be applied to larger undertakings.

The farms are divided into two groups: Group I refers to concerns worked in conjunction with agricultural farming and Group II to purely poultry farming. The cost of land per hen in the first group is calculated at 5 francs and in Group II at 17 francs. The costs are calculated at 11 and 20 francs respectively.

The hens are valued at 6.50 to 9.20 francs each. The average production amounted to 100 eggs per hen. As these statistics refer to relatively good farms the average for all farms in Switzerland will be lower. For the improvement of the egg production, laying competitions are advised. A quarter (27 %) of the birds written off, died, owing to diseases which have frequently
occurred during recent years. Beasts and birds of prey (fox, marter, hawk) also did considerable damage. The average working period was calculated at 6 to 7 hours per hen and per year. The ratio of the work to the cost of production was 23 %. The feeding cost amounted to 54 % of the cost of production. From comparisons with the amount of capital needed it is apparent that poultry breeding, in comparison with the production and the turnover, does not need much capital.

The profit per hen is not large and amounts to only 2 to 3 francs.
The Rudimental Copulatory Organ of the Male Domestic Fowl
by Professor Dr. Kiyvoshi Masui, Assistant Professor, Agricultural Department, Tokyo Imperial University, Japan. The South African Poultry Magazine, May, 1929.

The male copulatory organ of the duck has already been described by many authors, but, as far as we are aware, none of the investigators have shown the existence of the same organ in the domestic fowl.

In the cloaca of the domestic fowl, both in the male and female there are several folds in which three main ones are usually to be seen which are called, for convenience, folds I., II., and III., in the present paper. The cloaca is divided by fold I. into two portions, the corprodeum and urodeum. Fold II. is situated between folds I. and III., and the latter is the largest of the three folds, and forms the anus.

In the cloaca of the male fowl a white body, about 2-3 mm. in diameter, can usually be found which lies at the ventral portion of fold II. Moreover, in fold II., two round folds appear beside the white body. The white body can clearly be seen with the naked eyes in the chicken immediately after hatching.

In the female, however, the white body and two round folds can never be found, but the ventral median portion of fold II. appears as a small depression. It is very interesting to note that the white body disappears almost entirely after castration.

The white body consists of loose connective tissue, containing a great amount of the elastic fibres usually arranged in bundles. Many small cavities are found in this body thus indicating the appearance of the corpus cavernosum of the mammalian penis. It is, however, difficult to ascertain whether the blood vessels open directly into these cavities or not in the mature birds; but no fat can be shown in the cavities. The nerve-end organs, the pacinian-corpuscles, are abundantly found in the sub-mucosa of the round folds of fold II., and in the white body.

From the facts above-mentioned, it seems most probable that the white body may be looked upon as a male copulatory organ or its rudiment.

As is well known, it is very difficult to distinguish exactly the difference of the sexes in chickens, but, as stated before, the male copulatory organ can clearly be seen in the chickens even immediately after hatching, and accordingly the sex of the chickens can distinctly be differentiated by means of showing of the male copulatory organs.

The Influence of caponising upon the metabolism of Cocks by Dr. J. G. Szumann. Zootechnical Institute of the University of Poznan, Poland.

The daily excrements of Leghorn capons were 21.8 grams as compared with 37.6 grs. for cocks. The average daily amount of food in proportion to the weight of the birds in kilogrammes, was 36 grs. for the cocks and 16 grs.
for the capons. This enormous difference between the food requirements is due to the hormonal action of the testicules and not the elaboration of the gametes. The complete castration of cocks reduced their food requirements for 50 per cent. The minimum protein requirements of normal cocks and capons respectively, would appear to be about the same.


Contents:


Articles:

Marking of Preserved Eggs; Legal Notes, A. E. Hamlin; Judging Chickens for Egg Production, Prof. Rice; Application of Science to Feeding Laying Hens, Capt. Halnan; Winter Records; Poultry Keeping Costs; Observations on Poultry Disease, H. P. Hamilton; Register of Breeds; List of Members; List of Branches; Advertisements.


Summary:

1. Chicks which had access to direct sunlight or sunlight passing through a „screen glass“ substitute made equally good gains in weight and did not develop leg weakness, while others under identical conditions with the exception that they received light through window glass developed leg weakness.
2. A 30-minute daily exposure to direct sunlight, sunlight through a "screen glass," and a "fabric glass" substitute, caused chicks to grow at an apparently normal rate for 13 weeks, without signs of leg weakness, while similar "unexposed" groups contracted leg weakness. The ash content of the tibias of the 3 "exposed" groups was somewhat below normal.

3. Exposing chicks afflicted with leg weakness to direct sunlight, transmitted by a "screen glass" and "fabric glass" substitute for 15 minutes, and 5 minutes to ultra violet rays from a quartz mercury vapor lamp, daily, for 4 weeks caused a marked improvement in the behavior and the general appearance of the birds with a general disappearance of leg weakness and an increased ash content of the tibias.

4. The efficiency of a "glass substitute" in preventing leg weakness or rickets depends on its power to transmit the protective ultra violet rays, the amount of sunshine available, the season of the year, and its freedom from dust or other foreign particles.


Summary:

The chicks considered in this paper grew somewhat more slowly than those reported by several previous investigators.

Day old chicks averaged to be 68.00% of the weight of the eggs from which they were hatched.

A high degree of association was found between egg weight and day old chick weight.

The size of the eggs largely determined the size of the chicks at hatching time.

Day old chick weight proved to be an unreliable index of the chicks when two, four or twelve weeks of age.

Rate of growth was in most cases independent of chick size at hatching, and indirectly of size of eggs set.

Environmental conditions as weather, etc., probably affected the results with certain individuals.

In none of the three sets of correlations was there shown any consistent variation in the relationship of day old chick weight to rate of growth for birds hatched at different dates (Dates ranging from Nov. 16 to May 4).


Summary:

1. Duck eggs may be hatched successfully in an electric, cabinet style incubator, with no more moisture than is supplied by the use of a moisture pan.

2. Mortality during the brooding and rearing season is very low.
3. Ducklings can be raised successfully without water in which to swim.
4. Two feeding formulas are sufficient to secure satisfactory growth.
5. "Green" ducks can be fed so that they will weigh six pounds in eleven weeks.
6. It takes 23.848 pounds of feed to produce a "green" duck.

The Relation of the Weight of Rhode Island Red Pullets at four weeks to their subsequent rate of Growth by D. C. Henderson. Poultry Science, 1928, p. 181.

Conclusions:

The variation in the weight of chicks relative to the mean weight remains nearly constant from four to sixteen weeks.

The correlation of the weights of female chicks at four weeks and the weights at eight, twelve and sixteen weeks are positive and show that the chicks that are relatively large at four weeks are relatively large at eight, twelve and sixteen weeks, respectively.


Discussion:

In this paper an attempt has been made to determine the relative value to assign the various characters when judging for annual egg production. It has been found that the constants for these characters are of such diverse nature, when comparing the two samples, that a score card for one is not practical for the other.

It has been shown by Knox and Bittenbender that observations taken at intervals of a few weeks give significantly different results. It has not been shown whether this difference is caused by the birds changing from season to season or by intrinsic inaccuracy in taking measurements. Doubtless both the seasonal change and experimental error in taking measurements are operative in causing this change. It seems that it would be worthwhile to determine the best season to take measurements in order to get the best index of a hen's producing ability. This time would be different for different sections of the country and would likely vary from season to season, and also for different flocks. It could, however, be fairly satisfactorily answered for average conditions,—at least some mere definite knowledge could be had than is available at the present time.

It has been found in this study that the progeny from one male causes the difference between the two samples with reference to molt, which shows that these samples are not homogenous.
The methods used in this study for measuring such characters as pigmentation and handling quality are not as accurate as would be desirable. Some more refined measures should be used so that the variability of these characters could be divided into a larger number of classes. No doubt there is also an experimental error in taking the measurements which may influence the result. These have not been accounted for in this study.

Linear relations have been assumed in all cases. Until it is learned to what extent curvilinear relations exist, this assumption must be listed as a possible source of error. It would seem, then, that more refined methods must be used before a score card can be made that will have any range of applicability. That is, the things that cause the difference between these two samples must be determined and accounted for.


The analysis of the records of egg production presented previously makes clear why the opinions of a number of early workers varied in respect to the relationship between the first two years' production. Some of the early workers based their opinions on results secured from low first year producers. Low first year production may be due to a variety of causes; the birds may not possess the proper genes for high egg production or if they possess them the birds may have caught a cold, or they may have acquired chicken pox, or they may have become heavily infested with worms, or a host of other factors might have intervened to prevent the birds from laying the number of eggs their genetic constitution would permit.

It will be recalled that except in the cases of relatively low first year production none of the figures of second year production expressed as a percentage of first year production is as high as that given by Brody, Henderson and Kempster (1923). In other words, the decline in egg production observed by these three investigators was not so great as that found in the case of practically all birds discussed here. This is interesting because it may mean that the Brody, Henderson and Kempster stock was genetically superior from the standpoint of maintaining egg production at a high level from one year to another.

Another important observation brought out in this discussion is that a standard of approximately 150 eggs for the second year production is a relatively high standard when the first year minimum standard is 200 eggs and the same is true in respect to a standard of 160 eggs for the second year when the first year standard is based on a minimum of 225 eggs. The standard of 180 eggs, therefore, for the second year in the Record of Performance breeding work seems to be too high. It should be possible, of course, to develop strains of poultry characterized by relatively high production in the second year.
Egg production on a two year basis would appear to be a better basis for the selection of breeders than first year production alone. In view of the observation of Harris and Lewis (1923) that those birds which are most persistent in laying at the close of the first year are the most precocious in the resumption of laying activities in their second year, it is apparent that the intensity of production during the fore part of the second laying year is an excellent criterion for determining the laying ability of birds on a two year basis.


The production of energy in fowls varies very little, even when the temperature of the surroundings shows differences of 20°. The writer has made investigations with a view to ascertaining in how far the plumage plays a part in the „thermoregulation“. The test animals were first observed under normal conditions and afterwards plucked. The plucked birds showed a considerable increase in their normal metabolism. In geese this increase amounted to 78 %, in turkeys 40 % and in cockerels 54 %. The increase of the loss of warmth in the plucked birds is proportionately reversed to the temperature. In the case of the cockerel this amounted to: at 20°, 93 % and at 0° 191 %. The plumage, therefore, has a great influence on the metabolism.

National Poultry Council in Germany.

The committees of the „Bund“ und „Club“ Deutscher Geflügelzüchter, which both have more than one hundred thousand members, together with the Committees of the Agricultural Associations, have formed a committee which will represent the interests of German poultry breeders both at home and abroad.

The Chairman is Mr. Friedrich Keiser.

The committee have studied various branches of poultry breeding. They are also working for the World’s Poultry Science Association and are making preparations for the World’s Poultry Congress in London. Correspondence should be addressed to Dr. Theodor Schülz, Hafenplatz 4, Berlin, S.W. 11.
INTERNATIONAL REVIEW OF POULTRY SCIENCE

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Dr. Gustave F. HEUSER

Professor of Poultry Husbandry, New York State College of Agriculture at Cornell University, Ithaca, N.Y.

Studied at Cornell University from which institution he has received the following degrees:
- Bachelor of Science — 1915.
- Master of Science in Agriculture — 1916.
- Doctor of Philosophy — 1918.

Appointed Assistant Professor of Poultry Husbandry in 1918 and Professor in 1922.

In charge of research, teaching and extension relating to poultry nutrition.

Member of Sigma Xi, honorary research society.

Secretary-Treasurer of World's Poultry Science Association since 1923.
Section 1. Six members of the Council shall constitute a quorum of that body.

Section 2. Ten members of the Association shall constitute a quorum of the Association.

Section 3. On a requisition signed by five members of the Council the Secretary shall communicate to all members of the Council any matter of business and ask for their vote on the question, either by mail or in Session.

Section 4. On any postal vote of the Council or Association the polls shall be considered closed at four calendar months after the date of the original mailing.

Section 5. Membership in the Association may be forfeited because of:

(a) lapse of eligibility under the rules as set forth in the Constitution (Article III); or

(b) failure to act in full accord with the objects of the Association as set forth in the Constitution; or

(c) two successive failures to pay the annual subscription.

Section 6. A recommendation for the reconsideration of eligibility for continued membership may be made in writing to the Secretary at any time by any member, with a full statement of the facts believed to demand such reconsideration. Such recommendation shall be placed in the hands of the Council, who shall consider the case, and report to the Association, with a recommendation as to the action to be taken either in the direction of forfeiture or continuation of membership.

Section 7. The Constitution and By-Laws may be amended at any time by three-fourths vote of the members of the Association voting. Such vote shall be taken by mail.

Section 8. Any proposed amendment to the Constitution or By-Laws shall be placed in the hands of each member of the Association at least six months prior to the time of voting on the amendment.

Section 9. In all postal votes where a definite majority is specified in either Constitution or By-Laws such majority shall be construed as of those voting.
REVISION
OF
CONSTITUTION

The Secretary-Treasurer has forwarded to the Members of the World's Poultry Science Association, a copy of the Revised Constitution as recommended by the Council.

The experience since this was first introduced in 1912 and the great developments which have taken place, have made it desirable that there should be a number of minor modifications. These are as follows:

Article I: Title. It has been felt that the designation 'The World's Poultry Science Association' would more completely indicate the sphere of this organisation.

Article III: Membership. In view of the great advances which have been made, the original limitation to those who were officials or directly engaged in teaching and research, should be extended, as there are those who are rendering great service in both directions and yet who are not personally so engaged.

Article IV: Officers. In view of the extension of the operations of the Association, and in order to enable the work to be carried out more effectively, it is recommended that there shall be not more than three section secretaries, each of whom will look after their own special areas and be in constant communication with the President and the General Secretary. These secretaries shall be appointed by the President.

It is recommended that where any country has an individual active membership of over 50, such country shall be entitled to six representatives upon the Council.

In order to facilitate the operations of the Council, it is suggested that the officers who will be elected at the Triennial Meetings, during the time of the World's Poultry Congress, shall continue to hold office until the end of the current year, and that the newly elected officers shall assume those positions on January 1st following. This is desirable as it will give time for the changes to be made.
Article VI: Affiliations. As there is a considerable number of national associations which are engaged in promotion of the Poultry Industry, and in many cases are making a most valuable contribution to educational and investigational work, and that the active co-operation of these bodies with the World's Poultry Science Association will strengthen it and give them a status, it is proposed that these may become affiliated to our association, and a number have already signified their intention of accepting this opportunity.
NEW YORK, Jan. 18, 1929.

CONSTITUTION

Article I — Name.
The name of this organization shall be „The World’s Poultry Science Association.“

Article II — Objects.
The objects of this Association are:

(1) To facilitate in all possible ways the exchange of knowledge and experience among persons in all parts of the world who are contributing to the advancement of the Poultry Industry by teaching, demonstration, investigation, or in any other constructive manner.

(2) To promote the extension of knowledge in this field by the encouragement of scientific research, practical experimentation, the collection of statistics, the study of the economics of the Poultry Industry, of the problems of marketing and the world’s markets, and in every other way possible.

(3) The dissemination of knowledge pertaining to the Poultry Industry.

(4) The promotion of World’s Poultry Congresses.

Article III — Membership.

(1) Proposals for membership shall be made in writing. Each proposal shall bear the signature of two members who vouch for the candidate. A Certificate of Election shall require approval of a member of the Executive Committee.

(2) Eligibility of active membership shall be based upon some one or more of the following considerations:

(a) that the candidate be engaged in the teaching of Poultry Husbandry;

or (b) that the candidate be engaged in the advancement of knowledge regarding poultry by scientific research or practical experimentation;
or (c) that the candidate be officially connected with a Government in some capacity relating to poultry work; or (d) that the candidate is making a definite contribution, in any other manner not specified in the above clauses, to the advancement of the Poultry Industry.

(3) The Council shall have the power of naming as Honorary Life Members such persons whom it considers to have made a noteworthy contribution to the work of the Association or to the promotion of the Poultry Industry in any of its branches.

Article IV — Officers.

(1) The Officers of the Association shall be a President, three Vice-President or more, a General Secretary-Treasurer, not more than three sectional Secretaries, and a Council composed of three members from each country represented in the Association, except such countries which have an individual active membership of over fifty, in which case six representatives can be named to the Council.

(2) The term of office of President, Vice-Presidents, and Secretary shall be three years. Each member of the Council shall be elected for nine years.

(3) For the election of the President, Vice-Presidents, and Secretary-Treasurer, a three-fourths vote of the Council shall be required.

(4) One-third of the members of the Council shall be elected at the regular meeting every three years. Nominations for the Council may be made in writing by any member of the Association residing in the country for which the nomination is made, at least six months before the date of election. If no nominations are received from such members, nominations may be made by any member of the Council. A majority vote of the Council shall be required for election.

(5) In all votes of the Council the requisite majorities specified in the above clauses shall be construed as of those voting.

(6) The President, Vice-Presidents, Secretary-Treasurer, and sectional Secretaries shall constitute an executive committee, ex-officio.

(7) The term of office in each case shall begin on January 1st, following election.
(8) Sectional Secretaries shall be appointed by the President.
(9) The President shall have the power to appoint members to vacancies on the Council between regular meetings, such term of office to extend until the next regular meeting.

**Article V — Patrons.**

The Council may designate as a Patron of the Association any person, Government department, association, or club which shall contribute to the Treasury of the Association the sum of not less than Two Hundred Fifty dollars, or Fifty pounds, in one payment, or not less than Twenty-five dollars, or Five pounds, per annum.

**Article VI — Affiliations.**

Associations may become affiliated by the payment of an annual fee of Twenty-five dollars or Five pounds. This entitles the association to claim affiliation with the World's Poultry Science Association, to receive five copies of the Review, and to use for the benefit of its members anything contained in the Review.

Affiliated associations are required to notify the World's Poultry Science Association each year as to the number of members the association represents. These may be called Affiliated Members in the records of the World's Poultry Science Association.

**Article VII — Meetings.**

General Meetings of the Association may be called by the President, Vice-Presidents, General Secretary, and Council, who shall determine the time and place of meeting. A regular meeting shall be held every three years, if possible, for the election of officers.

**Article VIII — Subscriptions.**

The subscription of each member of the Association shall be Five dollars or One pound per annum, payable in advance to the Secretary-Treasurer or whom he may designate. Failure to pay the subscription before the end of the year will remove the member from the active membership list.
Ithaca, October 1, 1929.

NOTICE TO THE ASSOCIATION MEMBERSHIP.

Nominations for officers must be made soon. Besides the President, Vice-Presidents and Secretary-Treasurer, one-third of the members of the Council shall be elected at the regular meeting to be held at the time of the Congress in London next year.

"Nominations for the Council may be made in writing by any member of the Association residing in the Country for which the nomination is made, at least six months before the date of election."

Each country is entitled to be represented on the Council by not more than three members except such countries which have an individual active membership of over fifty, in which case six representatives can be named.

One-third of the Council shall be elected every three years. The terms of the following expire in 1930:

Professor J. F. Frateur (Belgium).
Mr. W. A. Brown (Canada).
Dr. M. Tumlirova (Czecho-Slovakia).
Dr. A. Schachtzabel (Germany).
Mrs. A. K. Fawkes—Ansell (India).
Miss A. Kinross (Scotland).
Dr. M. A. Jull (U. S. A.).
Professor Wm. F. Kirkpatrick (U. S. A.).
Dr. Scott Robertson (Northern Ireland).

Return nominations to this office not later than February 1, 1930.

Sincerely yours,

Dr. G. F. HEUSER,
Secretary-Treasurer.
THE WORLD'S POULTRY SCIENCE ASSOCIATION
1929.
MORE THAN 500,000 MEMBERS.

Patrons.
Countries enrolled as Patrons .................. 10

Membership.
Individual Members ................................ 333
Affiliated Members ............................... 470500
Total Membership ............................... 470833

INDIVIDUAL MEMBERS.

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139 222 333
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PATRONS


BULGARIA. Ministry of Agriculture, Sofia.

CANADA. Department of Agriculture of Canada, Ottawa.

ENGLAND. The English Ministry of Agriculture and Fisheries, (Address) The Secretary, 10, Whitehall Place, London, S. W. 1, England.

NORTHERN IRELAND. Ministry of Agriculture of North Ireland, Belfast.

POLAND. Government Institute for Agricultural Research, Polawy.

ROUMANIA. Ministry of Agriculture. Direction Générale Zootechnique et Sanitaire Vétérinaire, Bucharest.


SOUTHERN RHODESIA. Department of Agriculture of Southern Rhodesia (Address) Secretary, Department of Agriculture, Salisbury, Southern Rhodesia, South Africa.


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    Reichsausschuss für Wirtschaftsgeflügel, Hafenplatz 4, Berlin.


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SWEDEN. Sveriges Allmänna Fjädefåvelsforening, Idungatan 2, Stockholm.

UNITED STATES OF AMERICA. International Baby Chick Association, 126 Wirthman Building, Kansas City, Missouri.
    National Poultry Council, East Greenwich, Rhode Island.
COURTEOUS REQUEST TO OUR MEMBERS.

Our International Association has grown very rapidly of late. Different Countries have joined as Patrons, different large societies have joined as Affiliated Societies.

The number of personal members is increasing daily. For this reason our roll is subject to great changes, and it is exceedingly difficult to keep it up with the exact addresses.

Yet, an exact list of the names and addresses of the members is absolutely essential, with a view to our administration, the forwarding of the International Reviews and other information. I should therefore very much appreciate your willingness to inspect carefully the membership list which has now been published, and would ask you to inform me direct of any desired correction.

With a view to getting the list ready for 1930 I remind those members, who have not yet paid their contribution for 1929, that the treasurer is expecting it as soon as possible.
MEMBERS IN GOOD STANDING OCTOBER 1st. 1929

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Mr. J. B. Leitch, Irymple P. O., Victoria.
Mr. John B. Merrett, Government Cool Stores, Melbourne.
Mr. W. H. Paine, Govt. Meat Board, Homebush, Sydney, N.S.W.
Mr. H. E. Powell, Govt. Poultry Expert, Hobart, Tasmania.
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Dipl. O. Hübner, Mittendorf a. d. Fischa.
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Prof. F. N. Marcellus, Ontario Agricultural College, Guelph, Ontario.
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BREEDING


To summarize concerning battery rearing is to say that:

1. A room approximately 12ft. by 14ft. in size will accommodate a battery large enough to handle nearly two thousand chicks, an economy in housing provision for chick rearing.
2. One man can satisfactorily take care of from four to five times as many chicks by battery methods as by former methods.
3. The chicks are surrounded by strictest possible sanitation, and B.W.D. and coccidiosis have little chance to kill chicks.
4. The chicks have nothing else to do but eat and grow, and yet they get sufficient exercise to enable them to make proper growth.
5. The scheme is especially convenient for the handling of chicks during their first four weeks, until the worst danger period is passed, and is a splendid answer to the handling of surplus male chicks.
6. The pullets are well started in the batteries and are finished under normal conditions.
7. The batteries must be kept fairly darkened, to keep down any tendency to toe-picking, etc.

The method is new and interesting. Undoubtedly it will be useful as a part of the regular brooding device on many a large poultry plant. We figure that it will reduce the cost of rearing pullets by a shilling per bird, and that is worth while.


Illustrated description of this brooder.

The most reliable information we have indicates that the home-made brick brooder originated in Randolph County some six or seven years ago. However, poultrymen are indebted to F. G. Bridges, Notasulga, Alabama, because it was largely through his efforts and interest in reducing brooding cost that this type of brooder has become very popular throughout the State. Scores of them are in use and giving satisfactory service in many sections of Alabama. The brick brooder is a practical solution of the problem of supplying artificial heat. It is not an experiment because its successful operation by numbers of poultrymen has proven its value and dependability.


Description of: Movable brooder house, with open front designed for the maximum utilisation of sunlight, Suggested routine for care and management of chicks, Feeding schedule, Battery brooding, Allmash-ration.
Artificial Incubation by H. Embleton. Timely Hints for Farmers, University of Arizona, College of Agriculture. Agricultural Experiment Station. Tucson, Arizona, May 1929.

Description of: The Incubator and Incubation, The Breeding Hen, Selecting Eggs, Saving Eggs, Artificial Brooding, Feeding little Chicks.

Effects of early handicaps on chickens as measured by yolk absorption and body weight to twenty weeks of age by Sylvia L. Parker, Hilgardia, California Agric. Exp. Station Vol. 4, No. 1, 1929.

Conclusions:
1. A variety of early handicaps including poisons, starvation, and high and low temperatures, failed to alter markedly the course of yolk absorption in baby chicks.
2. The same series of early handicaps, and the removal of the unabsorbed yolk when chicks were 1 day of age, failed in general to produce permanent effects in body weights.
3. The doses of mercuric chloride seemed to show a more permanent effect on body weight than the other handicaps, both males and females so treated weighing less at 20 weeks of age than the controls.
4. Nicotine sulfate, the larger dose of arsenic trioxide, and the removal of unabsorbed yolk when chicks were 1 day old, all tended to show permanent effects in males, but not in females. Starvation also gave indications of a more lasting effect in the males, but the effect was not found in all shipments.
5. No consistent correlations appeared between day-old body weights and body weights at 20 weeks of age.
6. There was a significant positive correlation between day-old body weight and the weight of unabsorbed yolk, up to and including the age of 5 days.
7. The mortality of chicks up to the age of 20 weeks was selective in respect to day-old body weights, tending to eliminate the smaller chicks. The early mortality was more stringently selective than the later.
8. Chicks that died, irrespective of cause, had on the average larger unabsorbed yolks than survivors killed at corresponding ages. This difference increased with age during the 9-day period of observation.
9. Among the chicks killed at a particular age, there was found to be a low but significant correlation between yolk absorption and the percentage gain in body weight.
10. The occasional abnormal yolks found, including putrified, hardened, and bloody yolks, could not be shown to have any relationship to the treatment which the chicks had received.


Summary:
In domestic poultry, one group of breeds shows a combination of white earlobes, white eggs, small bodyweight and relatively small eggs, while the other group possesses red earlobes, brown eggs, large bodyweight and heavy eggs. In these experiments the cause of the fact, that these characters tend to exist together, was examined.
A number of F2 hens of the cross between Barnevelder and white Leghorn
were grouped in correlation tables, to show correlation between different characters, if such exists.

Between earlobecolour and eggcolour no correlation was found. (Table I).

High bodyweight was correlated to high weight of eggs (Table II), but the hens, which lay eggs, which are relatively heavy (as shown by the number of eggs of which the weight equals that of the hen) are lighter than those, which lay relatively lighter eggs. (Table III).

Between high bodyweight and a tendency to red ears a positive correlation was found. (Table IV).

No correlation was found between earlobecolour and relative egg-weight (Table V).

Eggcolour and bodyweight were probably not correlated. (Table VI).

It was further found, that there was no difference in bodyweight, eggs size or eggcolour between the earlymaturing and the late maturing hens. (Table VII).

It was found, that the socalled „dominant white factor” acts by suppressing black colour exclusively. Experiments with a strain of White Barnevelders further showed, that egg-colour is independant from bodycolour.

It was shown, that the Leghorn has dominant yellow, the Barnevelder recessive yellow legs, which accounts for darkshanked females in F2.


The avitaminose B. in pigeons, on a certain diet, is more quickly caused by galactose than by other sugars. In further tests, however, galactose did not prove to be more harmful than glucose. Much depends, however, on the quantity of galactose given.


Summary:

A Summary of the results and advantages of the confinement system may be listed as follows:

1. Hatching results are very satisfactory after two generations of confinement.
2. Mortality in stock from hatching time to maturity is low.
3. All birds possess a deep yellow color throughout the brooding period and at maturity.
4. Very uniform growth is obtained.
5. Egg production in mature stock is the equal of range reared birds.
6. Birds can be reared free from round and tape worm infestations.
7. This system gives an opportunity for careful supervision.
8. It permits a constant and accurate check on all chicks.
9. It is possible by this system to obtain more accurate data on feed consumption and feed costs.
10. It prevents loss from hawks, crows and vermin.
11. It avoids the intermingling of various ages of chicks as on free range.
12. It makes it necessary to remove the cockerels at 6 or 8 weeks of age to allow sufficient room for the pullets.
13. It tends to prevent thieving.
15. Coccidiosis can be more easily prevented and the disease more successfully treated should it develop.
16. Less land is required for the raising of poultry and makes possible the factory method of poultry management.
17. Labor costs are probably not increased.
18. It is a way out for the poultryman, who is unable to successfully rear chicks on free range.

In conclusion let me state emphatically that the confinement is not a cure all. Raising chicks by this method should not be employed unless you have in your present system great difficulty in rearing young stock. The confinement system does offer a way out for the poultrymen whose flocks are infested with parasites, and there are many such in most states in the Union and I dare say in some provinces in Canada.

In Sweden Bacillary Diarrhea in hens was first observed in 1925, although it probably occurred before that time. The disease should be called "Bird typhoid" and the bacteria which cause it, "bacterium gallinarium Klein" after the person who discovered them.

In 1928 regulations were made in Sweden by which owners were enabled, with support from the Authorities, to combat the disease. The following measures must be taken:

1. The blood of all the birds in the flock must be examined and all infected birds killed. This examination must be repeated until no more infected birds are found.
2. All places which can possibly have become infected either by the birds or by eggs must be repeatedly disinfected.
3. Final disinfection under veterinary control.


According to Nuszhag and Ansorg, bacillus gallinarum (Klein) (formerly called typhi gallinarum) can occur in the cloaca of clinically healthy birds.

The Bacillus gallinarum (= cause of the Klein disease) is considered to be identical with the pullorum bacil (= cause of white diarrhea in chicks).

