lungs. Next it starts to push its head outward, then rests, changes position, and repeats to push its head outward, then rests, changes position, and repeats these actions until its head falls out of the opened shell. Finally it kicks itself free and rests. When it becomes stronger, its down dries and it commences to walk about.

Newly hatched chickens can be shipped long distances without food (up to 72 hours travel time) because some of the yolk is still unused and was absorbed into the body of the chick on the 19th day just before it hatched. The yolk is highly nourishing and provides proteins, fats, vitamins, minerals, and water. The remainder of the yolk is gradually absorbed during the first 10 days of life out of the egg shell.

Suggested References

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Letters to the Editor

I read with interest Dr. Richard Weaver's commentary *BSCS Plus* in the October issue of ABT. I agree with Dr. Weaver's suggestion that a careful look at the total K-12 science program is necessary and that many important aspects of biology, particularly health and conservation, should be taught at the elementary and junior high school levels. He did, however, make several statements that could lead to an unfortunate misunderstanding of the BSCS program. As a high school teacher involved with the BSCS since 1960, I feel compelled to expressed my views in reaction to these statements.

First of all, "college scientists" did *not* undertake the job of modernizing the high school biology course. The BSCS writing conferences involved *equal* participation by *both* college and high school personnel. The BSCS effort, in all of its aspects, has been a cooperative secondary and collegiate project since its inception. This interaction of college scientists and high school teachers has broken communication barriers and has allowed ideas to flow freely over conference tables. The final result of this interaction is evident in the three BSCS versions of high school biology.

The BSCS versions were *not* written specifically for "college bound" students but rather for the majority of 10th grade students of biology in the American high school. That a majority of 10th graders could and did master the fundamental biological concepts presented in the Blue, Green, and Yellow Versions of BSCS Biology, without a prior course in chemistry, has been amply demonstrated in hundreds of high schools across the nation.

Specific biological topics were *not* abandoned in the Versions because of the pressure of precollege training. As Dr. Weaver pointed out, the accumulation of biological knowledge has made complete coverage of biology all but impossible. Learning science as a process of inquiry and understanding important biological concepts had to take precedence over the memorization of isolated facts about biology. This was considered particularly significant for the *noncollege bound* student since the 10th grade biology course might be his last formal experience in science.

Certain topics, therefore, *were* omitted from the BSCS materials, not because they lacked value, but because they properly belonged in the elementary school curriculum or because they did not contribute to an understanding of basic biological principles. Other topics were omitted because they were of a highly specialized nature and belonged in a college curriculum for science majors. I would include *detailed* instruction in anatomy, physiology, and systematics in this category.

The BSCS is currently testing a second

level biology course in 62 high schools across the nation. This program is designed for students who have successfully completed the 10th grade program and who have demonstrated the interest and ability to pursue the science of biology in greater depth. Special materials have also been prepared to assist the minority of students who have difficulty reading at the normal 10th grade level.

I am sure that Dr. Weaver is aware of these broad aspects of the BSCS program and I hope that this letter will serve to make clear the role of the BSCS in helping to bring about a general improvement in the teaching of secondary school biology.

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Parasitism, Hyperparasitism, and Commensalism

• *A. Amaro, Colégio Estadual Paulo de Frontin, Rio de Janeiro, Brasil*

The following laboratory exercise has been submitted by one of our Brasilian readers. In it he describes an interesting exercise in parasitology using frogs.

Presentation of some associations among living beings, including the study of adaptations and the collection and classification of specimens.

Materials

Recently captured frogs and toads

Dissecting microscope or hand lens, microscope slides, and cover glasses

Thick pasteboard or a wooden plank (30 x 20 cm.)

Entomological pins, dissecting forceps, scissors, camel's hair brush

Alcohol lamp

Large mouth jar (500 ml.) containing some cotton soaked with ethyl ether

Petri dishes, small bottles

Saline solution (0.7% NaCl)

Aqueous solution of Neutral Red (1/5.000) or other vital stain

Lugol's iodine solution (1 gm. iodine, 2 gm. potassium iodide in 300 ml. distilled water)

Formalin-acetic solution (5 ml. formalin [commercial], 2 ml. glacial acetic acid in 93 ml. saline solution)

Procedure

(1) Observe the animal's skin to look for ticks (ectoparasites). To anesthetize the animal, put it into a large mouth jar containing cotton soaked in ethyl ether. When anesthetized, attach the animal to the pasteboard, belly side up, by pinning through the feet.

(2) Cut off one of the fingers and collect a drop of blood on a microscope slide. Place under the microscope and search among the red blood cells for small worm-shaped organisms, the embryonic filaria (microfilaria).

(3) With the scissors, make a longitudinal incision all along the trunk. If microfilaria were present in the blood, seek the adult forms between the skin and muscle wall (under the cutaneous tissue), in the abdominal, inguinal, and axillary regions, or in the thoracic-abdominal cavities.

(4) Cut the membranes holding the organs so as to free them, and remove the entire mass of internal organs, leaving only the animal's carcass. Separate and identify each organ, placing each in a petri dish with a small amount of saline solution. Tear the organs into fragments and examine with the naked eye or the microscope for the presence of parasitic organisms.

(5) Using the brush, transfer mucosites adhered to the body to petri dishes containing saline solution to prevent dehydration.

Observations

(1) To examine parasitic forms alive, place in the saline solution a few drops of Neutral Red which will better show structures without killing the animals.