**DEAD IN SHELL**
R.H. Owen, MRCVS (Courtesy Budgie Bulletin)

Since an egg takes approximately 24 hours to pass down the oviduct of the female Budgerigar, it follows that a considerable amount of development of the embryo chick will have occurred by the time the egg is laid. Indeed, since the ovum entered the oviduct and became fertilized, great changes have taken place in the germinal disc. The single microscopic cell, which resulted from the union of the male & female elements, has now been transformed into hundreds of small units by multiplication, sub-division, into a three germ layer. The yolk, the white, the shell membranes and the shell play no part in the construction of the chick, excepting of course, nutrition and protection. This cell proliferation is so rapid that, after the first 24 hours sitting, or incubation by the hen bird, the axis of the embryo has been laid down and considerable progress made in the construction of the brain and eye rudiments.

By the thirtieth hour the simple tubular heart can be seen to contract at intervals; by the fortieth hour the heart has become more developed and it now has a constant beat. By this time, too, the system of arteries and veins has spread over the yolk sac. Yolk, as such, never passes direct to the embryo, but is broken down, first into its elements of carbohydrate, protein, and fat as in ordinary alimentary digestion. These elements are sufficiently small to enter into the minute blood vessel and be carried by the blood and used by the developing embryo. This net- work of vessels on the germinal disc is the small dark spot one sees floating about in the middle of a fertile egg, when it is held up to the light, after a few days incubation.

The things most essential for the successful development of the embryonic chick are moisture, oxygen, and an even temperature. Any irregularity in these three factors will cause serious effect in the future chick.

The commonest single factor producing death in the shell is the wrong position into which the chick has developed, or grown, in the shell.

Let us now consider the normal hatching position - as only knowing the normal can we understand the abnormal. The head is in the large end of the egg, with the beak close to the air space. The right wing must be over the head and the legs are in the trussed position, so that the flat of the feet can get in contact with the shell to assist rotation when chipping. The yolk sac should be between the legs, & free from anything which will prevent it being pressed into the abdomen prior to hatching.

The commonest abnormal positions are:

* Head buried between the thighs, this is always fatal.
* Head in the small end of the egg; birds can hatch from this position after a great deal of struggling, though no air space is within reach of the head. To assist the bird to hatch, the shell should be broken, to allow air to the young chick.
* Head turned to the left, instead of to the right; the chick can also hatch f rom this position with a struggle,if it is initially very strong. Here again the shell should be broken, to allow air to the chick if possible.
* Body rotated; the chick is normally presented, but the head is rotated away f rom the air sac. The treatment is the same as the two preceding cases.
* Legs, or feet crossed over the head; there are too many variations of this to enumerate.
* Head over the wing, instead of under; it is strange that this minor deviation should be fatal, but it would appear that the wing plays a vital part in the escape of the chick from the shell. The wing makes the beak strike the shell at a critical angle,otherwise it slips and fails to chip the shell
* Body across, instead of up and down the egg; this is always fatal; chicks are usually half grown.

In short,any position other than the normal one,greatly reduces the chance of a successful birth, or, if the chick does manage to overcome the abnormal position and get out of its shell, it has so used up its reserves of food and energy that it is weakly, and soon dies.