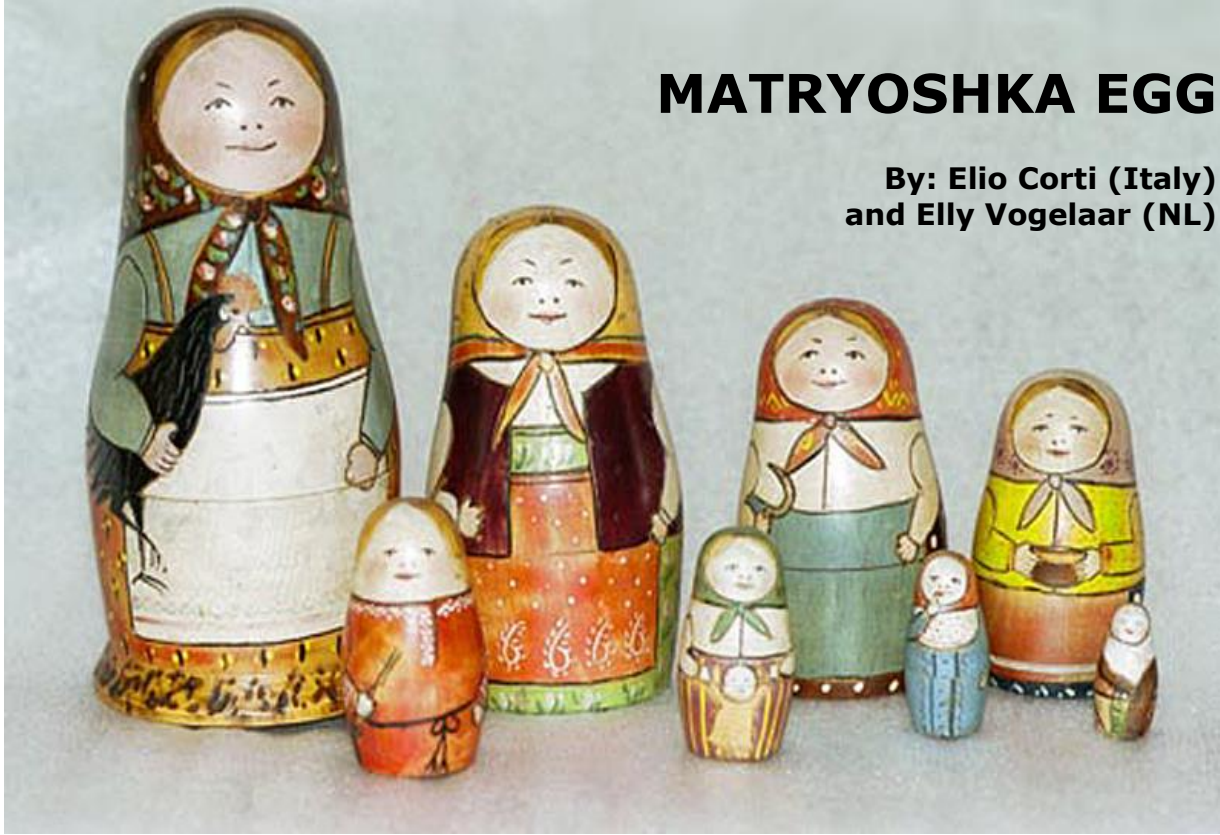


CONCERNING POULTRY

MATRYOSHKA EGG

By: Elio Corti (Italy)
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A fully formed and shelled egg encased within another eggshell is very rare, but it happens! It deals with the branch of science called teratology, which in Greek means monstrosity. The author, Elio Corti, named such an egg-within-an-egg – *ovum in ovo* in Latin – a Matryoshka Egg, after the Russian nesting doll Matrëška.