Hof examined 400 positive agglutinating but clinically healthy hens (of 8 months to 2 years old). An attempt was made to cultivate a tribe of bac. gallinarum from the cloaka and oviduct. This succeeded in 13 cases; there were, therefore, 13 tribes found. Bacteriologically, chemically as well as biochemically the bacteria found, all appeared to agree with B. gallinarum, (milk sugar and grape sugar did not ferment; agglutination with specific Bac. gal. sera up to the titre limit). Only two tribes differed slightly. Hof considered these as biological active mutation forms, 2 % of the tribes found originated in the cloaka and 1.25 % in the oviduct.

Pullorum-Disease in Japan. Japanische infektiöse Diarrhoe „Küfun“

by Dr. Tsunetaro Konno, Fusan (Korea). Deutsche Tierärztliche Wochenschrift, 1929, S. 482.

For 50 years already an infectious diarrhea has been known among chicks in Japan, which is called Küfun. The writer ascertained that this disease is the same as that which goes under the name of pullorum in America and Europe.

Fowl-typhoid bacilli, which the writer isolated in Korea, and Japanese
Bact. pullorum, could not be agglutonatorily distinguished from each other. The Beaudettesche „single Tube Method” was used successfully to combat this disease.


Eggs which contain B. pullorum, which is related to B. coli and Salmonella, may, in some cases, be poisonous for human beings. The combatting of pullorum is of great importance. The writers have made tests with pullorine and the blood agglutination method. The results obtained with pullorine were good.


A lasting immunity was obtained by administering cultures of the bacilli through the mouth. The writer obtained good results in infected flocks by the following method:

- Culture in bouillon killed by 5 in 1000 carbolic acid. Every morning, before it has eaten, each hen gets 0.50 grams of magnesium sulphate, 1 hour later 3 cubic cm. of dead culture. The treatment is repeated after 10 days.


**Conclusions:**

1. There is no relation between B. Pullorum; B. gallinarum and the group of the hemorrhage septicaemia.
2. All bacteriological methods of separation between B. Pullorum and B. gallinarum have failed.
3. There are epidemiologic differences present between the two diseases which point to differences in an etiological sense.
4. With the aid of the agglutination method it is possible to decrease the number of bacilli carriers among the full grown birds.
5. The agglutination method must be improved, and demands, as in the case of the study of the causes of bacillary white diarrhea, an increase of the knowledge concerning the biology of the fowl.


The bullfinch had been purchased from a large importer in New York City. From its heart-blood and liver pure cultures of Bact. pullorum were isolated.

The heaviest mortality occurred between the sixth and fifteenth days, 63 of the 105 birds having died during this interval. In the interval from the 15th to the 25th day, the mortality was still quite heavy, after which it rapidly diminished. There were 115 survivors out of the 220 birds infected and 105 that died. Many of the birds that recovered have been used in the breeding flock. Their production and hatchability have been as good as those of similarly bred birds that were not subjected to the disease.

Bacillary White Diarrhea Control in New Jersey, 1925—1927 by F. R. Beaudette and J. J. Black, New Jersey Agricultural Experiment Station, New Brunswick, New Jersey, Bulletin no. 458.

Remarks.

A study of the data presented in the foregoing tables will show that, in general, the annual testing of flocks of birds reduces the percentage of infection found in them. In a few cases the percentage infection has actually increased but the authors believe that there is always a good reason for this. In some cases stock was brought in from other sources and has served to introduce more infection, in other instances poor sanitation doubtless was responsible for the increased spread of the disease. In a very few cases infection has been introduced into a flock judged clean by previous tests. In at least two of these flocks the infection was brought in by the purchase of infected birds from outside sources. These purchases, however, were made subject to the test and when the additions were found to be infected they were not added to the flock. More rigid rules and regulations have been formulated for 1927-28, and with more frequent inspections it is hoped that more progress can be shown in the future.

The question has frequently come up: How many tests will be required in order to completely eliminate the infection from a flock? Obviously, the time required to completely eradicate the disease depends upon several factors. The more heavily infected flocks should require the longest time for eradication, but this depends to a great extent upon the management of the flock. The ideal flock should be kept in such quarters as may be thoroughly disinfected. The range flock offers a difficult problem and especially on the general farm where good practices are not adhered to. Often these flocks are on dirt floors, and frequent places which are never cleaned. Under such conditions there is very likely to be an increase in the degree of infection in spite of the fact that reactors are determined and eliminated after the annual test. Even a very heavily infected flock may be cleaned up in a very short time, however, under good management.


Summary and Conclusions:
The results of the present investigation are quite in accord with the
earlier observations, and, show that large numbers of Bacterium pullorum, when administered by mouth to young kittens and rabbits, cause disturbances in them which resemble in some measure at least those which are commonly associated with bacterial food poisoning.

While the kittens all recovered from the effects of the pullorum feeding, 18 of the 21 infected rabbits died; and from the blood of each of those which succumbed Bact. pullorum was revored without difficulty. All of the 3 control rabbits lived, and were in apparently normal condition throughout the investigation.

Definite conclusions as to whether eggs which harbor Bact. pullorum constitute a serious menace to man must still be held in abeyance, in spite of the positive results obtained with the kittens and rabbits. It is, of course, not feasible to carry out similar experiments on human subjects and no authenticated cases of serious disturbances in man, caused by Bact. pullorum, are on record, though any number of such may have gone unrecognized. The possibility of heavily infected raw eggs causing grave disturbances, particularly in children and in convalescents, should not be overlooked, however. Without doubt, a goodly proportion of eggs in this country reach the consuming public as infected eggs; and among these there are always some in the yolk of which the white diarrhea organism has grown to enormous numbers, due to faulty storage and handling of the eggs.

It may be of interest also to note that considerable heat is required to destroy organisms of the Bacterium pullorum, and indeed almost any, type. Experiments at this Station have shown that Bact. pullorum is not necessarily killed in ordinary yolk during 3 minutes of boiling, and that the boiling of infected eggs to be thoroughly effective must be continued for at least 4 or 5 minutes. Ordinary coddling requires from 6 to 8 minutes to bring about complete destruction.

If Bact. pullorum infected eggs constitute a real menace to man, the problem of elimination of bacillary white diarrhea from poultry assumes an important public health aspect, and it becomes more imperative than ever to engage in a nation-wide and coordinated effort to establish pure and sound poultry stock everywhere.


Summary:
1. Chicks hatched from parents that had both survived an acute infection of fowl typhoid gave a total mortality of 40.9 percent.
2. Chicks whose sire only had survived such an infection showed a mortality of 62.4 percent.
3. Chicks from non-tested parents showed a mortality ranging in different breeds from 82.5 to 98.1 percent.
4. The mortality rate in the groups from non-typhoid-tested parents was also much greater than that in the other two groups.
5. The mortality rate in the chicks with single typhoid ancestry was greater than that of chicks with double typhoid ancestry.
6. Evidence is presented to show that the lower rate of mortality in the chicks hatching from typhoid-surviving parents cannot be due to chance alone.
7. Significant differences were noted in the mortality of different breeds, but it is suggested that these represent strain rather than breed differences.
8. Multiple factors are undoubtedly concerned in determining resistance to fowl typhoid in chickens.
TUBERCULOSIS


A case of tuberculosis in a cowbird (Molophrus ater). Most of the tuberculosis reported in birds has been in domesticated species, or, in wild birds reared or kept in captivity under conditions which would enable infection to be contracted from another source. The occurrence of the disease in wild birds, as such, has been observed by few, at least the literature leaves that impression. Van Es and Schalk demonstrated the infectiousness of chicken tuberculosis for sparrows by producing fatal generalized tuberculosis in twelve of them by a single feeding of tuberculous chicken liver.


In a man suffering from lupus an avian tuberculose bacil was found. The material was treated according to the method Löwenstein-Sumioyoshi, supplemented by Hohn. Success attended cultivation on the feeding basis of Lubenau. Later cultures were obtained on the feeding bases of Petroff and Petragnani. Intravenous injection of the bacil was fatal to hens after 20 to 50 days, without macroscopic tubercles. Macroscopic tuberculosis was caused by feeding. After 25 days rabbits died from intravenous injections, without visible tubercles (type Yersin). After intraperitoneal infection guineapigs suffered from typical tuberculosis of liver and spleen.


The writer describes experiments concerning:
1. In which stadium the eggs of tuberculose hens contain tubercle bacilli.
2. How long these bacilli containing eggs must be boiled to make them fit for consumption.
3. The tests were made with the eggs of 3 artificially infected hens and one spontaneously infected hen.

By means of cultivation tubercle bacilli were found in the eggs already 10 days after infection. In more advanced stages of tuberculosis, bacilli were also found in the eggs. The tubercle bacilli were found both in the white and the yolk of the eggs. It was proved that the eggs had to be boiled for more than 5 minutes in order to kill the bacilli.

22 cases are known of avian tuberculosis in human beings. 7 of these have been proved by the animal experiment. One case was positively proved to have been caused through contact with diseased hens. According to Löwenstein avian tuberculosis in human beings has an inclination to septicaemia. Swelling of the spleen is always present.

In 1912 Riegler described 5 cases of tuberculosis in crows (Corvus vorax) in captivity. In 1928 the laboratory at Ottawa received 36 crows (Corvus brachyrhynchos) which died in great numbers, showing symptoms of ocular roup. Acid resisting bacilli were found in liver and spleen. Crows can become infected by means of mammal offal. The bacilli were not virulent for poultry.


Potter succeeded in infecting hens by means of filtrated cultures. The writers succeeded in infecting pigeons with filtrates. Infection through the mouth succeeded better than subcutaneous injections.


Full grown cattle are not often infected by fowl tuberculosis. Calves are more sensitive, the attacks are light. An infected calf does not obtain immunity. An infected cow or steer does not react to bovine tuberculine. The disease can be transmitted by rubbing the cultures into a scarified hide or by their being dropped into the eyes. Pigs and hens can be infected by bacilli which have been a whole winter in the ground. Rats fed with tuberculose organs do not transmit tuberculosis to healthy birds by means of their excrements.


Poultry tuberculosis also increased in Saxony after the war. In connection with the great advantage to the health of the people, it is necessary that this disease should be combatted. It is essential that the inspectors of the veterinary service should inform poultry breeders of the harm caused by this disease. In future the State Laboratories will keep the veterinary inspectors posted with regard to cases of tuberculosis.


Conclusions:

Canaries can be infected with all three kinds of tubercle-bacilli. Infection with Typus Gallinaceus is the most certain. After infection the canaries died quickly of general tuberculosis.

With typus humanus and typus bovinus no success attended the tests to cause fatal tuberculosis. In some cases they remain alive without tubercle changes.

Description of cases in which Bac. pseudo-tuberculosis rodentium has been cultivated from the bone marrow of turkeys. The writers propose to consider these bacilli as a Bacilli para-positeux and to call the disease Para-Pest of Turkeys.

DIPHTHERIA AND POX

Chicken Pox may be controlled. New vaccin gives complete Immunity by Editor New England Poultryman, 1929, p. 196.

A new type of vaccine is now available which gives complete immunity or protection against chicken pox. This vaccin, is brushed into feather follicles which have been exposed by the removal of a few pinches of feathers from the bird's thigh just above the hock.

Experimentation proved that a suspension of 200 milligrams of pox virus in 50 cubic centimeters of a mixture of 2 parts glycerine and 3 parts normal salt solution makes a satisfactory vaccine.

INFECTIOUS DISEASES


It is often stated in literature that no vaccin exists which gives protection against a full virulent infection by cholera bacilli.

The vaccin from the Institute Pasteur gives permanent immunity against cholera bacilli.


Heavy losses were suffered by canaries breeders in Natal, whose birds were suffering from a disease caused by Salmonella Aertrycke.

Clinical symptoms: dull plumage, sleepiness and quickened breathing.

Postmortem symptoms: enteritis and sometimes liver-hyperaemia.

Swine erysipelas bacilli in pigeons by D. Nai. Biochimica e terapeutica sperimentale, 30 Sept. 1928.

By passage in pigeons the virulence of the bacilli for pigeons is considerably increased. By passage in pigeons fed on polished rice the virulence was increased thirty times.

Attempts to make virulent material a vaccine by heating failed. Good results were obtained with a vaccine consisting of virulent liver mixed with four times its weight of the following liquid: carbolic acid 0.5 grams, glycerine 60 cubic c.M. distilled water 39.5 grams. The hens received 3 injections \( \frac{1}{2}, 1, 2 \) or 3 cubic c.M. with an interval of one week between each injection and were then immune.

**Combatting Fowl Cholera. Zur Frage der Bekämpfung der Geflügel-Cholera by Dr. J. G. Szumann, Posen, Poland. Archiv für Geflügelkunde, II 3.**

**Summary:**

We are trying to combat fowl-cholera in the following manner: When the disease has broken out the floor of the hen-house is white-washed every two hours in order to destroy the harmful activity of the excrements of the birds. The hens should be kept on this floor for a period of 2-3 days. There is then no question of the infection being transmitted. The experiments refer to both artificially and naturally infected birds.

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**PARASITES**

**Mites and Lice on Poultry. U. S. Department of Agriculture.**

Farmer's Bulletin no. 801.

The chicken mite and various species of lice cause tremendous losses to the poultry raisers of the country. The fowl tick and sticktight flea are very serious poultry pests, but they are not so widespread in this country.

The common mite sucks blood from the fowls and breeds in the cracks of the roosts and buildings. Infested chicken houses may be completely freed of it by the construction of simplified roosts and one to three treatments with carbolineum or crude petroleum.

Scaly leg is caused by a small mite which may be destroyed by dipping the feet and shanks of the fowls in crude petroleum.

Methods are described of eradicating the depilating mite and the new and destructive pest known as the feather mite.

Methods by which poultry lice may be eradicated by a single treatment with sodium fluoride are fully explained. This material has been found by the department to be the most effective remedy against all poultry lice. If properly applied it will not injure the fowls in any way and its cost is but a fraction of a cent per bird. Since its introduction in 1917 it has become the standard louse remedy throughout the country.

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**A Calendar of Livestock-Parasites. U. S. Department of Agriculture, Miscellaneous Publication no. 25, 1928.**

A careful consideration of this parasite-control calendar may save you time and money, may help to save your livestock, and may even save your life. It gives timely warnings as to seasonal troubles from parasites and suggests ways and means of avoiding or controlling them. More detailed information may be obtained, on request, from the United States Department of Agriculture.

The year-round suggestions at the end of this publication should be kept in mind as practical measures for preventing losses and increasing your income from livestock.
The time arrangement in this calendar is based on conditions in the East, Middle West, North, and in the Rocky Mountain region of the United States. It is not so definitely applicable to conditions in the South, Southwest, and the Pacific coast. However, the control measures noted are generally applicable, and more precise information will be found in the various publications mentioned here.


With allochrysine (C₆ H₁₃ O₂ S Au Na₂) excellent results were obtained in preventing and curing the disease.


About 1923, during the routine examinations of hens in the Veterinary Department of the Washington Experiment Station, a single case of the above-mentioned tape-worm was found, quite, by accident. During recent years the number of cases has increased considerably. Numerous hens are noticeably sick and the cause is the Davainea. The intermediary, the carrier therefore of the cysticercoid is a snail (about 4 cm. long, probably Limax civereus). A photo shows a snail of which the abdomen has been opened; numerous small white spots in the abdomen are cysticercoids; through a single lens these look like small pearls.

**Experiments.** Hens were fed with snails containing cysticercoids. After 8 days no tape-worms were found by autopsy. After 15 days numerous tape-worms were found.

* Blackhead of Turkeys by A. Kotlan, Allatorvosi Lapok, 1928, p. 68.

In Hungary the disease occurs in turkeys and chicks. In acute cases the death rate amounts to 50—80%. Histomonas Meleagridis (Tyzzers) is given as the cause. Treatment led to no results. (Ref. Revue Générale de Médecine Vétérinaire 1929, p. 349.)

* Infections Entero-Hepatitis for „Blackhead” of Turkeys by T. M. Doyle, Veterinary Laboratory, Ministry of Agriculture and Fisheries, 1929.

Description of: Species affected, causal agent, incubation period, mode of infection and method of spread, symptoms, post-mortem appearances, diagnosis, treatment, prevention, desinfection.


Most up-to-date poultrymen have had a chance to test the validity of the addition of cod-liver oil and lime to the ration of growing chicks and invariably feel that they are sound.
Rachitic chicks that had been fed cod-liver oil and lime showed extensive enteritis, usually due to coccidiosis. The feeding of powdered milk eliminated this trouble.

*Lice, Mites and Other Pests* by F. R. Beaudette. New Jersey Agricultural Experiment Station, Department of Poultry Husbandry, New Brunswick, N. J. April 1929.

Description of Lice, Species of Lice, Treatment, Dusts, Dips, Ointments, Vapor, Mites, Remarks.

**GENERAL**


As a rule the liver, pancreas and spleen of the hen did not appear to contain any bacteriaphages. In one case a Shiga-bacteriaphage was found in a spleen and a liver. The thick intestine contained the largest number of bacteriaphages. These were active against typhoid and coli-bacteria and other bacteria.


The technic of section on birds is described. Further a few frequently occurring skin disease are described. These are:

1. Sarcome. They are smooth, shiny, pink protrusions, soft to the touch.
3. Eczema. Especially on the neck, chest and back.
4. Ordinary dermatitis. Mostly parasitical and often leading to alopecie.
5. Nodulae (epitheliomateus) on comb, wattles, eye-lids.


In literature only few tumours are known, from which tumours in the oviduct originated. This article describes a tumour which originated in the blood-vessels of the muscles in the oviduct. The hen died of internal hemorrhage.


On the Philippines more than 50,000 hens died of disease in the windpipe at the end of 1927 and in the beginning of 1928. Death took place 1 to 7 days after the disease commenced. The birds which withstood the disease suffered from diarrhea and paralysis. The disease is caused by a virus that can be filtered.
Tumours in Birds. Bijdrage tot de kennis van nieuw-vormingen bij vogels in het bijzonder bij de kip, bij Dr. K. Reitsma, Rheden, Holland, 1929.

An extensive study regarding the literature on tumours in fowls followed by a description of 81 cases which the writer personally investigated. Special chapters are devoted to leucosis and melanine. The book, contains 180 pages including several illustrations.


The condition of loose eggs in the abdominal cavity is seen quite frequently in hens. Nothing has been reported on the treatment. Description with illustrations of a case, cured by operation. The hen continued laying, the first egg was laid forty-six days after operation.


The Ministry desires to draw the attention of poultry and rabbit keepers to the facilities available at the Ministry's Veterinary Laboratory, New Haw, Weybridge, for the veterinary examination of chicks, poultry and rabbits. The scale of fees in respect of this service has been revised and is as follows:— Post-mortem examination of an adult fowl, or a rabbit ... ... ... ... 3s. Post-mortem examination of chicks, including full bacteriological examination of any number of chicks necessary to establish identity of disease, if any ... ... ... ... ... ... ... ... ... ... ... ... 5s.


Description of disease. Gmelin attributes the inclination of fowls to gout to be due to their ability to deal largely and quickly with nitrogenous food (70 per cent of which is secreted as uric acid). The secretion of the urate on the surface of the serosa causes no inflammatory condition. Thanks to the presence of a stasis transudate it passes out from the well-filled capillaries and veins of the sub serosa. The blood plasma rich with uric acid comes on the surface and there the uric acid loses its solvent (acid phosphate of soda) and is deposited.

Treatment is to change of food and put the fowls out on grass, green food is advocated and not much corn.


Summary:

Since it has been shown by Ross that cellular infiltrations occur due to the presence of a specific exotoxin it would not be unreasonable to assume that the cellular infiltrations of the nervous system and viscera observed by
Pappenheimer, Doyle, May and Stafseth and Johnson are due to neurotoxins associated with the presence of intestinal parasites particularly coccidia and tape-worms. If we select the following conditions, assuming that they are indicative of, or associated with toxin production we find one or more in 96.76 percent of the 93 cases: cecum worms, tapeworms, enterites; round worms heart lesions, coccidiosis, tumours ruptured ovum and peritonitis.

It is undoubtedly true that all of these conditions may occur without any manifestation of paralysis. This would end to indicate that the toxin productions or absorption takes place only under certain definite circumstances.

It would appear from a review of the literature and our own observations that a toxin production occurs more readily in the presence of coccidia tapeworms and other intestinal parasites. A marked catarrhal enteritis and peritonitis are associated with a majority of the cases of ruptured ovum; which provides two possible locations for toxin production or absorption. However the peritonitis is probably more of a mechanical than a septic nature and the marked catarrhal exudate usually present in the lumen of the intestine would provide a favorable place for the production of various toxins. The possibility of a filtrable virus being the etiological factor is not to be altogether ignored especially in the absence of definite information relative to other factors.

The great difficulty which has been experienced in reproducing the condition with any degree of regularity rather precludes the idea of any living infectious agent but does not necessarily render it an absolute improbability.

Conclusions:

From our study of fowl paralysis we might draw the following conclusions:

1. The incidence of fowl paralysis in flocks, previously suffering losses from coccidiosis may go as high as 50 per cent.
2. The association of tapeworms and other intestinal parasites with fowl paralysis is quite marked.
3. It seems possible that no definite single etiological factor is responsible.
4. Measures designed to control coccidioses and intestinal parasites will greatly reduce the incidence of the disease.
5. The suggestion that the condition might be caused by more or less specific toxins associated with intestinal disturbances seems plausible.
Feeding Standards for Poultry by Eric B. Lomax, B.A., N.D.P.

In order that poultry may be fed in an economical manner it is essential that there be standards upon which to calculate the requirements of the bird and that these requirements may be correctly varied for birds differing in weight and in expected production.

In an article by E. T. Halnan, in the N.U.P.S. Annual for 1929, figures relative to the requirements of poultry have been given which are of interest and value to those engaged in compounding and criticising rations for fowls. Although much work has been carried out upon investigation into the problems in the field of poultry nutrition, little information has been obtained as to the definite requirements of birds in terms of protein, fat and carbohydrates. As is well known, the most usual calculation used in connection with rations for poultry is the working out of the „albuminoid or nutritive ratio.” Now this figure, although valuable in indicating the proportion of protein to the carbohydrates (+ fats × 2.3), gives no indication of the amounts of the nutrients contained in 1lb. of the food and consequently we cannot tell from this figure whether the bird is able to take in sufficient nutrients for its needs in the amount of food which it consumes. This knowledge is obviously of the greatest importance, for as will readily be realised, a ration of the correct ratio may be made up in such a way as to provide the bird with nutrients insufficient in amount to supply the body needs and leave excess for the production of eggs. In the case of the larger farm animals it has been possible to calculate the amounts of nutrients required for maintenance and to feed over and above this amount for production, but until recently figures of a similar nature for poultry have not been available.

Table I. shows the requirements of pullets of various weights for maintenance and for production.

Table II. shows the digestible protein and starch units in pounds per pound of the feeding stuff, together with the chemical analysis of the foods. The figure given in the digestible protein column has been obtained by digestibility trials and the starch units figure by multiplying the digestible protein by .94, adding the fats multiplied by 2.3 and to the figure thus obtained adding the carbohydrates.

TABLE I.

A. For growth and maintenance. (Pullets).

<table>
<thead>
<tr>
<th>Weight of bird in lbs.</th>
<th>Dig. Prot. in grms.</th>
<th>Starch units in grms.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>6.5</td>
<td>51.7</td>
</tr>
<tr>
<td>4</td>
<td>7.4</td>
<td>58.1</td>
</tr>
<tr>
<td>5</td>
<td>8.3</td>
<td>64.1</td>
</tr>
<tr>
<td>6</td>
<td>9.2</td>
<td>69.7</td>
</tr>
<tr>
<td>7</td>
<td>10.1</td>
<td>75.0</td>
</tr>
<tr>
<td>8</td>
<td>11.0</td>
<td>80.0</td>
</tr>
</tbody>
</table>
B. For the production of a 2oz. egg.

<table>
<thead>
<tr>
<th>Dig.</th>
<th>Prot.</th>
<th>Starch Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>in grms.</td>
<td>in grms.</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

28.4 grms. equals 1 oz.

For purposes of comparison, the actual amounts of nutrients consumed by the pens of White Leghorn pullets have been used. Each pen consisted of forty birds housed in a section of a long laying house and kept under strictly controlled conditions for a period of forty-eight weeks. The rations fed to each pen differed in composition, and it is thought that the data obtained with regard to food consumption, egg averages and body weights of the birds are sufficiently accurate to be useful in calculating comparative figures.

### TABLE II.

GROSS COMPOSITION AND DIGESTIBILITY VALUES OF THE COMMONER POULTRY FEEDING STUFFS.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Matter.</td>
<td>Protein.</td>
<td>Oil.</td>
</tr>
<tr>
<td>Alfalfa Meal ..........</td>
<td>89.3</td>
<td>14.6</td>
</tr>
<tr>
<td>Barley and Meal ........</td>
<td>85.1</td>
<td>8.6</td>
</tr>
<tr>
<td>Beans and Meal ..........</td>
<td>85.7</td>
<td>25.4</td>
</tr>
<tr>
<td>Biscuit Meal ..........</td>
<td>90.6</td>
<td>13.9</td>
</tr>
<tr>
<td>Blood Meal ..........</td>
<td>86.0</td>
<td>81.0</td>
</tr>
<tr>
<td>Clover Meal ..........</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Buckwheat ..........</td>
<td>87.7</td>
<td>10.7</td>
</tr>
<tr>
<td>Dari ..........</td>
<td>88.9</td>
<td>9.6</td>
</tr>
<tr>
<td>Fishmeal ..........</td>
<td>87.0</td>
<td>55.6</td>
</tr>
<tr>
<td>Groats ..........</td>
<td>92.0</td>
<td>16.4</td>
</tr>
<tr>
<td>Maize, and Meal ..........</td>
<td>87.0</td>
<td>9.9</td>
</tr>
<tr>
<td>Maize, flaked ..........</td>
<td>86.0</td>
<td>9.5</td>
</tr>
<tr>
<td>Maize gluten feed ..........</td>
<td>89.6</td>
<td>23.5</td>
</tr>
<tr>
<td>Maize gluten meal ..........</td>
<td>90.9</td>
<td>35.5</td>
</tr>
<tr>
<td>Meat Meal ..........</td>
<td>89.2</td>
<td>72.2</td>
</tr>
<tr>
<td>Meat and Bone Meal ..........</td>
<td>90.8</td>
<td>50.5</td>
</tr>
<tr>
<td>Milk, fresh ..........</td>
<td>12.8</td>
<td>3.4</td>
</tr>
<tr>
<td>Oats and S.G.O. ..........</td>
<td>86.7</td>
<td>10.3</td>
</tr>
<tr>
<td>Peas and Meal ..........</td>
<td>86.0</td>
<td>22.5</td>
</tr>
<tr>
<td>Potatoes ..........</td>
<td>23.8</td>
<td>2.1</td>
</tr>
<tr>
<td>Rice ..........</td>
<td>87.4</td>
<td>6.7</td>
</tr>
<tr>
<td>Rice bran ..........</td>
<td>91.4</td>
<td>12.8</td>
</tr>
<tr>
<td>Rice polish ..........</td>
<td>91.5</td>
<td>12.8</td>
</tr>
<tr>
<td>Rye ..........</td>
<td>86.6</td>
<td>11.5</td>
</tr>
<tr>
<td>Soybeans ..........</td>
<td>90.0</td>
<td>33.2</td>
</tr>
<tr>
<td>Soybean meal extr. ..........</td>
<td>88.7</td>
<td>44.7</td>
</tr>
<tr>
<td>Soybean cake ..........</td>
<td>85.5</td>
<td>42.4</td>
</tr>
<tr>
<td>Wheat, strong, vars. ..........</td>
<td>87.9</td>
<td>13.0</td>
</tr>
<tr>
<td>Wheat, weak, vars. ..........</td>
<td>88.5</td>
<td>9.5</td>
</tr>
<tr>
<td>Wheat bran ..........</td>
<td>87.0</td>
<td>15.1</td>
</tr>
<tr>
<td>Wheat midds., fine ..........</td>
<td>86.7</td>
<td>17.0</td>
</tr>
<tr>
<td>Wheat midds., coarse ..........</td>
<td>86.0</td>
<td>15.8</td>
</tr>
<tr>
<td>Yeast, dried ..........</td>
<td>95.7</td>
<td>48.5</td>
</tr>
</tbody>
</table>

* The digestible protein and starch unit figures given in the last two columns are calculated from the results of poultry digestibility trials in all cases except those marked*. 
TABLE III.
COMPARISON OF ACTUAL AND THEORETICAL DIGESTIBLE PROTEIN AND STARCH UNITS INTAKE FOR WHITE LEGHORN PULLETS.

