

PUBLIC HEALTH

Ability to Move Should Be In Physical Fitness Test

► THE ABILITY TO MOVE should be a part of the physical fitness testing of U.S. youth along with the old standbys of strengths and endurance.

This is the conclusion of Dr. Jack Keogh, assistant professor of physical education at the University of California at Los Angeles, who declares that tests of strength and endurance alone do not reveal how physical performance is developed or indicate how to correct the deficiencies of the awkward or "poor performing" child.

"We must learn all we can about basic motor performance in children in order to develop the potential of the awkward child, which is greater than people think," Dr. Keogh says.

Dr. Keogh tested more than 1,000 school children, ages 5 to 11, on their ability to perform basic skills such as running, jumping, throwing, hopping and balancing.

The tests show the kinds of differences between the performance of boys and girls, reveal important aspects of attitude toward performance, and establish average performance levels against which the poor performing child can be evaluated. The tests are repeated every six months so that Dr. Keogh can observe development and patterns of change in individuals. "We know that most children improve as they get older, but they improve at different rates," he said.

Results show boys several years "ahead" of girls in throwing, but girls are about a year "ahead" of boys in hopping.

"Girls not only hop better than boys in terms of speed and score but they have better control and appear more graceful," Dr. Keogh said. On the other hand, "many girls put the same foot and arm forward when throwing, even after they have been shown the proper arm-foot position."

The average scores of boys increase more than do those of girls after age 8, but "all boys 9, 10 or 11 are not better at any of these skills than all girls of the same age," Dr. Keogh points out. "Many individual girls are better than many of the boys."

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PUBLIC HEALTH

Beetles in Ear Included Among Camping Hazards

► EVEN TRAINED CAMPERS find it hard to cope with the Japanese beetle, especially when one gets into an ear and wedges itself against the eardrum.

This is what happened to 186 sleeping Boy Scouts during one National Jamboree, and to 48 of them a few years later. Both Jamborees took place at Valley Forge Park, Pa.

A Phoenixville, Pa., doctor at the Valley Forge General Hospital where 13 of the beetle-beset boys were taken in the summer of 1964, gives some advice on what to do if the occasion should arise again.

The simplest thing to do would be to kill the unwelcome creatures with ether or alcohol drops and then refer the patient

to an otolaryngologist for removal of the body, Dr. Howard B. Danforth suggests in Archives of Otolaryngology 82:251, 1965.

A large alligator forceps was used to remove the beetles in the ears of the first five boys, but because the manipulation was so painful, a local anesthetic identical to that used for internal ear surgery was given to three of them.

Other methods included various instruments and irrigation and suction. An anesthesiologist barbed a spinal needle and attempted to "hook" the beetles out. Some success was achieved with a dental burr, which was introduced into the ear with a dental handpiece.

One Health Service physician stated that he had had success in removing beetles by placing the patient in a dark room and shining a flashlight in the external ear canal. The insects, having an affinity for light, merely backed out of the canal.

"This method, in my experience, would require a rather stoical patient," said Dr. Danforth.

Most of the 53,000 boys attending the 1964 Jamboree used cotton in their ears during the sleeping hours. Eight of the boys said the cotton fell out during the night, however, and one Scout claimed that his beetle had rolled the cotton out of his ear and proceeded to walk in.

Eleven of the 13 boys had the insects removed within a few hours but one counselor with chronic middle ear trouble was bothered by his beetle three days before he came to the hospital. He had a perforation believed to exist before the beetle entered his ear. Another counselor had a beetle in his ear canal seven days without apparent ill effect.

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BIOTECHNOLOGY

Electronic Computer Simulates Human Lung

► A NEW ELECTRONIC computer simulating the human lung can solve 31 mathematical equations describing the lung's operation.

Dr. Fred Weiner, a physiologist with International Business Machines Corporation, told the American Physiological Society meeting in Los Angeles that the new tool, which he along with researchers from Columbia University, helped to develop, should be "useful both in improving our understanding of pulmonary diseases and as a teaching aid for medical students."

The new lung model is built around the concept of three air sacs and matching data observed in patients for all three gases present in the blood—oxygen, nitrogen and carbon dioxide. One type of treatment for lung patients is to have them breathe different gas mixtures, such as more oxygen than that normally present in the air. With the computer model, physicians can predict the patient's reaction to these mixtures and their effect on arterial blood oxygenation.