In the above photo you see the first original matryoshka, dated 1892. It was carved by Vasiliy Zvezdochkin and painted by Sergei Maliutin at the Children's Education Workshop in Abramtsevo. It consisted of eight dolls; the outermost was a girl holding a rooster, six inner dolls were girls, the fifth doll was a boy, the innermost – a baby. (Source: *Sergiev Posad Museum of Toys, Russia.*)

The matryoshka doll

A matryoshka doll or a Russian nesting doll is a set of dolls of decreasing sizes placed one inside the other. 'Matryoshka' is a derivative of the Russian female first name Matryona, which was a very popular name among peasants in old Russia. The name Matryona in turn is related to the Latin root '*mater*' and means 'mother', so the name is closely connected with motherhood and in turn the doll has come to symbolize fertility.

A set of matryoshkas consists of a wooden figure which can be pulled apart to reveal another figure of the same sort inside. It has, in turn, another figure inside, and so on. The number of nested figures is usually five or more. The shape is mostly cylindrical, rounded at the top for the head and tapered towards the bottom, but little else; the dolls have no hands (except those that are painted). Traditionally the outer layer is a woman, dressed in a sarafan. Inside, it contains other figures that may be of both genders, usually ending in a baby that does not open.

The artistry is in the painting of each doll, which can be extremely elaborate. Matryoshkas are often designed to follow a particular theme, for instance peasant girls in traditional dress, but the theme can be anything, from fairy tale characters to Soviet leaders.



Matryoshkas date from 1890, and are said to have been inspired by souvenir dolls from Japan. However, the concept of nested objects was familiar in Russia, having been applied to carved wooden apples and Easter eggs; the first golden



Fabergé egg, in 1885, had a nesting of a golden yolk, a hen, and a small ruby pendant, which is now lost.

Above: This golden egg was made in France around 1720. It was a present from Charlotte d'Orléans to Caroline Matilda of Great Britain. It is not unlikely that the egg may have served as an inspiration for the Russian crown jeweller Carl Fabergé's famous eggs, which his company produced in the period 1885-1917. Source: www.kongernessamling.dk

The Matryoshka egg

We are speaking here of a fault in the reproductive process whereby the developing egg (for whatever reason) is reversed in direction by the wall of the oviduct and then when the following ovum/yolk is released from the follicles, the problem of reversal is corrected and the shell is formed over them both (though often the 'outer' egg will contain only the egg white).

Perhaps the oldest description of egg-within-an-egg dates back to 1250 when Albertus Magnus (also known as Albert the Great) in *De animalibus* I, 81 described an egg with two shells:

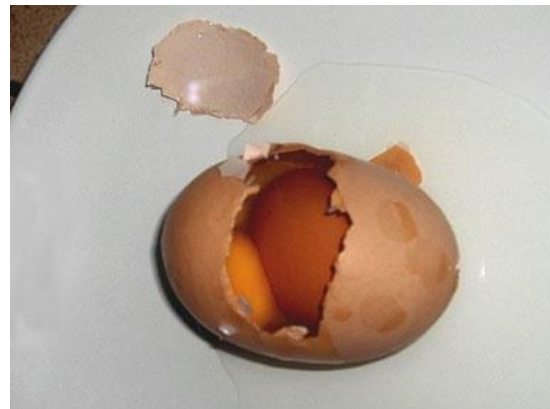
"Ego tamen iam vidi ovum gallinae, quod habuit duas testas, unam intra aliam, et in medio duarum testarum habuit albuginem, et intra interiorem etiam non fuit nisi albugo, et fuit ovum parvum, totum rotundum ad modum sperae. Sed hoc erat unum de naturae peccatis et monstris".

Translated: "However, I already saw a hen's egg that had two shells, one inside the other, and between the two shells was albumen, and within what was inside, there was another egg white, and was a small egg completely round like a ball. But this belongs to one of the errors and abnormalities of nature".

From the cases described with the course of the centuries it appears that there may be different types of double eggs, both in form and size. The outer egg can be smaller or larger than normal. The inner egg instead is generally smaller than normal. The one or the other may be without shell, or only a very thin one. Often such 'Matryoshka eggs' have an abnormal shape. In certain cases both the internal and the external egg have the same abnormality.