Data on which comparison is based.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. All Mash (Wet and Dry) ...</td>
<td>178.2</td>
<td>3lb. 9 ozs.</td>
<td>10.5</td>
<td>Fish Meal.</td>
</tr>
<tr>
<td>B. Wet Mash and Grain ..........</td>
<td>174.2</td>
<td>3lb. 10 ozs.</td>
<td>3.0</td>
<td>Meat Meal.</td>
</tr>
<tr>
<td>C. All Mash (Dry) ................</td>
<td>155.0</td>
<td>3lb. 8 1/2 ozs.</td>
<td>10.8</td>
<td>Fish Meal.</td>
</tr>
<tr>
<td>D. Dry Mash and Grain ............</td>
<td>181.6</td>
<td>3lb. 10 ozs.</td>
<td>5.43</td>
<td>Meat Meal.</td>
</tr>
<tr>
<td>E. Dry Mash and Grain ............</td>
<td>181.6</td>
<td>3lb. 10 1/2 ozs.</td>
<td>12.5</td>
<td>Meat Meal.</td>
</tr>
<tr>
<td>F. Dry Mash and Grain ............</td>
<td>178.7</td>
<td>3lb. 10 ozs.</td>
<td>12.1</td>
<td>Extr. Soya Meal.</td>
</tr>
<tr>
<td>G. Dry Mash and Grain ............</td>
<td>170.2</td>
<td>3lb. 8 ozs.</td>
<td>10.05</td>
<td>Ex. Dec. Grd. Nut Meal.</td>
</tr>
<tr>
<td>H. Dry Mash and Grain ............</td>
<td>164.5</td>
<td>3lb. 6 ozs.</td>
<td>10.20</td>
<td>Fish Meal.</td>
</tr>
<tr>
<td>I. Dry Mash and Grain ............</td>
<td>172.8</td>
<td>3lb. 12 ozs.</td>
<td>10.70</td>
<td>Fish Meal.</td>
</tr>
<tr>
<td>J. Dry Mash and Grain ............</td>
<td>180.3</td>
<td>3lb. 10 ozs.</td>
<td>12.0</td>
<td>Fish Meal.</td>
</tr>
</tbody>
</table>

TABLE IV.
Actual Amounts Consumed.

<table>
<thead>
<tr>
<th>Pen</th>
<th>Dig. Protein ozs. per day.</th>
<th>Calculated Requirements.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>.413</td>
<td>.927</td>
</tr>
<tr>
<td>B.</td>
<td>.418</td>
<td>.923</td>
</tr>
<tr>
<td>C.</td>
<td>.415</td>
<td>.920</td>
</tr>
<tr>
<td>D.</td>
<td>.396</td>
<td>.913</td>
</tr>
<tr>
<td>E.</td>
<td>.403</td>
<td>.916</td>
</tr>
<tr>
<td>F.</td>
<td>.367</td>
<td>.884</td>
</tr>
<tr>
<td>G.</td>
<td>.361</td>
<td>.874</td>
</tr>
<tr>
<td>H.</td>
<td>.362</td>
<td>.877</td>
</tr>
<tr>
<td>I.</td>
<td>.369</td>
<td>.870</td>
</tr>
<tr>
<td>J.</td>
<td>.384</td>
<td>.862</td>
</tr>
</tbody>
</table>

These figures indicate, therefore, that according to Halnan's standards the total food consumed per day by each bird must contain .5267 ozs. of dig. protein and 2.6941 ozs. S.U., and that these amounts will satisfy the needs of a bird weighing 3lb. 9oz. and producing 178.2 eggs in 48 weeks.

Discussion:
The birds used in the trials with which we have dealt were allowed free access to grass runs throughout the 48 weeks of the experiment, and small amounts of green food were fed during the months of December, January, February and March, the amounts given being the same for each pen. Hainan, in his calculation of the digestible protein and starch units requirements, estimated that 0.5 oz. of dry matter grass was consumed per bird per day, which contained 0.100 oz. digestible protein and 0.283 oz. S.U.

If these amounts of the nutrients are added to the actual intake figures given in Table 4 it will be seen that the intake figures correspond very closely to those given for theoretical requirements. It is hoped that during the course of the next six months it will be possible to use the figures for food consumption from a large number of birds which have been confined to the house for a full period of 48 weeks. From these birds it will be possible to obtain accurate data upon the actual amount of green food consumed.

This experiment was one of a number of experiments, designed to obtain information upon the feeding of pullets for economical table egg production. In this investigation the barley was fed as a whole grain in the litter as part of the scratch food. Two pens each consisting of 40 Singlecomb White Leghorn pullets were selected for these experiments.

**Conclusion:** From the facts and figures given it will be seen that the two pens differed to no appreciable extent in any of the points on which data were collected and it may be said that so far as this investigation was concerned, little or no difference existed between the value of barley and wheat as constituents of the scratch grain.


**Conclusions:**

The results of these experiments prove without any doubt that the size of eggs is influenced materially by the rations fed. The results consistently and very definitely show that sour skim-milk was, under the conditions of the experiments, superior to all other feeds in the influence it had on the weight of the eggs produced.

A well balanced ration gave larger eggs than a poorly balanced ration. The addition of peameal or peameal and mineral mixture did not bring about an increase in egg size in comparison to the check pen.

The use of milk whey increased the egg size only slightly over the check pen.

Meatmeal and meatscraps are of about equal value in their influence on egg size, but slightly inferior to tankage.

Condensed buttermilk, milk curd, dried buttermilk and milk casein are apparently of about equal value and rank higher than meatmeal or meatscrap. With a well balanced ration of which sour skim-milk is a part, the egg size in Single Comb White Leghorn pullets increases rapidly from the time they start laying to about February 1st and often slumps slightly during April and May, and then continues upward for the remainder of the year.

Contrary to the general opinion, the pens that laid the most eggs in the experiment also gave the largest size of eggs.

The producer of eggs for the market should plan the right ration for his layers by making use of feeds that will give a high percentage of marketable eggs and may get increased returns by using such feeds even if the use of such feeds increases to some extent the cost of producing the eggs.


Wheat was used as one-half of the scratch grain for the first year, and barley as one third of the scratch grain for the second pen.

1. The average percentage egg production was slightly in favour of barley.
2. Food cost per dozen eggs was lower for the wheat pen.

**Study of the effect of feeding different amounts of the same scratch food.** The Harper Adams Utility Poultry Journal, 1929, p. 217.

1. Little difference existed between the two pens as far as average percentage egg production and cost of food per dozen eggs were concerned.
2. Food cost per bird was lowest for the pen receiving 1 3/4 ozs. and the
profit over food cost was highest for the pen receiving 2 oz. of scratch food.
3. Body weight was well maintained in both pens.
4. Possible differences in egg size are being investigated.

The results of experiments conducted in 1927 and in 1928 indicate that for growth, cost of feeding, and quality of pullets produced, the All-Mash system of feeding was, under the condition of the experiments, as good as the scratch and dry mash method of feeding chickens. It appeared to have the additional advantage of being simpler and to require less labour. Further data are being obtained as to the ability of pullets reared under the All-Mash system to withstand forced feeding for egg production.

Comparison of the all-mash (wet and dry), the all-mash (dry), and dry mash and grain systems. The Harper Adams Utility Poultry Journal, 1929, p. 217.
1. The average percentage egg production was highest for the All-Mash (Wet and Dry), followed by the Dry Mash and Grain; the All-Mash (Dry) being lowest.
2. Food cost per dozen eggs was lowest for All-Mash (Wet and Dry), next lowest for Dry Mash and grain, and highest for All-Mash (Dry).
3. Food cost per bird showed all three pens approximately equal.
4. Profit over food cost per bird was highest for the All-Mash (Wet and Dry), next highest for Dry Mash and grain, and lowest for All-Mash (Dry).
5. Body weight was satisfactorily maintained, the All-Mash (Dry) being in line with the other pens in this respect.
6. Mortality was highest for Dry Mash and Grain (3), followed by All-Mash (Wet and Dry) (1), no deaths occurring in the All-Mash (Dry) pen.
7. The possible differences in egg size are being investigated.
8. No conclusions will be drawn from this project until the results of the 1928-1929 experiments are obtained.

1. The average percentage production was highest for Dry Mash and Grain.
2. Food cost per dozen eggs was lowest for Dry Mash and Grain.
3. Food cost per bird was lowest for Dry Mash and Grain.
4. Profit over food cost per bird was highest for Dry Mash and Grain.
5. Maintenance of body weight was not good in either pen, the Dry Mash and Grain, however, being better in this respect than the Wet Mash and Grain.
6. No deaths occurred in the Wet Mash and Grain pen; three deaths in the Dry Mash and Grain pen.
7. The possible differences in egg size are being investigated.
8. This experiment is being repeated. No conclusions will be drawn until the results of the second year's work are known.

The protein foods used were 10 per cent. meal, 10 per cent. meat meal with 3 per cent. minerals, 14 per cent. Soya meal with 3 per cent. minerals, 13 per cent. earthnut meal with 3 per cent. minerals, and 10 per cent. fish meal.
1. Meat meal and Minerals, and meat meal gave the highest average percentage egg production, being 2 per cent. above Soya meal and minerals, 3 per cent. above earthnut meal and minerals, and over 4 per cent. above fish meal.

2. Food cost per dozen eggs was lowest for meat meal, meat meal and minerals being equal to earthnut meal and minerals at a fraction more, followed by Soya meal and minerals and fish meal.

3. Food cost per bird showed the lowest figure for earthnut and minerals, followed by fish meal, meat meal, meat meal and minerals and Soya meal and minerals.

4. Profit over food cost per bird showed meat meal to give the highest figure, followed by meat meal and minerals, earthnut meal and minerals, Soya meal and minerals and fish meal; the difference between the highest and lowest being a little under three shillings.

5. Mortality was highest for fish meal and meat meal (3 birds in each pen), meat meal and minerals lost two birds and no mortality occurred in the vegetable protein pens.

6. Body weight was satisfactorily maintained in all cases except that of meat meal. This fact, however, does not appear to have been detrimental to production.

7. The possible differences in egg size are being investigated.

8. This experiment is being repeated. It is unsafe to draw conclusions from the data obtained.


Summary:

1. When the food of newly-hatched chicks was limited to mixed „grains” and separated milk, a mixture of dari, hemp, millet, canary seed, groats, rice, lentils, peas, wheat and maize gave better results, judged by live weight increase, than either mixture of dari, millet, canary and hemp or of groats, lentils, rice, peas, wheat and maize; a mixture of groats, lentils, rice, peas, wheat and maize gave better results than a mixture of dari, millet, canary and hemp.

2. After the groups of chicks had been fed on the grain mixture for 55 days and then given a dry mash of known utility, the two backward groups failed to make up on the best group, thus emphasising the importance of suitable feeding during early life.

3. A feeding trial with a mixture of dari, hemp, millet and canary seed apparently failed to justify the birds' selection of these shown in a previous paper.


Feeding Crab Scrap to Poultry by John Ruel Manning. Bureau of Fisheries, Department of Commerce, Washington, April 1929.

Preliminary experiments with crab scrap in poultry mash, which appears to be a valuable supplement to the poultry ration. The analysis of the crab scrap used in the feeding test follows: Moisture 6 per cent, Calcium Carbonate 44 %, Calcium phosphate 8.5 %, Protein 28 %, Sulphur 0.3 %, Iodine 0.000056 %, other Constituents not determined 13 %.

Description of the history of the use of fishmeal and the methods of preparation. In France, Spain and Italy very little fishmeal is used. In England, Germany, the United States and Scandinavia very much is used, chiefly for pigs, poultry and milking cows.


It is of great economic importance that by-products are worked up into valuable products. The book describes the methods by which slaughter-house waste can be worked up. There are still many unsolved problems in this field of work, and up to the present there was no book in existence which treated the subject exhaustively. In connection with the tests made by R. W. Prange, S. M. Hauge and C. W. Carrick (Int. Review II i. p. 38), it is interesting for the study of poultry feeding to learn, on page 79, that from extensive tests made at the Institute for Animal Physiology at the Agricultural High School at Berlin, it appears that the presence of „stick“ or „extract“ in animal meal has an irritating influence on the digestive organs of animals. It is therefore recommended not to mix extract in animal meal. Other people, however, contest this point of view, so that the question still remains, whether extract containing meal or meal without extract should be used as food.

1. The experiment confirmed the previous experiment of the winter 1925-1926. Under the conditions of this experiment confined White Leghorn pullets showed a decrease in egg production. The important condition associated with this decrease in eggs was a glass fronted house which prevented any direct rays of sunlight reaching the pullets when confined to the house itself.

2. That the apparent reason for the decrease in egg production is a lack of sunlight or the antirachitic vitamin, which results in a condition resembling rickets among the pullets so confined.

3. This condition in adult stock appears only after the birds have been confined for two-three months. It has occurred in both the experiments of 1925-26 and 1927-28.

4. That the use of an open-fronted house, protected in a suitable way against inclement weather, and at night, is one definite method of obtaining improved results with confined birds.

5. That the use of 2 per cent. Cattle Cod Liver Oil supplies the necessary food accessory, the absence of which appears to result in the decrease of egg production described.

6. That the birds under confinement without a sufficient source of Vitamin "D" are likely to lose body weight, as indicated by the results obtained in this experiment.

7. That the egg weight is not influenced by the differences in management practised in this experiment.

Further experimental work upon this subject is being done at the Institute.


1. Under the conditions of the experiment late hatched (May) pullets proved profitable. Due to the relatively small size of eggs they produced, however, their value is considerably below earlier hatched pullets for winter production of standard eggs.

2. The lights were turned on at 4 in the morning in one pen. This pen responded to artificial illumination especially in the winter period, and gave better production and profit over feed and lighting costs than the unlighted pen.

3. The experiment proved that satisfactory inexpensive devices may be arranged for automatic regulation of the lights.

4. A reasonable allowance of artificial illumination did not injure the health of the birds. There was no ill health or excessive mortality.

5. The body weight increased very materially during the experiment, but especially during the lighting period.

6. Food consumption is materially increased by the use of lights.
7. Estimating the cost of electricity at 7d. per unit the cost of lighting was 2d. per bird. The margin of income over the combined feed and lighting costs was 14s. 6.4d. per bird in the lighted pen, Is. 8.4d. per bird more for the 48 week period than the margin of income over feed cost in the unlighted pen.


The object of this project was to test a cross that showed possibilities of being valuable in applying sex-linkage to light commercial breeds. The shank colour of the pullets was dark grey or slate, and that of the cockerels was white. The differences in the shank colour, however, were not sufficiently reliable at a day old or even at two weeks to render selection for the sexes completely reliable.

Report of Experimental Station, for the year 1926. Charlottetown, P. E. I. Canada.

Poultry.

During 1926 several new phases of work were conducted at the Station. Selection work continues in an effort to eliminate birds producing small eggs, and valuable data are being collected. This severe culling, however, is reflected in our lowered annual production per bird. Valuable data were collected on the effect of various feeds on fertility, etc., and this has been tabled in this report. There is also included a comprehensive study of the cost of rearing chicks to the age of 5 months. While figures on the cost of rearing chicks have been kept for many years at this Station, this is the first time such figures have been published in tabular form.

Reports of Experimental Station, Fredericton, N. B. 1927, Canada

Poultry.

The work in the poultry plant for the year included pedigree breeding, feeding experiments, hatching experiments, caponizing experiments, and conducting the sixth New Brunswick Egg-Laying Contest.

The stock on hand December 31, 1926 consisted of: —

- Barred Rocks: 16 males, 454 hens and 87 chickens.
- Toulouse Geese: 4 ganders, 3 geese.
- Pekin Ducks: 3 drakes, 13 ducks.

This is the fourth season that beef scrap has been compared with skim-milk for egg production. In two seasons beef scrap gave better results than skim-milk. In two seasons skim-milk was better than beef scrap. In the aggregate skim-milk has a little advantage from the standpoint of egg production, and a larger advantage from the standpoint of profit. This is the first season that fish meal has been tried. From the results it would appear to be a satisfactory animal feed. From the standpoint of the hatchability of the eggs, skim-milk is apparently superior to either beef scrap or fish meal.


Table of Contents:

- General Conditions; Work of the Division; Breeding; Experimental Work; Hatching; Summary; Duration of Fertility; Ultra-Violet Rays in Incubation,
Moisture in the Incubator, Starvation Period for Chicks, Vitamine Feeds and Varied Rations, The Effect of Sunlight upon Growth of Chicks, Vitamine Feeds for Rearing, Feeding Experiments for Winter Egg Production. Home-Mixed vs. Commercial Grain and Mash, Ultra-Violet Rays for Egg Production, Vitamine Feeds for Winter Egg Production, Semi-solid vs. Fresh Buttermilk, Substitutes for Fresh Greenfeed; Feeds for Fertility, Hatchability, and Viability of Chicks; Experimental Work on the Branch Farms; Experimental Work with Waterfowl: Duck-Feeding Experiment, Comparative Rate of Growth of Different Breeds, Comparative Rate of Growth of Geese; Poultry Diseases; Canadian National Egg-Laying Contests; Field Work in Quebec; Farm Egg and Poultry Accounts; Demonstrations and Exhibits; Wild Geese Experiment; New Projects.


Description of the twelfth year of the Vineland-Egg-Laying Contest and the eighth year of the Bergen County Egg-Laying Contest.


Report on the Seven-Point Program by J. C. Taylor. New Jersey Agricultural Experiment Station, Department of Poultry Husbandry, New Brunswick, N. J. March, 1929.

In the spring of 1928 a state-wide campaign was inaugurated to reduce mortality in the raising of day-old chicks to maturity. The campaign was based on sanitation and emphasized the following seven points in raising chicks:


This pamphlet describes methods of improving poultry breeding and is illustrated by very instructive drawings. For every drawing illustrating a mistake, there is also one illustrating the improvement.

First Poultry-School in Cuba. Primera Escuela de Avicultura, practica y por correo. Instituto Ávicola interamericano, fundado en Cuba por la Revista Agrícola „Trinidad Productiva“, Habana by Emilio Unshelm Siegert and Luis Gerónimo Martínez.

The school was established by the Revista Agrícola Trinidad Productiva,
the purpose being to spread knowledge concerning poultry breeding in Cuba and the Spanish speaking countries of America. This takes place by lessons at the school and lessons by letter. The school will be called: Instituto Avicola Inter-Americano.
The National Mark, a symbol of Reform. Plain selling and easy buying by the Right Hon. Walter Guinness, Ministry of Agriculture and Fisheries, London. 1929.

In this article, reproduced by the courtesy of "the Times" the Minister of Agriculture describes the working of the National Mark Scheme.


The National Mark Egg Scheme, designed to secure a better service of home-produced eggs for the large consuming centres and to help home produce to capture ground held by imports, came into operation on February 1, 1929. The Scheme was approved by the various sections of the industry represented on the Poultry Advisory Committee of the Minister of Agriculture and Fisheries, and has been carried into effect under the Agricultural Produce (Grading and Marking) Act, 1928.

Description of:
1. The agricultural Produce (Grading and Marking) act, 1928.
3. The Marking of preserved, cold stored and chemically stored eggs.

Conclusion:
Home-produced eggs, properly handled, are superior in quality to any supplies from abroad, and the conditions of production in this country are favourable for the maintenance of superiority. What is needed is to ensure that, at least in the "exporting" areas of England and Wales, where production exceeds local requirements, supplies will be marketed, so far as practicable, through specialist packing-stations where they can be assembled and handled efficiently in bulk for transfer promptly and economically to the centres of demand. The National Mark scheme provides for the organisation of the industry on these lines and enables the industry to face, on level terms, the competition of imported supplies which compulsory marks of origin may be expected to intensify. Distributors in the large centres of population will get to know that home-produced supplies offered under the Mark are all that they purport to be, that the Mark, therefore, eliminates chance and saves time in buying, that, thanks to the packing-station system, there is standard grading, standard packing and continuity of supply of National Mark consignments, and that such consignments meet the needs of present-day business in the same way as competing imports in that they are easy to obtain, easy to handle and easy to sell. Consumers will learn, through the Mark, that dependable grade standards for home produce have been established by authority, and that produce, so that the Mark will largely advertise itself, cumulatively and economically, a feature of the scheme will be the use of National Mark cartons, holding ½ dozen and 1 dozen eggs, has its own significance in this connection. Further, the same National Mark is to be used on all kinds of graded homegrown
produce, so that the Mark will largely advertise itself cumulatively and economi-
cally, as one commodity after another is brought within its scope. The National Mark will thus become not only a guarantee of quality but a powerful
selling force, standardisation and advertisement being linked together. Through
the National Mark scheme, with its possibilities of publicity and organisation,
the egg industry of this country can increase output with confidence and direct
its marketing activities to definite ends.
Markets and Co-operation Branch,
Economics Division,
Ministry of Agriculture and Fisheries,
Revised January, 1929.

Canadian National Egg Laying Contest 1924-25, 1925-26, 1926-27
by A. G. Taylor, Poultry Husbandman, Ottawa. Dominion of
Canada Department of Agriculture, Bulletin no. 108. New
Series. 1929.

The Purpose of the Laying Contest.
The purpose of the Canadian National Egg Laying Contest may be said
to be two-fold. (1) To stimulate interest in the breeding of birds for egg pro-
duction. (2) To provide a medium of qualification for registration.
The first mentioned purpose — to stimulate interest in the breeding of
birds for egg production — was the primary motive of the contest, and so great
has been the success of this undertaking it is safe to say that, as a result,
trapnesting and judicious breeding of high egg producing birds has doubled in
the last few years. The demand for information on construction of trapnests
and plans for improved methods of breeding, together with the increased demand
for reliable breeding stock, especially cockerels is evidence that poultry im-
provement work, with special reference to high egg production, is making rapid
progress.

Much valuable data has, and is being secured and when time and circum-
cstances will permit, we expect this mass of figures will be worked over and
when properly compiled, should be of great service to the poultry industry.
The main purpose of the contest, however, is to provide a medium of
qualification for registration of poultry. This is a unique undertaking, as
Canada is the only country in the world where egg-laying contests have been
so standardized as to make this undertaking possible in a national way, and
also where poultry registration on the production basis, backed by a federal
government has been put into effect.

At the present time there are thirteen contests in Canada all operated
under the same rules and regulations and controlled by a central executive body.

Contest Development.
„The Canadian National Egg Laying Contest” started November 1, 1919,
with six provincial contests, and the Canadian Contest at Ottawa. The following
year three additional provincial contests were started making ten contests
in all.

In 1921 the Quebec Contest was divided into two parts to be known as
the „Quebec Western” at Lennoxxville, and the „Quebec Eastern” at Ste. Anne
de la Pocatiere. These two contests together with those held the previous year
were conducted in 1921-22 and again the following year.

On November 1, 1923, an additional contest was started at Sidney, B.C.,
known as the Vancouver Island Egg Laying Contest, making twelve contests
for the year 1923-24.

The following year beginning November 1, another contest known as the
Nova Scotia Southern was started at Kentville, N.S., making thirteen contests
for the year 1923-24.
The following year beginning November 1, another contest known as the Nova Scotia Southern was started at Kentville, N.S., making thirteen contests for the year 1924-25.

Contest Egg Weights.

Careful weighings are kept of the eggs laid by all birds throughout the contest.

The practice which is adopted is to weigh every egg at the commencement of the contest, the weight being recorded on the egg report for future reference. Only eggs averaging 20 ounces or over to the dozen are counted.

As the egg yield increases and eggs begin to run normal in size, weighings are taken twice weekly, and always on the same days each week. All eggs are weighed the day after being laid and are therefore in the same degree of freshness making weighings as uniform as possible. Only birds laying eggs which average 24 ounces or over to the dozen are considered for position in any contest, and all birds were registered which laid 200 eggs or over providing the eggs were up to the 24 ounce standard, and the bird was not otherwise disqualified.

Registration.

Registration certificates are issued to all birds which qualify for them. This is a new section in poultry breeding work and has been made possible by using the egg laying contests as the medium of qualification for registration. No other country has a national system of registering poultry and no bird can be registered in Canada except through the egg laying contests. The Canadian National Live Stock Records Office, Ottawa, issue all registration certificates, thus placing the registration of poultry on an equal plane with that of live stock.

Rules and Regulations.

The rules and regulations governing the Egg Laying Contests are printed and sent out annually to all those who apply for them, and as they were included in the previous report of the Egg Laying Contest they are not repeated at this time. Changes of note in the regulations will be mentioned as occasion demands.


Summary:

Eight years' summary: Selection of the contest pen; Development of the pullet: Inspection, mating, marking, etc.: Registered birds: Registration qualifications: Observations.

Experiments Show that Carbon Dioxide Gas is best Egg Preservative. The British Columbian, 1929. June.

ITHACA, N. Y., May 4. — A discovery for preserving eggs that appears to have practical uses for farmers, packers and housewives is announced at Cornell University.

The preservative is carbon dioxide gas. Disclosure that this gas ranks first in Nature's own egg preserving process, and that it can be controlled readily by methods previously unconsidered, are the secrets revealed by the Cornell research.

Carbon dioxide is part of ireshly laid eggs, but it escapes rapidly through the shells. Its loss is found to be one of the most important causes of decomposition. Control of this loss is accomplished readily because the shells reabsorb gas about as easily as they lose it, and because only a slight percentage of gas is needed. Furthermore, prompt attention to containers of freshly laid eggs helps to retard the loss. Because carbon dioxide is a natural part of the egg, its artificial use in mild doses has no ill effects upon quality.
The research was conducted by Dr. Paul F. Sharp, professor of dairy chemistry, with technical assistance of A. E. Everhart of the poultry department. The experiments began two years ago at the suggestion of Dr. C. K. Powell of the poultry department.

Six factors are found in egg preservation, microscopic living things, quality of freshness, absorption of flavors and odors from containers, loss of water, temperature, and increase in alkalinity. And alkalinity depends almost wholly upon carbon dioxide balance.

Safe for Workmen.

As the gas escapes, says Dr. Sharp, the egg whites become watery, the yolks soften and finally the thinned yolk breaks if the shell is opened. At room temperatures, he says, ten to twelve per cent, of carbon dioxide is necessary to preserve eggs, but at freezing about one per cent, is enough, an amount costing but a few hundredths of a cent a dozen under favorable conditions, and safe for workmen.

The effective use of the gas seems at present to lie in approximating Nature's method, rather than in forcing by large quantities. Yolk and white are affected at different rates by absorbed gas, and the white thickens with too much of it, though this thickness disappears when natural evaporation is permitted again.

The two most important results thus far attained are longer preservation of eggs and delivering them in a fresher state. It probably is a fact, Dr. Sharp says, that effectiveness of present storage methods comes largely from the fact that the evaporating carbon dioxide in the eggs slightly charges the air about them. This points to practical methods of getting newly laid eggs quickly into good containers, even if no gas charge is available. Even a day is vital, so rapid is evaporation.

Fourth Central Egg-Laying Test at School of Agriculture and Experiment Station, Glen, Orange Free State, South Africa. From 1st May, 1929, to 1st April, 1930.


The Australian Egg & Export Association is a growing organisation. It now has over 1,000 members and with affiliated societies represents over 4,000 producers in Australia. In 1925 the Association shipped to England 2,007,520 eggs, in 1928 it shipped 14,957,640. Mr. J. B. Merrett, who was a delegate to the World's Poultry Congress at Barcelona, is General Manager of the Association.

A very complete grading machine has been invented in Sydney by Mr. Cowan, a clever electrical engineer. It grades eggs into four sizes, electrically tests for quality and stamps the eggs all in one operation. It was patented last October.

Egg production has increased remarkably and the industry in the Commonwealth is now valued at £12,000,000 annually.

Queensland and N.S.W. have recently passed legislation to control the egg supply. A Board is elected in each State which is empowered to regulate prices and supplies. Every producer is compelled to pay a levy to cover the expense of administration.

Contents:
Patrons and Officers of the Congress page 3; Congress Committees pag. 13; Introduction pag. 15; Delegates and Members page 16; Papers and Sessions page 17; The National Exhibits page 18; Live-Stock Exhibits page 19; Commercial Exhibits page 20; Excursions and Entertainment page 21; General page 22; The Crystal Palace page 23; Plans opposite page 24.

World's Poultry Congresses were initiated by the World’s Poultry Science Association (until recently the International Association of Poultry Instructors and Investigators) for the purpose of (i) bringing together those concerned with the development of the poultry industry and promoting international friendship; (ii) pooling the best and most recent knowledge concerning the various aspects of the poultry industry in all parts of the world; (iii) improving and developing poultry research, education and economics both through papers and discussions and through national exhibits; (iv) encouraging, through displays on an international basis of pure bred poultry, the improvement of poultry stocks in all countries; (v) stimulating, through commercial exhibits, trade in all the requirements of the poultry industry. Congresses are held triennially, the first being held in Holland in 1921, the second in Spain in 1924, and the third in Canada in 1927.


Summary:
The symptoms and pathologic lesions encountered in chickens from two different flocks in Illinois were, as far as could be determined, traceable to the presence of the nematode Capillaria. The possibility of two separate species of this parasite in cases 1 and 2 is recognised. These parasites impair the function of the ingluvium and intestine. The gross lesions in one specimen were confined to the intestine while the ingluvia of several fowls examined from the other flocks were involved. It is possible that capillarias are more prevalent than supposed yet in conducting several hundred autopsies, the above cases represent the first time capillarias, to our knowledge, have been recognised as a pathogenic agent in farm flocks in Illinois. Necropsie findings fortified by microscopic and histopathologic examinations may enable veterinarians to recognise parasitic ingluvitis or enteritis in fowls from enteric inflammations due to other causes.


In December 1926 a Committee was appointed by the Minister of Agriculture and Fisheries to examine the various kinds of packages in use in the trade in home-produced eggs and dressed poultry and to make suggestions with a view to standardisation. The main outlines of the Committee’s report are given in this leaflet No. 5.

This report was presented at the National Poultry Parliament on the 17th July 1929. It treats the growth of the Poultry Industry in England from its establishment in 1920 up to the present day.

In ducks we find three independent pancreas beginnings—one dorsal and two ventral. The dorsal pancreas beginning is in no way directly connected with the liver beginning. The writer cannot vouch for the existence of a hepato-pancreatic circle, either according to Webers or to Ludwigs in ducks. The ventral pancreas beginnings are caused by local growing processes of the Entodermeplhites close behind the liver beginning. While the dorsal beginning, which is in the beginning flat, is transformed into a grooved organ, owing to the lifting of the surfaces of the Entoderm, half round diverticals are formed of the flat beginning of the ventral pancreas beginning owing to the lifting of the Epitels. The accessory diverticals can be considered as a dislocated part of the two pancreas shields there present. In the centre, underneath, a tripartite of the ventral pancreas beginning is to be seen. As this is not usual, however, Weber’s opinion regarding the earlier development process of the Pancreas beginning may be rejected.


