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BUILDING CHARACTER IN THE PHYSICS CLASS

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In our first session with the science teacher where I attended high school, he said, "the study of science helps us to find our place in the great scheme of creation". I have continued to pass on to my students this purpose for the study of science. Then I proceed a step further by reference to the BIBLE. The Eighth Psalm reveals the majesty of man's place in this great scheme provided he develops the character and ability to take the place of dominion over all the matter and forces of nature that are his great heritage from the Creator.

Sherwood Taylor (1949, p. 122) says that "Man's behavior is influenced by what he believes himself to be." It is certainly the responsibility of the science teacher to help the student develop a conception of himself conducive to the highest possible character development.

Thus we begin in the very first class period to provide motivation for and help in the development of character and personality through the study of physics, showing the student the place of power and dominion that awaits him if he prepares himself for such a high station in life.

Very early in our study of units of measure the student develops a deep respect for standards—standard units, yes! But at the same time he is led to realize the necessity for standards in all phases of life so basic for a well ordered society. Taylor (1949, p. 131) says, "Science shows us the remarkable orderliness of the universe, an orderliness similar to that in which our intelligences rejoice." It is this rejoicing in orderliness that we must develop in our future scientists.

The very first time someone drops a piece of breakable apparatus (it almost always happens in a large class before many days pass) we stop to ask what happened. "Why did the object fall?" "The law of gravitation", some one answers. "Does it always work that way?", I ask. The reply, "Always". And then I present this question: "Since you did not intentionally drop the beaker and did not want it to break, why did not the law of gravity suspend for the moment and let you grasp the object out of the air?"

In the ensuing remarks it is pointed out that if we do not respect laws, physical, moral, spiritual or civic, we shall suffer loss or inconvenience. As other occasions present themselves, further stress is placed upon the importance of respect for laws, rules and regulations until the science students have developed a healthy respect for law and order.

Again, as the boys and girls confirm laws and principles and physical constants they develop respect for authority, for opinions and ideas of others. They even decide sometimes that "Dad" is a little

wiser than they once thought he was, and our principal at the high school is not the old "fuddy duddy" after all.

We do not mean that boys and girls are trained to be spineless followers of others; but, rather, through the study of physics, they are stimulated to critical thinking as a basis for intelligent behavior in a democratic society. They are able to evaluate more wisely the inhibitions placed upon them by their superiors and to fit their actions for their own welfare as well as for the group as a whole.

Around the laboratory table where students work in groups of three or four they learn how to work together and to recognize the importance of the contribution of each to the success of the experiment. Sometimes a student makes a mistake in weighing a calorimeter causing the experiment to come out wrong. After the others get through chiding him, he is more careful with his work and more thorough in his procedure. He has learned a good lesson in citizenship and community living, *viz.*, that he must accept his share of the responsibility for the well being of the commonwealth.

Development of respect for property of others and for public property is a desirable objective of the science teacher. This can be accomplished, in part, by making the students responsible for the equipment they use in the laboratory and encouraging them to look out for the care of the laboratory in general.

An increase in scientific knowledge, the development of fine techniques, and the contact with complex equipment certainly tend to develop pride in their accomplishment and a greater self-confidence and self-respect, thus fitting them the better to live in this complex world and to tackle the problems that lie before them.

We do not want our physics students to develop a self-centered attitude that would mar their personality. Hence, somewhere near the end of our course we have them to take a look into the heavens to learn of the remarkable orderliness of the universe and to make them realize what an infinitesimally tiny part of it they represent. Humility, in one easy lesson.

We do not want you to get the idea that we spend most of our time teaching morals and desirable traits of character. We bring them in incidentally at the most opportune times and when the greatest good can be accomplished.

If we are going to train people to unleash the great forces of nature and to construct and operate machines with such great potential for destruction, we must develop the moral and spiritual equivalent to handle such great power, lest our civilization be destroyed. A. E. Wiggam (1923, pp. 91-92) says, "In other words science means a new moral code—many moral codes—superimposed upon but not abrogating the old. No thinking man can doubt that the working out of these moral codes, their embodiment in social life and institutions, their crystallization into laws and constitutions, their development in personal character, customs and ideals will be the great work of the present century. This task will have no end."

At the present time the indication is that we are failing to attain the desired results. As science teachers we must do more than

merely teach science. We must teach boys and girls who are to be scientists a keen sense of responsibility so to direct scientific development that it will improve man's estate and bring about the realization of his heritage from the Creator in all its fullness, ". . . to the end that he may discover and apply those ethical principles and the moral technique which will minister to his own racial success—his own progressive evolution" (Wiggam, 1923, p. 95).

Literature Cited

Taylor, F. Sherwood. 1949. *Concerning science.* Pp. i-xii, 1-141. MacDonald and Co., Ltd., London.

Wiggam, A. E. 1923. *The new decalogue of science.* 1st ed. Pp. 1-288. Bobbs-Merrill Co., Indianapolis.

CELLS FOR MOUNTING THICK SPECIMENS

(Continued from page 232)

The suggestion made here is a very simple one. It consists of nothing more than the use of a coverglass support made from a piece of sheet plastic slightly larger than the coverglass in which a hole of appropriate size has been bored. The plastic is fastened to a slide and the specimen oriented as desired in the hole. The hole is then filled with mounting medium and a coverglass put on top. Since sheet plastic is available in a range of thicknesses, this material can be used to make cells for almost any kind of specimen to be mounted.

One of the advantages of this method which might not be readily apparent is the fact that a number of specimens can be mounted on a single slide using a single piece of plastic with a number of holes. For example, by using a 3x2 inch slide and 35x50 mm. or 48x60 mm. coverglasses, the entire series of chick embryo whole mounts usually studied in embryology courses (18, 24, 33, 48, 72 and 96-hr. stages) can be mounted on a single slide.

Bibliography

Beaton, L. E. 1936. Two microtechnical devices. *Stain Techn.*, 11:103-104.

Cordts, Hertha M. 1938. "Props" for cover glasses. *Science,* 88:194.

Stapp, Paul, and Russell W. Cumley. 1936. A technic for clearing large insects. *Stain Techn.,* 11:105-106.

Patterson, J. T. 1932. A method for mounting specimens of Drosophila on microscopic slides. *Science,* 76:258.