They can be grouped into four types:

1. A full egg inside a complete egg: it is a rare case. In 1945 Romanoff and Hutt found themselves in the presence of an exceptional case of production of double eggs in series: within three months a hen laid 10 complete double eggs; no double was preceded egg, the day before, by the deposition of eggs; two double eggs were followed by normal eggs in the following days; usually the lay of her double eggs was separated by a two-day interval. For this rare type of Matryoshka egg see the report and photographic documentation of Dr Frederick Comellini (below in the article).
2. A complete egg inside an egg with no yolk: this type belongs the regular full egg provided a second set of enclosures.



Right: The egg was literally the size of a large goose egg. It had no yolk. The inside egg was normal in all respects except for that it was a soft-shelled egg; not hard-shelled like normal. It also got another coating of albumen & membrane. Photo courtesy of Jack's Henhouse.

3. An egg without yolk in a complete egg: this is the most frequent situation. In a case described by Curtis in 1916 the interior egg had an unusually complex structure: four concentric membranes separated by layers of albumen alternately clear and cloudy.

4. An egg without yolk in an egg without yolk: this is the rarest case. It probably corresponds to the *ovum in ovo* described by Albertus Magnus and reported by Conrad Gessner, *Historia animalium* (1555) page 422:

Vidi ego ovum prorsus sphaericum, duabus testis intectum, una intra alteram, cum albumine aquoso tenui inter utranque absque vitello, et altero etiam albumine intra interiorem testam.

Translated: "I have seen a completely spherical egg covered by two shells, one inside the other, with watery, little dense albumen which was located between the two shells and without yolk, and also with a second egg white inside the inner shell."



Right: This egg didn't have a yolk and another teensy egg was inside it. When I cut that one open (the shell was fragile and pliable) it had more albumin and a small piece of white tissue inside.



Photo courtesy of Cynthia - [Blue Roo Creations](#).

Above: Egg within egg. Photo courtesy of Rumperpumper63.

In addition to these types, there are also other rare and hard to classify cases: eggs that contain two other eggs inside; two yolks in the outer egg; eggs equipped with 3 sets of casings; the internal egg lying in the outer egg yolk.

Domestic chickens have the distinction of producing various types of such 'Matryoshka eggs', although there are examples in other birds: Jungle fowl, duck, goose, turkey, ostrich. Probably this phenomenon may be due to an egg ascending to the proximal portion of the oviduct as a result of an anti-peristaltic movement. Frank Lillie described this in *The development of the chick - An introduction to embryology* (1919): "Enclosed eggs are due to abnormal oviducal conditions, or to both ovarian and oviducal abnormalities. Assuming the normal peristalsis of the oviduct to be reversed when a fully formed egg is present, the egg would be carried up the oviduct a greater or less distance and might there meet a second yolk. If the peristalsis became normal again, both would be carried to the uterus and enclosed in a common shell".

The lexicon of Dr. Comellini, veterinario in Pozzuolo Umbro (PG)

"I witnessed the case of a hen who laid in sequence some double eggs. On August 4, 2006 my cousin Paola Comellini gave me one of those eggs which I promptly photographed.

The hen that had laid this egg was owned by Ms. Maria Bondi from Pozzuolo Umbro in the province of Perugia. The hen is a commercial hybrid with brown plumage, purchased from the Agricultural Consortium of the same country".

Right: Mrs. Maria Bondi with her hen.