The air chamber in the eggs forms between two membranes. These two membranes differ in the size and position of the fibres and in their chemical composition. The space becomes filled with gases which force their way through the inner membranes. The splitting of the two membranes takes place already in the oviduct.


Old and conserved eggs are distinguishable from fresh eggs by fluorescentie of the whites in ultra violet light. This fluorescentie is absent in fresh eggs and increases as the eggs become older. The age of eggs can be ascertained by comparing the fluorescentie of gelatine solutions.


Influence on big combs. Combs of 130—150 m. M. suffered most. The comb is rounded off and the wattles become smaller. Small combs did not show the same symptoms. The circulation of the blood did not suffer. The comb did, however, become much smaller. Later they grew bigger again.


When hens are to be weighed they should be placed on their backs on the scale. The left hand should be placed on the chest and with the right hand the head of the bird should be forced downwards under the upper portion of the scale. After a few seconds the hen can be freed and will remain immobile for a few minutes.
INTERNATIONAL REVIEW
OF POULTRY SCIENCE

OFFICIAL ORGAN OF THE
WORLD'S POULTRY SCIENCE
ASSOCIATION

600,000 MEMBERS

EDITOR:
Dr. B. J. C. TE HENNEPE
ROTTERDAM (Holland)
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EDITOR:
Dr. B. J. C. TE HENNEPE
ROTTERDAM (Holland)
Report of Meeting held at Canada House, London,
25th October, 1929.

Present: President F. C. Elford (in the Chair), Dr. Edward Brown (England), Prof. de Blieck (Holland), Prof. M. Calinescu (Roumania), Prof. Chlebaroff (Bulgaria), Miss N. Henner-ty (Dublin, I.F.S.), Miss A. Kinross (Scotland), Mr. W. A. Kock (Denmark), Dr. Bela Mangold (Hungary), Mrs. Tom Newman (Ireland), Mr. Tom Newman (England), Mr. T. R. Robinson (England), Dr. Schachtzabel (Germany), Mr. G. R. Scott Robertson (Northern Ireland), Mr. Sidney Smith (Belfast, Ireland), Dr. B. J. C. te Hennepe (Holland).

Apologies for non-attendance were received from Professor S. Castelló (Spain), M. Frateur (Belgium), Professor A. Ghigi (Italy), Dr. J. Gordon (Ireland), Mr. Kleb (Switzerland), M. Maenhout (Belgium), N. Nilssen (Norway), Dr. L. Weinmiller (Germany).

President Elford opened the meeting by welcoming the delegates, and referring briefly to his trip, full report of which is published in this issue of the Review.

Report of the American Committee upon the International Review.

Mr. Newman and others discussed this report and all felt that though they appreciated the kindly suggestions from America they felt that at the present time they were impracticable and the consensus of opinion was that the present editor should carry on as in the past. Dr. te Hennepe, the editor, was asked for his opinion and it coincided with the feeling of the meeting.

On the proposal of Dr. Brown, seconded by Mr. Tom Newman, it was resolved that any newspapers or publications desiring
to publish the articles appearing in the Review, should be at liberty to do so provided such papers gave acknowledgement as to the source of these articles. Thus advertising the Review.

**French Edition.** Dr. te Hennepe spoke at length as to the growing demand for a French edition of the Review, and intimated that this perhaps could be carried out by a firm he was in contact with, in Brussels, at a low figure. It was stated that there are in the Association some 600,000 members, and many of these could not read the English language, in which the Review is now published.

Prof. Calinescu expressed the opinion that this Review should be printed in every language of the country in which it was circulated, but this proposition was not accepted.

Resolved, on the proposal of Dr. Schachtzabel, seconded by Dr. Scott Robertson, that there should be a French edition of the International Review.

**Membership.** With regard to Membership, Dr. te Hennepe reported that the various poultry papers in the different countries would take more interest in the Association if there were more members in those countries. Dr. Schaschtzabel stated they could publish a notice in all their poultry papers explaining the work of this Association and there are many thousands of copies circulated in his country, and thus probable members could be interested in this movement. He suggested the advantages would be very great, and the cost would not be very much. At the same time the publicity is given.

Dr. te Hennepe suggested that it would be a very good thing to have as many countries as Patrons of the Association as was possible, and also the affiliation of the different Poultry Organisations in these various countries, thus increasing the membership roll.

**Collection of Membership Fees** was fully discussed. Dr. Brown referred to the method adopted during his years of Presidency as a guide for the present, and on the proposal of Dr. te Hennepe, seconded by Mr. Tom Newman, it was decided that some responsible person in each country should be delegated to collect the fees of members in that country, these to be reported to the Treasurer. Also that a slip should be attached to the last issue of the Review saying that fees are now due, and that the subscription expires with this issue. Unless there is a renewal of the subscription, the Review will not be forwarded in future. Also that there should be a Membership Card.
Manner in which Resolutions from Congress Sessions can be dealt with by the Association. President Elford felt that this question needed some explanation, and referred to the resolutions which appeared to finish at the time of the Congresses, in that nothing more was heard of them. Dr. Brown also spoke on this subject, stating that in his opinion, many of these resolutions did not go beyond the Governments to which they were sent, if that Government felt it had no interest in the matter.

Prof. de Blieck said he thought a Permanent Committee of the Congress should be appointed to go into this question, and be given certain authority. This gentleman was accordingly asked to bring forward a resolution at the next meeting to this effect with Prof. Calinescu.

World’s Poultry Science Association in the Congress Exhibition. Dr. te Hennepe said he should like to have at the Exhibition in London next year, a stand where we can show the work of the Association to all the visitors at the Exhibition, as he thought that would be a good means of advertising it.

At this point, Mr. P. A. Francis, stated that it is the intention that the President of the Association shall be given the King’s Room which is the best at the Palace, and pointed out that as it is large and roomy, it would perhaps be sufficient for meetings, and for the general use of the President. At the same time he intimated that they would be happy to make arrangements for space if it was desired.

Dr. te Hennepe said he should like to have space at the entrance of the National Exhibitions Hall.

Dr. Brown moved a Vote of Thanks by intimating how greatly indebted this Association is to the public spirit and generosity of the Dominion of Canada in sending President Elford over as they have, for the purpose of enhancing the interest in the World’s Poultry Congress. Also to the Netherlands Government for their co-operation Dr. te Hennepe to accompany the President in his tour through the Southern European countries. He also expressed his great satisfaction that Mr. Francis was able to accompany the President on his mission, which he felt sure could not fail to bring about successful results.

This was seconded by Mr. W. A. Kock, and unanimously carried.

Mr. P. A. Francis briefly referred to the success which would not have been attained without the President, and also to the great assistance rendered by Dr. te Hennepe. This gentleman was
able to go with them and was of invaluable help in the countries he visited with both the President and Mr. Francis, and he wished to pay tribute to Dr. te Hennepe for all his services.

The proceedings then terminated.
The countries visited this year were, in order of visitation — Portugal, Spain, Italy, Switzerland, Bavaria, Czecho-Slovakia, Austria, Hungary, Jugo-Slavia, Bulgaria, Roumania, Turkey, Greece, Egypt and Palestine.

Upon this visit, Mr. P. A. Francis, Poultry Commissioner for England, and Director General of the World’s Poultry Congress for 1930, represented the Congress, and upon the delegation were Dr. B. J. C. te Hennenpe, Rotterdam, Holland, Continental secretary of the Association and Editor of the International Review, who was present at the countries from Bavaria to Greece. In addition, Mr. W. A. Sleight of the United States visited all of the countries, Mr. W. W. Baird of Canada went as far as Switzerland, and as was the case last year, the Canadian National Railways sent an attendant in the person of Mr. Baumgartner to the middle European countries from Northern Italy to Greece.

As Mr. Francis discussed with all of these governments the question of direct representation at the Congress next year, I will not touch upon his end of the work, except incidentally in passing however, I will mention the fact that I believe his visit to these countries has been eminently justified. Although we found in most of the countries quite an interest in the Congress, in some there was a more or less indifferent interest, and in one case the country had decided not to participate, but because of the personal visit this decision was reversed, and the fullest co-operation in all countries was promised.

This enthusiastic promise of support from every country to the Congress could not have been obtained without the personal visit of the Director, and as President of the Association I want to say most emphatically that the support which many of these countries will give to the Congress next year will be the direct result of the visit by the Director.

I am sure Mr. Francis will pardon me for referring to the Congress end of our mission, even to this extent, but I feel it is only fair in my report that reference should be made to his good work and the very satisfactory response. Further particulars as to the results of his work I am quite sure will be given in its proper place.
As to the visit on behalf of the World’s Poultry Science Association, I will mention the countries individually and though it will be impossible to give the detail of the hearty reception which we received by the various Departments of Agriculture and others, I may mention a few of the names of those whom we met, especially those who are or who may become members of the Council.

**Portugal:** Before reaching Portugal we were met at the border of France and Spain by the European First Vice-President, Professor Salvador Castelló, who had made all arrangements for our visit in both Portugal and Spain, and who accompanied us throughout these two countries.

At Lisbon a large delegation including Professor Pratas, Professor Brigandizi and others met us.

We were fortunate in being able to meet the Minister of Agriculture, who gave us a very kind reception and who assured us that Portugal would be glad to become a Patron of this Association. Also, one or two delegates would be named upon the Council, and with Professor Castelló’s help the affiliation of the National Association would follow. In accordance with these arrangements, Professor Castelló will report at this meeting.

In this report it will be impossible to refer even briefly to the hospitality showered upon us by the countries, and it is only because of the necessity of making it brief that the mention of such courtesies will have to be omitted.

**Spain:** At Madrid a very representative delegation met us and here we saw the Director of Agriculture, who assured us that our request would be answered through Prof. Castelló and that Spain would be glad to become a Patron of this Association, and through its member of Council, the National Association would become affiliated, all of which Professor Castelló would report at the meeting in London.

**Italy:** It was a pleasure to meet the member of Council Professor A. Ghigi at the station in Rome. The preparations for our visit had been well made by Professor Ghigi, and we were given a splendid reception. We met the Minister of Agriculture, Professor A. Martelli, who had with him the Director of Agriculture, Comm. Professor Mario Mariani, and Professor E. Cortis, who represented the poultry work. The Minister was good enough
to assure us of Italy’s heartiest co-operation in every way, and Professor Ghigi comes to this meeting with a fuller report of the detail of Italy’s participation in the Association as also in the Congress.

While in Rome we met the Director of the Federated Societies, who works in co-operation with the government in matters pertaining to agriculture. Here again we were assured of Italy’s co-operation in the Association and in the Congress, and, further, the matter of Rome’s suitability for the holding of a World’s Poultry Congress was discussed.

While referring to the visit in Italy, I cannot fail to mention our kind reception from Dr. Brizi, Director of the International Institute, who has always been a good friend to this Association.

Switzerland: At Berne we had an interview with Dr. T. Keppeli, Director General of Agriculture, who had with him Mr. Kleb, Chairman of the National Congress Committee. Dr. Keppeli assured us that Switzerland was behind this world movement and was not only going to participate in the Congress, but wished to become permanently identified with the Association Mr. Kleb who is also the President of the Swiss Association for Poultry Breeding, was appointed as representative upon the Council, and would attend this meeting in London.

It was intimated by the Director of Agriculture that Switzerland would be a very desirable place in which to hold the triennial gathering of the Association at some not too far distant date.

Bavaria: According to previous promise to Dr. Weinmiller, and although Germany was included in last year’s visit, a stop was made at Munich and with Dr. Weinmiller, a very pleasant visit made to the Director of Agriculture for Bavaria, Dr. Wm. Niklas. This gentleman was good enough to assure us that Bavaria was behind Berlin’s support of the Association and the Congress, and that he hoped to be present personally at the Congress next year.

Czecho-Slavakia: At Prague the Minister was absent, but we were fortunate in meeting his secretary, Counsellor Hanosek, and also Counsellor Zeman, Head of the Poultry Work, and Dr. A. Prokes, Head of the Publicity Department.

These officers assured us of their country’s hearty support and co-operation in the Congress next year, and in the work of
the World's Poultry Science Association, and directed us to Dr. Antonin Schönfeld, who was named as Member of Council, who will also be the Chairman of the National Congress Committee and who I expect will be at this meeting to give a further report upon their participation.

**Austria:** In Vienna we had the honour of being received by Dr. Liebseher, Head of the Agricultural Department for the Government, and Dr. Peter, secretary of the Department. Dr. Liebseher said that Austria would be pleased to become a Patron of the Association, and appointed Dr. Otto Hübner as member of the Council, and intimated that this gentleman would possibly attend this meeting.

As the nationalisation of associations within the country is an important step in becoming affiliated with this world organisation, I might be permitted to mention the fact that in Vienna we attended a meeting of the representatives of six Austrian Associations that were called together for the first time to consider the organisation of a National Association, which it was hoped would be accomplished very soon, and which would, it was expected, affiliate with this Association.

**Hungary:** In Budapest we were received at the Government by the Minister of Agriculture, Mr. John Meyer, who promised very hearty support from his country. Afterwards we met Mr. John Winkler, Secretary of the Hungarian Poultry Breeders' Association, and Mr. S. Lorant, Chairman of the National Congress Committee, who was named as a member to the Council of the World's Poultry Science Association, and who I expect will be at this meeting.

**Jugo-Slavia:** At Belgrade we first met Dr. L. Prohaska, Head of the Livestock Department in the Ministry of Agriculture, and afterwards the Minister himself, Dr. Otto Franges. The Minister said his country would support this world organisation and the Congress, and intimated that Dr. Prohaska would give us the details of their co-operation. He further intimated that Jugo-Slavia would be glad to become a Patron of the Association and he named Dr. Prohaska as a member of the Council, and promised the Doctor, if possible, would attend the meeting in London on the 25th-inst.
Bulgaria: At Sofia we met Mr. Christoff, the Minister of Agriculture, who gave us the assurance of Bulgaria's support to the Congress and the Association. Also he intimated that he himself would be pleased to attend the Congress and that Professor Chlebaroff, Head of the Animal Husbandry Department, would be their representative upon the Council, and, also would act as secretary of the National Congress Committee. Further, that in all probability he would attend this meeting. After the visit to the Minister, Professor Chlebaroff discussed the details of our mission, and assured us that the Bulgarian Poultry Breeders' Association, of which he was President, would be pleased to affiliate with this Association. I am hoping that Professor Chlebaroff will be able to give us further information concerning this to-day.

Roumania: In Bucharest we met the Minister, Mr. Ion Mihalache, who was kind enough to assure us of Roumanian's continued co-operation in this world movement, and that he himself hoped to visit the Congress, and that his country would be glad to become a Patron and in every way possible support the organisation. After our interview with the Minister we met Professor I. Braila, the Livestock Commissioner, and Dr. T. Calinescu, Veterinary Inspector and Head of the Poultry work for Roumania, Dr. Calinescu accompanied us on our visits in Roumania, and was named as the Director upon his Board and intimated that he would attend the meeting in London.

Turkey: At Angora we were favoured by an interview with the Minister of Natural Resources, the Hon. Sakia Bey, who assured us that Turkey was pleased to receive us and to co-operate in this world movement in poultry. Further, he stated that Turkey would be represented at the Congress and that Dr. Cevat Rüstü, Secretary of the National Congress Committee, would represent Turkey upon the Council and the Association, and if possible, would attend the meeting. If this was not possible, he would see that Turkey would be suitably represented at the meeting to-day.

Greece: Unfortunately the only member of the Association in Greece, Mr. J. Antoniades was indisposed, and we could not see him, but Mr. Spyros Synodinos represented him in welcoming us to Greece. He and Mr. Basile Sifneo, member of the National Agricultural Bank, and President of the National Poultry Association, were present when we visited Mr. P. Contsomitopouly,
Director of Agriculture, the Minister himself being absent. The Director of Agriculture assured us that Greece would be pleased to be represented in the Association, and he would immediately take the matter up with his Minister upon the latter's return to Athens, and that he would intimate to Dr. te Hennepe further information after he had the opportunity of discussing it with his Chief.

In a letter I intimated to our member, Mr. Antoniades what had taken place in the Ministry, and I expect, as soon as he is able, he will communicate with Dr. te Hennepe concerning his country's participation.

**Egypt:** Our Member of Council, Dr. Mohammed Askar Bey had seen to all arrangements in Egypt and gave us constant attention whilst there. At Cairo we met the Secretary to the Minister, who assured us that Egypt would continue her support of the Poultry Science Association in every way possible, both by exhibiting at the Congress and by becoming Patron of the Association and affiliation of National Associations, all of which would be reported through Dr. Mohammed Askar Bey. Whilst there, we met Mr. A. M. Greiss Bey of the Ministry, who also promised his co-operation, and before leaving Egypt, after we had visited Palestine and after the election in Egypt, we met the new Secretary of State, Rashwan M. Pacha, who gave us a very pleasant reception and who assured us, not only of his own personal interest in the Congress, and the Association, but stated that he hoped to be present at the Congress and that he would do everything to assist the work of the World's Poultry Science Association. Also that Dr. Mohammed Askar Bey would be instructed as to Egypt becoming a Patron and hoped that Dr. Mohammed Askar Bey himself would see to the nationalisation of their Poultry Organisation, and the affiliation with this Association.

Whilst in Egypt the question again came up as to a suitable location for a World's Poultry Congress, and here it was suggested that Egypt would provide a very desirable meeting place.

**Palestine:** We were met here by our member, Professor A. Livshitz in charge of the poultry work for the Palestine Government, and Mr. David Uri of the Agricultural Experiment Station at Tel Aviv. With them we met the Director of Agriculture, Col. Saure, who intimated that Palestine would co-operate in every way with the organisation and would be represented at the Con-
gress in 1930. He further intimated that through Professor Livshitz the act of becoming a Patron of the Association would be carried out, and that he hoped the affiliation of a National Organisation would follow very soon.

Before closing this brief account of the trip through Southern Europe, I want to refer to the fact that Dr. te Hennepe was of great value to me, and to the work, in the countries which he was able to visit. As Continental Secretary, and as Editor of the International Poultry Review, he was able to give, and to get, information, and to make connections which should be of great value to the association, and to those whom it is serving. Dr. te Hennepe's presence was made possible by the generosity of the Government of Holland. This act on the part of the Dutch Government, as also many other similar acts, are very much appreciated.
MEMORANDUM TO SECRETARIES OF NATIONAL COMMITTEES.

On October 26th, 1929, a joint meeting was held in London between the main Congress Committee and European members of the World’s Poultry Science Association. Mr. Elford, President of the Association, was also present, and one or two foreign representatives not members of the Association, but interested in the forthcoming World’s Poultry Congress. Mr. Percy Francis, O. B. E. Director of the Congress, was in the Chair.

This meeting was held in order that representatives of the different countries might have an opportunity of discussing with the Congress Committee the progress of arrangements for the Congress, and of raising any points of difficulty. It is thought desirable to circulate to National Committees this note of the discussion, inasmuch as some of the points raised may be of interest to Committees who were not represented at the meeting.

Submission of Papers.

As already announced, proposals for papers must be in the hands of the Congress Secretary by November 30th, 1929. The actual papers may be submitted up to 28th February, 1930. Mr. Elford made a plea that this date should be strictly adhered to, in order to allow adequate time for printing and translation work, so that delegates could be supplied with copies of all papers in advance of the Congress.

In countries where National Committees have been established papers will only be accepted which have been recommended by the National Committee.

A large number of proposals for papers has already been received, and the Congress Committee will certainly be under the necessity of cutting down the list. This is necessary in view of the limited time available at the paper-reading sessions and of the importance of leaving time for adequate discussion of the various subjects. In the case of papers which have to be rejected, however, the Committee hope that the proposed authors will be able to take part in discussions on their respective subjects.

It is proposed to have at the conference sessions interpreters
qualified to speak in French, German, Italian and Spanish in addition to the official language, English.

Final Assembly of Delegates.

At this meeting resolutions passed at the various conference sessions will be submitted for confirmation, or otherwise, by the general body of delegates. The method of voting will be that adopted in the case of the third Congress at Ottawa, viz., the number of votes which each country may give will be in proportion to the total population, provided that no country may give votes in excess of the number of delegates in attendance at the Congress.

In addition to resolutions forwarded from the various conference sessions, independent resolutions may be presented provided that not less than 24 hours before the opening of the Final Assembly they have been submitted to and approved by a committee consisting of the First Vice-President of the Congress (Mr. Elford), the Congress Director (Mr. Francis) and the Secretary of the World's Poultry Science Association (Dr. Heuser).

Resolutions passed at the Final Assembly will be transmitted by the Congress Secretary to the Secretary of the World's Poultry Science Association.

National Exhibits.

One or two overseas representatives were under the impression that the national exhibits would be limited to the poultry and small live stock industries. This, however, is not the case. As indicated in the Preliminary Announcement, it is recognised that although poultry should be the dominant feature of exhibits, opportunities will be taken by National Committees of bringing the general national features of their countries to the notice of the public.

It is essential to bear in mind that national exhibits must not be used for commercial advertising.

In regard to the inclusion of live poultry etc. in the national exhibits, the Congress Committee desire to explain that, in view of the desirability of keeping the main floor of the Crystal Palace as quiet as possible for the purposes of the opening ceremony, concerts, etc., they would prefer that livestock should be excluded from national exhibits. If, however, a National Committee regards it as essential, in order to demonstrate, say, a piece of educational work, to include three or four live birds, this will be permitted, on the understanding that such birds will be taken away on
specific occasions such as the opening ceremony, and replaced later at the request of the Congress Committee.

**Livestock Exhibits.**

The Congress Committee wish to encourage National Committees to send to the Crystal Palace entries of livestock representing as many breeds as possible in the particular countries. It is recognised that the entry fee of £1 per trio (or 10/- per bird for production entries) may make a representative entry difficult in the case of certain breeds. If, therefore, National Committees desire to send over some entries under their own name (that is, without the name of a breeder displayed on the pen) in order to make their display representative, the Congress Committee will accept such entries for a low charge, which will be communicated on application to the Congress Secretary stating the proposals.

At the meeting several overseas representatives indicated their proposals regarding livestock entries. Canada, for example, proposes to send 500 birds, Germany 1,000, France 200 to 250, Denmark 300, and 100 pigeons, Belgium 100 rabbits, Roumania 100 birds.

The Congress Committee are endeavouring to secure reduced rates for the transport of birds from overseas countries to the Crystal Palace, and an announcement will be made as soon as practicable.

**Post-Congress Tours.**

The official post-Congress tour of Great Britain and Northern Ireland, to which a tour of the Irish Free State (by invitation of that Government) has been linked up has now been settled, and a pamphlet describing the itinerary in detail will shortly be circulated to National Committees. A proof of the tour brochure was circulated at the meeting. Amendments have since been made, and the cost of the tour which was indicated in the proof as £27.6s.0d. (130 dollars) has been reduced as indicated above. The tour commences on July 31st and finishes in London on the morning of Monday, August 11th. The cost is £26.5s.0d. (125 dollars).

In addition to this tour, the Congress Committee will probably arrange a limited number of short tours after the Congress. During the Congress half-day tours to places within easy reach of London will be held in the afternoons. Particulars of these will be included in the Congress programme.

The Congress Committee desire to urge on National
Committees the necessity for delegates registering early for the main post-Congress tour. Although bookings may be made up to 30th June, 1930, early registration would help considerably in the successful organisation of the tour. The Wagons-Lits Company and Messrs. Thomas Cook & Son Limited, who are the official travel and accommodation agents for the Congress, reserve the right to decline applications received after 30th June.

An overseas representative asked if it would be possible for delegates to take a section only of the main Congress tour. The reply is that this would be quite impracticable; the tour must be taken as a whole. If, however, any party of delegates wishes to take a limited tour after the Congress and indicates its wishes in good time, the Congress Committee will endeavour to make provision for this.

Films.

As already announced, facilities for the display of films of an educational character sent in by National Committees will be provided in the Cinematograph Theatre at the Crystal Palace. Particulars of the conditions for the display of films will shortly be circulated. The films will be shown free of charge, but they must not be used as a medium for commercial advertising. Proposals from National Committees should be sent early to the Congress Secretary, if possible by January 31st, 1930.

Publicity and Propaganda.

The Congress Committee trusts that National Committees will do their utmost to secure publicity for the Congress in their respective countries.

Congress Secretariat,
November, 1929.
GOVERNMENT LUNCHEON TO FOREIGN REPRESENTATIVES TO THE WORLD'S POULTRY CONGRESS

The Feathered World - November 1, 1929

Following upon a meeting between the Finance and General Purposes Committee of the Congress and representatives of the World's Poultry Science Association, to settle a number of points connected with next year's great gathering, H.M. Government gave an official luncheon to the members present thereat as well as to a number of other poultry experts who are assisting to make the Congress an assured success.

The chair was taken by the Right Hon. C. Addison, M.P. (Parliamentary Secretary, Ministry of Agriculture), and amongst those present were Mr. F. C. Elford (Canada), Prof. C. and Miss Voitellier (France), M. Calinescu (Roumania), Dr. B. J. C. te Henniepe (Holland), Dr. L. de Blieck (Holland), Miss M. Hennerty (Irish Free State), Mr. Sidney Smith (Northern Ireland), Mr. G. Scott Robertson and Miss A. Kinross (Scotland), Dr. A. Schachtzabel (Germany), Prof. G. Chlebaroff (Bulgaria), Mr. and Mrs. W. A. Kock (Denmark), Mr. M. de Wachenfelt (Sweden), Senor José Casada (Spain), Mr. E. A. Foley (U.S.A.), Representative of the Italian Embassy, Sir Chas. Howell Thomas, K.C.B., C.M.G., Capt. the Hon. C. K. Greenway, Messrs. L. Ardern, John Garton, H. E. Dale, C.B., H. J. Buckland, P. A. Francis, V. S. Wilkins, Mr. and Mrs. Lever, Dr. Edward Brown, Leslie Williams, Mr. and Mrs. Tom Newman, A. Arbuthnot, S. Street Porter, C. Bryner Jones, F. J. Broomhead, C. A. House, W. M. Elkington, Dr. C. Crowther, A. S. Juniper, J. N. Leigh, T. R. Robinson, C. Almond, Mrs. Birks, D'Arcy, H. Edwards, E. A. Evans, P. Hedworth Foulkes, R. H. Franklin, F. S. Graff, P. W. D. Izzard, A. W. Legg, J. A. McGilvray, Dr. Bela Mangold, H. Meadows, B. W. Philips, Miss Pratt, Miss Stopford, Claude Taylor, Dr. J. Traberg, W. E. Walters, A. R. Whyte and F. E. Wilkinson.

Luncheon over. Dr. Addison gave the toast of „H.M. the King“, followed by that of „The Heads of States here represented.“ These duly honoured, he proposed that of „The World's Poultry Science Association and our Foreign Guests.“ some amusement being caused by the Toastmaster giving the word as „Silence“ instead of „Science“ —a slip which gave the speaker an opening for remarking that he had not noticed that quality as particularly prevalent among the company present. With the toast he would like to associate also the names of Mr. Elford (Canada) and Miss Hennerty (Irish Free State). The Government felt that in connection with the approaching Congress this country had something to live up to. He had heard of the wonderful show which Canada put up at Ottawa, and whilst no effort on the Ministry's part would be spared to make the 1930 Congress even better he did not envy either Mr. Francis or Dr. Wilkins the task they had before them to accomplish this. As the result of the very successful tour recently undertaken by Mr. Francis and Mr. Elford, forty-five countries had signified their intention of participating in the Congress, and thirty-four of these had set up National Committees for the purpose. The British had a gift for naturel self-depreciation, as he discovered when visiting some smallholdings recently. All said they were doing badly, but one thing he noted was the wonderful cheerfulness of the poultry keepers. As Sir Howell Thomas had said to him.

„The hen gets the pip, but the poultryman never.“

There must be some telepathic, influence between the fowl and its owner to account for all this. Joking apart, the hen was a wonderful animal, which poultry experts had developed into a 300-egger (some of them!). Well, his at home never laid anything like that. Still, considering the hen’s weight and its
annual output of nourishing food, the bird furnished a wonderful phenomenon. He had read of a learned Italian physiologist who lived to the advanced age of ninety-three upon one egg and water per day, but he never heard if he accomplished much work on the diet, and he would therefore venture no deeper into the subject, and he would conclude by expressing the thanks of the Government to the ladies and gentlemen who are assisting the Ministry so ably on the various committees.

Mr. Elford, replying on behalf of the World's Poultry Science Association, said he was glad to see present visitors from ten European countries, for their Association, organised in 1912, was the mother of these Congresses. It owed its inception to their leader, Dr. Edward Brown, who had hatched and brooded it, and of whom it might be said that he had no nationality, for apparently the whole world claimed him for their own. At least that was his experience on his recent tour with Percy Francis. As its President he was proud to think that the World's Poultry Science Association promised to become the largest agricultural association in the world. Continuing, Mr. Elford described how he and Mr. Francis had visited the Ministries of thirty-two States; they had found some indifferent at first, and Mr. Francis had great difficulty in arousing their enthusiasm, but he had succeeded and accomplished a great work. It was no small satisfaction to have thus put the Congress over on these officials, to have sold the goods satisfactorily, and come away with an assurance of 100 per cent assistance. Everywhere they went they found that Governments were waking up to the importance of poultry, and the necessity for dissemination of information thereon, realising, no doubt, that in the humble hen lay the possibility for increasing the standard of living and of yielding a satisfactory return to the farmer and smallholder. Some countries had the idea that marketing alone had to be considered; that was wrong, for quality and production had to be considered as well. Some people asked:

What Use is a Congress?

