

Incubation and Hand Rearing

by John and Pat Stoodley
Portsmouth, Hants
United Kingdom

Introduction
by Ramon Noegel

During my October, 1980 visit to England it was my very good pleasure to be introduced to two of the foremost aviculturists in England and no doubt in the world. Such dedication needs to be shared with American aviculturists. The sight of seeing so many difficult to breed psittacines being bred successfully in such dismal weather and a collection of birds in such excellent condition was the highlight of my visit to the U.K. and Europe. There were fourteen juvenile Plum-crowned pionus (P. tumultuosus tumultuosus). By the way, these were first bred by Pat and John Stoodley in 1977 making it a first world captive breeding no doubt. The eggs were all incubated and chicks hand raised from day one. In all, about fifty large type psittacines eggs were incubator hatched and hand reared in 1980.

Such success has, needless to say, been highly criticized by older aviculturists of the traditional English school. But I observed many of these critics allowed eggs and chicks to remain in the nests during inclement weather thus allowing them to be destroyed by the cold temperatures. The opinion of the owners was if the chicks aren't parent raised it isn't natural and therefore the young should not be removed from the nests. One would think in a country so advanced in civilization the average aviculturist would be equally sympathetic to his birds.

Pat and John are far ahead of their time and this is the kind of thinking aviculture needs today if we are to justify the taking of birds from the wild. WE MUST BE ABLE TO SHOW WE CAN SUCCESSFULLY CAPTIVE BREED, and thereby silence the voices of our conservationist critics. The Stoodleys have



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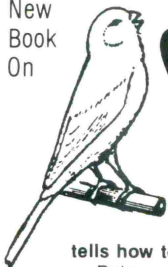
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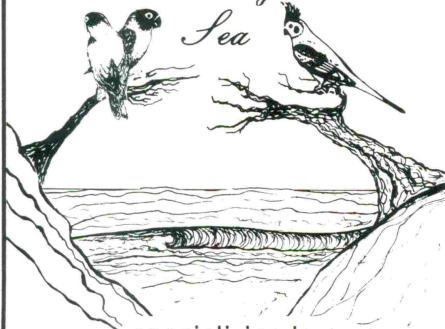
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proved this point in a remarkable way. I sincerely trust American readers will appreciate the practical data their article contains.

Like most people keeping the larger parrots, my wife and I have been concerned over the number of dead in shell we have experienced in our collection. This problem we felt was because we were unable to provide the correct humidity in the aviaries for parrots of the New World. We did have a little success in hatching a few eggs in a small incubator, but considered the overall experiment far from satisfactory.

We were unable to obtain much useful or helpful information on incubators until we met Mr. Philip Glasier of the Newent Falconry Centre. It was pleasing to meet a man of such outstanding achievement who was so generous with his knowledge. My wife and I were invited to spend the day at the centre. We were soon in a room with his students discussing the merits of the unit that Mr. Glasier had built. I sketched the unit and took notes of this successful incubator. Before leaving the centre we walked through the grounds with Mr. Glasier, his birds were delighted to see him. On the day we visited the centre, there was a heavy fall of snow, therefore few visitors were to be seen but for us. It was the perfect day to observe this vast collection of birds of prey.

Having obtained the components required, the incubator was assembled. The unit takes the form of a simple cube, each side being approximately 29.5 ins. (75 cm.) in length. However, two thirds of one side forms a door which opens to the full width of the cube. A large opening is essential to provide easy manipulation of the eggs within and the removal of the egg tray. Above the door is a small glass panel, this allows observation of the thermometer without the incubator door being opened. On one side at about 4 ins. (10 cm.) above the base are three holes, on the opposite side three similar holes exist, but are twice the distance above the base. Each hole is approximately 3/4 ins. (2 cm.) in diameter. Their presence is to ensure a constant change of air within the incubator.

The sides of the cube are double skinned to restrict heat loss, simple household insulation is placed between the walls which are about 3/4 ins. (2 cm.) apart, even the door is insulated in such a way. The inside surface is Formica and the exterior plywood. Placed centrally within the incubator is the egg tray, it consists of many wooden dowels about



A view of the incubator.

Marked eggs on the tray.



Plum-headed pionus babies.



