
THE ORIGIN EVOLUTION

HISTORY

AND

DISTRIBUTION

OF THE

DOMESTIC FOWL

PART 2

CHICKEN BONE RECOVERIES



W. J. PLANT

1984

THE ORIGIN, EVOLUTION, HISTORY AND DISTRIBUTION
OF THE
DOMESTIC FOWL
BOOK 2
BONE RECOVERIES



Archaeopteryx: first specimen, later called the London specimen



W. J. PLATT
1984

William J. Platt
4/9/94

12/9/94

David J PLANT
46 Newcastle Road EAST MAITLAND
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1st November 1997

TO:
Mr. Elio CORTI
VALENZA ITALY

RE: The Late William (Bill) PLANT of MAITLAND N.S.W.
AUSTRALIA

* Publication of his written work, Research papers, tape recordings, Books and notes.

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DAVID PLANT

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THE ORIGIN, EVOLUTION, HISTORY AND DISTRIBUTION OF THE DOMESTIC FOWL

PART 2

CHICKEN BONE RECOVERIES

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INTRODUCTION

The overall subject of the Origin, Evolution, History and Distribution of the Domestic Fowl in its entirety covers quite an amount of ground. This book is only a part of the story in which I will cover as much as I have been able to learn on the recovery of chicken bone throughout the world.

As far as I can ascertain, study into the beginnings of the Domestic Chicken and its progress has never been fully explored and it would appear that very little importance has been credited to the Chicken, as it is called by the Americans, the Domestic Fowl by the British and ourselves. For the purpose of this exercise I shall use both terms.

I fail to see the logic in this lack of importance and feel that the anthropologists, archaeologists and those in other branches of the sciences in this field are missing opportunities in tracing the ways and wanderings of man himself. I think it can be safely assumed that where man lived and travelled his domestic animals were with him. Whilst we realise the bones of the Domestic Fowl are frail in nature there are instances where they have been recovered of which I will speak of later.

Unfortunately, from what I can understand little or no further study has been done on these recovered bones in some instances. The nature of their makeup could be the key as to where they or their antecedents came from. Finsterbusch, as a student of the Game Fowl illustrated very clearly that there was a difference in bone structure between what he termed the "runner" and the "flyer" i.e. Malay and Bankiva.

I began some years ago researching on the Pekin or Cochin Bantam and in the process realised that I was also collecting material on the Origins etc. of the Domestic Fowl in general. The subject intrigued me so much that I continued on with the research and touched, lightly on the matter in my book, *THE PEKIN BANTAM IN AUSTRALIA* (1982).

I made contact with many sources requesting, information and received a great deal of assistance. The only problem was that very few firm conclusions could be made and as time went on I had collected quite a deal of material and it became hard to define what was relevant and what was not.

In the process of delving through this material I have formed some opinions in different areas but unfortunately some of these conclusions would appear to be hypothetical. However that will be for the reader to judge, or perhaps these conclusions may create a spark in someone much more learned than myself who may be able to shed a little more light on the subject. From this we would all benefit.

It is now accepted that the birds descended from the dinosaurs, then evolved into their different species through the years. However it does appear little is known of this progress. Charles Darwin put forward the suggestion that ALL Domestic Fowl evolved from the Jungle Fowl, Gallus Bankiva. Later thinking finds loopholes in this theory for Darwin does not explain what the Jungle Fowl evolved from originally. There is evidence that Gallus Bankiva was not the sole progenitor all Domestic Fowl. There are so many differences among the breeds.

The Diffusion of the Domestic Fowl when it got to that stage of the evolutionary process is also somewhat clouded. As far as I can ascertain the question of the Domestic Fowl Pre-Columbian in the Americas has never really been resolved.

Of course as mentioned earlier the frailty of the chicken bone and the fact that when chickens used as food the scraps would probably be fed to other domestic animals such as dogs and the like, this probably explaining the lack of evidence.

Thor Heyerdahl I feel did at least prove from his voyages from east to west -- Kon Tiki in the Pacific and the Ra expeditions in the Atlantic that Diffusion of the Fowl could have occurred in that direction as well as diffusing west to east from India into the Pacific. Heyerdahl's Tigris expedition substantiated the link from India and Asia to Egypt and Persia. Diffusion could have been possible through early voyages or overland in that area.

I will have some difficulty sorting out the information I have researched but will endeavour to put the material in some sort of order. It covers such a wide field of sciences. I have not had a background of academic training so may I be excused for any lack of presentation. However I feel that what material I have gathered does deserve being put together in some form so that it may be added to in the future as more information becomes available.

The overall subject I am writing about does not have an answer as yet, and probably wont in our lifetime, but as archaeologists carry on with their work a little more evidence may come to hand. I will detail the Jungle Fowl, the Malay Fowl and the Asiatics which I feel and firmly believe are three distinct species, most probably stemming from a common extinct ancestor. There is also evidence of other species or sub-species from Europe. However, perhaps we can safely assume the origins of the Domestic Fowl as we know it stemmed from Asia.

Very little appears to be known or written on the Domestic Fowl in India, China and the like prior to it being imported into England and the United States. There are plenty of writings from the 1850's around the time of the importations but nobody appeared to take the trouble to ascertain the history of these fowls prior to their importation. Most of the Poultry writers from the 1850's on just followed on from each other. Throughout these treatises on the Domestic Fowl there will be references to papers relevant, to the subject and in many instances it will be necessary to quote their text to some extent. However, I will endeavour to condense this material as much as possible without losing its content.

I am much indebted to many authorities on different facets of the subject to whom I have written. They have provided as much information as they have available. I will make the appropriate acknowledgements as I go along. It has been necessary to explore avenues throughout the world, England and the United States particularly. My thanks go to these people and organisations who have gladly given forth their assistance.

The whole treatise will be divided into sections, not necessarily in the order the title suggests and I hope to be able to publish each section independently as it is completed. Hopefully, when the whole treatise is completed each particular section will fit into its place.

This particular section covers the recovery of chicken bone, or as much information as I have been able to uncover. Perhaps I might be excused for doing the bone section first which I list as Part 2 of the complete treatise, but as the reader will be well aware the whole subject of the Domestic Fowl is very comprehensive, through circumstances both financial and the lack of time make it necessary for me to use this method. It may appear disjointed to some extent as during the preparation of the text whilst typing the stencils more information may come to hand, so therefore will be included, although perhaps not quite where it should be.

I have listed the sections of the complete treatise at the beginning of this book the seven parts which I hope to publish eventually as time and finance come to hand. Therefore I trust you will bear with me both in respect to this method and also in my rambling style of writing, at the same time trusting some of the information will be of interest and perhaps useful to the study of the Origin; Evolution, History and Distribution of the Domestic Fowl.



THE ARAUCANA OF CHILE, the Blue egg shell, laying chicken, from a sketch by George Hampden Edwards in *POULTRY*, Sydney, NSW, 26/2/65. A possible explanation as to the origin of this breed is put forward in the following text.

SOUTH AMERICAN RECOVERIES

I will deal first of all with the South American recoveries which I think could be of importance because of the fact when some of the facts are pieced together you may or may not agree the recovery on Mocha Island off the coast of Chile could have had some bearing on the origin of the Blue Egg shell coloring of the Araucana Fowl.

As far as I can ascertain (1980) no Pre-Columbian chicken bone has been recovered in the Americas. I made contact with Professor S. J. Olsen, Zooarchaeologist, University of Arizona in Tucson seeking information on this matter of Pre-Columbian chickens. He replied to me 29/8/80 and I quote as follows:

"The earliest chickens recorded from the Western Hemisphere, are from South America. They were brought there by the Spanish about 1519. There are no Pre-Columbian chicken bones from the Western Hemisphere. Some years ago I consulted two avian palaeontologists, Drs. Pierce Brodkorb and Alexander Wetmore (now deceased). They both agreed that until chicken bones are recovered from an early dated archaeological site we cannot assume that they were here in prehistoric times."

Professor George F. Carter in his chapter 'Pre-Columbian Chickens in America' which was part of the treatise *MAN ACROSS THE SEA* (1971) 'Problems of Pre-Columbian Contacts' on page 180 states as follows: "Obviously, the key piece of evidence would be a chicken bone from a Pre-Columbian archaeological level. Although such a find has been claimed in Chile and the bone identified by experts at the Smithsonian as *GALLUS GALLUS*, adequate proof of Pre-Columbian time was not supplied."

Professor Carter in a footnote on that same page supplied the following information: "Dillman S. Bullock found chicken bones in graves on Mocha Island, Chile, that must date before 1687. Chickens are documented on the island by 1600, but there is no dating on the critical grave finds (Bullock, 1956, personal communication)."