He could answer that by telling them that at Ottawa in 1927 Canada spent £1,000,000 on the Congress, and his Government considered it was the best investment Canada had ever made. Not only did it enormously increase the sale of their stock, but it advertised Canada internationally and brought people together in such numbers as no other agricultural convention had done. If Canada had but had such a building as this wonderful Crystal Palace, she could have shown them all something, and remembering what the British Isles are he could picture what a Congress she can stage if its poultry-keepers put their backs into the task. Remember that Canada will boost you, and the American cousins to the South when they come will say: "Not half so bad for the Old Country." Above all, let them prize the opportunity which such gatherings had for bringing folk together. At the end of the Ottawa Congress, Lord Willingdon, the Governor-General, said: "This is not a Poultry Congress, it is a League of Nations." We had forty-five nations represented in Canada. Great Britain will have the greater advantage of sixty-five, and the occasion should not be looked upon as a duty to perform but as a fine opportunity for business. Traveling as they had done, wherever Francis and he went, under different complexions and speaking varying tongues, they found human nature much the same, and the culture of the little hen afforded them at the 1930 Congress an unrivalled opportunity for promoting international friendship. (Applause.)

Only a Step.

Prof. Dr. L. de Blieck (Holland) felt it difficult to follow so eloquent a speaker as Mr. Elford, but, none the less, he was glad to have the honour of thanking the British Government for their hospitable reception of himself and colleagues from oversea. His country was near to England; the G.E.R. advertised as "only a step," but it was sometimes a rough one. (Laughter.) Many of the visitors had come long distances, some even three days en route, but it was worth while to come to London to be the guest of the British Government. They had also learnt much at the joint meeting that morning as to the working of the Congress, and, finally, he would like to say what pleasure it had been for him, like Mr. Elford, to see the realisation of Dr. Edward Brown's dream. (Hear, hear.)
Sir Chas. Howell Thomas then gave "Success to the World's Poultry Congress," coupling with it the name of Dr. Edward Brown. At the Dairy Show last week, Sir Charles said that he had heard a speech from a prominent agriculturist in which it was authoritatively laid down that the cow was the basis of sound farming. Yet all the while that statement was being made from without the room came the protesting voice of the hen. That was somewhat significant, for undoubtedly in the past the influence of poultry keeping had been despised. That oversight he hoped the Congress would remedy. It should benefit poultry keepers by the papers and discussions which would take place thereat, and by the influence of the educational exhibits which would be staged by so many nations. It should also develop trade and increase general interest in poultry and by establishing contacts with other nations promote international friendship. On behalf of the Ministry, he desired to thank those poultry experts who had worked so hard with it over the Congress, Mr. Elford and Mr. Francis had done a great service by their recent successful tour. To another friend, Mr. Buckland, whom he might describe as "The Crystal Palace," they were also deeply indebted for his wise advice and help. Then there was Dr. Edward Brown, with whom he had associated the toast. For fifty years that enthusiast had ploughed what was for long a lonely furrow, but had at last seen the hen come into her own. Finally, he desired to thank the Press for their valuable support. He trusted that their assistance would be given to the full, and then they might hope that the high standard set up for these Congresses in Holland, Spain and Canada might be even excelled at the Crystal Palace next year. To that end the Ministry will spare no effort, and Sir Charles added: "If there is anything, that we can do to secure success that we have not done, let us know it." (Applause.)

Dr. Edward Brown, acknowledging the toast, remarked that a foreign visitor had said to him, "You English are a funny lot of folk. Over these Congresses you have helped us in all sorts of ways. We have spent thousands on fitting up buildings for them, and yet all the time you had in the Crystal Palace the most wonderful building in the world for such a purpose." To that he answered, "We realised that, and also that a building was no use without the human element behind it." Mr. Buckland, as director of the Crystal Palace, has made this site a possibility for the Congress, and to him they owe a great debt of gratitude. As Sir Charles had said, the humble hen in the past had been disdained, but some of us thought otherwise, and that she might be made contributory to the welfare and bringing together of the nations. Certain it was that to-day,

Poultry Science knew no Boundaries.

Moreover, it was remarkable how the status of its scientists had improved. The beginning of that new era may be dated from a Conference in 1907, at which Profs. Bateson and Punnett read papers, and as a result of a movement here and in America in 1912 the World's Poultry Science Associations (under its old title) was formed. From the first he had found that not only was it necessary to educate Governments as to the importance of poultry, but to drive it home to them it was essential to create a favourable atmosphere without. It had been his task to create that atmosphere here and abroad. From those small beginnings came the inception of these Congresses, the first of which would have been held in Rome but for the war in Tripoli. Holland nobly filled the breach in 1921, and he paid a tribute to that little country for its pluck in doing so. Our anxiety as to how the Congress may result can be nothing to that which our Dutch friends had at their initial effort. The success at The Hague opened the eyes of Governments, even though neither Canada nor the U.S.A. then participated. What happened in 1924, when the Congress was in Spain, you all know, and by then Canadian enthusiasm had been roused, and Mr. Elford succeeded, with British assistance, securing the 1927 Congress for Ottawa. The effort made there was magnificent, and gave us something to rival. In eloquent sentences Dr. Brown expressed his gratitude at being spared to see the realisation of lifelong hopes for the poultry industry, and added that he might almost say, "Now let thy servant depart in peace, for mine eyes have seen my dream accomplished." (Applause.)
Mr. L. Ardern, as President of The National Poultry Council, proposed the toast of „Dr. Addison,“ stating that the hen had no politics and was therefore cheerful. After the eloquence which had preceded him he was rather in the position of the dust car which came round after a function and gathered up the débris. He had, however, a pleasant task to perform, and that was to propose the health of their Chairman to-day.

Dr. Addison, replying, said that „The Press“ had usually two unfailing topics for criticism—the weather and the Government of the day. To that, from remarks which he had heard from speakers as to the difficult task it was to convert the permanent officials of the Ministry he thought he might now add them as a third target. It had been a pleasure to preside over such a gathering and to learn how the cause of international friendship was promoted by the common bond of poultry-keeping. In these efforts and to their industry he wished all success.

The meeting then broke up, and the foreign delegates adjourned to select the position in the North end of the Crystal Palace allotted to national exhibits, which promise to be on an extensive scale and of an instructive character. Interviewed, the foreign visitors were loud in their praises of the Crystal Palace as the venue of the Congress, the general verdict being: „The finest building in the world for the purpose.‟
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Prof. F. B. Hutt, Poultry Division, University Farm, St. Paul, Minnesota.
Prof. John E. Ivey, Alabama Polytechnic Institute, Auburn, Alabama.
Dr. M. A. Jull, United States Department of Agriculture, Washington, D.C.
Prof. B. F. Kaupp, North Carolina Experiment Station, West Raleigh, North Carolina.
Dr. D. C. Kennard, Ohio Agricultural Experiment Station, Wooster, Ohio.
Dr. O. B. Kent, Quaker Oats Co., 80 East Jackson St., Chicago, Illinois.
Mr. Roy A. Kente, Bellport, Long Island, New York.
Mr. E. D. Koehler, c/o Vitality Mills, 166 W. Jackson Blvd., Chicago, Ill.
Mr. J. W. Kruisselbrink, Sandhurst Poultry Farm, Vineland, New Jersey.
Mr. H. M. Lamon, Adams Center, New York.
Mr. H. R. Lewis, Davisville, Rhode Island.
Prof. W. A. Lippincott, California Agricultural College, Berkeley, California.
Prof. W. E. Lloyd, University of California, Davis, California.
Prof. A. G. Lunn, Oregon State Agricultural College, Corvallis, Oregon.
Prof. J. H. Martin, University of Kentucky, Lexington, Kentucky.
Prof. Wm. C. Monahan, Massachusetts Agricultural College, Amherst, Massachusetts.
Prof. C. L. Morgan, Clemson Agricultural College, Clemson College, South Carolina.
Mr. R. S. Moseley, East Aurora, New York.
Prof. L. F. Payne, Kansas Agric. College, Manhattan, Kansas.
Dr. Raymond Pearl, Johns-Hopkins University, Baltimore, Maryland.
Prof. A. G. Philips, c/o. The McMillen Co., Fort Wayne, Indiana.
Prof. C. S. Platt, New Jersey Agricultural College, New Brunswick, New Jersey.
Mr. T. E. Quisenberry, The American Poultry School, Kansas City, Missouri.
Prof. D. H. Reid, Texas Agricultural and Mechanical College, College Station, Texas.
Prof. N. W. Sanborn, University of Florida, Gainesville, Florida.
Mr. Craig Sandford, c/o Quaker Oats Company, Foster Building, Utica, N.Y.
Mr. H. C. Schaefer, 835 South 8th St., St. Louis, Missouri.
Mr. Willis A. Schleit, Candee Incubator Corporation, Syracuse, N.Y.
Mr. Carl H. Schroder, Larrowe Milling Co., Detroit, Michigan.
Prof. Ross M. Sherwood, Texas Agr. Exp. Station, College Station, Texas.
Mrs. George R. Shoup, Route 9, Box 744 L, Seattle, Washington.
Mr. Henry Silverthorne, 212 Madison Road, Riverside, Ill.
Mr. H. J. Shrader, U. S. Dep. of Agriculture, Washington, D. C.
Prof. A. C. Smith, University of Minnesota, St. Paul, Minnesota.
Mr. H. B. Steckel, American Incubators Inc., New Brunswick, New Jersey.
Mr. L. W. Steelman, R. D. I, Lansdale, Pennsylvania.
Mr. L. W. Taylor, Poultry Division, College of Agriculture, Berkeley, California.
Prof. Wm. D. Termohlen, Iowa State College, Ames, Iowa.
Prof. R. B. Thompson, Oklahoma Agricultural College, Stillwater, Oklahoma.
Prof. W. C. Thompson, New Jersey Agricultural College, New Brunswick, New Jersey.
Mr. E. M. Whitney, c/o „Grain World“, 1018 South Wabash Avenue, Chicago, Ill.
Prof. A. R. Winter, Poultry Department, Ohio State University, Columbus, Ohio.
Mr. J. H. Wolsieffer, R. F. D. 2, Millville, New Jersey.

URUGUAY.
Prof. Eduardo Llovet, Rue Paysandú No. 1196, Montevideo.

WALES.
Miss M. P. Bally, County Offices, Haverfordwest.
Capt. N. Bissett, Cathays Park, Cardiff.
Mr. J. A. Caseby, Ministry of Agriculture, Welsh Dept., Little Darkgate St., Aberystwith.
Mr. G. E. Reddaway, Tregrocs, Pencoed, Glamorgan.
Mr. John Rowland, Madryn Farm School, Bodvean, Carnarvonshire.
Mr. Lester C. S. Ross, Llysfas Farm School, Ruthin, North Wales.
Mrs. Rhoda van der Lely, The George Hotel, Criccieth.
Miss May C. Thomas, Chadacre Agricultural Institute, Hartest, Bury St. Edmunds.
BREEDING


Contents:
- The nomenclature of the Genes
- A Short Description of the Genes of the Domestic Hen
- The Genetics of Color
- Classification of the Genes
- The Genetics of Leg Feathering
- Types of Leg Feathering
- Inheritance of Heel Tufts
- Inheritance of Recessive Leg Feathering (Pavloff type)
- Inheritance of 1002 Type Leg Feathering
- Dominant Leg Feathering (Faverolle Type)
- Pavloff-Faverolle Cross
- Leg Feathering in Orloffs
- Leg Feathering in a Family of Bantams
- Leg Feathering among Progeny of Male 612
- Leg Feathering in Brahma Wyandotte Cross.

Reviewer's Note:
This report of the poultry breeding studies at Anikowo covers the work of the station from its inception, in 1917, through 1923. The work was delayed in passing through the press, and was not actually issued until late in 1926. As indicated in the table of contents, the report consists of articles on various problems by a number of workers. The most extensive paper, that by Serebrovsky, "Studies on Genetics of Domestic Fowl", has been translated and abstracted and is to be published as Parts I and II of this review. It is hoped to publish in subsequent parts abstracts of some of the other papers. Certain of these, however, have appeared elsewhere. The interesting paper of Promptov on "The Genetic Analysis of the Structure of the Pelvis," for example, has been published in the Russian "Journal of Experimental Biology", Vol. 11, p. 128, with English summary, and more material on the same subject has just appeared in the "Journal of Genetics". This paper, therefore, will not be abstracted.

In attempting to make the chief data and conclusions of this work available in English, we have been forced to practice a rather rigid selection and to judge the relative importance of the various contributions. The chief criteria used were newness of material or methods, and adequacy of the data presented. Detailed new data are quoted wherever given in the original.

Throughout the volume a new system of genetic nomenclature is used. This was proposed by Serebrovsky in 1921, and a short description of this system is given, chiefly as applied to poultry, in order that the terminology of the original papers retained in the abstracts may be clear to the reader.

Yearbook for Hatcherymen. Published by International Baby Chick Association. Managing Director: Reese V. Hicks, Kansas City, Mo.

Contains:
- Brief History of the Chick Industry, names of Officers and Directors, Officers and Official Emblems of State Associations affiliated with the International Baby Chick Association, Membership list, Marston Telegraphic Chick Code, Shipment of Chicks by Mail, Instructions for Shipping Chicks by Express, what the Standard Breeding Plan should accomplish, Storage Brooders and
Brooded Chicks Building a bigger Baby Chick Demand by Means of Better Advertising.

*Poultry for Profit in New Zealand* by J. B. Merrett, Government Cool Sores, Melbourne, Simpson & Williams, Printers, 238 High Street, Christchurch, N.Z.

**Contents:**


A handbook of the best methods of modern Poultry Keeping. Mr. Collignon has collected during many years all questions to him as editor of a poultry journal and publishes these with his answers.

*Poultry Calendar for 1930. Kalender für Geflügelzüchter 1930.*


Description of different modern breeds, also the Welsummer breed. Experiments with crossings of different breeds in Germany. Many articles on hatching and breeding, also of ducks.

Results with battery-brooders were very successful. Professor Lehman gives very interesting figures about digestibility of different foods. Diseases are explained by Dr. Schütz.


This register is restricted to entries in Recognised Laying Trials and to birds which attain the following minimum standards of production.

a. for White Leghorns, White Wyandotes, Black Leghorns, Rhode Island Reds, Buff Rocks and Anconas 200 first grade eggs;
b. for other breeds 180 first grade eggs;
c. for ducks all breeds 230 first grade eggs.

The minimum number of eggs in the case of ducks is raised from 200 to 230 eggs. The scheme of egg-grading is as follows:

<table>
<thead>
<tr>
<th>Period of Trials</th>
<th>Minimum Weights</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First Grade</td>
</tr>
<tr>
<td></td>
<td>Second Grade</td>
</tr>
<tr>
<td>First 4 weeks</td>
<td>1 1/2 oz.</td>
</tr>
<tr>
<td>5th to 8th week (inclusive)</td>
<td>1 15/8 oz.</td>
</tr>
<tr>
<td>9th week to end of Trials</td>
<td>2 oz.</td>
</tr>
</tbody>
</table>

Summary:
1. Fertility tests of eight partially castrated cocks and three controls show that within quite wide limits of fertility and of testis size the fertility of the male fowl is not in any way dependent upon size of the testis.
2. The average density of sperm suspension was found to be approximately four million spermatozoa per cubic millimetre for the thirty-six samples examined from ten males.
3. The variations in the average density of sperm suspension from different birds ranged from 825,000 to over 7,000,000 cells per cu. mm., but within this range the density of sperm suspension bore no relation to fertility.
4. The number of sperm per cubic millimetre of semen appears to be entirely independent of the size of the testes within the ranges covered by this experiment.
5. Compensatory hypertrophy to a degree approximating to the normal weight of both testes was observed in the retained right testes of cocks castrated unilaterally on the left side at one week of age.
6. Exceptions to the rule of compensatory hypertrophy included birds with subcutaneous testis grafts and two in which one whole testis and part of the other had been removed.
7. It is suggested that fertility in the male fowl is dependent upon the physiological efficiency of the spermatozoa rather than upon their quantitative production.


Summary:
The appendicular skeletons of 53 females, 36 males and 16 capons were measured and subjected to biometrical study.
A statistically significant sex-dimorphism was found in the mean absolute length of all bones measured. With the exception of one phalanx in the wing, a statistically significant sex dimorphism was also found in the mean ratio of every wing bone to the humerus and of every leg bone to the femur. In the phalanges of the toe the length proportional to the femur is greater in females than in males. In all other bones the ratio to the humerus or femur is greater in males than in females.

The longer bones in males fowls were 13.4 per cent greater than in females. The increase in the males was not constant for all bones but varied from 6.8 to 16.5 per cent.

The tarso-metatarsus exhibited a greater variability both in absolute length and in proportional length than any other bone. It also represented the extreme sex dimorphism being 16.5 per cent greater in males than in females. In dwarfed fowls the growth of the tarso-metatarsus was found to be retarded more than that of other bones. It is concluded that this bone differs from others in its potentialities for growth and its susceptibility to environmental conditions.

Variability in the absolute and proportional lengths of the phalanges was found to increase progressively toward the distal extremity of either limb.

Capon were found to be slightly larger in all bones (except one) than males. In the six longer bones the average difference was 2.9 per cent. It was shown that in capons the increase in size is greatest in the posterior limb but reasons are given for the opinion that the elongation of that limb results from the continuation of a process already operative in normal males and not from a heterogonic growth induced by gonadectomy.
It is concluded that sex dimorphism results from a differential response of the soma, caused by its genetic constitution, to the different factors promoting growth.

No index was found which would permit diagnosis of sex in doubtful individuals from a study of the appendicular skeleton.

*High Average Set in Laying Contest* by John M. Goodman, New Jersey Agriculture, 1929, no. 11.

New Jersey's egg-laying contests have just completed a highly successful year. In spite of a short season of 47 weeks which was brought about by the change in the opening date from November 1 to October 1, the records of the year show up exceptionally well when compared to past 51-week full time records.

*Pen Records of Michigan Contest to October 23, 1929.* East Lansing, Michigan.

The seventh Contest closed on October 23rd. A table gives the production of each pen entered in the Seventh Michigan International Egg Laying Contest for the last half of the month. Each pen contains 10 birds. Under the column marked total is shown the total number of eggs produced by the pen for the period. Under the column marked points we have the value in points given each pen based on the size of the egg. A 2 ounce egg is given a value of one point. For each ounce per dozen over this weight is added one-tenth of a point until the 26 ounce limit is reached, after which no additional value is added. For each ounce under 24, one-tenth of a point is deducted. The following is the schedule of points: 14 oz., 0 pts.; 15 oz., 1-10 pt.; 16 oz., 2-10 pts.; 17 oz., 3-10 pts.; 18 oz., 4-10 pts.; 19 oz., 5-10 pts.; 20 oz., 6-10 pts.; 21 oz., 7-10 pts.; 22 oz., 8-10 pts.; 23 oz., 9-10 pts.; 24 oz., 1 pt.; 25 oz., 1-10 pts.; 26 oz. or over 1 2-10 pts.

100 pens were entered, 14 hens laid more than 300 eggs.

*The Effect of Inbreeding on the Bones of the Fowl.* Storrs Experiment Station, Bulletin 152, Storrs, Connecticut.

**Summary and Conclusions:**

The measurements of the lengths of five bones, of cranial breadth, and of three proportions between skeletal parts from a series of about 600 inbred females belonging to eighth families and an average of three generations, and about 350 outbred females from the same foundation stock have been studied. It has been found that the lengths of the individual bones and the total bone length show a decided tendency to decrease progressively as inbreeding proceeds in all families at least as far as the third generation of brother-sister matings. The proportions between the parts show no tendency to change under inbreeding. Variability within the inbred families was lower than in the outbred stock.

Differentiation among the inbred families occurred with respect to bone length and especially in the proportions of the parts. The most striking differences between the families appeared in the shape of the cranium, although family differences in the proportions of the leg and wing bones were also definitely established. These differences appeared in the first generation of inbreeding and were ascribed to the segregation of factors influencing the relations between the parts rather than the size of the parts as such.

The evidence shows that relatively small differences in bone length and in proportions are due to the operation of genetic factors and that inbreeding affects these traits chiefly through its influence on the way in which the factors are distributed in inheritance.

The results also demonstrate the usefulness of stable characters such as
bone length not only for studies of the effects of inbreeding but for the more general problem of the inheritance and determination of size and shape characters. The differences dealt with are small, but they are apparently under a fairly exact hereditary control and sufficiently insulated from environmental variations to give dependable results.


This study embraces a test of the ability of different cockerels to transmit high egg-production tendencies to their progeny. Up to the present time, the study has included only the female progeny. The progeny from six cockerels were trap-nested with a range in average egg production of the various cockerels from 130.3 ± 5.1 to 180.6 ± 4.9. The standard deviation ranged from 52.2 ± 6.9 to 16 ± 3.5 eggs. The per cent of daughters laying over 180 eggs ranged from 12.5 per cent to 60 per cent and the per cent laying less than 100 eggs ranged from 22.6 per cent to 00.0 per cent. The cockerels that prove to be good breeders are used to mate high-bred females in the Station flock.

Another part of this project is a study of the improvement in egg-production of a strain of White Rock fowls by the introduction of Barred Rocks, and later by eliminating the color factor. A small pen of F—1 birds was mated this year and the eggs pedigree-hatched. All white pullets will be trap-nested. The breeding pens of White Rocks were mated to Barred Rock cockerels the past spring and their pullets will be trap-nested and the better ones continued in the test.

In another part of this study an analysis of data on the relation of body characters to egg production was made.

Studies of Variation in Hatching Quality of Eggs.

The work under this project was continued during the year. Data were secured from 3944 eggs from 128 individual hens and from 43,107 eggs from different flocks. The eggs from the individual hens ranged in hatchability from 0.0 per cent to 100 per cent. The seven different flocks ranged from 44.9 per cent to 71.9 per cent hatchability of the total eggs set. The average hatch of the 43,107 eggs set this year was 65.7 per cent as compared to 69.8 per cent the last year and 65.3 per cent the previous year. Seasonal conditions, flock management, handling conditions, breed of fowls, and individuality are factors which cause differences of hatchability of eggs under like conditions.

Egg Production by O. A. Barton, Experiment Station Progress, 1925-1927 by P. F. Trowbridge, Agricultural Exp. Station, Fargo, N. Dakota.

Breeding for higher egg production shows satisfactory progress as evidenced by highest individual producer for the following years:

<table>
<thead>
<tr>
<th>Year</th>
<th>From for year</th>
<th>Prior to April 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1922</td>
<td>168 eggs</td>
<td>52 eggs</td>
</tr>
<tr>
<td>1923</td>
<td>186 eggs</td>
<td>64 eggs</td>
</tr>
<tr>
<td>1924</td>
<td>200 eggs</td>
<td>87 eggs</td>
</tr>
<tr>
<td>1925</td>
<td>221 eggs</td>
<td>97 eggs</td>
</tr>
<tr>
<td>1926</td>
<td>248 eggs</td>
<td>98 eggs</td>
</tr>
</tbody>
</table>

More than 25 percent of the entire present flock has surpassed the best individual record of 1922.
Anglo-American Méthodes of Poultry Keeping. Poules qui pondent, Poules qui paient by A. J. Charon, Librairie Agricole de la „Maison Rustique”, 26 Rue Jacob, Paris VI.

An illustrated book containing 241 pages in which modern poultry farming is discussed in 24 chapters.

The following points must be reckoned with in order to make a poultry farm in France profitable:
1. About 90 eggs per hen for the food eaten by them.
2. A hen must lay at least 130 eggs in order to defray the cost of food, work and other expenses.
3. One must not commence egg production before one is certain of having a large enough market. The wholesale price is not sufficient to cover expenses.
4. One must experiment for at least a year before giving up one’s usual work.


A short description of various points connected with the breeding of good layers.

Scientific Poultry-Keeping. Elementi Scientifici di Avicultura, con 14 Figure e 14 Favole. Publicazione fatta col contributo del Ministero dell’ Economia nazionale, by Dott. Anita Vecchi, Prof. inc. di Zooculture nel R. Instituto Sup. Agrario di Bologna, Bologna, 1929.


Poultry Breeding. Geflügelzucht by R. Römer, Director Poultry Experiment Station, Halle-Cröllwitz, 1929. Editor Fritz Pfenningstorf, Berlin W 57.

The following subjects are treated: Housing, Nutrition, Science of breeding, Eggs, Hatching (artificial and natural), Chicken rearing, Fattening and Glaughtering, Diseases, Turkeys, Ducks, Geese, Pigeons. The conclusion is an article by H. Leutsch on „Knowledge of Breeds“.


In the poultry plant set up in Ben-Shemen the following breeds were introduced: Black and White Leghorns, White Orpingtons, Wyandottes and Plymouth Rocks. The pure Leghorn did not resist disease, the P. R. succeeded better. The equipment of the Experimental Farm is arranged on the best modern lines.

When disease broke out only a few individual out of the Leghorns and Rhode Island Reds remained.
Experiments are made in: Breeding and Selection, Feeding, Incubation and Hatching. Laying Capacity, Caponisation, Egg preserving, Diseases, Spirochaetosis, Macfie-disease, Roup.

Bulletin no. 5 is publishing: Experiments in Poultry Raising at Ben-Schemen by D. Uri.

Summary:

A. Breed. For the present local breeds must be considered preferable for the farmer, to foreign pedigree ones. The local hen lays more eggs than the foreign one, even though rather lighter in weight, and it is more resistant to disease; moreover the foreign hen requires some time for adaptation, until its special characteristics develop.

B. Feeding. Hens must not be fed upon concentrated food which is designed only to increase egg production, without giving green food also. Germinated oats cannot take the place of green food, which includes clover, green maize etc. With an allowance of 90 grms. of food a day, a feeding ration may be arranged, so that the hen will receive sufficient protein. The cost of feeding hens is about 53 P.T. a year, reckoning 35 kgs. food per annum. In order to balance the cost of feeding in 1924 every hen had to lay 152 eggs and in 1925 — 103 eggs. The number of eggs is not the sole consideration, for the period of laying is also an important factor. Winter-laid eggs are much more profitable than summer-laid eggs.

C. Hatching. Only eggs 10 days old, at the most, should be used. Older eggs give poorer results. The eggs of pullets are better than those of two-years old hens. No positive results were obtained from sex-prediction according to weight. The following are the average hatching results for three years according to breed: Leghorn — 62.2 %, Rhode Island Red — 57.5 %, Cross bred Rhode Island × Local — 68 %, Cross bred Leghorn × Local (average for two 2 years) — 77.5 %, Leghorn × Local (second generation), according to 1926 results — 56 %.

D. Rearing. It is important to use the few sitting hens available for hatching purposes only and not for rearing. This means the use of fireless brooders, which also enable the farmer to obtain day-old chicks elsewhere and to rear them.

E. Selection of Hens according to Sitting Characteristics. It is not worthwhile to maintain a special sitting breed, for the advantage is not great. On large farms this problem is solved by using artificial incubation, but small holdings also can obtain all the chickens they require by keeping turkeys for sitting, or by the establishment of central hatcheries.

F. Selection of Good and Bad Layers according to External Characteristics. Our results have shown that it is impossible to state with absolute certainty that broad-built hens are good layers, especially in the case of Rhode Island Reds, nor that narrow-built birds are as a consequence poor layers.

G. Periods of Moult. There is some connection between egg-laying capacity and period of moult. All the hens which moulted in June, July, and August, were bad layers. All the hens which moulted in October, November, and December were on the whole good layers, and of those moulted in September, one-third were bad layers, and two-thirds good layers. It may thus be affirmed that hens moulting in June, July, and August are bad layers and should be removed.

H. Diseases. The most prevalent diseases are Spirochaetosis, Diphtheria, Sunstroke, Intestinal Gout, Diseases of the Oviduct, and Leucaemia. The worst pest of poultry is Argas persicus, both as blood-sucker and as disease-carrier. It lives in the cracks of the poultry houses and under the rind of the trees. The best remedy is burning out. The boards are slightly raised and all the ticks are burnt with the blow-pipe. After this treatment all cracks and chinks are smeared with a mixture of Carbolineum and Petrol in equal parts. But we have not obtained any permanent results.
I. Structure of the Poultry Houses. The method of poultryhouse construction and the materials are very important problems in Palestine. Until now it has been the custom to build wooden houses open on the south, and covered on this side by wire netting. Wooden poultry houses are unsuitable, for the numerous cracks are sure to harbour all kinds of insects. It is sufficient to mention Argas persicus which it is impossible to dislodge. When planning new poultry houses, all these factors must be taken into consideration. Nor is wood a very cheap building material, when imported. It is further advisable to make the automatic feeders of tin; they are much lighter, more durable, and neither can mice enter, nor ticks obtain a hold in them.

The National Egg Laying Test, 1928-29. (Approved and Recognised by the National Poultry Council.) Promoted by the „Daily Mail“ & the National Utility Poultry Society. Held on the Test Ground at Milford, Surrey.

This test consists of 432 pens of pure bred and first cross pullets. Each pen in Section 1 consists of twelve pullets; in Sections 2 to 8 and 11 and 12 of six pullets, in Section 9 of two pullets, and in Section 13 of four pullets. Eggs laid during the first four weeks, weighing 1½ ozs. or more; during the second four weeks those weighing 115/16 ozs. or more, and during the remainder of the Test those weighing 2 ozs. or more, are scored at unit value as first grade. Any eggs laid during those periods and weighing not more than 1/4 of an ounce less than their respective weights fixed for first grade eggs during the before-mentioned periods are assessed as second grade and scored at unit value, but not more than 120 second grade eggs in Section 1; 60 in Sections 2 to 8, and 11 and 12; and 40 in Section 13, are included in the Pen Score for competitive purposes.

