Bell Tones Studied by Physicist

Physics

"The silver-toned bells rang out a sweet old tune." Perhaps you think that is a trite statement but it is worse than that; it's a lie, according to Prof. Arthur Taber Jones of the Department of Physics at Smith College. If those bells have any silver in their tin and copper alloy the chance of their being sweet is very small and those notes you think you hear are not the ones the bells are playing.

This curious fact that the note you hear is not any one of the tones actually given out by the bell is a phenomenon which Prof. Jones has been studying for many years. He has performed an interesting series of experiments with the Dorothea Carlile Chime at Smith and another with the Harkness Memorial Chime at Yale. He believes now that the "strike note" of the bell is really a whole octave higher than you think it is.

The making of bells is at present to a surprising extent a matter of luck. A generally effective shape has been found and certain proportions have been worked out so that if you make a bell, like the biggest one in the Harkness Chime for instance, about five and three-quarters feet high by seven feet broad, it will ring F sharp below middle C, and if you make another bell half as high and half as broad and half as thick, it will ring the F sharp above middle C. But sometimes an F sharp bell has a sweet tone and sometimes a very harsh and unpleasant one. That is because we have not yet learned how to control the "overtone." "Turning," cutting many lines about a bell at different heights, often improves the tone; but how much should you cut and where?

You know that when you pluck a violin string you hear not only the fundamental note to which it is tuned but a number of other overtones or "partial tones" as they are called. The same thing happens when you blow into a flute. A bell too has partial tones though their relation to each other is different. If you put a tuning fork tuned to E against a violin, the E string will begin to vibrate in sympathy. But if you have a bell that rings E seldom will your tuning fork or anything else get an E out of it. The fifth "partial tone," however, is high E, a whole octave above the tone you hear.

Psychology enters into this, Prof. Jones thinks, as well as physics. Like an optical illusion, perhaps, there is some sort of aural illusion about the performance that makes the high E, blurred by the other lower partial tones, sound to you like E an octave lower. No one has yet explained this problem in psychology and the solution of the problem in physics is by no means complete. Prof. Jones is inclined to feel, however, that he is so close to the right track that if some one would give him a bell foundry to experiment with he would be able to tune the bells pretty accurately.

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A "Male" Hen Pheasant

Physiology

A beautiful ring-necked pheasant which first laid eggs and later assumed male plumage paid the penalty for its idiosyncrasies with its life and now is one of the collection of mounted birds in the museum at Marysville, Calif.

During its lifetime of about eight years this strange bird laid about 280 eggs, many of which were hatched under a bantam hen, as the pheasant would nest only occasionally. Suddenly in 1926 she quit laying. From that time on she began to display an abnormal plumage, commencing at first with flecks about the head, then a ring on the neck, feathers on the crown, neck, and back changing to those of the male, a well-developed ring around the neck, tail elongated and barred, rump feathers, breast and underpart the same as the male bird. To all appearances she was an immature male, except that there were no signs of comb, gills, or pouts feathers from the ears.

Then the bird was killed in the interest of science and an examination of the body made by W. F. Peacock. It was found to be very fat; vital organs seemed to be normal. An examination revealed that the ovaries were completely atrophied, not a semblance remaining.

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