This lead I felt was worth following up and after an enquiry a letter and the correspondence relating to Bullock's discovery was forthcoming from George E. Watson, Curator Division of Birds, National Museum of Natural History, Smithsonian Institution, Washington D.C. which stated as follows and was dated November 7th 1980: "I have examined Bullock's chicken bone from Mocha Island. It (Accession No. 130325, catalogue USNM 322183; cite USNM catalogue number in any publication) is a dark stained and polished tarso-metatarsus of extraordinary length and robustness with a well developed spur. Its measurements are: Length 103.9 mm, Spur length 28 mm, Widest diameter 9.7 mm. I am enclosing the correspondence covering its accession into the National Collection. As far as I can ascertain there is no way at present to determine its age accurately enough, short of destroying a

portion of the bone to make dating it worthwhile. If additional evidence suggesting the presence of chickens in Pre-Columbian America comes to hand we could reconsider the present decision. You might be interested in writing to Dr. Carl Johannessen, Department of Geography, Condon Hall, University of Oregon, Eugene 97403. He has been studying New World chickens with black bones."

The enclosures received from this source began with a letter from Dr. Bullock to Dr. Wetmore and I quote:

El Vergel - Escuela Agricola - Casilla 2-D
Angol June 22, 1934

Dr. Alexander Wetmore
National Museum - Washington DC

My Dear Dr. Wetmore,

A few days ago I sent to your address a small parcel containing the leg bone of some kind of a gallinaceous bird. This was found in a grave on Isla de La Mocha. I cannot tell the age of the cemetery but probably at least 250 years. According to history the last of the natives of the island were destroyed in 1687. We have no way of knowing whether the grave of the Indian from which this was taken is a very old one or not.

There are a whole series of interesting questions which come up in connection with this bone. Is it fossilized? If so where did it come from and why did the Indian have it buried with him. If it is not fossilized then the question also arises as to why he had it. Possibly it was the leg bone of a famous fighting cock which he owned.

If it was fossilized it would mean probably that there were chickens of some-kind in this region in very remote times. There is a general idea that Araucana Indians had chickens when the Spanish arrived although many authorities claim that they did not. It is still a question. Perhaps this might throw some light on the matter.

I have sent it on to you because it is of little value to me except as a curiosity and to you it might be much more. If it is simply the bone of a rooster dug up in a grave then Dr. Hough might be interested in it for the anthropological section. At any rate it is for the Museum.

If you wish to look up information concerning the Isla de La Mocha there is a publication of the National Museum of Chile in 1903 which is very interesting.

With kind regards I remain Signed D. S. Bullock."

Following is a copy of the Accession Certificate No. 130325, Cat. No. 322183, dated December 21st 1934 to the Smithsonian Institution, United States National Museum, Department of Biology, Division of Birds.

Accession from Dr. D. S. Bullock

Escuela Agricola - Casilla 2-D Angol, Chile

1 Leg Bone of the domestic fowl, Gallus gallus (130325) as a gift.

Dr. Wetmore's reply on December 19th 1934 went as follows:

"Dear Dr. Bullock,

Your letter of June 22, together with the leg bone of gallinaceous bird came duly to hand at a time when I was away from Washington, and was held for my attention. I am much interested in this type of thing and receive a considerable amount for examination so that sometimes, as in the present case, a little period must elapse before I can make a reply. Your specimen is the leg bone of a male domestic fowl Gallus gallus and must have come from a strong and robust fighting cock from the strength of the spur.

The specimen is highly interesting because of its antiquity and I am pleased to have it for preservation in our collections here. To discuss some of your queries and questions, while most of the fatty matter has been lost from this bone it is not fossilized in the sense that the bony tissue has been replaced by silicon. The brown appearance may be due to leaching in the grave in which it is found, while the polish may have come from handling. It would be fascinating to know just why it was buried with its owner.

That there were domestic fowl in the New World at the time of discovery has been frequently advanced as a theory but is one for which there is no absolute basis in fact. When we recall that the

early explorers took domestic animals with them, and when we remember how easily chickens propagate and establish themselves, then I think we must believe that *Gallus gallus* was introduced. Undoubtedly it came at a very early date. You may know that chickens have for more than a hundred years been established in a wild state in some of the South Pacific Islands undoubtedly from escapes from domestication. The specimen is accessioned as a gift in your name for which I give you my sincere thanks. With kindest regards I am

Signed A. Wetmore - Assistant Secretary."

Perhaps an explanation regarding the size of this Mocha Island bone comes from a passage on page 374, 375 in *COCK FIGHTING ALL OVER THE WORLD* by Carlos Adolfo Finsterbusch (1929) which reads as follows: "At one time, they had in Peru a breed of cocks, for which we find no other explanation but that they were brought over from the Dutch East Indies. Many of these cocks were imported by Dutch pirates who settled in the Gulf of Arauco, Chile, and apparently from here they found their way to Callao, Peru. These birds were larger than the Spanish Peruvian, and we suspect at one time that they as well as the slashers used, were entirely due to the Dutch East Indies. We learnt, however, that the Peruvian slasher was patterned after the Mexican, though their weight and size apparently was influenced by the Javanese.

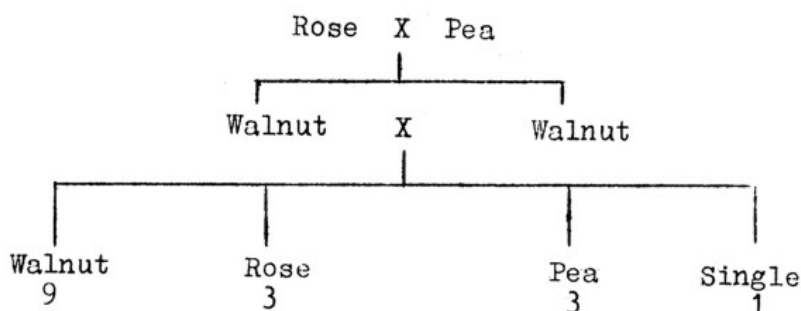
Early writers, Buffon and followers, never could account for the strange Oriental type fowl which was perpetuated in Peru, merely for pit use. In Arauco, Chile, they were not used for the pit but the Indians crossed them indiscriminately upon the native stock producing freak dung hills that have misled many good intentioned writers. At one time, nobody knows exactly when the early Orientals and their crosses began to fade away and eventually became extinct. Their traces may be still detected among the common barndoor poultry."

As can be observed from the map of section of the coast of Chile, Mocha Island is just off the coast of the province of Arauco so there fore I feel that it could safely be assumed that these imported Orientals, either Malays or Aseels could have found their way from the Gulf of Arauco to Mocha Island, thus accounting for the proportions of the metatarsus recovered by Bullock. Bullock estimated the grave excavated was perhaps 250 years old. That would take the burial time back to around 1664.

May I digress a little from the bone situation for I feel another point arises from Finsterbusch's foregoing remarks and that is the question of the Araucana or Blue Egg laying chicken. This chicken that lays the blue shelled eggs as far as I am aware originated in this area of Chile. Finsterbusch maintains Oriental cocks brought to Chile by the Dutch pirates were crossed by the Indians with their own stock producing freak dunghills.

From the sketch of Bullock's metatarsus it would seem most probable it had Aseel antecedents or perhaps the Malay. The length of the bone would I think point more to the Aseel but could have shortened from Malay infusion with the local native stock. However I feel that we could safely assume either or both of these breeds were involved.

I must still lean towards the Aseel however because of the Pea or Triple comb which has a very important bearing on what I am leading up to. The Malay has a Walnut comb which can be made up by crossing a Rose and a Pea comb as shown in the accompanying sketch, so therefore cannot be disregarded.



This may all appear to seem irrelevant to the bone situation but I feel is important to the origin of the Blue Egg shell of the Araucana chicken. The Pea comb acts as a simple Dominant to the Single comb (MENDELISM R. C. Punnett 1919).

Hutt in GENETICS OF THE FOWL (1949) speaks in the Chapter on 'Variation in Eggs' of the Blue Egg shell (genetic symbol O) which are laid by the Araucana chickens of Chile (various shades of blue and green). Some of these eggs were taken to Europe and North America and Punnett (1933) tested them genetically and found that Blue is an autosomal dominant mutation which segregates sharply from white shell without any doubtful intergrades. This is the only simple mutation affecting the egg that has been demonstrated thus far. The symbol O has been used to designate it. The gene is closely linked with the one of Pea comb.

An interesting point brought out by Punnett's studies is that, when the blue mutation is combined with genes for Brown shells the result is olive or green depending on the intensity of the brown. Can we therefore assume that a mutation in egg shell color occurred when the Orientals imported by the Dutch were crossed with the Chilean chickens kept by the Araucanian Indians? This theory does seem to have its possibilities.

The egg shell color of the Malay is dark brown, the Aseel, tinted according to the Brown in RACES OF DOMESTIC POULTRY (1906).

Brown's sketch done by Ludlow of the Aseel shows the spurs upturned. A. J. Compton in THE AUSTRALASIAN POULTRY (1899), his sketch shows them downturned.

Herbert Atkinson's sketch shows upturned spurs. Atkinson calls the breed Asil.

Bullock's metatarsus shows upturned spurs.

Wright's BOOK OF POULTRY and also Compton show more of stubby spur than the others mentioned.

