

ported sitting that was broken as Mr. Carley describes. I covered the place with a piece of gummed paper torn from an envelope; it hatched all right. Of course if the thick skin that lies next the shell is injured it would not hatch. In my case the eggs had travelled from Minnesota, U.S. The germ in the egg is wonderfully tenacious of life and not weak as many suppose.

### THE EMBRYO.

(CONCLUDED.)

**A**T the time that the yolk is drawn into the abdomen, the air-cell, which has attained its full size, usually occupies about one-fifth of the interior of the shell. The chick penetrates with its beak the membrane intervening; it breathes the air and commences an independent existence. The air-cell is a wonderful provision of nature, which not only provides for the respiration of the chick, but also forms a chamber wherein it may conduct, with some freedom, its labor of making its exit into outer life. If, during the period of incubation, the temperature has risen too high, that is, above 104° C., with a corresponding lack of humidity of the atmosphere, the membrane intervening between the chick and the air-cell will have become so much toughened that the efforts of the chick to penetrate it are in vain and the little thing dies in the shell. This usually occurs on the nineteenth day. And it is one of the unprofitable results of attempting to hatch with inferior machines. During incubation the large end of the egg should lie slightly higher than the small end, which will prevent the chick from developing in such a position as to cause it to attempt to effect its exit at the wrong place. In the excessively dry atmosphere of Southern California, toughening of the membrane and the death of the chick on the nineteenth day, occurs to a great extent in the natural process of incubation. Experienced persons, however, avoid this result by sprinkling the eggs every alternate day with luke warm water. By the natural process eggs are not so liable to excessive evaporation as when placed in machines, for the reason that the oil on the hen's feathers soon closes, somewhat, the pores of the shells, giving the latter a glossy appearance. In a machine, eggs will retain their fresh look, and the shells remain so porous that an immersion in water for a very short time will drown the chicks contained within.

Our note is to call attention to a further advance in the knowledge of the

hatching process. The extracts say that "the chick penetrates with its beak the membrane that exists between it and the air cell." But if you will observe carefully you will find that there is an oblong opening in the membrane ready for the beak, and it enlarges as the head comes through; this oblong opening in the membrane, is surrounded at the extremee by a vein, which gradually dries as the chick breathes the air, and as the head of the chick forces its way out, this vein passes over its back and under the body and parts as soon as it is dry enough, as one might slip a noose of elastic over the beak and head, and as it stretched over the body and got too fine a tension it would break; so does the vein, which at first is full of blood, enlarge, the blood is absorbed and the vein, having fulfilled its mission, dries; loses its elasticity and finally breaks. The subject of the embryo, is so intensely interesting, and so ably treated, that we preferred to give the extract in the noted authors own words, our notes are from our own observation, and merely refer to differences that the more extended use of incubators since the publication of the book, has enabled us, and others too, to find out.

### ❖ QUERY • DEPARTMENT • ❖

S. R. W.—My brother takes many agricultural journals, and all of them have more or less to say on the subject of poultry, such as how to feed and keep the birds in health, &c. But I must say I had no idea how much there is in business of poultry raising to interest one. I am so glad that you have given the subject a place in the JOURNAL, and that your editor knows how to make it interesting. I always had a notion that it was very hard to raise good birds such as I have seen at the show. But after all it appears as if there is some chance for a beginner to make his way in it. And now I want to ask you a question. I have some white hens, quite white all over, if I mate them to a white Leghorn male, will the chicks be pure white Leghorns, or must I get hens as well? These hens were a present.

Quebec, June 15th, 1889.

Your birds may be quite white all over, and yet be only common mixed hens, Look them over for colored feathers, or colored marks in the fluffy part of the feathers. See if there legs are yellow, or white, or even a pinkish tint, see if they have four or five toes and note what