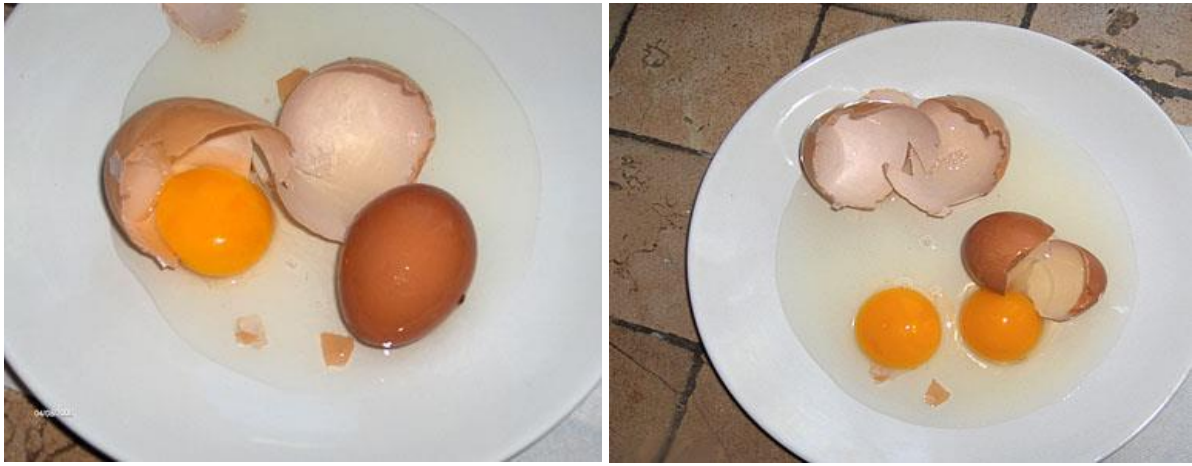
"The owner, Mrs. Maria Bondi, worried by the production of such special eggs, appealed to the manager of the Agricultural Consortium bringing as evidence some of these eggs and asked if there were health risks related to their consumption.

When started laying, the pullet began immediately to lay 4 double eggs, each at 3-4 day intervals, then continued laying normal eggs. The double eggs were much larger than a normal egg; they were over 8 cm long."



Photo: Comparison between a double and a normal egg.

"The outer shell of the egg appeared slightly thinner than normal, but normally shaped. Inside there were a yolk of normal size and a second egg of 5 cm long that had a darker and thicker shell than the outer egg."



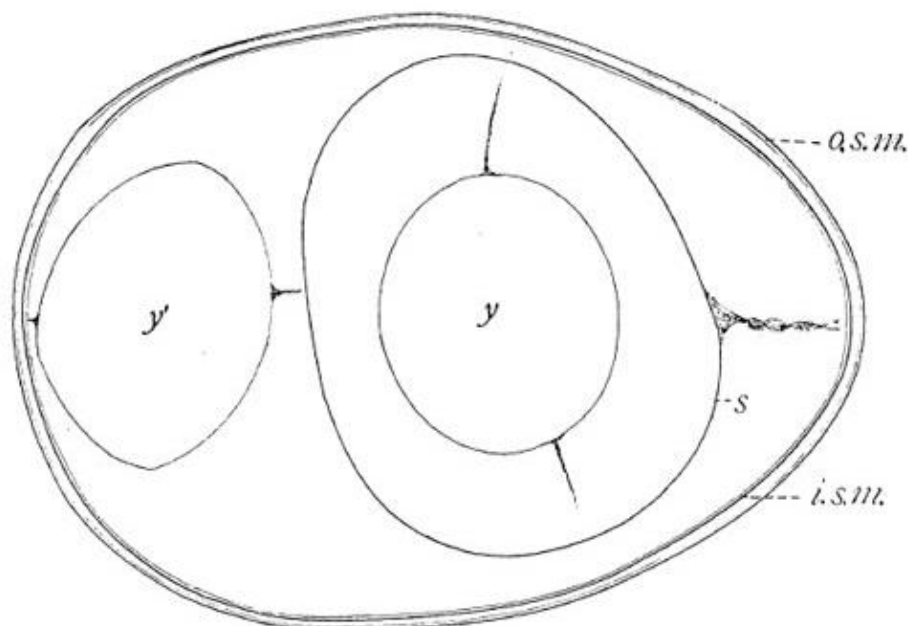
**Above: The content after the complete breaking of the shell.
Right: The content of both the eggs.**

How 'Matryoshka eggs' are formed

Early in the 20th age, many researched the physiology of its formation and tried to explain how 'Matryoshka eggs' are formed. According to common hypotheses a completely formed egg is carried by antiperistalsis back up the oviduct, where it meets a second one, and the two passing down become covered by a second shell and are laid.