My apologies for the digression but I have found during my researches that many factors emerge even when following a certain line and perhaps in some ways the diversions do throw some light on the subject on an overall basis.

I must now return to Finsterbusch's claim that Dutch pirates from the East Indies who settled in the Gulf of Arauco and imported cocks, and Professor Carter's comments that it has been documented that chickens were on the Island of Mocha by 1600. Dr. Bullock states that the last natives were destroyed on Mocha in 1687. He estimated the age of the cemetery where the bone was recovered was at least 250 years old. He recovered it in 1934. Working on the 250 years basis would take us back to 1680, which is in the limits of importations (around 1600) and the end of the Indians (1687).

In an endeavour to ascertain the date of the occupation by the Dutch in Chile I contacted the University of Newcastle, N.S.W.. University Librarian Mr. Ted Flowers very kindly sent me some material on the subject. From Woodward, Ralph Lee ROBINSON CRUSOE'S ISLAND (1969) comes the following: "The first Dutchmen into these waters were apparently those led by the pirate Jacob Mahu who in 1598 temporarily installed one of his captains as 'Emperor' of the Island Chiloe in southern Chile." This island is south of Mocha and Arauco province but within a reasonable distance. Other Dutchmen coming into the area were Oliver Van Noort, Joris Van Spillbergen around the times of 1614-17.

William Schouten and Le Maire also spent time along the South American coast in the early 1600's, The East India Company was operating. The Magellan Company sent a fleet around through the straits of that name and one ship commanded by Baltazar de Cordes anchored in the Bay of Castro in Chiloe, incited the Indians to rebel against the Spaniards in 1599.

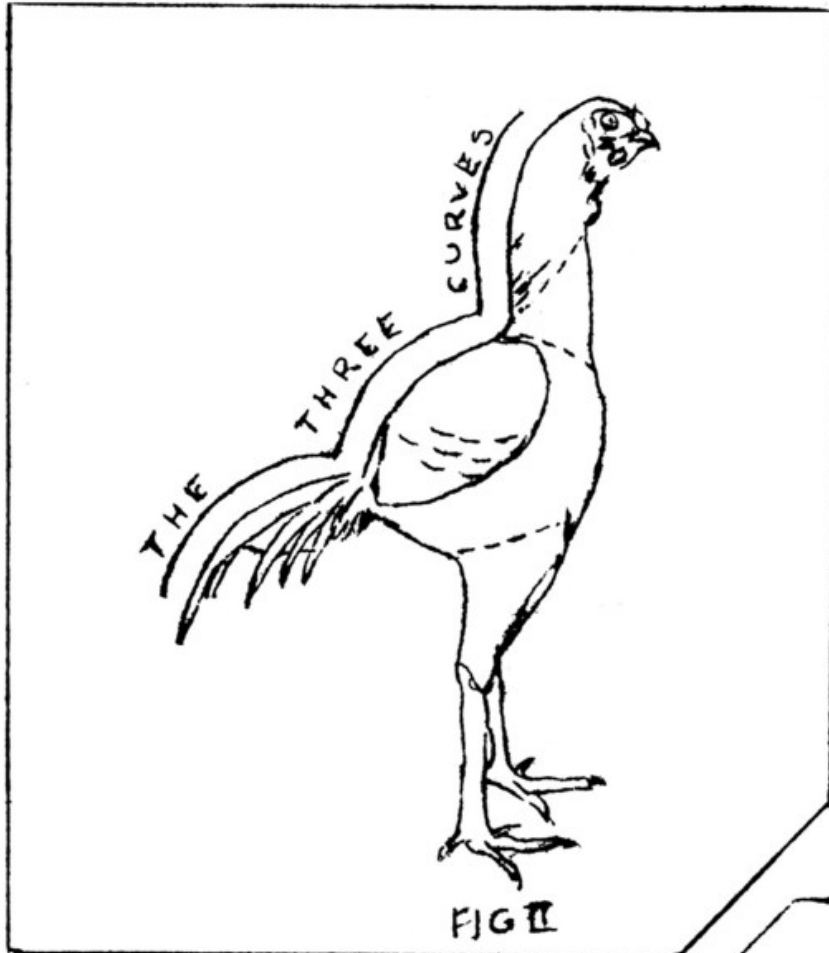
So there is a wealth of evidence to support Finsterbusch's claim that the Dutch were very active along the coast of Chile and would have made contact with the Dutch East-Indies across the Pacific in the process.

JUNGLE FOWLS FROM THE PACIFIC ISLANDS -- Stanley C. Ball, Bishop Museum Bulletin 108 (1933) gives us little information that the size of the tarsus of Bullock came from the Pacific area. Jungle Fowls covered in Ball's treatise all appear to be of Bankiva Lineage. Ball seemed to be more concerned with feathering (color) of the Jungle Fowl of the Pacific Islands rather than type or species. He states they are mostly almost identical with the Black Breasted Game Bantam which would lead us to believe, much like Gallus Bankiva.

Ball's work mostly covers the collections of the Whitney South Sea Expedition of the early 1920's and gives us no leads to tie in with Bullock's chicken bone of Mocha Islands. His table, page 27 he gives lengths of tarsus of adult males collected. The longest tarsus amongst 48 males measured was 94 mm,

No. 194086, a bird from the island of Hivaoa in the Marquesas Islands, collected October 28th 1922. The spur length of this male was 30 mm. No measurements were taken of the diameter of the tarsus collected. The average length of the 48 males was 79.3 mm. On page 30 Ball speaks of this cock 194086 (Hivaoa) as being a large fowl, then describes the color, no further type description. The illustrations of Ball of a Marquesan male No. 194 085 from Hivaoa is type Bankiva.

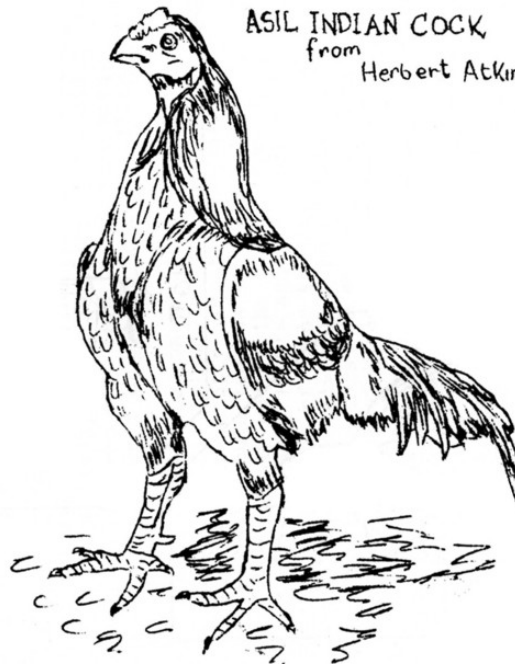
CHARACTERISTICS OF THE MALAY GAME THE "BILL SYKES" OF POULTRYDOM Mark Marshall for "Poultry"



ASIL INDIAN HEN
from
Herbert
Atkinson



ASIL INDIAN COCK
from
Herbert Atkinson



During my research in 1980 I wrote to Professor George Francis Carter of the Texas A&M University, College Station, Texas, and received from him some interesting notes dated February 27th 1980: "Thank you for the long letter on chickens. I wish that I could give you a lot of information, but I cant. I did the chicken paper and pretty well let the subject slide. Carl Johannessen, Geography, University of Oregon has pursued the question of ceremonial uses of the chicken in America and that of Asia. He finds that in many ceremonies, the whole thing is duplicated. This reinforces the notion that the chicken was introduced, a number of times, into America long before Columbus. Chicken bones are surely hard to come by in archaeology, and even harder to get identified. And this ridiculous since the chicken specialists can identify them right down to varieties.

In America chicken bones dating back to about 1400 were found some years ago but the finder has lacked the courage to publish them. I don't think that we can do anything much with the separate species argument until some good scholar takes the whole thing in hand, collects the wild species, and the tame, and really compares them histologically and osteologically. Think that they will prove to be two or three different species involved. I base this on the plant world. Domestication often started with one species, but as the idea and, or the plant spread, it was hybridized with local wild species and the result was a swarm of hybrids of markedly different aspect and decidedly different parentage.

It is amusing to have you comment on the unimportance of the chicken, in the archaeological mind. One can find articles on various tribes in the Handbook of the South American Indians, where chickens will be mentioned, but they are not indexed, only turkeys etc. It is becoming increasingly clear that America was reached many times from east and west. We now have alphabetic inscriptions all over the Americas, mostly Mediterranean, but some Asiatic. For this see H. B. Fell "America B.C." just out..."Saga America". Whether or not they brought chickens or not it is harder to say.

Heyerdahl's stone hens are real enough, but dating them is seemingly not possible. The Blue Egg trait is most mysterious. Why only in America? A local mutation? I would expect it in Asia but I have never heard of a trace of it. Is it more likely in brown eggs or in white eggs? White, all colors. Brown is the result of a red-blue mix. Suppress the red and have blue? Blue eggs occur as far North as Central America, far more wider spread than I had thought.