Drs. Claire Hatzfeld and William A. Briscoe of Columbia's department of medicine, Bellevue Hospital, New York, cooperated in developing the new lung model.

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IN SCIENCE

TECHNOLOGY

Super-Fast Television Camera Developed

► AN IMAGE TUBE camera which can take up to a hundred million pictures per second was shown at the seventh International Congress on High-Speed Photography in Zurich, Switzerland.

One end of the image tube is coated with a metal which emits electrons when exposed to light and the other end has a screen like that in a television receiver. A picture focused on the metal end causes a stream of electrons which forms a similar picture on the screen.

Switching the tube's power supply on and off produces the effect of a shutter. Single exposures as brief as five-hundred-millionths of a second are possible with one version of the camera.

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GENERAL SCIENCE

U.S. Utilities Check Nuclear Power Costs

► AT LEAST ONE-HALF of all the electrical companies in the United States check on the cost of nuclear reactors to produce power before deciding how best to expand their facilities.

Nuclear power costs are now competitive in certain areas with electricity generated from coal. The sales outlook for nuclear reactors is therefore very good, James F. Young, vice president of General Electric Company's Atomic Products Division, San Jose, Calif., said in Washington, D.C.

One of the most promising prospects for nuclear reactors is in a combination power and water-desalting plant.

He recommended that the power part of the combined plant be operated by the local electrical utility company, while the water-producing part be run by the local water authority. Cost at the plant of desalted water using the heat from steam produced by the nuclear reactor is estimated to be under 30¢ per 1,000 gallons, if the output is 100 million gallons a day or more.

Mr. Young noted that the point at which the steam has done its job in electrical production while still having sufficient heat for running a flash evaporator is a natural point at which to separate the cost of power from the desalting operations.

One barrier to the predicted expansion of nuclear reactors for power could be a shortage of large steam boilers, if orders pile up too fast.

One problem in building a flash evaporator, Mr. Young said, might be a shortage of pipes to carry the steam, since one plant requires many miles of pipes. He noted that the buildings for the desalting portion of the proposed plant would fill 20 acres.

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E FIELDS

PUBLIC HEALTH

Lead in Gasoline Kept At Safe Levels by PHS

► THE WORLD is not necessarily facing another machine-made menace in the form of poisonous lead accumulated in human bodies and causing chronic illness.

Granting that lead gets into the atmosphere from "anti-knock" components of gasoline, the U.S. Public Health Service and lead-using industries have set a maximum level of about one-tenth of an ounce of tetraethyl lead per gallon of gasoline. So far, only six-hundredths of an ounce is being used, authorities report.

To iron out differences of opinion and to be sure that no real danger exists, however, the Public Health Service is planning a meeting of the leading experts on lead contamination before the end of the year.

Dr. Patterson reported in the Archives of Environmental Health, September, 1965, that the "average American ingests some 400 micrograms of lead per day in food, air and water, a process which has been viewed with complacency for decades."

The U.S. Public Health Service and various industries state that there has been no complacency.

Dr. John H. Ludwig, chief, Laboratory of Engineering and Physical Sciences of the Public Health Service's Division of Air Pollution, located in Cincinnati, told SCIENCE SERVICE that PHS gave Dr. Patterson a grant to help with his lead research, and that the research is sound.

"We need to find out exactly what is a harmful lead level in the blood and urine," said Dr. Ludwig. "However, there should be no need for alarm, even if the contamination bears critical watching."

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BIOPHYSICS

Sound Detects Bone Disease in Early Stages

► THE WAY SOUND TRAVELS through a bone may provide early clues to the detection of bone disease.

Dr. Wilbur A. Selle and J. M. Jurist of the department of biophysics and nuclear medicine at the University of California at Los Angeles Medical School, report development of an acoustical technique which determines the density of the arm bone known as the ulna.

From these measurements of bone density it may be possible to detect the incipient demineralization which is characteristic of the disease, osteoporosis.

Changes in bone density caused by osteoporosis occur throughout the skeletal system, the UCLA investigators point out. The ulna, a convenient bone for such acoustical measurements, would thus reflect general changes in bone density.

