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way the embryo is fed. A clear pouch, called the **amniotic sac** has grown around the embryo. Inside the sac, the embryo moves about in a watery liquid. The amniotic sac protects the embryo and gives it a safe place to grow. Another sac begins to develop called the **allantois membrane**. The allantois is full of blood vessels that take in oxygen from the air that comes through tiny pores or air

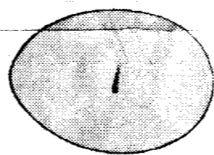


15 DAYS

holes in the shell. The blood carries the oxygen to the embryo and it also carries away carbon dioxide. This is the way that the embryo "breathes," even though it is completely covered in the water. The allantois also takes in calcium from the shell to help form the chick's bones, and it acts as a "trash can" by storing the waste materials produced by the chick until it hatches.

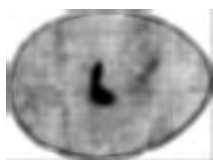
**THE MIRACLE OF AN EGG TO A CHICK**

When the ovum inside a female chicken (hen) is fertilized a miracle begins to take place. Even before



A CHICKEN EMBRYO 1 DAY OLD

the eggshell forms around the ovum, the single ovum cell splits in half and makes two cells. Just as soon as the two cells are made, each of these also splits and makes four cells. Then the four split and make eight, and the eight make sixteen,



3 DAYS OLD

and so on. Soon there will be a great many cells called an **embryo**.

After the hen has laid the egg, it cools and the embryo cells stop splitting (or dividing) and all growth waits. After a dozen or so eggs are laid, the hen will sit on the



6 DAYS

eggs to warm, or brood, them. The eggs are now kept at a temperature of about a 100° F day and night. Now the cells start to divide again very fast (the finished chick will be made up of billions upon billions of cells).



9 DAYS

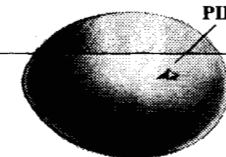
In 33 hours a tiny heart is beating inside the egg. A web of blood vessels spreads over the outside of the yolk. As the heart pumps blood through the vessels, the blood comes back to the embryo, bringing food and water stored in the yolk. In this



19 DAYS

At one week the embryo has all the parts that the finished chick will have, and is now called a **fetus**. The parts are not fully developed, but they are started.

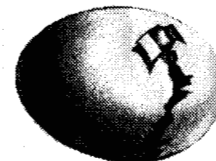
The day before hatching, the chick pokes a hole through the amniotic sac, into the air space and takes a breath of air. The chick is still getting oxygen through the blood vessels, but begins to practice breathing before it hatches. At the end of 21 days all the parts have formed. With eyes that can see and lungs that can breathe, a perfect new chick lies folded in the egg, ready to hatch.



21 DAYS

At the end of 21 days the chick **must break out of the egg by itself**. The shell is hard and it is difficult for such a young bird to break. On top of the chick's beak is a sharp, hard point called an **egg tooth**. Using the egg

tooth (which will fall off a few days after hatching) the chick hits the inside of the shell again and again until a small triangular break opens called a **pip**. Then the chick makes another break beside it, then another and another, until the shell has been



CRACKING EGG

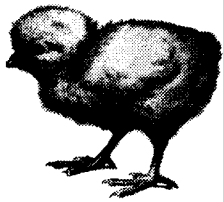


12 DAYS



HATCHING

circled. This can take many hours and thousands of blows. Next, the chick braces itself and with a great shove pushes the end of the shell away and

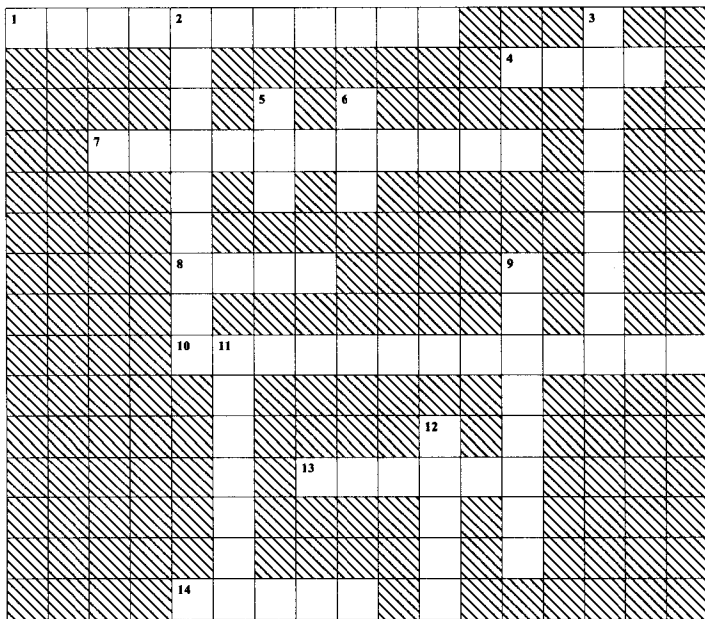


CHICK

struggles out - a tired, wet little thing. As soon as it has rested and dried, it becomes a fluffy ball of down we call a **chick**. This is a great miracle of God's which is almost too wonderful to believe.

Many scientists called **embryologists** have studied the growing egg, and we know exactly when and where each part of the body starts and that it happens in the same way in almost every egg that hatches. But no one has been able to discover how or why the coming together of the two little cells starts the process of unfolding life that can make a perfect chick. It certainly never could have happened by chance and accident or evolution. When we study how an egg becomes a chick (or how any life begins) I think you must agree, that we are looking at a well designed miracle. A miracle that could only have come from God the Creator!

**CHICKS** (all words are from *The Miracle of an Egg to a Chick*)



**ACROSS**

- 1 Hour the chick's heart begins to beat
- 4 Stores food and water
- 7 Water filled pouch that protects embryo
- 8 Single cell from female
- 10 Scientists that study growing eggs
- 13 Young chick in first stage of life when cells begin to split
- 14 Second stage of chick that has all the unfinished



parts of the final chick

**DOWN**

- 2 Day chick hatches out of shell
- 3 Membrane that lets embryo and fetus "breathe"
- 5 Who created you and me (and the chick)
- 6 First break in the shell that the chick makes
- 9 Sharp point on end of chicks beak that falls off shortly after hatching
- 11 Something that happens that can't be explained without God
- 12 When hen sits on and warms egg

**CHICKIE CHUCKLES**



A. If a rooster laid a brown egg and a white egg, what kind of chicks would hatch?



B. What do you call a greasy chicken?

C. What did the chick say when the hen sat on an orange?



D. What do you get if you cross a chick with a guitar?

E. What game do baby chicks love to play?



**ANSWERS**

ACROSS: 1. Thirtythree 4. Yolk 7. AmnioticSac 8. Ovary  
 10. Embryologists 13. Embryo 14. Fetus  
 DOWN: 2. Twentyone 3. Allantois 5. God 6. Pip 9. Eggtooth 11. Miracle 12. Brood  
 A. None. Roosters don't lay eggs. B. A sick chick. C. Look at the orange marmalade (mamma laid). D. A chicken that makes music when you pluck it. E. Peck-a-boo

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