There is a large book in Dutch on the chicken, apparently about the last to show any interest in the varieties and their origins. DE HOENDERRASSEN, R. Houwink Stoomdr. Floralia, Assen 1909. I have it in Xerox, and have long intended to translate it but I find too many other thing to do. For a very good summary of the present state of our knowledge of trans oceanic contacts with America see: "Pre Columbian Oceanic Transfers" by Stephen Jett in ANCIENT NATIVE AMERICANS, Jesse D. Jennings, editor, W. H. Freeman Co. San Francisco."

Professor Carter's comments regarding the Blue egg laying chickens, the Araucanas is interesting, the subject I digressed on a little earlier. I suggest from the evidence available is that the bone recovered by Dr. Bullock on Mocha Island was or had as its ancestors the Aseel or Malay from Asia or the Dutch East Indies either in its pure form or mixed with the breed kept by the local Indians and the origin of the Blue eggs, a mutation from a crossing of these Oriental or Asiatic breeds and the chickens that were already in Chile.

I think perhaps at this juncture a description from Finsterbusch describing the difference in bone structure of the "runner" such as the Malay and the "flyer", Bankiva species would be in order. I feel that many of the answers we are seeking lies in the fact that study of any chicken bone recovered is necessary and until this is done we can only be more or less hypothetical in our deliberations.

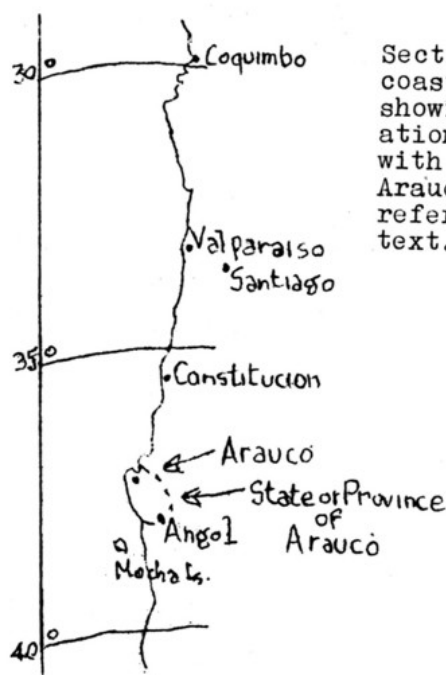
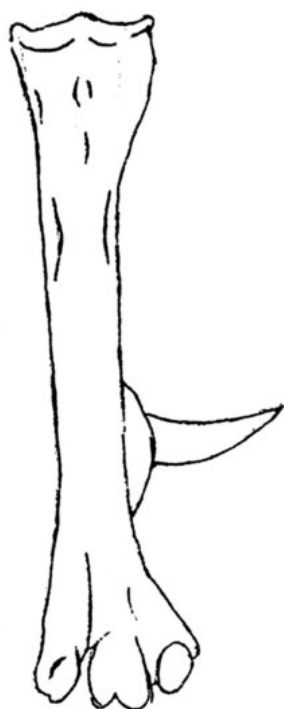
From Finsterbusch page 58 COCKFIGHTING ALL OVER THE WORLD (1929): "The skeleton of Orientals again shows a marked difference, while Bankiva, as most 'flyers' show hollow, pneumatic bones, those of the Malay especially in legs, are filled with marrow and reinforced laterally by spongy bone structure. All bones of the Malay are naturally strong, a fact at once remarkable in the skull, which is heavy and very hard. The enormous thighs are heavily muscled and the bones show excrescences and ridges that materially strengthen them primarily and besides give a larger surface for muscular insertion. The bones of the Bankiva are light and smooth." Page 118: "Here is another point of differentiation between the Malay and the Bankiva. The first is an extremely heavy and strong bird, with a frame adapted for a runner, while the latter is a light framed flying bird, that appears larger and stronger by the profusion of feathers it wears." Page 118-119: "The skeleton is composed of different classes of bones; tubular, flat and short ones. These are formed by the outer bone tissue and the inner, spongy, marrow containing structure. We have pointed out already that the tubular bones of flying birds are hollow and filled with air, while those of runners are filled with bone filaments surrounded by plenty of marrow. Such tubular bones are those of the legs and wing, which are by far the largest and the strongest."

The reader would note from the drawings of the Malay and the Aseel that a fairly close relationship would exist between these two breeds, both of which are referred to in the foregoing text an perhaps the breeds imported into Chile.

Further evidence comes from a communication from Mrs. A .C. Banning Vogelpoel of Waardenberg in the Netherlands in answer to some questions. I had tendered her. Permit me to quote in part some of her communication: "They could be from the beginning a fowl in the mountains of South America that has evolved in another way as the Bankiva in Asia. Later these birds could have crossed with the Spanish birds which the invaders took in with their ships. But the old Dutch Standard of Perfection (around 1960) there I found some old history of the Araucanas. The chickens got their name from the region of Arauco in Southern Chile, the Indians there proved to be very brave and would never submit to the Spaniards. The first foreign chickens came to Chile with Inés de Suárez when coming from Peru. Later more chickens came from Spain, common fowl and game fowl. In the 17th century pirates

commanded by Olivier van Nordt came and brought Asiatic fowl. These pirates, being driven away in the beginning of the 17th century from the Sunda Islands by the Dutch Government, provisioned at Bali and took live fowl and pigs with them and exchanged these with the Araucana Indians for other things. The Dutch pirates stayed for about 25 years in Chile and attacked Spanish merchant ships which went home from the Silent Sea via the South Cape to the Atlantic Ocean. So Chile had long before other parts of America fowl with much variation. But the Blue shells and ear bussels make these fowls remarkable. I have quoted Mr. C.S.Th. Van Gink who was vice president of the World Poultry Science Association and a famous Poultry artist. I knew him in person 10 years ago. In 1967 he wrote an article on this subject. In the Poultry History there is a note about Araucanas laying blue eggs from 1854. In 1907 a German emigrant from Chile took some Araucanas to Germany. There are found illustrations of fowl with ear bussels made by missionaries dated from the early time of the Spanish invaders. The origin of blue egg shells of chickens is not found now, may be it can be found in South America or one of the islands off the coast (Van Gink)."

I feel this information from Mrs. Banning further supports my hypothesis with regard to the importation of Asian chickens to South America from the Dutch East Indies and the probable mutation with the local stock resulting in Blue egg shell laying chickens.



Section of the coast of Chile showing the location of Mocha Is. with respect to Arauco territory referred to in text.

Above is a sketch of a metatarsus bone of Gallus gallus which I have endeavoured to reconstruct. A bone such as this was recovered by Dr. Bullock on Mocha Island, Chile, in 1934. I have used the measurements provided by George E. Watson, Curator, Division of Birds of the National Museum of Natural History, Smithsonian Institution, Washington D.C. The sketch is very close to actual size, within a few millimetres. It must be understood however that I have not seen the bone. All I could do was to blow up a sketch of a metatarsus to this size from THE STRUCTURE OF THE FOWL, Bradley, 1938, and apply the measurements as I had them. These measurements are covered in the text.

NORTH AMERICAN RECOVERIES

There have been little recoveries in the North American continent that I can find and all I can present to at this point of time. This information is provided from Professor George F. Carter of Texas A&M University.

I believe the Picuris Pueblo referred later in the text to be in Mexico. There is also further reference to South America but I trust the reader will understand that it is perhaps hard to place the material I have gathered in the order that it should be. A more experienced writer would probably do this, however no matter where the material is placed I feel it is relevant to the overall picture.

I made further contact with Professor Carter in 1983 in an endeavour to ascertain if any further information had turned up on the recovery of chicken bone. He did give me some details of findings and although not all the dates were supplied I will quote in part from his letter: "I doubt that the data on the archaeological chicken bones from Picuris Pueblo (Mexico) will ever be published. I will put down here some of the circumstances as known to me. I gave a paper on chickens at Santa Fe, New Mexico. A young man came up afterwards to tell me that archaeological chicken bones had been found in a dig where he had worked at Picuris. I lost his name but he came to Mexico City to hear me give another paper and again came up to tell me about the bones at Picuris. I tried to get information out of the excavator, and out of Hargraves, the osteologist who identified the bones. I didn't get anywhere. So I got in the car and drove to Colorado and interviewed the excavator Herbert Dick. He took me to his laboratory and showed me his excavation notes he had classified 1 million shreds; there was a card for each level of each excavation, by 5 foot squares, as I recall. It was meticulous work. I then asked about chicken bones. He had a shoe box filled with bird bone identifications. I expected to find one chicken identification. Instead there were as I recall about 14. They started from the bottom of his undisturbed as to strata test pit and continued up. The Pueblo was established about 1400, as I recall. Finds included virtually whole skeletons. The important point is that Dick insisted that his test pit data showed that there had been continuous deposition, and NO disturbance and he had his immense shred analysis to prove it. There have been other finds of archaeological material - egg shells, chicken bones etc. The assumption is always made that there was disturbance - or one of the Mexican diggers probably threw his chicken bones in the trench."