One of the researchers was Dr. J. Thomas Patterson. March 1910 he examined a double egg kindly handed to him by S. L. Pinckney, Austin, Texas, from her flock of which several double eggs had been received, but it could not be ascertained whether they were all laid by the same hen. Dr. Patterson gives a minute description - completed with a drawing - of the egg:

Diagram of a median section of the egg. *i.s.m.*, inner shell-membrane, the two lines representing its two layers; *o.s.m.*, outer shell-membrane; *s*, shell of inclosed egg; *y*, yolk of the inclosing egg.



"It was practically a soft-shelled egg. The contents of the inner shell-membrane consisted of much albumen in which were imbedded a hard-shelled egg and a yolk. Upon examination the inclosed egg was found to be perfectly normal in every respect, and its yolk contained a healthy blastoderm. The in-closed yolk,

although normal in structure, was much distorted, owing to the pressure exerted upon it by the approximation of the hard-shelled egg. The albumen closely adhered both to the egg and to the yolk, but much of it was of a liquid nature, as was indicated by the ease with which it flowed out of the cut first made in the inner membrane”.

Dr Patterson continues: “The inclosed egg lies toward the pointed end of the enclosing egg, and its long axis meets the corresponding one of the double egg at an oblique angle. On account of this inclination of the inclosed egg its pointed end lies nearer to the blunt than to the pointed end of the inclosing egg. The inclosed yolk occupies the blunt end of the inclosing egg and is considerably distorted by pressure. The chalazae are but poorly developed, but the axis formed by a line passing through their points of attachment to the vitelline membrane approximately coincides with the long axis of the enclosing egg, showing that the yolk has maintained its original orientation.

It seems quite evident from the description of the egg just given that it is the product of antiperistalsis, but according to Dr Patterson, the especial interest lies in the fact that this process has taken place twice.

He continues: “The first antiperistalsis took place immediately after the hard-shelled egg was formed, and of course caused its migration to the upper or proximal end of the oviduct where it met the second egg. This meeting must have taken place very close to the infundibulum, for otherwise the yolk of the second egg would have possessed much larger chalazae.

The second antiperistalsis occurred immediately after the inner of the two shell-membranes had been laid down, and must have succeeded in carrying the double egg up the oviduct to a point where albumen is secreted, that is, to a place slightly above the beginning point of the isthmus; for it is only on this assumption that we are able to explain how a thin layer of albumen came to exist between the two shell-membranes. The small amount of lime deposited on the outer of the two shell-membranes indicates that the egg did not remain long in the uterus, but must have been laid shortly after having entered that organ.

In many respects this egg conforms to the facts already seen in the inclosed types of double eggs”. (Source: *A Double Hen's Egg*, Dr. J. Thomias Patterson, University Of Texas)

**To end with a short note by Douglas Russell, Curator, bird group,
Department of Zoology, The Natural History Museum, Tring,
Hertfordshire, UK:**

“As the curator of the British [Natural History Museum](#) egg collection, I've come across quite a few examples of egg oddities. Double eggs (as opposed to multiple-yolked eggs) are less common than some other oological anomalies and consequently the *ovum in ovo*, as the phenomenon described here is known, has attracted specific scholarly attention for hundreds of years.

Several theories have been proposed for the origin of double eggs, but the most likely suggests that the normal rhythmic muscular action, or peristalsis, that moves a developing egg down the oviduct malfunctions in some way.

A series of abnormal contractions could force a complete or semi-complete egg back up the oviduct, and should this egg meet another developing egg travelling normally down the oviduct, the latter can engulf the former; more simply, another layer of albumen and shell can form around the original egg.

Often when no yolk is found within the “dwarf” or interior egg, a foreign object is found in its centre. This object has served as a nucleus around which the

albumen and shell were laid down, in a process not dissimilar to the creation of a pearl.

Anybody interested in learning more about this subject should try to find a copy of *The Avian Egg* by Alexis Romanoff and Anastasia Romanoff (John Wiley & Sons, 1949) and turn to pages 286 to 295.

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