Final Report. For the 48 weeks, from 15th October, 1928, to 15th September, 1929.

The Manager’s comments and observations on the Test will appear shortly in the National Laying Test Journal, the first number of which will be published on the 29th November, 1929, and subsequent numbers every Lunar Month.

Breed Averages and Summary:

<table>
<thead>
<tr>
<th>No. of Birds entered</th>
<th>Death</th>
<th>BREEDS</th>
<th>Average for Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>White Leghorns</td>
<td>191-79</td>
</tr>
<tr>
<td>622</td>
<td>58</td>
<td>Black Leghorns</td>
<td>188-96</td>
</tr>
<tr>
<td>168</td>
<td>1w 15d</td>
<td>Anconas</td>
<td>159-59</td>
</tr>
<tr>
<td>32</td>
<td>2</td>
<td>White Bresse</td>
<td>166-73</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>Exchequer Leghorns</td>
<td>159-17</td>
</tr>
<tr>
<td>24</td>
<td>1</td>
<td>Brown Leghorns</td>
<td>160-02</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>Cuckoo Leghorns</td>
<td>178-23</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>Black Bresse</td>
<td>121-20</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>Black Minorcas</td>
<td>149-83</td>
</tr>
<tr>
<td>564</td>
<td>8w 34d</td>
<td>White Wyandottes</td>
<td>185-94</td>
</tr>
<tr>
<td>494</td>
<td>20</td>
<td>Rhode Island Reds</td>
<td>186-75</td>
</tr>
<tr>
<td>208</td>
<td>16</td>
<td>Light Sussex</td>
<td>158-81</td>
</tr>
<tr>
<td>122</td>
<td>4</td>
<td>Buff Rocks</td>
<td>167-38</td>
</tr>
<tr>
<td>58</td>
<td>2</td>
<td>Australorps</td>
<td>152-24</td>
</tr>
<tr>
<td>28</td>
<td>2</td>
<td>Barnevelders (D.L.)</td>
<td>162-18</td>
</tr>
<tr>
<td>18</td>
<td>2</td>
<td>Buff Orpingtons</td>
<td>137-34</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>White Orpingtons</td>
<td>134-08</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Barnevelders (Black)</td>
<td>167-00</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Buff Sussex</td>
<td>127-73</td>
</tr>
<tr>
<td>156</td>
<td>8</td>
<td>First Crosses</td>
<td>207-54</td>
</tr>
<tr>
<td>2592</td>
<td>9w,168d</td>
<td>Total</td>
<td>183-20</td>
</tr>
</tbody>
</table>

This book contains 150 pages and is published in Polish and French. It is richly illustrated and treats: The development of Poultry Breeding in Poland, the trade in geese, poultry, feathers, the trade in and production of eggs, the breeding of and trade in pigeons, the breeding of and trade in rabbits, the poultry organizations and the progress of instruction.

Farmers and breeders who have desired to test their flocks for pullorum disease (B. W. D.), but have delayed because of the expense and time required by the agglutination test, may find their way out in the new simplified form of this test which has been developed by the U. S. Department of Agriculture.

Reactors may be determined within 30 seconds after the test is applied, and the results check very closely with tests made by the tube-agglutination method, according to the investigators developing it. The only equipment needed to apply the test is a pane of glass marked off in two-inch squares, a small packing box (without lid and blackened inside) on which to rest the glass, some clean microscope slides, a glass stirring rod, carbolized normal saline solution, cloth towels, and a rubber-stoppered dropper-bottle to contain the antigen, the reagent used.

A drop of blood from the tip of the comb or the wing is spread over one of the squares on the glass by means of one of the microscope slides and a drop of the antigen mixed with it either by using a stirring rod or by rocking the pane of glass. The slide should always be cleaned before using again.

Curdling Indicates Reactor

If the fowl is infected, a slight curdling appearance will be noted in from five to thirty seconds, or if the bird is free from the disease no reaction takes place. The curdling appearance is caused by the clumping or flocculation of the bacteria suspended in the antigen.

Advantages of the test are readily apparent as the fowl need be handled only once, and by holding her for thirty seconds she can be definitely placed in a reactor coop or a disease-free pen as the test indicates. No leg band records need to be kept unless desired for retesting or official records. The cost per bird is given as one to one and one-halm cents.

This test may be carried out in the laboratory also by putting four or five drops of blood from each chicken on a strip of filter paper and allowing them to dry completely. A drop is cut into quarters in the laboratory and soaked 30 minutes with .5 cc. of normal saline solution. Five drops of this sample are placed on a glass plate and a drop of the antigen used as in the field. The reaction is also the same.

This simplified form was worked out by Herbert Bunyea, Walter J. Hall, and M. Dorset, all of the Bureau of Animal Industry, Washington, D. C.


Summary and Conclusions:

Pathological changes in the liver such as a mottled, pale or ochre color, do not appear to be pathognomonic of bacillary white diarrhea of chicks. Partial
or complete non absorption of the yolk substance is not pathognomonic of the disease.

A high mortality is the first few days after hatching was not particularly characteristic of the disease as we observed it. An abrupt rise in the number of deaths on the sixth to eighth days after hatching followed by a considerably decreased, yet abnormally high mortality up to two weeks of age is very suggestive of bacillary white diarrhea infection.

Necrotic spots in the lungs seem to have considerable diagnostic significance. These lesions together with similar on the musculature of the heart appear to represent a form of bacillary white diarrhea infection acquired by inhalation. Though 21 per cent of necrotic heart lesions are recorded in pullorum negative cases, these cases are open to some questions. The presence of gross intestinal lesions such as thickening and necrosis of the large intestine are indicative of infection by ingestion and suggest brooder infection rather than incubator infection. The frequent absence of any gross lesions in acute forms of bacillary white diarrhea in baby chicks necessitates recourse to bacteriological procedures in diagnosing the disease with certainty in many cases.

*The Slide Agglutination Test in the Detection of Bacillary White Diarrhea* by P. R. Edwards and F. E. Hull, Lexington, Kentucky Agricultural Experiment Station. Journal of the American Veterinary Medical Association 1929, p. 628.

**Summary:**
The antigens which we have prepared for use in the slide agglutination test and commercial antigens which we have examined, have been found lacking in sensitiveness. The slide test has been found quite satisfactory in detecting birds whose sera caused complete agglutination in a dilution of 1:80 or higher. The slide test has been found less efficient than the tube test in detecting birds whose sera agglutinated in lower dilutions only.

*Pullorum Disease, Poultry Disease Elimination Law,* by W. R. Hinshaw and E. F. Sanders, Agricultural Experiment Station, Amherst, Mass. Bulletin 247.

The progress made in the control of Salmonella pullorum infection (Bacillary White Diarrhea) is summarized in Control Series Bulletins 39 and 43, which record the results of agglutination testing for the 1926-27 and 1927-28 seasons.

During the 1926-27 season, 127,327 tests were made in 249 flocks and 114 of these flocks, comprising 40,269 birds, were reported negative to the agglutination test. During the 1927-28 season, 232,091 tests were made on 321 flocks and 138 flocks, comprising 80,829 birds, were reported negative.

Based on the 1925 poultry population of Massachusetts, it is estimated that 9.39 per cent of the chickens in the State were tested in 1927-28 as compared with 6.27 per cent in 1926-27. Using the same comparison, 3.98 per cent of the chickens of the State were in non-reacting flocks in 1927-28, as compared with 1.98 per cent in 1926-27.

Following the 1927-28 testing season a questionnaire was sent to the 321 flock owners for whom testing had been done. Some of the information obtained from the 239 replies is presented.

**Effect of bleeding on egg production:** one person reported egg production increased by bleeding, 166 reported „no effect”, and 72 reported losses from 0 to 50 per cent, due either to bleeding or to handling of the birds or due to both.

**Mortality traceable to blood collecting:** thirteen persons reported a total of 50 birds lost from hemorrhage following the withdrawal of blood. Four
persons reported the death of 12 birds due to causes other than hemorrhage but indirectly traceable either to bleeding or to handling of the birds. A total of 62 birds or .026 per cent of all birds bled during the 1927-28 season were reported having died as a result of blood collection.

Kinds of disinfectants used: twenty-nine brands of disinfectants were reported as being used for spraying the hen houses after the removal of reactors. Seven of these are included on the U. S. Department of Agriculture B. A. I. approved list, (B. A. I. Circular Letter 1508) and ninety-six poultrymen were using these approved disinfectants.

A typical B. Pullorum Infection in young chicks by N. S. Barron, Department of Animal Pathology, University of Cambridge. The Veterinary Journal, 1929, p. 359.

Description of an outbreak which was of interest as showing a subacute form of B. pullorum infection due, in all probability, to the strain involved being of less than the normal virulence. It would appear that cases of this kind are of somewhat rare occurrence. The only description of a similar condition which the author has seen in the literature is a comparatively recent one by Truche and Bauche. These authors describe an outbreak in which deaths occurred in chicks from 10-15 days old.


Dr. J. R. Beach, University of California, Berkeley, presented "Present Status of Methods for the Diagnosis of Bacillary White Diarrhea". Dr. Beach described methods of making the pullorin and agglutination tests and stated that he had recently used three different types of pullorin. By the use of a chart Dr. Beach showed a summary of the tests in which the different types of pullorin were used compared with the agglutination test and bacteriological findings. The results of Dr. Beach experiments apparently indicate that the pullorin test is not so reliable at present as the agglutination test.


The results of this work confirm the earlier investigation of Rettger, Kirkpatrick and Card and indicate that transmission of bacillary white diarrhea among mature hens may occur without the presence of male birds.


During the past season we have had an increasingly large number of diseased poults coming to our laboratory for diagnosis. Lesions were often absent and in an effort to determine the cause of the condition we began to culture all of the organs of autopsied poults.

Salmonella pullorum was isolated from six poults from a total of three flocks. The organisms were isolated from the lungs of four poults, livers of five poults, hearts of two poults and from the intestines of all of the birds.
The poults ranged from two to three weeks of age. The birds from two flocks were being raised with baby chicks which later showed evidence of bacillary white diarrhea. We were unable to obtain any history of the third flocks.

It is generally conceded to be a bad practice to raise turkeys with chickens on account of blackhead. And this should be evidence that young poults should not be allowed to run with young chicks.


Weinberg and Barotte have referred to the advantage of bouillon cultures in the agglutination of bacteria. The writers have applied this method with Bac. pullorum and diluted the culture 3 to 4 times with physiologic NaCl solution. 1 cm. of this culture should be taken to which must be added 1 drop of serum. This should be shaken for 15 minutes. The reaction is then very noticeable. Doubtful cases as described by the Americans do not occur. Excellent results were obtained at a farm which was extensively infected.


Both young and old birds contract typhoid. The pullorum is very contagious. The death-rate is from 40-90%. Hygienic measures are stated as a means of combating the disease.

**TUBERCULOSIS.**

**Fowl-tuberculosis in Man.** Ueber einen Fall von „Sepsis tuberculosa gravissima“ (Geflügeltuberkulose?) by Max Dugge, Rostock. Beiträge zur Klinik der Tuberkulose, 1929, p. 538—560.

An extensive description of a case of serious sepsis tuberculosa. The bacillus was not pathogene for caviae and mice. A review of the literature on fowl-tuberculosis-infection in human beings.


The symptoms of the disease are clearly characterized: epidemiologically, etiologically, pathologically, anatomically, biologically and clinically. The first stage is marked by years of fever. In the second stage metastases occur in bone-marrow, kidneys, skin and spleen. The patients react to fowl-tuberculin.

**Avian Tuberculosis** by A. F. Schalk, L. M. Roderick, H. L. Foust. Experiment Station Progress, 1925—1927 by P. F. Trowbridge, Fargo, North Dakota.
Transmission and Sensitization Experiments.
  a. Relatively few cattle become infected with Avian Tuberculosis under ordinary barnyard conditions as evidenced by manifest tuberculosis lesions.
  b. Young cattle can readily be sensitized to avian tuberculosis by cohabitation with tuberculous fowls under ordinary barnyard conditions.
  c. Sensitization in the absence of visible lesions is of a temporary nature, fading out within 2 to 5 months after removal from avian tuberculosis cohabitation.
  d. Sensitization does not immunize cattle, sufficiently to prevent subsequent resensitization under similar cohabitation conditions.
  e. Cattle sensitized to avian tuberculosis in this manner do not react positively to bovine tuberculins.

2. Longevity of avian tuberculosis germs in Barnyard Soils.
   Both pigs and chickens will contract avian tuberculosis from contaminated barnyard soils after North Dakota winter weather exposure.

3. Susceptibility of young chicks to avian tuberculosis.
   Chicks 4 to 10 weeks of age in constant cohabitation with tuberculous birds from 1 to 5 months developed less than 1 percent of tuberculous infections. Chicks can be quite readily infected by feeding relatively large quantities of avian tuberculous organs or culture.

4. Rats as carriers of avian tuberculosis.
   Rats fed upon fowl organs infected with avian tuberculosis transmit the disease to healthy chickens thru their droppings.

5. Sensitization of cattle with minimum amount of avian tuberculosis organisms.
   Cattle can be sensitized to avian tuberculosis either thru the scarified skin or by simple installation into the conjunctival sac of the eye by 0.001 m.g. of the culture.

6. Control of avian tuberculosis in farm flocks.
   Work continued over a period of several years in the testing of farm flocks with annual and semi-annual tuberculin tests shows that while it is possible to materially reduce the infection and loss, it is impractical in eradicating the disease.


Deals with: Flock Morbidity in Tuberculosis. Extent of Disease in three Midwestern States, Testing Started in Nebraska, Results of Test.

During 1927 poultry flocks were tuberculosis-tested in three different counties. A total of 40073 birds were tested, 3760 chickens, representing 9.3 per cent were classified to be reactors. 3.6 per cent were one year old or less and 17 percent were over one year old. In each of the areas represented there was a low incidence and morbidity rate of tuberculosis among cattle, in contrast to a particularly high morbidity rate and a comparatively high incidence among poultry. It would appear from these limited observations that under field conditions tbs. among poultry is not a potent factor in accounting for the source of tbc. occurring among cattle.

The total of reactors slaughtered under inspection was 3515. From these 2786 were passed for food and 729 (20.7 per cent) were condemned as not fit for food purposes. A conspicuous thing was the high percentage of carcasses condemned in good to excellent flesh, and of which a physical examination would undoubtedly have failed as a means for indicating the disease.

Tuberculosis was found reliable in poultry. The principal, if not the only spreaders of tbs. are the older fowls. Affected fowls less than one year old...
are not apt to have developed the disease to such and extent as to become spreaders of infection.

Tuberculosis as a disease of poultry is not to be credited as an acute and immediate menace in all intensive poultry-raising areas, for it has been found only to a limited extent in some of the larger poultry-producing areas along the eastern sea board and in California.

A bacteriological Investigation of Cases of Tuberculosis in Cats, Dogs and a Parrot by A. W. Stableforth. The Journal of Comparative Pathology and Therapeutics, 1929, p. 163.

This case of tuberculosis in the parrot is believed to be the first example of natural infection in which definite evidence of the human type of the bacillus has been obtained. The bird had shown a small swelling of the lower eyelid for some time. The lesion was found to be of a caseous nature and microscopic examination of its contents showed it to contain numerous acid-fast bacilli. A strain was obtained through a guinea-pig. It was found that this bird was the pet of a man who suffered from phthisis.


Of 103 pigeons examined by the writer 4 were found to be suffering from tuberculosis. The liver, especially, was affected. Spleen, lungs and bowels in a lesser degree. In a one year old pigeon, tuberculosis of the mucosa of the crop was discovered. Success attended the cultivation of the bacilli according to the Hohn method. In all probability the pigeons had been infected by hens.

**DIPHTHERIA.**

The Stick Method of Cutaneous Virus Vaccination against Fowl-Pox by W. T. Johnson, Oregon Agricultural Experiment Station, Corvallis, Oregon. Journal of the American Veterinary Medical Association, 1929, p. 646.

A highly satisfactory method of cutaneous virus vaccination for the control of fowl pox and called the stick method is described. It is briefly compared with the scarification and follicle methods. The method has been applied almost exclusively to the common domestic fowl but its limited use on turkeys is also considered.

The small amount of virus used, rapidly of application and uniformly of takes especially commend it. The success of the method hinges on the use of a highly potent virus concerning which information is given as to its preparation and care. Such cases as when to vaccinate, examination for takes after effects, development and duration of immunity, sale of vaccinated fowls and demonstrating the effectiveness of vaccination are discussed.

The Standardization of Avian Diphtheria, Roup or Bird Pox Virus and Vaccines with Special Reference to Improving the Treatment of the Disease by N. J. Pyle. Agricultural Experiment Station, Amherst, Mass. Bulletin no. 247.
Since the publication of Technical Bulletin No. 14 in June, 1928, progress has been made in the study of the duration of the immunity produced by the cutaneous vaccine and in the results of its administration to birds as it may affect egg production, body weight, and temperature. It is planned to make further studies on the standardization of the vaccine.


Description of Etiology, Species affected, Epizoological Consideration; Carriers, The Virus, Immunity, Vaccination.

The various theories regarding the mode of transmission do not explain the annual appearance of the disease in epizootic form. A most adequate explanation of the mode of transmission is made possible as a result of recent work done by Kligler, Muckenfuss and Rivers, which showed that the disease could be transmitted by mosquitoes (Culex pipiens and Aëdes aegypti). Lesions followed in from 5 to 10 days after the infected mosquito was allowed to feed on a healthy fowl. In one case a mosquito was still able to transmit the disease 11 days after taking the infectious meal.

Doyle and Minett could not establish the existence of more than one strain of virus.

The vaccination method used by Johnson appears to satisfy all the requirements necessary for the production of an immunity of sufficient duration. The author's experience confirms the findings of Johnson.


Fowls can be so immunised with injections of living virus against fowl pox that their serum shows marked viricidal properties. Their early method was to inject normal fowls intramuscularly with increasing doses of killed virus, in the form of ground up heated comb scabs susupended in saline, followed by several injections of living virus. Later another method was used. Combs were scarified as in the production of fowl pox vaccine and after the birds were unable to produce further combscabs, living virus was injected intramuscularly and after four or five increasing doses a hyperimmune serum is produced. They are titrated either by scarification of separate areas of comb with mixtures of a test dose of virus and graduated dilutions or serum or by the intramuscular injections into separate birds of graduated amounds of serum followed after 24 hours by intravenous injection of a test dose of virus.

Vaccination against Diphtheria. Schutzimpfung gegen Hühnerpocken by Prof. Dr. K. Bierbaum, Dr. E. Eberbeck, Dr. K. Rasch. Institut für Tierseuchentherapie der Tierärztlichen Hochschule, Berlin. Zeitschrift für Infektionskrankheiten, parasitäre Krankheiten und Hygiene der Haustiere, 1929, p. 233.

No immunity was obtained against diphtheria by the use of vaccin and lapin (rabbit) virus: neither was immunity obtained with virus which had been weakened by the addition of carabolic-acid and formol.

Poultry-virus was gradually destroyed by passage on pigeon and the same occurred with pigeon-virus in hens. Pigeon-pox virus causes considerable resistance against poultry virus in hens. When a mixture of pigeon and hen
virus was used for vaccination excellent results were obtained. The vaccine keeps better in a watery solution of glycerine than when dry.

The pox outbreak, caused clinically by heterolog virus, does not, histologically, show the character of the outbreak caused by homolog virus, but rests solely on a reaction of the connecting tissues of the blood vessels in the corium.

When vaccinations of the mixed virus of hens and pigeons are given both kinds of virus are active and typical changes take place both in the epidermis and the corium.

The pigeon virus forms a primal immunity which is strengthened by the fowl-pox virus.

The anti-diphtherine, according to de Bliek and van Heelsbergen, proved to be a mixture of fowl- and pigeon-pox virus.

Vaccine-virus and not fowl-virus was found in the vaccine of Zwick, Seifried and Schaf. The vaccine caused but little immunity.


Owing to the fact that fowl-pox occurs frequently during the warm period of the year, the writers made experiments with the transmission of the virus by flies. (Culex pipiens and Aedes aegypti.)

In one case the fly carried the contagion over, fourteen days after it had been infected.


Tests with creoline, bacillol, rohmultisept, duramin and sulfoliquid. Only sulfoliquid proved to have a visible affect. This is also suitable for disinfecting the drinking water. A 3% solution is in no way harmful to hens and pigeons.

*The Effect on healthy Pullets of Preventive Vaccination against Chicken-Pox* by J. R. Beach, Division of Veterinary Science, University of California, Berkeley, Calif. Journal of the American Veterinary Medical Association, 1929, 609.

**Discussion:**

In the foregoing report of the results of vaccination of healthy young fowls with live-virus chicken-pox vaccine, specific mention of flocks has been made only in case the results were unsatisfactory. This has been done so that prominence might be given to the fact that very undesirable post-vaccination reactions have sometimes occurred, even when the condition of the birds and of the surroundings appeared to be entirely satisfactory. The data show, however, that, with birds in good condition, the undesirable results are not liable to occur frequently and, therefore, that the vaccination of healthy cockerels and non-laying pullets or hens may be regarded as a relatively safe procedure. The hazard attending the vaccination of laying pullets, although apparently greater than of non-laying birds, does not seem to be great enough to make this a practice to be avoided entirely in case the flock without vaccination is quite certain to become infected with chicken-pox later.

In seeking possible explanations of the serious losses following vaccination
of some flocks, consideration might be given to the fact that outbreaks of colds and roup are of common occurrence among flocks of young birds and also that, in some flocks of apparently healthy pullets and cockerels there occur rapid loss of condition and death of many birds for which no definite explanation is found. It is possible, therefore, that at least a part of the trouble that was experienced following vaccination of some of the flocks would have occurred if vaccination had not been practiced. Definite knowledge concerning this point can be obtained only by vaccinating a part of a number of flocks and leaving the other portion unvaccinated for from four to six weeks. It is hoped that such controlled field trials may be carried out in the near future.

The method of vaccination employed does not appear to be a factor in either increasing or decreasing the liability of the occurrence of undesirable post-vaccination reactions. The follicle-infection method, however, because of its simplicity, the small amount of vaccine required, and the ease and certainty with which a "take" can be recognized will probably be generally regarded as more desirable than the subcutaneous method.

It would seem that sufficient information regarding the effects and results of preventive vaccination against chicken-pox has now been obtained to warrant the adoption of this practice on poultry farms on which chicken-pox has been prevalent and on which the management and general health of the fowls are satisfactory. Veterinarians or others supplying or administering vaccine, however, should keep in mind that it is advisable that young fowls be vaccinated before egg-production has started; that fowls which are suffering from other diseases or that are in a poor state of nutrition, because of faulty management or diet, intestinal parasites or other causes, should not be vaccinated until they have regained normal health and the conditions that were responsible for the trouble have been corrected; that fowls are liable to become droopy and consume less food during the third and fourth weeks after vaccination; that in an occasional flock, such a reaction may be severe and prolonged and be responsible for the death of a number of birds, and that poultrymen should be informed of these possibilities before the vaccine is administered; and that it is necessary to vaccinate all of the susceptible fowls on a farm within a period of from one to two months to avoid transmission of chick-pox to the susceptible fowls from those which have been vaccinated with the live-virus vaccine.

OTHER INFECTIOUS DISEASES

Abortion Disease in the Fowl by M. W. Emmel and S. Forest, Huddleson, Agricultural Experiment Station, East Lansing, Michigan. Journal of the American Veterinary Medical Association, 1929, p. 578.

Dubois in 1910 reported what appeared to him to be an episootic of abortion among farm flocks of fowls.

Zwick and Zeller in 1920 were unable to produce infection in the fowl by Brucella abortus.

Koegel in 1923 found agglutinins in the birds' blood but was unable to find any outward manifestations of disease.

With Br. abortus infection was produced by the authors in most of the experiment birds. Death resulted in many cases. Four flocks were found in which natural infection occurred, 20 percent of these birds reacted to the agglutination test.

It seems that the isolation of the organism is rather difficult. The organism was isolated from about twelve of the experiment birds.

Recent experiments have proved that the Brucella Bang must now be regarded as producing a serious infection in the fowl. Pure cultures of the three members of the genus, isolated from man as well as animal, all produced infection. Death was produced in many cases. One of the most important and interesting features was the finding of natural infection in four flocks. From a flock reacted to the test for bacillary white diarrhea a very small percentage, while an average of 20% reacted to the test for the abortian germ.


About the middle of June Dr. P. R. Beaudette, poultry pathologist of the New Jersey Agricultural Experiment station reported an outbreak of European fowl pest in New Jersey. His diagnosis was confirmed by Dr. Hubert Bunyea of the U. S. Bureau of Animal industry and immediate steps were taken by state and government officials to eradicate the disease.

Close observations at the surrounding market centers since have failed to show any evidence of the disease. The manner of its introduction is still undetermined.


Pigeons were suffering from arthritis of the left humero-ulnar-radial articulation. The birds appeared perfectly normal. They were from a flock of 700 and were three of nine so affected. From the joints a thick, brownish fluid was removed and cultured. Salmonella Schotmulleri was obtained in practically pure culture. No evidence can be found in the literature that this organism may cause arthritis in pigeons.


Conclusions:
1. The incubation period of S. aertrycke infection in the canary bird is four to five days.
2. The course of the disease extends over a period of two to four days.
3. The organism can be isolated in pure culture from different organs and from the feces when brilliant-green is used.

Blackhead in Turkeys. Experiment Station Progress by P. F. Trowbridge, Fargo, North Dakota.

One pound of tobacco dust mixed with 16 pounds of ground grain fed in mash daily. This feed has been used cooperatively with over 30 farm flocks for the last 3 years. The feeding begins when the poult is a few days old and is continued 4 or 5 months and in many cases to market time. In more
than half of the flocks there has been no loss of birds, and in no year has the loss exceeded an average of three birds per flock.

**Immunisation against cholera. Immunisation rapide contre le choléra des Poules** by A. Staub. Institut Pasteur, Service des vaccins vétérinaires. Comptes rendus de la Société de Biologie, 1929, p. 106.

Hens can be quickly vaccinated against cholera. On the 17th January five hens received a $\frac{1}{6}$ ccm. injection of vaccine, on the 19th January they received stronger vaccine. On the 21st January, two days later, these hens withstood an injection of $\frac{1}{700}$ virulent culture, without reaction. Ten days later they withstood a $\frac{1}{6}$ ccm. injection of this virulent culture.


1956 geese were vaccinated in 1927 and in 1928, 259. The best method of vaccination is simultaneously with serum and cholera-antigene. This antigene consists of extremely virulent cholera bacilli which are physically and chemically weakened.


Collier made experiments to kill the virus of fowl-pest by chemical means. Canaries received injections of mixtures of virus and various colouring matters. Oxazin proved to have a slightly protective affect.


Opperman and Lauterbach have pointed out that hens react to deep intramuscular infection with virus of the Contagious Anaemia of horses, with histological affectations of the liver.

It now appeared that some of the livers of newly bought hens, showed the same changes. On further investigation it was discovered that many hens which had been in contact with stables, in which horses suffering from contagious anaemia were kept, had typically changed livers.

Further, it was ascertained that the virus taken up from the manure works quicker than the virus which was taken fresh from the sick horse (and which was mixed in the grain fed to the hens). Perhaps the anaemia-virus in the manure forms „Resistant Bodies“ which are suitable for infection of the intestinal-canal.

An 8 months old foal, which was free from contagious anaemia, was given a subcutaneous injection of 20 cc. liver-emulsion and 20 cc. blood of hens, which were suffering from the above mentioned liver trouble; 7 days after the infection a blood proof of this foal was examined serologically and according to the pigeon-test; the result was positive. At the post-mortem exa-
mination the animal was proved to be suffering from the typical liver changes. A second experiment with a four years old horse, also show a positive result.

It is necessary to prove whether fowls play a part in the epidemiology of contagious anaemia.

**Conclusions:**

1. On farms where anaemia is present, fowls can take up the virus.
2. Such fowls react to this by typical changes of the liver.
3. Success attended experiments to cause typical anaemia in horses by injection of blood from such fowls.


The hens inoculated with the Sarcoma of Rous show clear variations in the blood; the monocytes decrease and practically disappear, the poly-nucelaires, called the „Stäbchenführendes Leukocyt“ are greatly increased.


5 hens were given intravenous injections of lymph-gland paste from 2 cases of Hodgkin’s disease. In all cases a more or less typical tuberculosis developed. It would appear, therefore, as if avian-tubercle-bacilli can play a part in the development of many forms of Hodgkin’s disease.

**Death of an Ostrich from a strange body.** Tod eines Strauszen infolge Fremdkörpers by Dr. Fritz Schmidt, Hoensdorf. Zoologischer arten der Stadt Halle a. S. Deutsche Tierärztliche Wochenschrift, 1929, p. 646.

There was a haemoral festering of the mucosa of the eye of the ostrich. Tongue and throat were also swollen. When operated on it was found that the wall of the stomach has been pierced by a small iron rod, about 15 cm. long.

It is therefore apparent that in the case of birds, swellings of the throat can also occur as a result of gastritis traumatica, so as these are sometimes seen in the case of cattle.