Professor Carter remarks that he far from agrees with this attitude. He goes on to say: "The evidence is skewed. The assumption is that chicken bones when found in American Archaeology are intrusive. If they seem really to be in place, then it is assured that they fell down gopher holes. The Picuris data is important because nearly whole carcasses (skeletons) were found at times - and this is not what goes down rodent holes - and it much more suggests sacrifice and avoidance of eating, and this is widely documented for the Americas, and is very Asiatic, and NOT 16th century Mediterranean. In further review of the files, I find that there is some question whether the chicken bones at Picuris were chicken or Blue Grouse. That can only be settled by finding the original bones - Hargraves had them, and have an expert go over them." Professor states that: "The chicken bones from Picuris are (or were) at Prescott College, where Hargraves was when he died. I believe that the College is now extinct".

I would assume that the area referred to by Professor Carter, Picuris Pueblo is in region west of Veracruz in the Gulf of Campeche, Mexico. His remarks as to the establishment of the Pueblo as being about 1400 would put this in the category of being Pre-Columbian, an interesting point and certainly worth further study. Professor does not agree with my hypothesis of Dutch introduction of the chicken into Chile as mentioned earlier when speaking of the Mocha Island recovery.

To further support my hypothesis may I further quote from Finsterbusch, page 43: "Types similar to the Haiderabadi game or the Madrassi Calcutta, Culm, the naked Madagash and Black Silky of Java, Frizzles have been produced in Brazil due to mutation or simply degeneration of the Black Game with Tassel. They are also frequent on the Pacific coast of America, especially in Chile, where it is sure that Dutch pirates had settled in the Bay of Arauco, where they maintained friendly relations with the brave Araucana Indians. Here the Dutch gathered supplies and frequently chased and destroyed Spanish convoys for Peru. These Dutch pirates, it is believed - and in a single case evidenced by the then adventurous Captain Oort (later Admiral) - came from the Dutch East Indies, where the Dutch had already settled, and where the pirates found themselves continually molested by Dutch and English frigates. It is queer that where the American coast was in direct connection with Java, fowls should be found that are antique game of Java - crested, silky and black skinned. One has but to observe the mongrel fowls of Chile to find lots of evidence. Here they developed into freaks as feathered earlobes or earrings, and the production of the greenish or bluish egg shells. The latter fact, caused a good Spanish poultry expert to read a paper in one of the World Poultry Congresses, claiming that the hen that laid them was an original American variety indigenous to the continent. Subsequently the hen was depicted as bearing earrings and laying dark blue eggs, while in reality the shell is greenish or bluish due only to the loss of red coloring matter in the oviduct. That is to say a mere freak. As we have observed thousands of such hens and thousands of such eggs, we may state right here, that there was no other

excuse for such a blunder, but the good Professor was caught unaware with strictly falsified information."

From what source Finsterbusch obtained his information regarding the settlement of the Dutch pirates I do not know, but I would not assume it was not a figment of his imagination. Professor tells me that chicken and turkey bones were found at Casas Grandes, in Mexico, and chicken bones were also recovered from Mound 7 Gran Quivira National Monument, New Mexico in the US.

In his communication of 21/12/83 he maintains that the evidence for introduction, or introductions is massive and goes on to say that there has been an explosion of discoveries of inscriptions in America. Literate people reached America repeatedly and left inscriptions seemingly everywhere. This involves both the Atlantic and Pacific, though at the moment we have much more via the Atlantic.

A further communication from Professor Carter advises that (21/1/84) the amphoras from a shipwreck off Rio de Janeiro are now identified as coming from a Roman colony on the Atlantic coast of Morocco. A shell gorget from Etowah, Georgia, U.S., has a North African alphabetical inscription on it. That kind of alphabet is prominent on the Canary Islands, especially the outer ones, and more and more. America was continuously in contact with the Old World by sea via both the Atlantic and Pacific. The mystery is why there was not more transfers.

Professor Carter's latter remarks I feel are very important when looking at the overall situation of diffusion of the chicken etc., for Thor Heyerdahl through his Ra expeditions proved beyond doubt that it was possible to cross the Atlantic even long before the introduction of wooden ships, for on his Ra trips the boats were built of papyrus reeds. For his later Tigris expedition he brought over a South American to supervise the building of his papyrus craft.

However I will write more on this matter later. Therefore I firmly believe that the key to many of the answers we are looking for lies in the intimate study of any chicken bones that may be recovered, not only for the sake of determining the origin of the chicken, but of the people who owned them.

ENGLISH RECOVERIES

The following notes have been made from a paper prepared by Miss D.M.A. Bate who was in charge of fossil birds in the Palaeontological section of the British Museum (Natural History) and is taken from IBIS 1934, entitled DOMESTIC FOWL IN PRE-ROMAN BRITAIN.

Miss Bate states that the theory that the Domestic Fowl was first introduced into Britain by the Romans is still commonly expressed, even though Boyd Dawkins, 1874, in CAVE HUNTING page 80 said that the Domestic Fowl is to be recognised on Gallic coins before Roman invasion, and therefore was probably known at the very dawn of Gallic history. This statement was very suggestive, but did not appear to have been supported by osteological specimens.

The necessary, definitely dated osteological evidence has now been obtained, and it is hoped that the following note will demonstrate conclusively that the Domestic Fowl was a bird known and kept in Britain prior to the Roman occupation.

Miss Bate continues that important excavations of British and early Roman settlements near Colchester were carried out by the Colchester Excavation Committee beginning in 1930. A full report of the work was to be published by the Society of Antiquaries.

Author's note: I do not have a copy of this full report so am unaware as to whether any relevant information concerning the Domestic Fowl is contained in it.

A considerable number of animal bones were recovered during the course of the work. They included a small number of bird bones, representing five species, one of which was identified as being of Gallus species. The value and importance of this small collection was at once apparent as Mr. Christopher Hawkes of the British Museum advised Miss Bate that twenty two of the twenty five specimens were definitely dated, since they were obtained from a sealed pit known as Ditch 1 (Lift 4) and were associated with objects of Belgic-British culture of the half century ending AD 43 at latest.

Again from Miss Bate: "The most valuable specimen in the collection is the anterior half of a sternum of a Domestic Fowl which was obtained from sealed Ditch 1. The only gallinaceous birds in this country, the sternum of which might be confused with the one from Colchester, are Black Game and Pheasant. It should be perhaps mentioned here that the Pheasant is not yet definitely known as a pre-

Roman inhabitant of Britain. Very careful comparison has been made of the sterna of these three birds, and it was found that each differed in a number of characteristics from the others. As a result of this study the bone from Colchester is considered to be that of a Domestic Fowl (*Gallus*). It represents a bird of medium size."

Miss Bates Osteological notes are as follows: "If the accompanying text figures are referred to it will be seen that the Colchester sternum (fig. 3) is very similar to that of a Recent Domestic Fowl (fig. 4) except for the shallowness of the carina, a character which may be found in recent examples. The Colchester specimen likewise shows considerable affinity with *Phasianus* (fig. 6) but in this case there are also a number of differences. Fig. 3 and 5 make it clear that there is still greater distinction between the sternum of *Lyrurus* and the gallinae one from Colchester. A few of the chief characters on which is based the determination of the Colchester sternum as that of *Gallus* may be briefly enumerated:

(a) The spina communis (s. c.) in *Gallus* (it is to be understood when referring to *Gallus* here it is to include the Colchester and Recent specimens) it is truncated anteriorly, instead of having the prolonged forward extension seen in *Lyrurus* and *Phasianus*.

(b) In *Gallus* the anterior lateral or coastal process (a. l.) is a wide plate of bone of almost the same width for its entire length; it rises from a forward position, and projects above the spina communis. In *Lyrurus* this plate of bone narrows rapidly towards its apex, and does not overhang the spina communis.

(c) In *Gallus* the coracoidal grooves face anteriorly, or are disposed rather more at right angles to the central axis, whereas in *Lyrurus* these grooves slope rapidly backwards. In *Phasianus* the position of these grooves is rather similar to that found in *Gallus*.

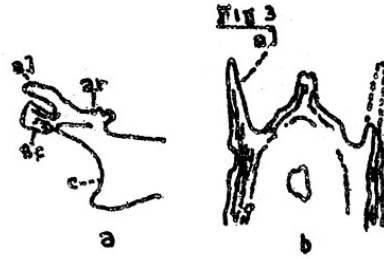
(d) In *Gallus* the anterior inferior angle of the carina does not project nearly so far forwards as it does in *Lyrurus*.

(e) In *Gallus* the space (a. r.) for the surfaces for the attachment of the sternal ribs is considerably more extended than in *Lyrurus* or *Phasianus*.

(f) The dorsal aspect of the anterior portion of the sternum fig. 3-6 shows very clearly the great difference between that of *Gallus* and of *Lyrurus*, and the closer resemblance of the former to that of *Phasianus*. A noticeable feature in *Lyrurus* is the great forward extension of the central portion of the sternum, part of which, presumably, merges into the spina interna, which in turn coalesces with the spina externa to form the spina communis. In these figures too, the difference in the positions of the lateral processes is well shown.