½ ins. (1 ½ cm.) in diameter, the dowels are covered in plastic tube to aid cleaning and more importantly the turning of the eggs. The tray is supported on slides so it may be removed as mentioned before. Positioned on the top and bottom of the incubator are two fans, these fans are essential to assist the circulation of heat and air. Surrounding the fans are two heating elements each of 120 watts, however, the heating elements are never used at their maximum output due to the use of a heavy duty lighting dimmer. The temperature within the incubator is controlled by a Jumo Adjustable Contact Thermometer type MS1ZZ coupled to Jumo Relay GKT 15-0, also a Jumo Thermometer 1411 at egg level. A small light bulb illuminates the inside of the incubator, this enables the observation of the eggs and thermometer.

The completed unit is most accurate, capable of maintaining temperature to within 0.2 of a degree. I select a temperature of 98.5 degrees F. 37C with confidence that it will be maintained. To obtain humidity within the unit I use one or two flat dishes about 7 ins. (17.8 cm.) in diameter. These contain water. To increase humidity I place the dishes closer to the fan and to reduce humidity they are moved away from it. If some adjustment in surface area of water is necessary a smaller water container sometimes is useful.

Next came the problem of what eggs to select for the experiment. Although Mr. Glasier obtains almost one hundred percent success rate, we were not so optimistic, however a number of Pionus eggs were put up. They were marked with an arrow on each side of the egg. These arrows are in opposition to each other which enables me to rotate the egg 180 degrees, then counter rotate so the turning is accomplished without the egg rolling continually in the same direction, which would be most harmful. If the egg is continually turned in the same direction, there is a likelihood the embryo would be strangled. I turn the eggs as near as possible every two hours ideally seven times a day. I suggest a minimum of five times a day. An odd number of turns were made to avoid having the egg lay on the same side two nights running. A percentage of eggs failed to hatch, these failures were examined and my findings show that some eggs had lost too much moisture, the air space being large, others had a small air space with excess moisture, this being the unabsorbed albumen. These problems were to be overcome, however, as I was now becoming more aware of actual requirements.



Three coral-billed pionus nestlings.

It will be appreciated that birds come from vastly different climatic conditions and altitude especially with the Pionus and Amazons. Balance scales of great accuracy were necessary as all new eggs were weighed and coded.

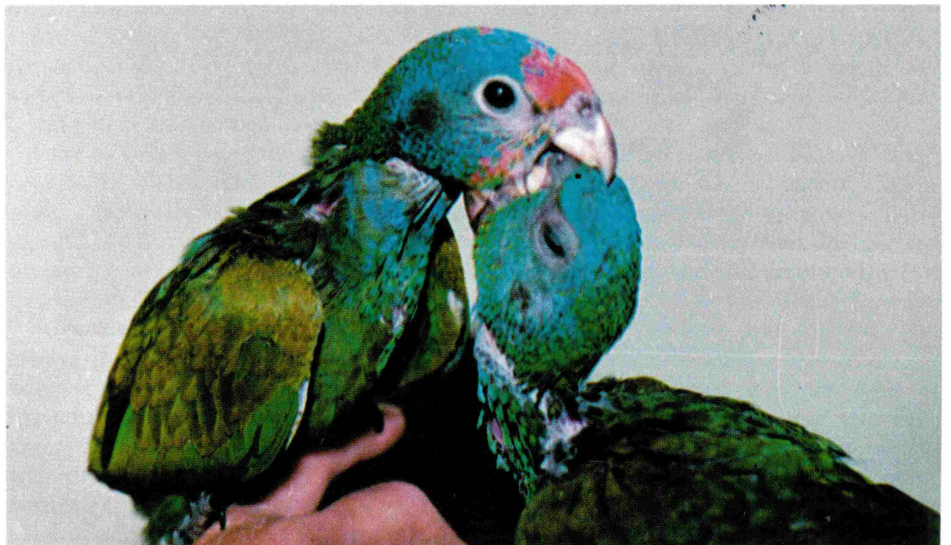
Some interesting facts on average weights of various eggs:

Blue and Gold Macaws	-	30.40 gm
Double Yellow Headed Amazon	-	20.25
Salles Amazon	-	18.20
Primrose Cheeked Amazon	-	17.75
Blue Fronted Amazon	-	17.50
Green Cheeked Amazon	-	17.25
Spectacled Amazon	-	13.50
Panamor Amazon	-	17.10
Blue Headed Pionus	-	15.25
Dusky Pionus	-	13.00
Maximillion Pionus	-	15.20
Bronze Wings Pionus	-	14.15
Coral Billed Pionus	-	18.50
Plum Crowned Pionus	-	15.40
African Grey	-	17.90
Eclectus	-	18.50



Young macaw.