**PARALYSIS.**

**Studies on Fowl Paralysis (Neurolymphomatosis Gallinarum).** I. Clinical Features and Pathology. II. Transmission Experiments by Alwin M. Pappenheimer, Leslie C. Dunn, S.M. Seidlin, Storrs Agricultural Experiment Station, Storrs. The Journal of Experimental Medicine, Jan. 1, 1929.
Conclusions:
1. Fowl paralysis (neuro-lymphomatosis gallinarum) is a disease entity, with characteristic clinical and pathological features.
2. The disease occurs in all parts of the United States, Holland, Austria, and probably South America.
3. The disease appears to be endemic in certain foci. Having once appeared, the disease tends to persist through successive years.
4. It occurs with about equal frequency in both sexes; all common breeds may be affected.
5. Symptoms appear between the 3rd and 18th month. Typical clinical cases have not been observed outside of the limits.
6. The conspicuous symptoms are (a) asymmetrical partial and progressive paralysis of wings and both legs, and rarely of neck muscles. (b) Occasional grey discoloration of iris, with blindness. Nutrition is usually preserved.
7. The duration is variable; the outcome is usually fatal, but spontaneous recovery may rarely occur.
8. The principal pathological changes are found in the nervous system. In the peripheral nerves, the essential feature is an intense infiltration of lymphoid, plasma cells, and large mononuclears. This is accompanied by a myelin degeneration in the more advanced lesions, but the cellular infiltrations appear to precede the degenerative changes. In brain and cord and meninges, there are similar infiltrations predominantly perivascular.
   Infiltrations of the iris with lymphoid and plasma cells are found in the cases showing gross discoloration of the iris.
   Visceral lymphomata, originating in the ovary, are associated in a certain percentage of the cases. Evidence is presented in favor of the view that this association is not accidental, and that the lymphomata are a manifestation of the disease.
9. Infiltrations of the spinal cord and brain, rarely of the peripheral nerves, are frequently present in birds showing no clinical symptoms. These are interpreted as mild cases of the same disease.
10. No micro-organisms have been demonstrated in the tissues or by cultural methods.
11. Inoculation of suspensions of brain, cord, ganglia or nerves of chickens with neurolymphomatous lesions, into newly hatched chicks, is followed by the development of typical lesions in approximately 25 per cent of cases.
12. In control chickens kept under laboratory conditions the incidence of the disease is about 7 per cent.
13. The disease does not become manifest until at least 2 months after inoculation; symptoms may not appear until after 4 months.
14. The active agent is not destroyed by 50 per cent glycerol in 9 days at ice box temperature.


Various causes of paralysis are described, also by disturbances in carbohydrate and albumen digestion. Marek's paralysis is specially treated. It is not caused either by food or by parasites. It cannot be cured by feeding vitamins.

Several causes are described, worms, coccidiosis, spirochaetosis, parasites, parabotulismus, avitaminosis, infectious diseases.

The specific paralysis is extensively described, which is pathologically-histologically distinguished by a round-cell infiltrate of the 'sinew substance. This disease, which is known as Polineuritis (Marek), Neuromyelitis gall. (Walle and Finkler), Neuritis (Doyle), Neurolymphomatosis (Pappenheimer), Polineuritis Chronica (Dobberstein and Haupt) is very frequent in South Africa and causes many deaths. The left leg is more often affected than the right. The joints are stretched and stiff, the muscles atrophic. The sinews are considerably swollen and often grown into each other. The colour is a dirty red.

**COCCIDIOSIS.**


Renal coccidiosis is an apparently rare but highly fatal disease of geese. A casual search of the literature shows but few reports of this condition from Europe and none from this country. Apparently there is some limiting factor in its spread for, although it has been known for nearly forty years, it has never become prevalent.

Description of a case in the northern part of Iowa. From the similarity of findings to those recorded in the literature, it is concluded that the organism observed is the Eimeria truncata of Railliet and Lucet.


The prepotent period of avian coccidiosis, and segmented oocysts is from four to five hours less than four days. Unsegmented oocysts ingested from twelve to eighteen hours after being shed are quite likely to produce the disease. If the chick is kept from reinfection the disease will run a rather limited course but immunity to later infection does not seem to be developed by experimental inoculation. The appearance of fowl paralysis in one of the test birds, infected a second time, leads the author to support the assumption that fowl paralysis in one of the symptoms of chronic coccidosis rather than in no way connected with coccidial infestation.


Although is a generally assumed that one species of coccidium (Eimeria avium) is widely distributed in many species of birds, the conclusion is made in the present study that multiple species of eimeria may be harbored by a single host species as exemplified by the chicken. The author thinks it preferable to regard the different types of eimeria found in the chicken as species rather than as subspecies or strains. Names have been suggested for new species. Morphological differences, the distribution of the parasites in the intestinal tract, the time required for development and for sporulation of oocysts and the reaction of the host to the invading organism must be taken into consideration in the differentiation of the various species of eimeria recognised to infect chicks. The pheasant, the turkey incitate in general a high degree of host restriction. A very thorough discussion of methods for maintaining, coccidia free stock, for collection and preservation of infective material, for the insolation of species, for the production and testing of immunity and for the study of developmental cycles is given. The author lays
stress on the advantages of utilizing natural protective principles rather than attempting to exclude coccidia completely from poultry.


The author discusses the transmission and prophylaxis of coccidiosis. The disease can be transmitted by insusceptible species of animals, even by their faeces. The author succeeded in infecting rabbits with cysts cultivated from the faeces of rats fed on Eimeria Stiedae. The ontinuous excretion of cysts by clinically recovered animals (coccidia carriers) is not due to a chronic course of the infection, but must be ascribed to repeated subsequent infections. By continuous cleaning of the hutches and by removing the manure every day, the author succeeded in rendering healthy coccidia carriers free from coccidia. Further the author demonstrated by experiments that coccidiosis does not confer any immunity in rabbits against a subsequent infection.

GENERAL.


This is the fifth issue of the journal in which all papers deal with questions related to poultry diseases. The increased interest which veterinarians are taking in Poultry practice is very encouraging and the number is increasing right along. One of the most gratifying features of the recent Detroit convention was the way the members attended the session of the newly organized Section on Poultry, which met for the first time this year. If there were any who had misgivings concerning the outcome of the experiment these were dispelled completely. The address of Chairman Stafseth is published in this issue.

Another indication of the fact that the A.V.M.A. is awake to the responsibilities imposed on the profession, by reason of the vast capital invested in poultry, is the creation of the committee on Poultry diseases, which functioned for the first time the past year.

The rapport made by the committee at the Detroit meeting was published in the journal last month.

At the present time there are three poultry diseases that are of major importance: tuberculosis, bacillary white diarrhea and fowl pox.

At the present a real problem is apparent in the report on Bang disease in the fowl by Emmel and Huddleson.

The transmission of fowl pox by mosquitoes, a comparatively recent discovery is discussed by Beaudette and the very latest observations on vaccination against the disease are reported by Beach of California and Johnson of Oregon, working independently. Bunyea and his associates in the U. S. Bureau of Animal industry upset our ideas relative to certain post mortem findings that have been associated with pullorum disease for a long time. Edwards and Hull, of the Kentucky Station report further on the agglutination test as employed in pullorum disease studies. Bushnell, Payne and Coon of the Kansas Station continue their studies on the forced draft type of incubator as a spreader of Pullorum disease infection, giving the results of their experiments in fumigating these necessary adjuncts of the poultry farm. State vete-

In order to emphasize the need of adequate veterinary service in the field of poultry diseases, the author calls the attention, first, to the importance of the poultry industry; second, to the importance of the disease problem; and, third, to the immediate need for adjustment of veterinary education and practice to the requirements of modern poultry husbandry.


Summary:
1. A survey of the internal parasites of poultry in the vicinity of Macdonald College, Que., was made and the various species of parasites present indentified.
2. Pest-free stock was successfully raised up to the age of over six months. The birds remained very healthy and vigorous throughout the course of the experiment. The pens used are described as well as the feeding and care of the birds.
3. Heterakis gallinae and Ascaridia lineata were selected for more detailed study, these being the commonest worm parasites in this locality.
4. Mortality in the egg stage, of the two parasites referred to above, is very high. A media is required that contains some chemical which will check the development of bacteria and yet not be of such strength as to kill the worm eggs.
5. It is probable that the use of weak disinfectants in a poultry plant would be more liable to favor parasitic development than retard it.
6. The mortality of even the infective eggs which reach the intestine of the host is very high.
7. Pressure may be an important factor in the hatching of these worm eggs. With mature birds this pressure may be excessive.
8. No evidence of prehatching infestation of the chick could be found. It is possible, however, for the chick to become infested very soon after hatching. Worm eggs occur on the outside of the shells and occasionally inside as well.
9. Pest-free birds inoculated with pure cultures of infective eggs of Heterakis gallinae showed marked changes of the caeca within a week's time. These changes are described.
10. Heterakid-free birds showed a very uniform condition of the caeca that could not be classed as normal. This is described.
11. The growth of the caecal worm is illustrated and the normal habitat explained.
12. Artificial infection of pest-free birds over the age of five months with Ascaridia lineata was not successful. It is very probable that resistance to infection increases with age.
13. The species of coccidium found in our locality is illustrated.
14. Parasitic infestations cause pathological changes in the intestines as shown by the classical symptoms of inflammation produced by their presence in the caeca.

15. The extension of the inflammatory process beyond the catarrhal condition may be assisted by the presence of bacteria and by the inability of the gut to take care of the end products of digestion. This may then hasten the absorption of end products of digestion of the broken-down walls and assist in the establishing of a septic tank within the intestines which will in turn produce the intestinal stasis spoken of and the auto-intoxication leading to certain clinical symptoms.

16. Changes in the cardio-vascular system are dependent upon the above.

17. Visceral gout often accompanies parasitism of the intestines.

18. There is an increasing tendency among birds that have suffered from parasitism, to later suffer from the formation of neoplasms.

*Disease and Pest Control* by O. A. Barton. Experiment Station Progress, 1925—1927 by P. F. Trowbridge, Agricultural Exp. St., Fargo, North Dakota.

Tuberculosis Eradication: Reactors in the college flock were found in 1921, 1922, and 1923. No reactors have been found in the flock since 1923. All new stock is tested before it is added to the flock.

Lice and Mites: One pound of sodium fluoride diluted with 4 pounds of ashes has been found perfectly satisfactory for control of body lice. The dipping method using 1 ounce of the fluoride to 1 gallon of warm water is efficient, but can not be used safely except under favorable weather conditions. The dipping method causes a temporary drop in egg production.

A mixture of kerosene oil and used crank case oil, equal parts, used as a spray is effective in control of the red mites.

Brooder pneumonia resulting from the dust of moldy litter is apparently controlled by spraying the chopped alfalfa or straw litter with formaldehyde and then drying and airing before use.

Two percent cod liver oil in chick mash prevents the leg weakness in young chickens.


Description of an interesting case of infection by Asp. fumigatus. The chick was about eight weeks old. The anterior two-thirds of the right kidney was covered with a greenish brown growth of Asp. fumigatus. The growth was very adherent as the mycelial threads penetrated the capsule and entered the adjacent parenchyma of the kidney.

Description of two cases in which a cock was reduced to the verge of death as a result of an excessively large comb, and was restored to perfect health by the single expedient of cutting off that structure.

Laboratory Service—Pathology, by G. L. Dunlap. Agricultural Experiment Station, Amherst, Mass. Bulletin no. 247.

From December 1, 1926 to June 15, 1927, 2,422 specimens were examined. These included 1,272 chicks, 95 adult chickens, 3 ducks, and 1,052 miscellaneous. From June 15, 1927 to June 30, 1928 this service was suspended, except for examinations of urgent material, which included 578 miscellaneous specimens. On July 1, 1927 it was resumed, with a fee of $2.00 for each examination. Since July 1, 68 examinations have been made with a total of 160 specimens. These include 106 chickens, 1 turkey, 6 foxes, 5 pigeons, 1 rabbit, 2 feed samples, and 39 miscellaneous specimens.


About four hours after having eaten smoked goose breast, 12 people became ill. The illness lasted 1—10 days. Paratyphoid bacilli were found in the meat. The bacilli were examined in different institutions. One institution stated that they were B. Paratyphoid Schottmuller and the other that they were B. enteridis breslaviense. It is therefore desirable that the Government Authorities should control the agglutination of the paratyphoid-enteritis sera.

Handbook of Poultry Diseases and Poultry Breeding. Handbuch der Geflügelkrankheiten und der Geflügelzucht, published by Dr. T. v. Heelsbergen, Bacteriologist in the Veterinary Medical Faculty at the University of Utrecht. In co-operation with Dr. E. A. R. F. Baudet, Utrecht; Dr. B. J. C. te Hennepe, Rotterdam, Dr. H. J. M. Hoogland, Utrecht; Dr. B. J. Krijgsman, Buitenzorg (Java), Dr. G. M. v. d. Plank, Utrecht; Dr. H. Veenendaal, Utrecht, Dr. H. A. Vermeulen, Utrecht. 631 pages, 350 partly coloured illustrations. Lex. 8° 1929. Bound R.M. 45.—. In linen R.M. 48.—. Ferdinand Enke, Stuttgart.

Introduction:

During recent years Poultry Breeding has increased to such an extent that it has now become a very important factor in popular science. A natural
result of this development is that the practising veterinary surgeon must now take a more intense interest in poultry diseases, and everything connected therewith, than was formerly the case. The science of poultry diseases and poultry breeding has now become so widespread that specializing has become an absolute necessity. More than ever, a good handbook is now needed, in which all branches of the special territory of the veterinary surgeon are treated. Contrary to the books which have up to the present been published, this book deals with the numerous subjects of various authors, who are working as specialists in this field as a result of their long years of experience and investigations.

The quintessence of the book is the description of the parasitical and contagious diseases in poultry. In connection with this the Therapy has been extensively treated, as this is of the greatest value to the practising veterinary surgeon. In the description of the Anatomy special attention has been paid to the handling of the data, so that this can serve as a guide for lectures to students and those who attend courses of poultry science.

A special section has been devoted to hygienic measures, which should form the basis of every poultry farm. Breeding and feeding, which are of the greatest importance to the profitable working of a poultry farm, are described in a manner quite easy to understand. A thorough knowledge of these subjects is of the utmost importance for all veterinary surgeons, who are actively interested in poultry science.

Special attention has been given to those diseases, which are also of importance to the health of human beings: Paratyphoid, Tuberculosis, Pseudotuberculosis etc. so that, for those people, who are charged with the inspection of poultry intended for human consumption, this book is also a valuable advisor. The non-contagious diseases are also fully treated.

The illustrations consist for the greater part of originals, which have been most kindly supplied by numerous investigators, both at home and abroad in the field of poultry diseases.

Interest in Poultry Diseases Increases by Editor Journal of the American Veterinary Medical Association, 1929, p. 539.

This is the fifth issue of the Journal in which all papers deal with questions related to poultry diseases. The increased interest which veterinarians are taking in poultry practice is very encouraging, and the number is increasing right along. One of the most gratifying features of the recent Detroit convention was the way the numbers attended the session of the newly organized Section on Poultry, which met for the first time this year. If there were any who had misgivings concerning the outcome of the experiment, these were dispelled completely. The address of Chairman Stafseth is published in this issue.

Another indication of the fact that the A.V.M.A. is awake to the responsibilities imposed on the profession, by reason of the vast capital invested in poultry, is the creation of the Committee on Poultry Diseases, which functioned for the first time the past year. The report made by the Committee at the Detroit meeting was published in the Journal last month.

At the present time there are three poultry diseases that are of major importance: tuberculosis, bacillary white diarrhea and fowl-pox. All present real problems in prophylaxis and control and a great deal of work is being done in studying these problems, some of which is presented in the papers published in this issue. The possibility of another serious problem is apparent in the report on Bang disease in the fowl, by Emmel and Huddleson.

The transmission of fowl-pox by mosquitoes — a comparatively recent discovery — is discussed by Beaudette, and the very latest observations on vaccination against the disease are reported by Beach, of California, and
Johnson, of Oregon, working independently. Bunyea and his associates in the U. S. Bureau of Animal Industry upset our ideas relative to certain postmortem findings that have been associated with pullorum disease for a long time. Edwards and Hull, of the Kentucky Station, report further on the agglutination test as employed in pullorum disease studies. Bushnell, Payne and Coon, of the Kansas Station, continue their studies on the forced-draft type of incubator as a spreader of pullorum disease infection, giving the results of their experiments in fumigating these necessary adjuncts of the poultry farm. State Veterinarian Hays, of Nebraska, goes into the subject of controlling avian tuberculosis, with his characteristic enthusiasm and thoroughness.

* The previous poultry disease numbers were published in May, 1925; February, 1926; February, 1927; and February, 1928.

**Pseudo Fowl Pest**, by Dr. W. K. Picard, Veterinary Institute at Buitenzorg, Dutch East Indies, January 1930.

In various tropical countries this disease appears to be of a very serious nature.

Dr. Bubberman, of the Institute at Buitenzorg, met with this disease during his travels in British India in 1928, and it still occurs there.

This disease is also prevalent in the Philippines and the virus, when tested by Dr. Picard, proved to be similar to that at Buitenzorg. The disease also occurs in Ceylon, and in Japan too. A request has been sent to Dr. Doyle in England who, in 1927, described this disease under the name of Newcastle Disease, to send his virus to Buitenzorg for comparison. At the time of the publication of the above report, however, the vaccine had not been received.

Although some experimenters called this disease Avian Pest, Dr. Picard cannot agree with them and bases his contention on extensive tests carried out during a period of three years.

Pseudo fowl pest is a disease quite apart which differs from real pest in the duration of the incubation and the duration of the disease, in virus, in the localization of the virus in the body of the bird and also immunologically.

A hen having blood injected with fowl pest virus always dies within 48 hours, and is only sick for a few hours. Only symptoms of depression are noticeable, no breathing troubles and very little diarrhea.

Hens infected with pseudo pest blood remain healthy. The disease only appears if injections of brains, faeces, intestinal mucus or yolk are given to a hen. The incubation period is from 3 to 5 days with clearly visible symptoms peculiar to the disease, (intense diarrhea, difficulty in breathing, oedemata and paralysis. These symptoms also last 3 to 5 days. A certain percentage of the birds recover and become immune.

Hens which have been so immunized can stand big dosis of strong virulent pseudo pest virus but die without exception within 48 hours after receiving injections of real pest virus. This is the strongest proof that these two diseases are quite apart. The Institute at Buitenzorg is therefore firmly convinced that in this disease there is absolutely no question of Avian Pest in any form whatever, but that it is a disease quite apart.
Protein Changes in Fish Meal when fat has been extracted by trichlorethylen by Dr. J. C. de Ruyter de Wildt. Rijkslandbouwproefstation, Hoorn, Holland, 1929.

In the former communication it was shown that when the fat is extracted from fish meal by trichlorethylen, the feeding value of the fish meal has been decreased and we have started the idea that not only the diminution of the fat content has caused this decrease, but perhaps a protein change too.

In the present paper it has been reported that, reckoned on the same basis of dry matter, fat, and mineral content, the fish meal shows an other composition in protein when extracted by trichlorethylen. The average dates from four lots of fish meal are given in table III. The next table gives the procentual changes in protein composition.

<table>
<thead>
<tr>
<th></th>
<th>Extracted</th>
<th>Non-extracted</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. pure protein</td>
<td>77.2 %</td>
<td>83.4 %</td>
</tr>
<tr>
<td>b. amido compounds</td>
<td>22.8 %</td>
<td>16.6 %</td>
</tr>
<tr>
<td>pepsin and HCl</td>
<td>93.9 %</td>
<td>93.7 %</td>
</tr>
<tr>
<td>Water-soluble</td>
<td>35.0 %</td>
<td>23.4 %</td>
</tr>
<tr>
<td>pure proteins</td>
<td>33.4 %</td>
<td>34.3 %</td>
</tr>
<tr>
<td>amido-compounds</td>
<td>66.6 %</td>
<td>65.7 %</td>
</tr>
<tr>
<td>precipitated by alum</td>
<td>26.9 %</td>
<td>24.4 %</td>
</tr>
</tbody>
</table>

This table shows that the albuminoid-content is decreased, the content of amido compounds increased. The water-solubility of both has been increased; there was no great change in the mutual proportion of these water-soluble bodies.

The content of the water-soluble albuminoids precipitated by alum alone has been somewhat increased.

There was no difference in the digestibility of the albuminoids, estimated by mean of pepsin and hydrochloric acid, between the extracted and non-extracted fish meal.

Therefore, extracting the fish meal, some of the protein substances had been broken down, but the digestibility of the albuminoids was not changed.

Crab Scrap versus Meat Meal in Poultry Feeding by John Ruel Manning, Department of Commerce Bureau of Fisheries, Washington.

An experiment was conducted on a Maryland farm. The meat meal costs 3½ cents a pound and the crab scrap costs 1½ cents a pound. It was found that it cost 0.97 cents to produce an egg on the meat meal ration, where as it
cost 0.67 cents to produce an egg on the crab scrap ration. Crab scrap is a valuable supplement to the poultry ration.

*Feeding Value of Cod Liver Meal* by John Ruel Manning, Department of Commerce, Bureau of Fisheries, Washington.

The use of cod liver meal as a protein concentrate for feeding stuffs is rapidly increasing, thereby offering the fisheries an outlet for a product at present not utilized to the fullest extent.


**Summary:**

A quantitative method for determining vitamin D is described. Its chief features are the following:

1. The same rats are used for the preparatory period as for the test period.
2. Preparatory period. The rats are put on a Steenbock and Black diet or a similar diet. After about 25 days a skiagram of the left knee joint is taken and the rats are again weighed.
3. Test period. The antirachitic substance to be tested is given for 6 days, after which another skiagram is taken and the rats are again weighed.
4. The efficacy is indicated in units per g. on a principle analogous to that adopted by the United States Pharmacopoeia in its prescription for vitamin A.

*Commercial Feeding Stuffs from Sept. 1, 1926 to August 31, 1927* by B. Youngblood, Director College Station, Brazos County, Texas.

**Summary:**

This Bulletin contains a report of the inspection of feeding stuffs sold in the State of Texas for the year ended August 31, 1927.

In addition to definitions of terms used in reporting analyses of feeding stuffs there is a table showing the average composition of the feeds sold during the year and also one showing the digestible protein and productive energy of feeds as calculated by the method described in Bulletin No. 329.

Facts are presented with reference to the mineral requirements of farm animals.

Advice to purchasers of feed is given which, if carefully followed, will effect a saving in feed bills and will enable more effective work by this Division in securing observance of the rules by manufacturers and dealers.

The chemical standards for various byproducts and special-purpose mixed feeds now in effect for Texas are given.

This Bulletin also contains definitions for standard by-products as adopted by the Division of Feed Control Service and the Association of Feed Control Officials of the United States.

Rules for classifying and labeling mineral feeds as approved by the Association of Feed Control Officials of the United States are also given.

A table is given showing tentative guarantees for feeds for the convenience of manufacturers in registering feeding stuffs for sale in Texas.

The purpose of the Texas Feed Law is explained and a summary of the law is given.

Mention is made of rules and regulations promulgated under the law
and information is given concerning the payment of refunds and the control of interstate shipments.

Table 5 shows the shipments withdrawn from sale and the reason for taking this action.

Table 6 shows a detailed report of the results obtained in the inspection of feeding stuffs during the year ended August 31, 1927.

Commercial Feeding Stuffs from Sept. 1, 1927 to August 31, 1928
by A. B. Connor, Director, College Station, Brazos County, Texas.

Summary:
This Bulletin contains a report of the inspection of feeding stuffs sold in the State of Texas during the year ended August 31, 1929.

In addition to definitions of terms used in reporting analyses of feeding stuffs there is a table showing the average composition of the feeds inspected during the year and also one showing the digestible protein and productive energy of feeds as calculated by the method described in Bulletin No. 329.

A table is given showing the minimum, maximum, and average crude protein contents of cottonseed products inspected during the season 1927-1928.

Table 4 shows the estimated tonnage of feed sold in Texas yearly during the past twenty-two years as computed from the sale of inspection tags.

Suggestions are given to purchasers of feed which should aid them in securing the kind of feed desired and in buying feed which comes up to the representations of the manufacturers.

The chemical standards for various byproducts and special-purpose mixed feeds now in effect in Texas are given in Table 5.

Definitions of special-purpose mixed feeds which are before the South Central States Association of Food, Feed and Drug Officials for consideration and study are given.

This Bulletin also contains definitions of simple feed commodities as adopted by the Division of Feed Control Service and the Association of Feed Control Officials of the United States.

A table is given showing tentative guarantees of feeds for the convenience of manufacturers in registering feeding stuffs for sale in Texas.

The purpose of the Texas Feed Law is explained and a summary of the law is given. Mention is made of rules and regulations promulgated under the provisions of the Texas Feed Law and information is given concerning the payment of refunds and the control of interstate shipments.

Table 7 shows the shipments withdrawn from sale and the reason for taking this action.

Table 8 gives a detailed report of the results obtained in the inspection of feeding stuffs during the year ended August 31, 1928.

Approved Formulas for Special-Purpose Mixed Feeds. Circular no. 53, Texas Agricultural Experiment Station, Brazos County, Texas, 1929.

1. Formulas for feeds for mill manufacture are approved, which include Laying Mash with Oyster Shell, Scratch Feed, Growing Mash with Oyster Shell, All-Mash Chick Starter with Oyster Shell, Poultry Fattener, 24 Per Cent Protein Dairy Feed with Limestone, 19 Per Cent Protein Dairy Feed with Limestone, Carbohydrate Supplement with Limestone for Cows, Horse and Mule Feed, 49 Per Cent Protein Supplement for Swine, and 31 Per Cent Protein Supplement for Swine.
2. Formulas for home mixtures and for farm use will be furnished by the Extension Service on request.
3. It is intended that the percentage of each ingredient should be printed on the tag or label when these formulas are used.
4. Manufacturers are permitted to state that the formulas approved by the Texas College Feed Conference Board are approved by the A. and M. College of Texas, provided, they meet the requirements specified.
5. The Texas College Feed Conference Board will consider additional formulas for mixed feeds and approve such as meet their requirements.
6. Directions are given for feeding the mixtures made according to the approved formulas.

Comparison of the Value of Protein from Vegetable Sources with Protein from Animal Sources when fed to Laying Hens by R. M. Sherwood. Texas Agricultural Experiment Station, Brazos County, Texas. Annual Report 1927.

This project has been carried on actively since 1919. During the past year, nine different rations containing varying amounts of cottonseed meal were tested. These tests showed that cottonseed meal was a useful feed for economical production and that the eggs showed no marked discoloring when fresh. However, when these eggs were placed in storage for several months, the eggs from hens receiving large quantities of cottonseed meal did not stand up. Further experiments are being conducted to determine how much cottonseed meal may be fed without injuring the keeping quality of the eggs. An attempt is being made to learn what it is in the meal that is most injurious to the eggs. Cottonseed oil was added to meat-scrap rations and next year fat-free cottenseed meal will be tested. Other studies will be made to try to learn what is causing this trouble.


Earlier work at the Texas Station showed that cottonseed meal and alfalfa leaf meal were useful feeds for the economical production of eggs. The eggs when newly laid showed no discoloration of yolk or white, but in 1926, it was found that some feeds fed laying hens caused eggs in cold-storage to show discolored yolks and in some cases discolored whites.

A study of the effect of feeding various mixtures of feeds on the storage quality of the eggs produced was begun, and from the results of the first year's work, the Station recommends not over nine per cent of 43 per cent Protein Cottonseed Meal, Prime Quality, in the mash and not over six per cent in an "all-mash ration" during the months when eggs are going into storage. So far as the first year's work shows, the possibility is not eliminated absolutely that bad effects result even from these amounts. Cottonseed meal has been proven to be an economical poultry feed and at times of the year when eggs are not going into storage may be fed more liberally.

Comparison of Various Feeds for Young Chickens by R. M. Sherwood. Texas Agricultural Experiment Station, Brazos County, Texas. Annual Report 1927.

The work under this project was carried on during the year but the test was not completed. The test comprised a study of various milks as com-
pared with no milk in an attempt to limit losses of chicks and the study of the rate of growth under these conditions.


I. *The Digestibility of English Wheats, with a note on the Digestibility of Fibre in Sussex Ground Oats.*

**Discussion and Conclusions:**
Digestibility trials on Sussex ground oats showed that the digestibility coefficients of crude fibre fluctuated between 2.5 per cent. and 11.9 per cent. with an average of 7.6 per cent. Kaupp and Ivey, in six digestibility trials with whole oats, obtained digestibility coefficients for crude fibre which fluctuated between 6.9 per cent. and 19.8 per cent., with an average of 11.7 per cent. Brown, in eight digestibility trials with whole oats, obtained digestibility coefficients for crude fibre which fluctuated between 4.2 per cent. and 11.2 per cent. with an average of 8.1 per cent. The fluctuations shown in this experiment are not therefore, abnormal, but illustrate the fact that poultry digest crude fibre in whole oats, based on sixteen trials, is 9.0 per cent. It is quite evident, therefore, that the grinding of the fibre in the preparation of Sussex ground oats does not improve the digestibility of the fibre.

II. *The Digestibility of „Weak” and „Strong” Wheats, and their Value for Poultry Breeding.*

**Summary:**
1. Digestibility trials with wheats, carried out with white leghorn cockerels indicate that weak and strong wheats are equally suitable as sources of supply of food nutrients for poultry.
2. In the production of wheat for poultry feeding yield rather than strength should be the primary aim of the grower.
3. Further research work on the Katayama method of estimating the digestibility of poultry feeding stuffs is indicated.

III. *The Digestibility of „Whole” and „Flaked” Maize.*

**Summary:**
1. Digestibility trials with „whole” maize and „flaked” maize indicate that steam cooking by commercial processes considerably increases the digestibility of the food nutrients in maize.
2. The view held that the fowl is akin to the pig so far as its powers of digestibility of low fibre foods are concerned, is substantiated by the results of the trials here reported.