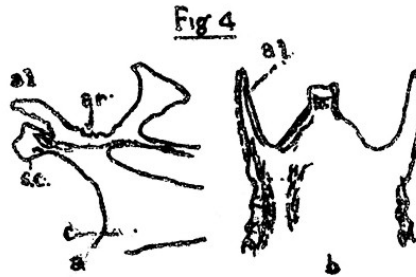
A consideration of the above characters, which are clearly evident in the accompanying figures seems to make it certain that the Colchester specimen undoubtedly represents *Gallus*. Remains of *Gallus* are commonly found in excavations of Roman sites such as London Wall, Silchester (cited by P.R. Lowe *IBIS* 1933 p.334) Carleon etc. and some of these bones attain a very large size, while the tarso-metatarsi may have highly developed spurs. Specimens have also been obtained from a number of caves in this country, but so far these have not admitted of definite dating, although occasionally they are found under circumstances suggestive of a fairly early origin."

Unfortunately this is all I have to offer at present. Since Miss Bate's paper further study may have been done of which I am not aware. If any one reading this has anything further to add I would indeed be pleased to hear from them.



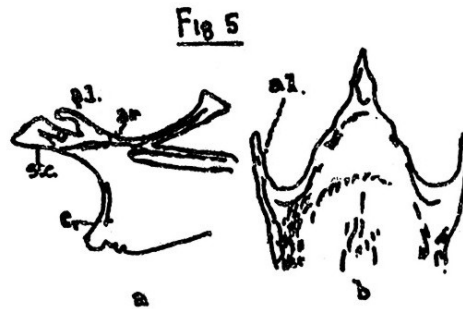
a. Gallus from pre-Roman deposit, Colchester.
Anterior portion of sternum (half natural size).

b. Dorsal view of same specimen (natural size).
s.c. - epima communis; - a.l. - anterior lateral process;
c. - carina; - a.r. - surface for attachment of sternal ribs.



a. - Gallus, recent domestic specimen.
Anterior portion of sternum (half natural size).

b. - Dorsal view of same specimen (natural size).
Lettering as in Fig 3.



a. - Lyrurus tetrix - Linn. - Anterior portion of sternum
(half natural size).

b. - Dorsal view of same specimen (natural size).
Lettering as in Fig 3.



a. - Phasianus - Anterior portion of sternum (half natural size).

b. - Dorsal view of same specimen (natural size).
Lettering as in Fig 3.

EUROPEAN RECOVERIES

My offerings from this continent come from a paper prepared by Dr. D. Janossy from AQUILA 1977, Budapest, which gives us quite important material on PLIO-PLEISTOCENE BIRD REMAINS FROM THE CARPATHIAN BASIN - GALLIFORMES AND 2 PHASIANIDAE. I will quote in part from his paper selecting the relevant information.

He begins by saying: "In the present paper I propose to give an account of all other Galliforms of the corresponding territory and age. Concerning the fact that all Galliform remains other than Tetraonoids, from the Carpathian Basin belong to the family of Phasianidae - the richest in species of all families of this group (about 170 recent species) - I deal in the present paper with the fossil members."

Systematical description of the palaeospecies - Order: Galliformes - Sub Order: Galli - Superfamily: Phasianioidea - Family: Phasianidae - Genus: Palaeortyx, Milne-Edwards 1871 - Palaeortyx aff. Intermedia, Ballman 1969.

Janossy sets out a table form of the comparative measurements of the humeri of recent and fossil species of Gallus.

Species of Gallus	Length	Proximal width	Distal width	Width of diaphysis
Gallus beremendensis n.sp Beremend	53,0	14,0	10,0	5,7
"Gallus" n. sp" Gwardilash Klde	59,1	15,2	12,1	5,3
G.gallus bankiva 454-1*	67,2	17,5	13,6	6,5
G.gallus bankiva 454-2*	56,0	16,0	8,3	5,8
G.gallus bankiva 2.73*	59,0	15,0	12,4	5,5
G.gallus 456 1, Middle Kambodia*	55,0	14,0	11,3	5,5
G.gallus, 1965, Middle Kambodia*	69,0	18,0	14,0	7,0
G.Sonnerati 459.3*	70,5	18,0	15,0	7,6
G.gallus Sonnerati 459.1	60,0	16,0	12,3	6,0
G.Sonnerati BM/NH/1155**	74,0	19,5	15,6	8,0
G.Domesticus, dwarf form "72" *	57,5	15,0	10,7	5,5

Specimens without locality originate from Zoological Garden.

* Collection at the University of Lyon

** Collection of the British Museum (Natural History)

Continuing from Janossy: Gallus Linné 1758 - Gallus aesculapii Gaudry 1861 - Fig 6 -- Material: Polgardi Leg. KORMOS, 1910 (Upper part of Lower Pliocene, Upper Pannonian, Baltavarian): left, nearly complete Carpometacarpus, Phalanx 2 digit 3, pedis.

A detailed analysis of the bones unambiguously manifests the morphological features of the genus Gallus. There were hitherto described only two valid fossil species in this genus i.e. Gallus aesculapii Gaudry 1862, from the Lower Pliocene and Gallus bravardi Gervais 1859, from the Upper Pliocene of Europe (regarding the taxonomical status of Gallus kormosi Gaillard and Gallus cranipes Gaillard, see later in paper).

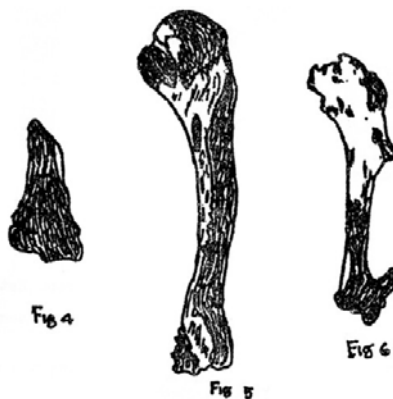
Since the corresponding bone of Gallus aesculapii agrees not only morphologically but also metrically as well as in geological age with Polgardi specimen, the specific identification appears valid.

I found, looking for comparative pieces, a carpometacarpus of this species originating from the Lower Pliocene of Pikermi, measuring in length about 40 mm, in the collection of the University of Vienna Palaeontological Institute, examination by courtesy of Professor Dr. E. Thenius, agreeing with our specimen in all morphological details.

The length of the carpometacarpus from Polgardi measures 42 mm, width of diaphysis in the middle about 40 mm. According to literary data, the carpometacarpus of the otherwise geologically much younger G. bravardi is unknown. However, according to the huge size of the tarsometatarsus and the coracoid of this form, the carpometacarpus must also be considerably larger (the dimensions of the tmt of the latter is nearly twice of that of the former one). The phalanx 2 digiti 2 with the length of 15.4

mm and with the width of the diaphysis of 3.1 mm as well as the morphological features of *Gallus* originate in all probability from the same species.

Gallus beremendensis n. sp. - Holotype: nearly complete right humerus - Leg. Noszky J. 1952 Fig. 5 Locus typicus and stratum typicum. Lowest Pleistocene (Lower Villafranchian - Beremendian) Karst fissure of the locality Beremend 5, Mts Villany, Southern Hungary. Derivatio nominis: beremendensis from the name of the locality. Diagnosis: a small *Gallus* species, smaller than the hitherto known recent of fossil forms of the genus. Description: this piece was first mentioned in the literature by Kretzoi (1956 in 1962) as Phasianidae indet. I compared it in detail with the same bone of all European forms as well as with that of forms outside of our continent, available in the collection of the British Museum. Although there are some resemblances with certain other genera (e.g. with *Rhizothera longirostris*, *Galloperdix bicalcaratus*, *Guttera edwardsi* or *Gennaues leucomelanos*), the morphological relations seem closest with *Gallus*. The form of the whole proximal epiphysis, of the tricipital fossa, of the eminentia musculi latissimi dorsi posterioris, as well as of the incisura collaris are especially characteristic for the genus *Gallus*. Moreover, I had the possibility to compare the Beremend specimen morphologically and metrically with the same bone of ten recent specimens of *Gallus gallus* (viz *bankiva*) and of *Gallus sonnerati* in the British Museum (Nat. Hist.) (by courtesy of G.S. Cowles) and in the collection of the University of Lyon (by courtesy of Mme. Mourer Chauvire). In view of the fact that on one hand the measurements of these humeri (55 to 74 mm) a variation of 25% seems to include practically the whole variation of recent Southern Asiatic species, and on the other hand that all forms the same size category is given in literature (wing length 200 to 230 mm) our species is smaller than the hitherto known recent material (according to Peters *Gallus gallus* Linné incl. subsp. *bankiva*, *Gallus lafayettei* Lesson, *Gallus sonnerati* Temminck and *Gallus varius* Shaw & Nodder all living in Southern Asia and Indonesia, show humeri's measurements as given in Table 1).