In the procedure, the length of the ulna is measured and vibrations are sent through the bone from a special sound generator into which the elbow is placed. The sound is picked up by a crystal detector on the wrist at the other end of the bone. A standard principle of physics involving length and resonant frequency of an object can then be used to determine bone density.

Studies of about 200 subjects have indicated that the new procedure is three to five times more sensitive than conventional X-ray techniques for diagnosing osteoporosis. Marked differences in bone density were noted between normal subjects and those with osteoporosis.

The bone disease, which occurs primarily in post-menopausal women and elderly men, is often too far advanced for successful treatment when diagnosed by X-ray. X-rays cannot detect the disorder until 30% demineralization of bone has occurred. The first indication of the disease is often the fracture of a hip bone that has been rendered brittle by the disease.

Early detection by the new procedure would not only reduce the number of these fractures but increase the probability of at least partial reversal of the demineralization process by drugs and other appropriate treatment, Dr. Selle points out.

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TECHNOLOGY

Logging Plant Operated By Data Processing

See Front Cover

► SWEDEN OPERATES what is claimed to be the only data-operated log sorting works in the world. Built at Sandslan in the lower reaches of the Angermanalven River, the new plant has made it possible to reduce the labor force from around 600 workmen in the busy season to about 100.

From the storing place in the river, the logs are directed by boat and a current-making, machine-driven propeller through a canal towards the sorting works. Faulty lumber is eliminated and the lumber is marked according to kind and owner.

The logs are then registered via a data push-button system. The readings are fed into a memory, where the impulses for the 28 log flumes, the ones seen on this week's front cover, are stored.

The separation of the lumber into the proper flume is then accomplished by an automatic impulse from the memory to the sawn timber pusher in the sorting path. This impulse is supplemented with a co-ordination selector, which allows different groups of logs to be guided into the chosen flumes without the loss of individual log count.

The sorting works has a theoretical capacity of 60 logs a minute per each of the four sorting lanes.

Sandslan's automatic sorting works was designed and built by the consulting engineers Allmanna Ingenjorsbyran, Stockholm, in collaboration with the cooperative floating association of the Angermanalven River.

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MEDICINE

Fewer, Better Autopsies Needed for Research

► FEWER BUT BETTER autopsies are needed, if this time-honored method of research and teaching is to maintain its place of importance, says an editorial in the Journal of the American Medical Association, 193:805, 1965.

"Unfortunately in all branches of medicine," the editorial stated, "teaching and service functions are becoming downgraded in relation to research (so-called). The autopsy suffers particularly severely from this trend."

A symposium on the autopsy by five pathologists and a clinical physician reported in the journal sums up the case of the autopsy, which today has been replaced largely by molecular biology.

Without a postmortem study of a patient, someone has said, it is like "reading a murder mystery novel with the last page torn out."

Through autopsies, says the AMA, the pathologist can answer various specific questions and provide simple, factual data important for the physician, the patient's family and the statistician.

The pathologist who can trace out the entire course of illness from beginning to end has the opportunity to be an unrivaled teacher, the editorial explains. Unfortunately, in academic circles, the teacher has fallen behind the researchers, in both status and preferment.

"But we have every confidence," the editorial concludes, "that eventually the tide will turn, marginal and submarginal 'research' will markedly diminish, and the teacher will come into his own."

The autopsy must not remain in the tradition of 50 years ago, however. "The popular idea that the more autopsies we can do the better off we are may become recognized as a pernicious fetish. When time and effort are limited, selection will be the key word."

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TECHNOLOGY

Vibrations Help Identify Minor Engine Damage

► A "LISTENING TECHNIQUE" can detect minor engine malfunctioning before it causes permanent damage and can locate defects in sealed assemblies.

Using the technique, called mechanical signature analysis, sound and vibration signals returned from the machine being checked are analyzed and any malfunctioning is thereby detected early. Both "active" systems that generate noise of their own and "passive" systems into which vibration signals must be injected can be so checked.

Under a contract from the U.S. Army's Frankfurt Arsenal, Joseph Gibbons, a project engineer at General Electric's Advanced Technology Laboratories, Schenectady, N.Y., and a team of engineers are working on the further development of the technique.

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