IV. *The Digestibility of certain Varieties of Oats.*

**Summary:**
1. Digestibility trials with oats carried out with white leghorn cockerels indicate that certain varieties of oats are more suitable as sources of food nutrients for poultry than others.
2. In the trials carried out grey winter oats proved more suitable than black bountiful or scotch potato oats for poultry feeding.
3. The suitability of varieties of oats for poultry feeding appears to be linked with the fibre content, and thin husked varieties appear to be most suitable for this purpose.
4. Oats do not appear to be very palatable to poultry.
V. The Digestibility and Feeding Value of Bulrush Millet.

Summary and Conclusions:
1. Palatability tests with bulrush millet (Pennisetum typhoideum) indicated that this green of Empire origin is in every way suitable as a food grain for poultry in all stages of growth.
2. Digestibility trials have proved that this green is readily digested by poultry.
3. Bulrush millet on a digestibility and composition basis, appears to approximate in feeding value to little joss wheat.

VI. On the Influence of the Size of a Ration upon its Digestibility.

Summary:
1. Four white leghorn cockerels were fed with widely varying quantities of a Sussex ground oats and milk mixture without material alteration in the coefficients of digestibility of the digestible nutrients.
2. The amounts fed varied from a sub maintenance ration of 50 gm. to a “limit of appetite” ration of 150 gm. A slight depression in the coefficients of digestibility of the organic matter, the crude protein and the N. free extract and a slight increase in the coefficient of digestibility, of the ether extract was obtained, but the differences shown are attributed to normal fluctuations in digestibility due to individual variation and not to differences in the quantity of food given.
3. In feeding experiments carried out with fowls in which variable amounts of food are fed; these experiments indicate that it may safely be assumed that the coefficients of digestibility of the food nutrients are not materially affected by the variations in the amounts of food fed.

The Value of Certain Scratch Grains in the Poultry Ration by R. Penquite, R. B. Thompson, H. R. Naylor, Bulletin no. 166, Oklahoma Agric. and Mechanical College, Stillwater, Oklahoma.

Summary:
1. The use of white corn as the only scratch grain in the poultry ration had a tendency to lower the hatchability and decrease the egg production.
2. Adult birds that were fed white corn were not healthy and many died from vitamine A deficiency.
3. In all of the lots, fed white corn, the fertility was good but the hatchability was poor.
4. The chicks hatched from birds fed white corn did not have a thrifty appearance, and did not grow normally even after being transferred to an adequate diet.
5. White corn fed as the sole source of scratch grain apparently did not affect the fertility, but did decrease the hatchability of the eggs.
6. The white corn plus green feed, white corn plus cod liver oil and the yellow corn were about equal in feeding value for egg production.
7. Wheat fed as the only scratch green to poultry gave no better results than did white corn.
8. The birds that received wheat as a scratch green were weak and emaciated throughout the experiment and the mortality was high.
9. The pen that was fed the variety of grains proved to be the healthiest most thrifty and produced the stongest chicks. These chicks grew normally and were healthy and vigorous.
10. The fertility and hatchability in this pen was no better than the other pens but the egg production was considerably increased by feeding a variety of grains in the scratch ration.
The Calcium, Phosphorus and Nitrogen Balance of the Non-Laying Pullet by E. T. Halnan, Journal of the National Poultry Institute, 1925, no. 9.

Summary:
1. Balance experiments carried out with white leghorn pullets indicate that egg laying is not preceded by a long period of storage of nitrogen or calcium.
2. The demands of the bird for calcium and nitrogen during egg production are almost if not complete, met by increased retention of these elements from the available food supply.
3. The number of eggs laid by a bird during each egg cycle appears to be a fundamental characteristic of the bird itself and is not regulated providid minimal requirements are met by variations in the food supply.
4. The metabolism of phosphorus in the bird is linked with that of Ca and excessive Ca feeding may lead to depletion of phosphorus reserves.
5. The normal path of excretion of Ca appears to be the intestine and the Ca is normally excreted in the form of Ca\(_3\) (PO\(_4\))\(_2\).
6. Egg production is associated with increased phosphorus catabolism, the phosphorus thereby lost from the body being much greater than that contained in the eggs produced.

Shade and Green Feed for Chickens by R. B. Thompson and Robert Penquite, Oklahoma Agricultural and Mechanical Coll., Stillwater, Oklahoma.

Shade and green feed are two essentials in successful poultry keeping. The idea of attempting to provide green feed for hens from pasture has been permanently abandoned. Pasture cannot withstand the attack of hens and is soon depleted. Green food should be grown in separate fields and harvested daily.

Feeding by O. A. Barton, Experiment Station Progress, 1925—1927 by P. F. Trowbridge, Agricultural Exp. Station, Fargo, N. Dakota.

Crate feeding — On 14 days feeding, groups of cockerels showed gains from 28 to 38 percent in weight at a feed cost per pound from 18.35 cents to 10.32 cents. These groups showed from live weight to market dressing a variation of 6\(^2/3\) to 14 percent. The feed cost per pound of gain varied from 10.01 cents to 17.45 cents.

Dressing Turkeys — With a spread of 10 cents a pound between live weight and market dress of turkeys the producer can realize about $0.94 to $1.54 per 'turkey for the labor of dressing, provided he does a good job. Our data for the last 3 years shows a range of $0.94 to $1.54.

Digestibility and Production Coefficients of Poultry Feeds by G. S. Fraps, Texas Agricultural Experiment Station, Brazos County. Bulletin No. 372, January, 1928.

Sixty-three digestion experiments on poultry are reported, with a compilation of all other digestion experiments on poultry that could be found. Poultry have little power to digest crude fiber; therefore feeds containing much crude fiber have a low digestibility. Energy-production coefficients for poultry are given, although the basis for such figures is not very satisfactory. The bulletin gives the approximate average and minimum chemical composition, digestible protein, and productive energy for a number of poultry feeds. It also tells how to calculate the composition and feeding values of mixtures of feeds.

Various kinds of fishmeals and meatmeals have been analyzed in order to ascertain the content of Vitamin D. The heating and raw material influence the content of vitamin D. The following results were obtained: Whailemeal, meat- and livermeal and fishbone-meal contain no vitamin D.

Very little was found in the usual trade fishmeal (codmeal). Fishmeal manufactured from whole fishes was anti-rachitically active.


The Burbot, lawyerfish, is found in great quantities in the inland waters of North-America. During 1928, 170 tons were caught in Lake Erie. This fish is mostly used for fertilizers.

The writers made tests on rats with the liver oil of this fish to ascertain its content of antirachitis vitamin. It proved to be eight times greater than that of cod liver oil.


Comparative tests with fresh brewery yeast and dried yeast proved that no loss of vitamin content occurred during the drying process.


The pigeon is not a suitable test animal for purposes of ascertaining the vitamin B content in green food. The quantities eaten by pigeons is too small. Larger quantities of green food cause bowel troubles.

The juice of green food is not suitable either as it is not known how much vitamin goes over into the juice.

Salt-Intoxication by Mayall. The Veterinary Journal, June, 1929.

Hens which had eaten mash containing too much salt (4 grams salt per K.G. living weight) died within a few hours, showing symptoms of paralysis, blue comb. At the post-mortem examination congestion of the muscles and liver and lung and gastro enteritis were discovered.


The influence of the material and construction of the feeding and drinking vessels on the health of the birds is investigated.

The influence of copper, zinc, tin, lead, enamel and aluminium on the health is also discussed.
The Secretion of Uric Acid by the Fowl, by O. S. Gibbs, Physiological Abstracts, 1929, p. 302.

The bird’s kidney can be perfused through the urether. Fluids enter the kidney as high as Bowman’s Capsule. The pressure required is low. True selective absorption of such fluids was not demonstrated. After a short time the uric acid secreting mechanism becomes injured. It is inferred therefore that tubular absorption is not normal, though it can occur. The secretion pressure in the fowl’s kidney is 10-20 c.M. of water. It is considered that uric acid is actively secreted by the bird’s kidney, while water is probably filtered off by the glomeruly.

Penetration of Ultraviolet rays through Clothing Materials by Harriet Morgan. Utah Agricultural Experiment Station, Logan, Utah. July, 1929, p. 4.

From the data presented it would seem that the mean interspace between the threads and weight are factors limiting the ultraviolet-ray transmissibility of clothing materials. This conclusion is in accord with the results of previous workers who have quantitatively measured the light admitted by open- and close-weave fabrics. However, that weave and weight are the only factors is negatived by the percentage of ash. This fact strongly suggests that the porosity of the fiber is a significant factor which influences the ultraviolet-ray transmissibility of clothing materials.

Causes of Differences in Poultry Profits by R. L. Mighell and F. H. Branch, Bulletin no. 251, Agricultural Experiment Station, Amherst, Mass.

Summary:
1. Records from 144 Massachusetts poultrymen in 1926 and 134 in 1927 were the basis for this study of poultry profits.
2. Labor return per bird increased about 35 cents for each increase of one dozen eggs in the average production per bird. Average egg production per bird was the most important factor influencing profits per bird.
3. Labor return per bird increased 28 cents in 1926 and 35 cents in 1927 for each increase of one dollar in receipts other than from market eggs. Such receipts included those from hatching eggs, baby chicks, broilers, roasters, and so forth. These supplementary lines contribute to profitable poultry keeping.
4. When the number of birds in the flock was reduced after November 1 so that the plant was operating below full capacity, labor return per bird decreased about 36 cents with each ten per cent reduction in number of birds.
5. A five cent difference in average price received for eggs was related to a difference in labor return per bird of 19 cents in 1926 and 33 cents in 1927.
6. Fall egg production increased labor return per bird through its relation to average price received for eggs and annual egg production per bird.
The Economic Significance of Egg Weights by W. C. Thompson, New Jersey Agricultural Experiment Station, New Brunswick, N.J. June, 1929.

For many years poultry breeders have been using trapnesting and individual egg production performance records as economical methods of identifying fowls which were worthy of being used as breeding stock and which would probably tend to improve the general egg-production capacities of subsequent generations of pullet flocks. In most instances the data accumulated have been those of the occurrence and distribution of egg production through the season or year only, this being indicated by an X under the date of such egg laying. In an effort to determine whether such X records were sufficient to give poultry breeders adequate bases on which to select future breeders, the New Jersey Egg-Laying Contests have been taking additional data on all eggs laid at the Vineland and Bergen County (and this year at Passaic County) plants. Every egg has been weighed and such weight recorded as "ounces per dozen." Table 1 gives a fair sample of the data thus accumulated. It points out very directly that the X data are inadequate, although they are, of course, very much better than no information on the individual. In the brief space available it is proposed to summarize the results of this initial (and probably incomplete) study of a part of these data, because of their apparent value to poultry breeders.

The cooperative Cold Storage of Eggs by Alabama Farm Bureau Federation, Edward A. O'Neal, President, Montgomery, Ala.

The material in this bulletin was prepared by the Poultry Department, Alabama Polytechnic Institute and the entire project is approved by the experts at this institution.

Description of: Cooperating Agencies, Objects, History, Plan, Agreement, Shipper's Code.

The cold Storage of Eggs and Poultry by Thomas W. Heitz, Bureau of Agricultural Economics, Juni, 1929.

This circular discusses the subject in such a way that the layman can get general information regarding the construction of warehouses, temperatures and humidities, and the preparation of goods before going into storage and in coming out of storage.

Marketing Kentucky Eggs, Bulletin no. 283, Agricultural Experiment Station, Lexington, Ky.

Conclusions:
1. The problem in Kentucky's poultry industry is that of improving the quality of eggs sold. It has seemed, theretofore, of special importance to study the methods of operation followed by those engaged in the industry and the principal problems confronting them.
2. The United States has experienced an increase in the per capita consumption of eggs during the last thirty-five years but increases in the future are likely to take place less rapidly than they have in the past.
3. The seasonal production of eggs does not coincide with consumption. High points in production come in March, April, May and June while high points in consumption seem to occur in March and in the fall and winter months of October, November and December. Normally the fall and winter months are periods of high prices.
4. Receipts of Kentucky eggs at New York City reach their peak in March and April while the peak of total receipts comes in April and May.

5. The spread between local and central market prices of eggs is largest in the fall and winter months.

6. Storage holdings of eggs tend to absorb fluctuations in receipts and to distribute the trade output according to demand. Demand for fresh eggs for consumption, however, does not permit the elimination of seasonal changes in prices.

7. Merchants buy eggs primarily to secure sale for their merchandise rather than because of expected profit from the eggs handled. They base their buying prices on nearby markets while produce dealers usually consider eastern market quotations as the basis for prices paid.

8. Large dealers operating several branch houses in a limited area have an advantage over local dealers in making up carload shipments of eggs.

9. The direct sale of eggs to hotels or restaurants is impracticable for most producers.

10. Existing marketing channels are well established and fill an economic need. They doubtless will continue to do so until replaced by more satisfactory methods. Any improvements in marketing must be brought about by influencing the practices of existing agencies or by assuming their obligations.

11. Kentucky eggs average higher in price than Tennessee or Missouri eggs but lower than Indiana and Ohio eggs.

12. The purchasing power of eggs shows some tendency toward cyclic movements. Changes in purchasing power, however, do not recur with sufficient regularity to make them particularly significant.

13. The receipts from the sale of poultry products form a much larger portion of gross farm income in sections of Kentucky where farm incomes are comparatively low than in sections where incomes are higher.

14. Possible improvements in Kentucky’s poultry industry which are open to producers and dealers may be classified as improvements in production practices and improvements in marketing practices.

Production Improvements.

a. The maintenance of quality in eggs is chiefly a matter of controlling temperatures, odors, cleanliness and the time involved in the marketing process. Producers have some control over all these factors while the eggs are in their possession. Penning roosters after the hatching season will help to insure good quality eggs.

b. Breeding for egg production during the periods of seasonally high prices should net returns.

c. More careful breeding of the American breeds of poultry in Kentucky, in Kentucky, probably would improve the average size of eggs. This is not entirely a question of purebred fowls but of breeding larger and more productive strains of the fowls now kept.

Marketing Improvements.

a. The production of quality products by the farmer should be met by an opportunity of receiving pay for his extra efforts. Trading in products strictly on the basis of quality will accomplish this. The universal use of standard grades for both eggs and poultry would be a decided improvement over present methods. Most produce dealers recognize the advisability of a more extensive use of grades as a basis of purchase price but the cooperation among them which is necessary to bring this practice into general use has not been developed.

b. When eggs of high quality are produced in sufficient volume, satisfactory
market outlets may be obtained thru express shipments to wholesale markets, but it is not practicable for the farmer keeping a small flock. Roadside marketing sometimes offers sales opportunities.

c. The development of trade with southern markets is one of the opportunities open to Kentucky poultrymen. Direct competition from Tennessee and Missouri will be encountered but can be met on a quality basis. The winter resorts of Florida demand a quality product but offer good market opportunities.

d. Closer at home is the eastern Kentucky coal field as a market for eggs, now being supplied largely from Missouri and Indiana. Kentucky farmers or dealers may do well to investigate this market carefully before looking elsewhere.

e. Market information and its wise use in reference to market demands and tendencies is needed among farmers and dealers in this State.

f. Cooperative marketing of eggs holds an opportunity for Kentucky farmers only if a sufficient volume of high quality eggs, coming from interested poultrymen can be maintained. The problem of assembling a sufficient volume of eggs at a reasonably low cost is one of the limiting factors in cooperative marketing development.

Annual Report, Division of Poultry Husbandry by J. S. Carver. Agricultural Experiment Station, Pullman, Washington.

Breeding and Selection. In the breeding experimental work with S. C. Rhode Island Reds and S. C. White Leghorns during the year, special emphasis was placed on the improvement of breed weight, type and color.

Four thousand chicks were individually pedigreed during the hatching season of 1928. The 126 White Leghorn hens used in the breeding pens had an average egg production of 288.46, the highest average egg production of any hens that have ever been used in the breeding pens. Over 66 per cent of the breeders laid 280 eggs or over. The Leghorn males heading the ten individual matings were carefully selected from hens laying from 285 eggs to 337 eggs, and with large egg size ancestry.

The egg production of the 80 Rhode Island Red hens used in the breeding pens was 241.85 eggs, and there were 41 hens laying from 240 to 307 eggs. Eighty-three per cent of the Reds used this season were non-broody. No hens were used in the breeding pens with standard disqualifications, poor color or low vitality. All hens used layed eggs weighing two ounces or larger. All hens not conforming to standard body weight requirements were discarded. All of the breeding pens were headed with male birds from hens laying 250 eggs or over, of large egg ancestry.

Relation of Date of Sexual Maturity to Annual Egg Production with Rhode Island Reds. For the years 1924-25, 1925-26, and 1926-27, there was no correlation between the number of days of sexual maturity and annual egg production. The mean egg production was 218.4 eggs. The number of pullets used was 238. A large percentage of the Rhode Island Reds which made high egg production records matured in the period between 200 days and 230 days of age. It would appear from the records that the correlation between rate of maturity and early egg production was governed by environmental conditions of the pullets during the growing season such as rations fed, methods of housing, and climatic conditions.

Watery Whites. (J. S. Carver and L. W. Casel). This study was continued and observations made on several hundred eggs that were furnished to the Division of Chemistry for further study.

Value of Various Proteins and Combinations of Them for Laying Pullets.
This is a continuation of feeding laying pullets a whole grain mash with various protein supplements. The results of the year's work may be summarized as follows:

The highest average number of eggs per pullet for the twelve months was received from the pen receiving the basal mash supplemented with liquid sour skim milk.

The liquid skim milk as a supplement to the basal mash appeared to be superior to supplements of milk powder, meat meals or combinations of them.

Powdered milk as the entire source of protein supplemented to the basal mash proved uneconomical.

Meat meal as the entire source of protein supplemented to the basal mash proved inefficient from an egg production standpoint.

A ration carrying 16 per cent of alfalfa leaves and blossoms and a fiber content of 8 per cent proved inefficient from an egg production standpoint.

A protein supplement to the basal mash of approximately 4 per cent of meat meal and 7 per cent skim milk powder proved efficient from an egg production standpoint, but was uneconomical.

A protein supplement to the basal mash of approximately 10 per cent of meat meal and 2 per cent of skim milk powder proved fairly efficient for egg production and fairly economical.

A protein supplement to the basal mash of approximately 6 per cent of meat meal and 6 per cent of skim milk powder proved efficient from an egg production standpoint and also economical.

Alfalfa leaves and blossoms were substituted for green food effectively.

Protein Requirements of Growing Chicks. (J. S. Carver and L. W. Cassel).

This project was inaugurated July 1, 1928, and is being conducted as a cooperative experiment with the Division of Chemistry. The object is to determine the minimum protein requirements of growing chicks and the most economical sources of protein and to study the fundamental differences in protein from different sources. Chicks will be grown under controlled conditions in nutritional feeding batteries. Chicks used will be S. C. White Leghorns selected on the basis of uniformity and breeding and health. This experiment has been under way for several months and is planned for a duration of at least two years.

Department of Poultry Husbandry by J. C. Graham, Massachusetts Agricultural Experiment Station, Amherst, Mass. Biennial Report, February 1929.

Broodiness in Poultry. (F. A. Hays). The relation of broody behavior to other characters concerned in high egg production has been further studied. Linkage relations have been discovered between winter intensity and the presence of broodiness. Total days spent in broodiness has been shown to exhibit an important negative net correlation to annual egg yield. Some evidence is available to indicate that non-broody birds are less vigorous than broody individuals. The total percentage of broodiness in the flocks has been very significantly reduced during the period and now stands at 19 per cent.

During the mating year of 1928 the broody character has been studied from three major aspects:

1. Inherited factors concerned in degree of broodiness.
2. Influence of management upon broody behavior.
3. Physiological phases have been studied to ascertain if the stimulus to broody behavior lies in the ovary or in the testes.

Breeding Poultry for Egg Production. (F. A. Hays). The mean annual egg production for all birds in this experiment for the year ending in 1927 was 205. Records are not yet fully complete for the flock whose year ends in 1928. During the past year particular attention has been given to a study
of the breeding behavior of intensity measured by winter clutch size. Winter clutch size has been shown to be inherited. Winter pause is being studied with special reference to its relation to other fecundity traits. Persistency has been given special attention in its linkage relation to early sexual maturity and also in its relation to calendar date. A very satisfactory degree of uniformity in age at first egg and in annual persistency has been attained. Special efforts are being directed toward the establishment of uniform, high fecundity and maximum livability.

Three papers have been published under this project, -- Scientific Contributions Nos. 53, 56 and 63.

**Statistical Study of Heredity in Rhode Island Red Breed of Poultry.** (F. A. Hays). During the period covered by this report, three bulletins have been published under this project — Technical Bulletins 11 and 12, and Bulletin 242.

Data are now being assembled for a bulletin on normal growth in Rhode Island Reds.

Particular attention is given under this project to the interpretation of data now on hand and the application of the findings to further progress.

**A Genetic Study of Rhode Island Red Color.** (F. A. Hays). The past two years have been devoted to the application of the theory regarding the inheritance of Rhode Island Red color proposed in 1926 to the strain bred intensively for high fecundity since 1913. Progeny closely approaching modern "Standard" color have appeared. These results indicate that no genes for "Standard" color pattern have been lost. The present problem lies in the establishment of a heavy laying "Standard" color strain. Present breeding stock consist of parent stock and 51 pullets and several cockerels to be used in future study. Complete color descriptions of all birds are on file.

**Determination of Genetic Laws Governing Results in Inbreeding Poultry.** (F. A. Hays). The ultimate object of this project is to measure the effects of different degrees of inbreeding upon characters concerned in egg production. Seven inbred strains were started in 1923. By 1928 only two of these strains had survived, the others disappearing because of low fertility and high mortality. The two remaining strains were crossed in 1928 and also bred as such. There have been no important advantages observed to come from inbreeding and undesirable results are common. Results will be published in the near future.

**Heredity and Environmental Factors Affecting Variability in Egg Production.** (F. A. Hays). This experiment was begun in the spring of 1928. Three pen matings were made using birds that were distinctive regarding variability in egg production. The first pen consisted of ten yearling hens mated to a yearling male. This pen was made up of families of sisters that were especially uniform in the five important characters affecting annual production mated to a male from a similar family. The second pen contained ten yearling hens selected for uniform egg production only and they were mated to a male of their own age from a similar family. The third pen of ten yearlings was selected for high annual egg production alone and they were mated to a male from high producing ancestry.

The parent stock, 165 pullets and several cockerels are now available for study.

**Factors Governing Egg Weight and Shell Character in Domestic Fowl.** (F. A. Hays). Preliminary studies on egg weight began in the spring of 1925, when all eggs laid by the breeding females between February 22 and March 3 were weighed and described. The same procedure has been practiced each season to date. In the fall of 1927 each egg was weighed as taken from the trapnests for the entire flock of 750 pullets housed. The records began with the first egg of each individual and continued until January first.

The present project was formulated in the fall of 1927 and became active
in 1928. Three pens of ten pullets each were selected on the egg weight basis and mated to three full brothers in 1928. The first pen laid eggs averaging 52 grams in December, the second pen laid eggs averaging 57 grams in December and the eggs of the third pen averaged 59 grams in December. All eggs incubated were weighed and described. A total of 120 pullets from these pens have been retained for student and cockerels are available for further breeding operations.

Relation of Intensity or Rate of Laying to Feather Pigmentation. (F. A. Hays). This project began in the fall of 1927 when 50 extremely light-colored and 50 very dark-colored pullets were selected to study possible relations between shade of color in Rhode Island Reds and intensity of laying. No very significant relations have appeared in the groups to date.

For the matings of 1928 two pens of ten pullets each were used. These pens were made up of pullets from the above two groups, the dark pen mated to an extremely dark male, the light pen to an extremely light-colored male. From these matings 59 pullets and several cockerels are available for breeding tests.

Studies of egg weight records indicate that egg weight depends upon two genes in its inheritance. Results of these studies will appear as a technical paper in the Journal of Agricultural Research.


The lungs of birds differ on three points from those of mammals:
1. the lung has inflations, the air-sacs;
2. the lung has no „alveoles“;
3. in the lung the incoming and outgoing air passages are different.

A result of this is:

a. that with in-breathing the normal air passes through the lung capillaries which give off their carbonic-acid gas in the air-sacs. No gasses, therefore, remain stationary in the capillaries.
b. When out-breathing takes place the air-sacs empty themselves through the large bronchial tubes. This air, which is rich in carbonic-acid gas has, therefore, very little contact with the blood capillaries. The oxygen pressure in the lungs of birds is, therefore much higher, than in the lungs of mammals (146 m.m. and 97.30 m.m. respectively). The blood becomes, as a result, better replenished with oxygen. This is of great importance to life in the higher air levels. When flying the air-sacs prevent that faintness which attacks mammals in the higher air levels.


Although the lymphnodules of the hen are of great importance in contagious diseases little mention is ever made of them. The topographical positions in various breeds of hens and others facts, are determined, as well as the histological build.

Irridiation of young animals. Influence de l’Irradiation des jeunes animaux par la lampe a mercure; importance zootechnique by
The treatment only shows favorable results in weak animals, not in healthy ones.


For about 4 months the writer fed various kinds of weed seeds to hens. These were all finely crushed in the gizzard. Both, pigeons and ducks also fully digest weed seeds.


During the first four days the nitrogen is removed in the form of ammonia and up to the 9th day as urea. Afterwards as uric acid. There is parallelism between the development of the nervous system and the forming of lecithine. The further the nervous system is developed the stronger is the reaction of the lecithine. During the first days the reaction is negative. It first becomes positive in the grey substance and much later in the white substance of the spinal-marrow. The reaction is stronger in the front than in the rear segment of the nervous system.


In mammals the anti-bodies pass through the placenta but the antigens do not. In consequence of this the reaction of the embryo on certain toxins cannot be studied. Therefore the writer injected diphtheria-anatoxin into eggs during the hatching process. The chickens developed normally but did not show any increased powers of resistance against diphtheria, as compared with control chickens. By the use of this anatoxin immunity in hens can be quickly aroused.


The fat granules in the interstitial tissue consist of a central mass formed of cholesterin-aether and an outer layer of phosphatides.

Tests were made on chickens which had been infected with Bac. pullorum. 1362 chickens received a chinosol solution (1 in 10,000) as drinkwater, 708 chickens served for control.

Among the control birds the death rate was 6.5% higher than by those which had been treated with chinosol. In this solution (1—10,000) chinosol certainly has a favourable influence but is not a complete preventative against pullorum. The same applies to diphtheria. Further proofs with a higher concentration are in progress.


Description of the difficulties in giving a definition of „fresh eggs”. Description of the results of chemical research. According to Hofmeister the egg albumen of fresh eggs can be crystalized, but not that of stale eggs. According to tests made by the writer no crystals can be obtained after the 11th day in eggs which have been stored in room temperature. Cooled eggs lose this power, more or less, about the eight month and after the eleventh month no crystals can be obtained. If the ammonia content in the yolk rises above 4.5 to the 100,000 the eggs are no longer fit for consumption. The glucose and fat-acid content increases but slowly.

After the eggs have been taken from the refrigerator they still retain the power to crystalize for fourteen days.


Only few investigators found Bact. pyocyanum in eggs. During 1927 the writer tested 2659 eggs and in 1928, 7734 for bacteria. In one case it was proved that the majority of the eggs from a certain incubator showed bad hatching results and were infected with Bact. pyocyanum. Reddish coloured drops were found on the pores of the shells.


Every year much poultry from refrigerators is rejected because it is covered with black spots. The cause of this is certain sorts of mildew viz. Penicillium and Aspergillus species. The mycelium threads of these mildews penetrate the subcutis. This digression can be a voided if the poultry receive expert treatment.

If the ovarium of a hen is removed a male sexual gland develops on the right side. Simultaneously a large comb and cock-feathers develop. If the ovarium is transplanted to another part of the body it develops into a gland which is similar to the male sexual gland. The left ovary retards the development of the right sexual gland. The hen is naturally bi-sexual.


Poultry farming is again increasing in the Caucasus. During 1913 there were 3484 million eggs exported, this being 64% of the world export. The export of live birds amounted to 152,400 tons. The total value of the exports in 1927 amounted to 277,9 million roubels.

The principal diseases are: Klein disease, Diphtheria and Spirochaetosis.


The following table shows the number of poultry in the Spring of 1928:

<table>
<thead>
<tr>
<th>Birds</th>
<th>1928</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hens</td>
<td>28,718,831</td>
</tr>
<tr>
<td>Turkeys</td>
<td>760,672</td>
</tr>
<tr>
<td>Geese</td>
<td>4,726,330</td>
</tr>
<tr>
<td>Ducks</td>
<td>3,139,143</td>
</tr>
<tr>
<td>Pigeons</td>
<td>1,340,806</td>
</tr>
<tr>
<td>Rabbits</td>
<td>358,796</td>
</tr>
</tbody>
</table>


Exports figures for the years:

<table>
<thead>
<tr>
<th>Years</th>
<th>1925</th>
<th>1926</th>
<th>1927</th>
<th>1928</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eggs (tons)</td>
<td>27.071</td>
<td>58.566</td>
<td>65.590</td>
<td>53.153</td>
</tr>
<tr>
<td>Poultry (head)</td>
<td>1,294.540</td>
<td>1,991.183</td>
<td>1,604.456</td>
<td>1,192.445</td>
</tr>
</tbody>
</table>

During the course of 1926/27 Poland was one of the leading countries for the export of eggs. Only Russia, if it had been properly undertaken, could have obtained a higher figure for the export of eggs.