From Janossy's paper

Fig 4. Distal fragment of right humerus oral view – Loc. n sp.
Gallus beremendensis h.s.p. - *Francolinus subfrancolinus*

Fig 5. Right humerus caudal view, Beremend, Loc 5 - *Gallus aesculapii* Gaudry

Fig 6. Right carpometacarpus, dorsal view, Polgardi *Palaeortyx* sp. (aff. *grivensis* Lydekker)

As mentioned above, the hitherto described fossil species within the genus *Gallus* are considerably larger and therefore there is no reason to compare the present fragment with them. We have to emphasize in this place that the identification of a small form of *Gallus* from Europe, very near the recent wild forms, is of great significance concerning the origin of the domestic fowl. The Hungarian remains from the Lowest Pleistocene throw new light, upon the hitherto doubtful similar remains from the Older Upper Pleistocene of the Crimea and from the Late Upper Pleistocene of Georgia (Kick-Koba Gwardilash Klde Caves, Burchak - Abramovich 1965) as well as from some Neolithic finds from the Middle East (unpublished identification by the author). This series makes probable, according to our present knowledge, on Eastern European (?) origin of the ancestor of the domestic fowl.

Gallus sp. - Material: Loc Osztramos 1, Coll. Janossy, 1971 (Middle Pliocene Estramontian) - Phalanx 2. digiti 3. posterior. After detailed comparisons, this phalanx shows a very close resemblance with the corresponding bone of *Gallus* of Polgardi (but not with that of the domestic fowl). The specimen differs from the remains of Polgardi more in proportions than in size. Length of bone 17.5 mm, width of the middle of the diaphysis 3.2 mm.

It remains an open question whether we have to do with a phalangeal bone of *Gallus bravardi* - phalanges unknown but probably larger) or with that of some other form, and this, we can only register the presence of also a larger form of *Gallus* in the Middle Pliocene in the territory under discussion.

In his conclusion Janossy states that large species of *Gallus* vanished according to our present knowledge in the Middle Pliocene from the territory of the Carpathian Basin and was replaced in the Lowest Pleistocene by a small form, very near the recent Southern Asiatic *Gallus*, the presumed ancestor of the domestic fowl.

I have drawn on Janossy's paper to quite some extent for I feel it is of much significance and importance to our study of the origins etc. of the domestic fowl. After all, my endeavours in this treatise is to bring together as much of the information I have been able to collect so that perhaps through reading it someone may be able to add to it and perhaps provide answers to some of the questions which still required to be answered.

Not being skilled in the many sciences that are involved in this form of writing I can only place the information that I have before my readers in the hope that they perhaps can make something from it. I will leave the times for Upper, Lower Pleistocene etc. to the Geologists as they will know all about that. It is evident that Janossy's treatment of the identification of material has been very thorough and also done in recent times.

Whilst Darwin proposed that ALL Domestic Fowl descended from *Gallus Bankiva* from India (not to discredit Darwin) and this has in the main been generally accepted, Janossy's paper creates somewhat of a doubt that they, did originate in India, for during my researches I have no information of fossilized material of the nature discussed by Janossy being recovered in Southern Asia. Of course that does not say that it does not exist there. Probably there has not been any work of this nature done in India or surrounding areas.

If there has been any work done I would welcome hearing of it. This information of Janossy is the only record I have of fossilized chicken bones. Most probably there have been other recoveries. If there has been they may assist in filling in some of the gaps that are still with us.

ASIAN RECOVERY NORTH EAST THAILAND



Northeast Thailand - Site Location Map
A - Don Khlang --- B - Ban Phak Top
C - Ban Don Khung --- D - Don Mun Hills

I will begin this chapter with a personal communication from Professor C.F.W. Higham, Department of Anthropology, University of Otago, Dunedin, New Zealand, dated 26th May 1980: "Excavations at Ban Chiang in N.E. Thailand resulted in the recovery of chicken bone as part of the burial offerings. In some cases complete skeletons of the bird were placed on the human chest area. There were also some

chicken remains in the middens. I enclose a reprint covering the economy and chronology in question. I think the Gallus in question is a domesticated south east Asian jungle fowl, but have not studied the bones in the detail they deserve."

The paper mentioned by Professor Higham was a reprint from the "Journal of Archaeological Science" 1979, 6, pp. 211-233 and was entitled "Ban Chiang and Northeast Thailand; the Palaeoenvironment and Economy" by Charles Higham, Department of Anthropology, University of Otago, New Zealand, and Amphan Kijngam, Fine Arts Department, Bangkok, Thailand. The paper itself is a quite lengthy report and I will first of all quote the introduction which I feel is necessary to give the reader an understanding of the overall situation. I will also extract from the paper what I consider relevant comments in keeping with this study on the domestic chicken. The period of the paper reconstructs the palaeoenvironment during the period 3500 BC to the end of the pre-historic period. From c. 1600 BC the presence of water buffalo and associated changes in the faunal spectrum suggests the inception of wet rice cultivation in the Ban Chiang and related sites in Northeast Thailand.

So now quoting from the Introduction it states as follows: "Excavations in the Sakon Nakhon Basin of Northeast Thailand have provided much environmental and economic data for the period from c. 3500 BC to the present. The objective of this paper is to summarise the faunal spectra from Ban Chiang and three related sites, and then to consider their implications for culture history in mainland Southeast Asia. Ban Chiang, Udon Thani Province, is a mound of as yet undetermined extent located at the confluence of three small tributaries of the Songkhram River. Like all other known contemporary sites in the Sakon Nakhon Basin, its location gives it access to water and extensive, relatively, flat low lying soils suitable for cultivation of rice under the inundation system (Higham 1975 a; Schauffer, 1978). Excavations undertaken there in 1974/75 document a six-phase prehistoric sequence followed by series of historic occupation layers (Gorman and Charoenwongsa 1976). The mound was used for both occupation and a cemetery. As was the case at the culturally related site of Non Nok Tha the occupants placed grave goods with the inhumed dead (Bayard 1972). These offerings provide much data on ritual, technology and economy. Unlike Non Nok Tha, however there is also much material from occupation contexts, including shell middens. The fine screening and flotation methods of data recovery have provided biological samples of unrivalled richness from a lowland site in Southeast Asia. Excavations by Schauffer (1976) at Ban Tong, Ban Phak Top and Don Khlang have also provided biological data. These samples, though small, are important in that they allow investigations of parallel trends in basin as a whole. There are few reports of non-human bones from Southeast Asia on which to build. Gorman (1971) has summarised the data relating to the widespread Hoabinhian technocomplex. He concluded that between the end of the Pleistocene and c. 3000 BC the uplands of Thailand were occupied by hunter gatherers exploiting a wide range of local plants and animals. Subsequently, Higham (1977 b) has published faunal spectra from Spirit and Banyan Valley caves. Each site has yielded mammalian, mollusc, fish and BIRD remains indicating broad range foraging. Moreover, the occupation of Banyan Valley Cave has been shown by Gorman to last until c. AD 900. Of excavation among lowland sites in which agriculture is highly likely, if not definitely proven (Yen 1977) only the Non Nok Tha fauna has been fully published and commented upon (Higham 1975 b). Animal remains from excavations at Lopburi, U-Thong, Chansen, Phimai and Ban Kao need detailed study."

In the paper there was a chart entitled "The faunal spectrum of 1975, square D5" and as I read it from my very limited knowledge of the methods of setting out the various materials recovered, tables the occurrence of Gallus at Ban Chiang at Layer 7s - 10 - 11s - 14 - 15s - 16s - 18 (2) and 28. At Ban Phak Top faunal spectrum Gallus appeared at Layer 6. At Ban Chiang there were the remains of birds which were either domestic chicken or are unidentified. Bird remains were never common, but were present throughout the site's use. The faunal spectrum at Ban Tong, Gallus appeared only at Layers 13 and 15. At Don Khlang, Gallus appeared at Layers 5 and 6.

From this paper a radio carbon date for basal Ban Phak Top suggests occupation there by 2500 BC that is a millennium later than at Ban Chiang. The actual associations and dates of the later levels are not at present available. The initial occupation of Ban Tong occurred c. 3100 BC. Schauffer has yet to comment on the dates of subsequent layers at this site.

From Professor Higham's correspondence and the relevant information from his paper I have extracted it would be most useful to have more information on the Gallus skeletons he mentioned as

regards size and bone construction for comparison between the Bankivoid and the Malay. Perhaps some study may be done on the bones in this regard in the future which may provide a lead towards ascertaining the species of chicken in this particular area from 3500 BC to the present time.

SOUTH PACIFIC AREA RECOVERIES

My source of information from this area comes in the main from Dr. J.R. Specht, Curator of Anthropology at the Australian Museum, Sydney NSW.

