

THE EFFECT OF A DISSOLVING SALT ON THE PITCH OF A VESSEL PARTIALLY FILLED WITH WATER.

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While dissolving some sodium phosphate in a glass tumbler about two-thirds full of water it was observed that the sound produced by striking a spoon against the glass was at first considerably lowered in pitch, and that the tone produced gradually rose in frequency as the solution proceeded, returning in a few seconds to practically the same pitch the vessel had before the salt was added. Of the several factors upon which the pitch of the tumbler depends all are constant in this experiment except the depth of the water and the elasticity and density of the solution. That the pitch change was not due to change of depth, or largely to change of density was proved by the fact that it did not occur with all salts (chloride of tin, for instance), or when fine sand was stirred in the water. It would appear, therefore, that the change was due chiefly to a change in the elasticity of the solution during the time the salt was dissolving, and during solution only. This conclusion was strengthened by the fact that the pitch change seemed to be roughly proportional to the amount of chemical reaction taking place during solution. It was particularly marked in the case of those salts in which more or less gas was evolved when dissolving. A small quantity of effervescent sodium phosphate mixed with the non-effervescent greatly increased the pitch change. Similar results were obtained when other containing vessels were used, such as tin cans and glass bottles. However, in the case of bottles with a long neck the effect is much less striking.

Inasmuch as wave velocity depends on the elasticity of the medium in which the waves are traveling, one might expect a considerable change in the velocity of sound through a fluid in which a salt is dissolving, and possibly in any solution in which chemical action is taking place. Experiments in this field will be made later.

The chief object in presenting this topic to the Academy is to call attention to the fact that, if one will but look for them, he will find problems for study and investigation on every hand. The writer's wife and his secretary years ago had observed the pitch change when soda was stirred in a bottle of sour milk. Doubtless millions of others have made similar observations. But to the writer's knowledge no attempt has been made, heretofore, to answer the question "why?" There are plenty of questions which Indiana high school teachers having little or no laboratory equipment could investigate if they willed to do so.

May not the physics program of the Indiana Academy of Science next year include the names of several who "will to do so"?