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A Simple Apparatus For Demonstrating Bernouli's Principle

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quirements. In some instances the credit offerings in the biological sciences are as low as *four* quarter hours. Quite commonly the offering, at least in the larger university, is as great as *twelve* quarter hours with the course extending over the entire academic year. In other instances the student is permitted to elect a sequence of one year's work in the biological sciences, chemistry or physics. In most universities the science courses required in the general education program have been carefully planned and prepared for that program. As indicated by the catalog of one of the larger colleges such information is included as "deemed necessary for successful living and teaching in public schools." Another states that it is the purpose of the science courses in the general education program "to introduce the student to points of view and methods of exploration characteristic of each field, to enable him to discover and make use of its resources for individual and social living."

The most common weakness in the requirements of the biological sciences within the general education (or all science courses within the program) as found in many of the colleges and universities studied is the failure of the program to recognize the entering freshman student's present level of knowledge in the science. On the other hand there do exist some colleges that are willing to accept high school laboratory sciences as partially fulfilling general education science credit requirements. It logically appears necessary that, if it is the purpose of the college education program efficiently to present a broad educational curriculum that will better equip all participating students with the background to meet and efficiently solve the problems of life as well as to prepare them for social responsibilities and for a rich and complete life, the program must recognize the individual needs of each student. The writer can see no more justification in the general education program that requires all students to participate in the same inflexible program of courses than in a law that might attempt to require all individuals to wear the same size shoe.

The history, to date, of the biological science courses in the general education program indicates that they should have had sufficient time to accumulate experimental data permitting evaluation of that sector of the whole and providing for the necessary revisions or revamping of the course insuring the successful continuance of this part of the whole program.

A SIMPLE APPARATUS FOR DEMONSTRATING BERNOULLI'S PRINCIPLE

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The apparatus to demonstrate Bernoulli's Principle is constructed of iron pipe fittings obtained from a plumbing shop. Six, six-inch lengths

of standard one half inch pipe, seven six-inch lengths of standard one fourth inch pipe, and seven one-half inch to one-fourth inch pipe reducers are assembled so that the one half inch pipe is adjacent to a one fourth inch pipe. When these have been assembled into one length of pipe, a one-sixteenth inch hole is drilled in the center of each six inch length of pipe.

The whole assembly may be placed on a lecture table and ordinary illuminating gas passed into one end. The small opening in the pipe will allow enough gas to escape so that small jets of flame will appear at each opening. The jets of flame coming from the one half inch diameter pipes will be higher than those coming from the one-fourth inch diameter pipes, thus illustrating Bernoulli's Principle.

Also, the effect of friction on the gas pressure is demonstrated, since the jets of flame near the open end are not as high as those near the opposite end where the gas enters. When the open end is partially blocked the flames at each opening will be higher thus indicating greater back pressure.

This report is to show that a device to illustrate Bernoulli's Principle may be easily constructed with simple equipment.

SCIENTIFIC APPROACH TO REALITY

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There is a fable of several blind men who came upon an elephant. None of them had previous knowledge of or experience with an elephant, and each one examining the animal, came in contact with a different part of its body. The first man touched the elephant's tail and decided the elephant was rope-like. The second blind individual came in contact with its side, and decided the elephant was wall-like. To the third man who contacted the leg, the elephant was stump-like; whereas to the fourth who touched the trunk, the object was a snake-like reality.

In its approach to reality, mankind is often like the blind men and the elephant. We have limited ideas based upon limited knowledge and experience. Yet, we are in the habit of projecting our limited concepts upon the universe and then in identifying these premature concepts as the final answers to the universe itself. We do not distinguish between our concepts of reality and reality itself. Our ideas become final and absolute instead of merely the best approximation of reality under circumstances of limited senses, limited knowledge, limited tools, limited experience. We constantly form concepts based upon that part of the elephant with which we happen to be in contact through our particular religious, racial or national groupings. If we are unwise, we call our own particular incomplete picture the final reality; we call the tail, the elephant, and the elephant a rope. The danger of pre-mature absolutes