Blue-headed pionus clasping beaks.





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May 1982 (dates and hotel to be announced)
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When one considers small parrots of the Pionus group, their eggs are not much smaller than the considerably larger Amazon parrots.

Clean eggs are an important part of successful hatching, however, it is not advisable to wash them, soiled ones should be cleaned dry with very fine sandpaper. I prefer not to put cold eggs straight into the incubator at 98.5F. 37C. The eggs should be allowed to warm gradually for several hours beforehand.

After three days incubation the eggs are weighed again and each egg weight is recorded, they are also candled at this stage. I find the best method of candling is to use a 40 watt lamp in a light tight box, an egg shaped hole is cut into the top, as the egg sizes are various. I have several rubber discs, these can be selected in accordance with the size of egg. The lamp must be about 2 ins. (5 cms.) from the egg, great care must be taken not to expose the egg to the heat of the lamp for more than a second or two, since I have a great many eggs to candle I place a compression switch on the floor and illuminate the box for each individual egg with a press of the foot, leaving my hands free, this method avoids any over heating of the globe and box. A fertile egg shows blood vessels in the yolk, at this early stage they are very thin. I also observe the air space. I do not discard the clear eggs, yet, but wait until the next candling at six days. At this point all clear eggs are then removed. I continue to weigh and candle eggs every three days, at nine days the candling will sometimes show slight movement, the embryonic development will be considerable and a distant centre is developing, also the air space should continue to enlarge. Eggs that are not keeping to their chartered course are transferred to another incubator according to their requirements. Whereas humidity control is important, the eggs can tolerate fluctuations to a greater degree than temperature variation.

I know that if the egg loses 16% of its weight during its incubation period, it is most likely to hatch. The embryo has some slight control over its water metabolism, for instance, should it be subjected to too much moisture, a period of dryer atmosphere will compensate or vice versa. However, I have found that eggs may hatch with a variation as great as 4% above or below the theoretical 16%. This differs from temperature control where mistakes cannot be corrected and in most instances prove fatal.

An example of weight loss at 16%:

If weight of an egg is 20 grams, then theoretical weight loss in 28 days =

$$\begin{aligned} & \qquad \qquad \qquad 3.2 \text{ grams} \\ \text{Weight loss in 28 days} & = 3.2 \text{ grams} \\ \text{Therefore loss per day} & = \frac{3.2 \text{ grams}}{28 \text{ days}} \\ \text{Divided by} & = 0.114 \text{ gms} \end{aligned}$$

To measure relative humidity in a forced air incubator, I find the most reliable method is to use a wet bulb thermometer. This is simply a normal thermometer with one end of a cotton wick slid over the instruments bulb end while the wicks other end is immersed in distilled water. This liquid prevents the wick from hardening hence the reading will remain correct. It is imperative that the wick covers at least 3 cms of the thermometer's stem. The average humidity requirements are between 50-60% (Relative humidity not to be confused with wet bulb readings). Exceptions do occur, as with Coral Billed of the Pionus group. I was obliged to reduce relative humidity to 40% to achieve success. The following relative humidity figures were obtained with the use of a Whirling Hygrometer, and relevant tables.

	F	
Incubator Temperature-98.5° Wet Bulb Readings	}	78 = 40%
		80 = 44%
		82 = 50%
		84 = 54%
		86 = 60%
		88 = 66%
		90 = 72%

At about eighteen days a large dark area will have appeared—also large veins can be seen reaching to the pointed end of the egg; towards the unabsorbed albumen. Three or four days before the egg is due to hatch they are placed in a shallow wire basket lined with kleenex tissue and are no longer turned, a cover is placed over the basket. Over the last couple of days a dry atmosphere helps the chick to break the membrane and enter the air space. If the egg is held to the ear, very often the chick can be heard scratching or tapping, sometimes even squeaking. Close inspection of the shells will often reveal small cracks. (I avoid the temptation to open the incubator every few minutes.) At this stage maximum humidity is essential to assist emergence from the shell, some chicks take many hours to hatch. With a natural hatch it will emerge with the aid of the egg tooth, which is a small pointed knob on the tip of the upper mandible.