My correspondence began with Dr. Specht in 1979 and I will quote in part a letter dated 27th February 1979 in reply to my request for information: "I regret I am not able to give you much information about the origin of the chicken or its history in the Pacific area. An issue of "Australian Natural History" published January/March 1976 Volume 19 No.1 has an article by Walter Boles titled "From Jungle Fowl to the Farm". This offers a very small review of what little information there is on the origin of the domestic chicken. Mr. Lampart visited Buka Island briefly in 1966 to do archaeological excavations and I was there throughout 1967, and although some bird bones were recovered none of these can be identified as coming from chickens. At Watom Island, New Britain, a bone from a member of the fowl family has been found on an archaeological site, possibly 3500 years old, though it could easily be much younger. To the best of my knowledge the chicken is not present in archaeological sites elsewhere in the Southwest Pacific earlier than a few hundred years ago. This should not be taken to indicate the late introduction of the chicken. I am sorry that the information is so scanty and unsatisfactory. I feel your suggested eastward spread from India is perfectly reasonable, though as you say the lack of evidence is a fairly serious problem. I suspect it will be many years before we have a large body of evidence from the East Asian or Pacific region to allow us to discuss the chicken origin and its distribution in more sensible terms."

I followed this with another enquiry to Dr. Specht regarding the nature of the bone recovered from the Watom Island site in an endeavour to establish as to whether it came from a "flyer" or a "runner" which would give some indication as to where its antecedents may have come from.

He replied as follows 9/3/79: "Thank you for your letter of 4th March concerning the origins of the domestic chicken. I regret I cannot answer your specific query regarding which sort of fowl may be represented by the Watom Island bone. The osteologist who examined it was unwilling to be positive in his identification. I do not have the bone in Sydney, so I cannot check for the details you mention. There are no animals depicted on the Lapita pottery, though several designs have been interpreted as anthropomorphs. The main designs are geometric, non-figurative. Several clay figurines have been found at Lapita sites and at sites of a similar age but with a different kind of pottery in the Solomon and New Hebrides Islands. None of these can be identified as chicken. I hope you do eventually find some clearer information on the history of the chicken and wish you well in your studies."

I did discuss through correspondence with Dr. Specht the details of Finsterbusch's descriptions of the bone structure between the "flyers" and the "runners", Bankivoids and Malays and wrote once again in June 1980. Dated 19/6/80 I received the following information: "Thank you for your letter of 3rd June regarding the fowl bone s from Watom Island. I am still trying to track them down as to where they are; at last report they had been sent inadvertently, from Dunedin to Auckland, New Zealand. I am now trying to get them back to Sydney, in which case I can quickly check them against Finsterbusch's view. I will let you know what happens, but first we must get the bones back."

My latest check with Dr. Specht was late 1983 and in reply he said: "Nothing new has come up regarding the chicken bone on Watom Island. It was a leg bone. Unfortunately it is not easily accessible for measurement."



Map showing the location of Watom Island, New Britain, where a leg bone from a member of the Fowl family has been recovered on an archaeological site, possibly 3500 years old, although it could be much younger. The Gazelle Peninsula is at the northern tip of New Britain. This discovery would be in keeping with a West to East Diffusion from Asia of the Domestic Fowl.

OTHER KNOWN RECOVERIES

In 1980 I received a communication from Pat V. Rich, Lecturer in the Department of Earth Sciences, Monash University, Melbourne, Victoria, after she in conjunction with Rita Berra an article entitled "Bird History - the first million years" which was published in "Australian Natural History" Vol. 19, No. 12, October/December 1979, the publication of the Australian Museum, Sydney NSW.

Mrs. Rich suggested several avenues I might explore in my endeavours. One of her suggestions was a publication of Pierce Brodkorb, "Catalogue of Fossil Birds" Pt 2 – 1964 - Bulletin of the Florida State Museum, Biological Sciences 8 (3) p. 318-319. This suggests that the genus in which the domestic fowl belongs (*Gallus*) first appears in the fossil record of the early Pliocene (about 7 millions years ago) in Greece *Gallus aesculapii*, while a second slightly younger species (*Gallus bravardi*) is known from several locales in France. This material to my knowledge has not been reviewed recently, so it is somewhat uncertain as to its rightful assignment. Anyhow it is a start. From there we must go to the archaeologists.

The reader will recall that these two species were mentioned in Janossy's paper discussed previously. One of the avenues suggested by Mrs. Rich was Professor Stanley J. Olsen, Department of Anthropology, University of Arizona in Tucson. A communication from Professor Olsen dated 29th August 1980 advised that at that point of time he had just returned from an extensive trip to China where he was parsing evidence of the earliest domestic dogs he could find. While going through the bone collection, he did note those of chickens. There were considerable elements of the chicken recovered from the Neolithic site of Pan-p'o, near Sian in North China.

Professor Olsen goes on to say and I quote: "The earliest chickens record from the Western Hemisphere are from South America. They were brought there by the Spanish about 1519. There are no Pre-Columbian chicken bones from the Western Hemisphere. Some years ago I consulted two avian palaeontologists, Drs. Pierce Brodkorb and Alexander Wetmore (now deceased). They both agreed that until chicken bones are recovered from an early, dated, archaeological site we cannot assume that they were here in prehistoric times."

Another lead offered by Mrs. Rich was Dr. E.E. Higgs of Cambridge, England who had done much archaeological work in the Middle East with emphasis on domestic animals. I wrote to Dr. Higgs in August 1980 but received no reply until late 1983. Not from Dr. Higgs, who unfortunately had passed on, but from Mrs. Sally Rodwell of Cambridge to whom my letter had been passed on by Dr. Geoff Bailey of the Department of Archaeology, University of Cambridge.

I will quote from Mrs. Rodwell's letter in part: "I believe you are right in thinking that very little research has been done on the origins of the domestic chicken. I have just completed an M. Phil. dissertation at the University of Cambridge - "The Transition to Agricultural Societies in early China" -

which embodies the evidence from Cishan, a sixth millennium BC North China site which was excavated a couple of years ago. At this site remains of chickens were found and the Chinese archaeozoologist, Professor Zhou Ben Xiong, considers the chickens were domestic. I have translated Professor Zhou's reports and made analysis of his findings and this is due to be published in the Indo-Pacific Prehistory Association Bulletin (Australian National University) next summer. In his report Professor Zhou postulates that the red junglefowl *Gallus gallus* L. was domesticated in China. Chicken bones are found in Neolithic assemblages in China from the sixth millennium onwards. They appear in India at about 2000 BC at Mohenjo-Daro, in the Indus Valley, and in Egypt at about 1500 BC. In the first millennium BC the domestic spread to Mesopotamia and Asia Minor and at about 500 BC it reached Europe. In particular Zhou refers to Zeuner F.E. (1963) *A HISTORY OF DOMESTICATED ANIMALS.*"

I have not seen either Mrs. Rodwell's analysis or Zeuner's work. However they should both be of benefit to the student of the origin of the Domestic Fowl. Prior to 1980 Peter White of the Department of Anthropology, The University of Sydney, NSW, wrote "The Past is Human".

After reading the book I wrote to Mr. White hoping he may have a scrap of information which would add to the story. I quote in part from his reply: "There have been very few bones discovered in archaeological sites, and it has not been possible to tie these down to varieties. Regarding the Pacific, my guess would be that all the birds there came from Asia. I don't really think there is any evidence for a southern American origin for any of the Pacific or their livestock. All our evidence is that Polynesia was settled from the west."

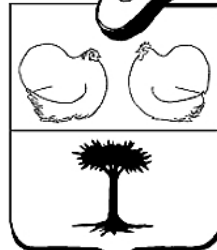
An enquiry directed to Dr. Roger C. Green, Professor of Prehistory, The University of Auckland, New Zealand, brought the following reply: "As you are doubtless aware there is an older literature of the History of the domestic chicken done largely without benefit of materials from archaeological sites. I agree with you that as archaeology recover chicken bones from early sites, the whole subject and the basis for various statements will change. The most recent essay of the older (and I think invalid speculative type) was on "Pre-Columbian Chickens in America" by Professor George F. Carter in a book called *MAN ACROSS THE SEA*, Riley, C.L. and others (eds.) Univ. of Texas Press, Austin, 1971. More recent work on the distribution and dating of the chicken was done by a student - Jenny Cave - at the Department of Anthropology, University of Otago, for her B.A. Hons thesis. My own involvement with the chicken to date is to note its finding in various Lapita sites in the Pacific dating to between 1500 and 600 BC. Enclosed is the relevant page from an article called Lapita in a book edited by J.D. Jennings *PREHISTORY OF POLYNESIA*, Harvard University Press, to be published late this year. It lists what I know about Lapita chickens."

The page referred to by Dr, Green reads in part as follows: "The other certain domesticated is the chicken in Lapita sites at Watom, Nenumbo, Malo, Tonga and Samoa. The uncertainty relates to either its identification or the security of its context. The evidence for horticulture of the expected root and tree crop variety in the Lapita economy is indirect but persuasive. Even the presence of the chicken, and more strongly of the pig, implies it. The need for horticulture is supported by the of many Lapita sites. They are in situations that otherwise would require a stronger commitment by the occupants than is evident to exploitation of marine resources or to hunting of birds and sea animals."

A working paper by Dr. Green, who kindly sent me a copy in Anthropology, Archaeology, Linguistics and Maori Studies will probably be most useful when I get around to the subject of Distribution.




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