The empty egg shells are collected for future use. If a chick has made no effort to pip I candle to check its position, then

a small hole is made into the air space. If they chick is alive, a pulsating movement can be seen. If the youngster's beak has pierced the membrane it will now be able to breathe so the possibility of suffocation has been averted. I then moisten the membrane with warm water applied with a small paint brush. The blood vessels will show very clearly when wet. Should they be bright red, then I know that they are still attached to the umbilicus. The hole in the shell is capped using one of the empty egg shells collected beforehand. When the chick is ready to be released from its shell, the veins will no longer be bright red when moistened, the colour will now be very dark red. This indicates that they will not bleed when I assist the chick in its emergence. The hole in the shell is enlarged and with the aid of the wet paint brush I enlarge the hole in the membrane around the beak. I prefer to help release the chick a little at a time (note being taken as to whether the youngster will try to further free itself). When placing it back in the incubator care should be taken to keep it away from the draught caused by the fans, thus avoiding drying the membranes. After a couple of hours I see if further assistance is required. Some chicks have exhausted themselves trying to emerge from the shell. While this tricky operation is being carried out I wear magnifying lenses, and always have at hand cotton wool buds and Friars Balsam. The latter is used if the umbilicus is not fully healed.

When the chick finally emerges, the membrane remains in the shell and a considerable amount of excreta is also present. If when the egg was opened, the beak had not pierced the membrane, I moisten it as previously described, the mandible should be clearly visible. With the aid of a large needle I puncture the membrane taking care not to rupture the veins. I make the insertion just large enough to let air in, then I cap the hole as before and return it to the incubator. It may be a day or two before the veins change to a dark colour then I proceed as previously mentioned. Using the technique I have described I have greatly increased the number of youngsters that in previous years I would have written off as dead in shell.

In past years my feeding formulas have always included well known brands of baby cereals together with many other ingredients. I did lose the odd chick at about fourteen days and this I considered was due to the diet. I feel this may be because the diet contained an excessive level of protein. Therefore, this year we

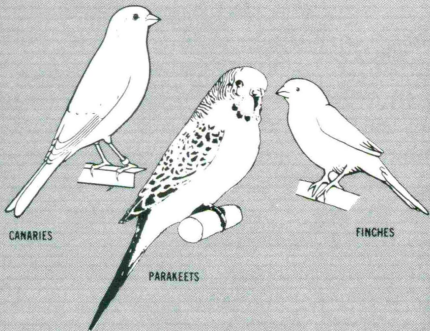
experimented with different diets, the chicks were divided into three groups, and what can only be described as feed trials were carried out. Group 1 was fed on a baby cereal, group 2 on a mixture of ground sunflower, soya cereal, juice from carrot and greens and a small amount of cereal, finally group 3 was fed on first stage baby meat and vegetable dinner (glass jar variety). All groups had included in their diet S.M.A. dried baby milk-food, we prefer this baby milk to any other, including fresh, because the animal fat has been removed and replaced by vegetable fats. To introduce flora into the system all chicks were fed a small amount of yogurt. This we feel contributes greatly to our successful rearing from the egg. I find that chicks that have benefited by as little as one day with the parent birds are very easily hand reared and suffer no digestive problems, proving that the first crop milk is most important. After three weeks chopped sunflower was added to all three groups. The trials proved group 1 death rate of 10%, group 2 no losses but some crop compaction and slow growth, group 3 also yielded no losses. But this time growth was vigorous. In conclusion, first stage baby dinner proved by far the better diet on all counts.

Birds are made to gape for their feed and never tubed, because when birds are tube fed they are difficult to get on to seed. All food is fed warm, newly hatched are given fairly liquid food using syringe with ½ ins. (1 ½ cm.) of cycle valve rubber attached to prevent damage to the soft mandible.

In different Parrot birds, the shapes of the mandible vary considerably, for instance, Blue-fronted Amazons have wide shovel like lower mandibles. Spectacled Amazons and Salles Amazons are somewhat finch-like at this early stage. During the first days the brooder temperature is reduced slightly by a mere three to four degrees. Humidity is very important to prevent dehydration, I keep the relative humidity between 60% and 65%.

In conclusion I would like to make clear my reasons for incubating eggs. I find if I take early first round eggs, all of which are not usually fertile, the hen will continue to lay and this second clutch is more likely to be fertile. These eggs are brooded by the hen and she will also raise the chicks. With the help of my incubators, which can also be used as brooders, some pairs this year have produced six or seven chicks, in fact one exceptional pair has produced many more. I consider results well worth the late night and early morning feeds. ●

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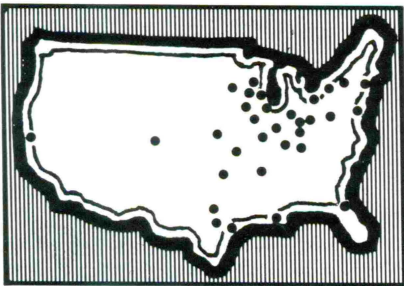
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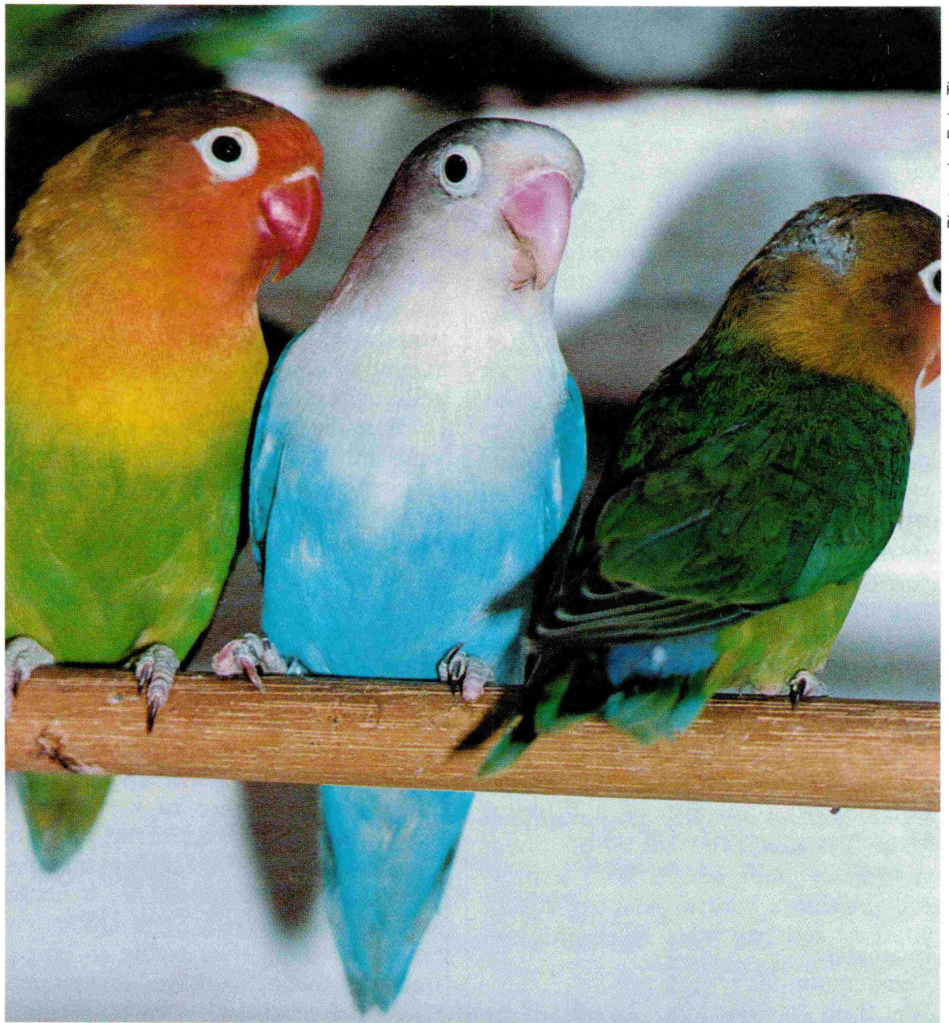


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