

their mouths. All standards or pillars are common black gas pipe, polished and chromium plated by a local craftsman.

The white jars, which trap fugitive drops of paraffin that get through the tubing, are common ointment or cold-cream jars. The white-handled cocks at the top are from an old gas stove. Other cocks are from ordinary hardware-store stocks.

Lights behind the bottles are night lights bought in the "five-and-ten." Switches and pilot lights at the front

of the base are the common type used to show when the cellar light is on.

The only strictly laboratory items are the clamps supporting the bottles, the rubber stoppers, the chemical thermometers inserted through them, and the six short pieces of thick-walled rubber tubing.

The vacuum pump (not shown) is a "reformed" double-cylinder beer pump. It can be changed into an air-pressure pump simply by reversing the motor.

Science News Letter, February 15, 1941

PSYCHOLOGY

Defense Duty of Universities Broader than Problem Solving

For Long-Term National Welfare, College Must Train Scientists, Teach Scientific Method, Preserve Culture

THERE would be no London now but for three British scientists who through brilliant research found ways to cope with German bombers," President Alan Valentine, of the University of Rochester, told the New York State Association for Applied Psychology meeting at Rochester, N. Y. American scientists can do as much, he declared.

First obligation of the college to national defense is the creation of ideas and knowledge, President Valentine said. But the universities also have responsibility for training new technological and scientific experts.

"That educational work is so important," he said, "that our leading college and university professors and instructors should be permitted to render their immediate defense service where they can also continue their educational service—in the shops and laboratories of their own colleges, utilizing equipment and personnel already established there, with the nature of which they are most familiar."

"Only in exceptional cases is it wise," he declared, "to move such men from their colleges into new research laboratories or Army camps. We must avoid the waste of robbing our colleges of talent, for men with that talent, if left in colleges, can create more talent to a greater extent than they can produce it anywhere else."

For long-term national welfare, the college must do more than train new scientists. It must give to a much larger proportion of American youth an under-

standing and appreciation of scientific method. Only thus can a nation have unity, President Valentine believes. The non-scientist can also use the scientific method in the solution of his own problems—he can learn how to collect the necessary data, to analyze it, to experiment, demand proof.

Finally, the college and university must give American youth access to those intangible cultural satisfactions that are more than knowledge, more than machines.

"What," asked President Valentine, "would life in America be like if there were no literature, no music, no understanding of history, no interest in painting, sculpture, or architecture, no desire to determine the values and the blessings of intangible things, no aspirations, no ideals, no affections? Such an America would not be worth living in or fighting for; such an America would not endure."

The strength of America, President Valentine emphasized, lies not only in factories and farms and in the muscles of men. It lies in the free loyalty of its free citizens. Mobilizing in freedom the many minds of free citizens is a work more difficult and more noble, he said, than the creation of armies and airplanes.

"Free men must know for what cause and what ends they curb their freedom. For what purpose do we marshal force without stint or limit? To what end do we organize men and minds? Surely we do not forge swords that our children

shall live by the sword. Surely we do not conscript to make conscription the permanent American order. Our fathers did not come to America for this; our experience and education did not lead us to this end.

"No, we are compelled by those who live by force to oppose their domination in the only terms they understand. We forge swords to defend ourselves from those who would rule by the sword. We arm ourselves so that we may be free not to arm again. To avoid the rule of force we are compelled to create it. As we do so, we must not forget that our purpose is to preserve freedom and the ways of peace. We must not fall in love with force, and glorify it, and we must not fall in love with giving or receiving commands.

"A nation so strong in arms that all the world fears it and does its bidding is not and must not be the ideal of American democracy."

Science News Letter, February 15, 1941

Basis of Morale

MORALE, both of soldiers and civilians, has its basis in physical and economic well-being as well as in mental fitness, Dr. Douglas H. Fryer, of New York University, told members of the New York State Association for Applied Psychology at their annual dinner.

Dr. Fryer was a morale officer attached to the Morale Branch of the U. S. Army's General Staff during the World War.

Among the causes of poor morale which the Morale Division had to correct then, Dr. Fryer said, were reports of poor food, delayed mail and pay, inadequate uniforms, pedantic orders, profiteering by local merchants, unnecessary restrictions on passes, incompetent officers, false rumors, home worries, pacifism, non-English speech, homesickness and cowardice.

The program of improving morale was aimed at convincing the men of America's war aims and giving each one a chance to participate actively in group programs. Instruction was provided in English and in athletics. Entertainers of all kinds, including jugglers, magicians, singers, boxers, wrestlers and tumblers were selected from among the recruits and formed into a company for camp entertainment.

Individual recruits were given friendly instruction and help in adjusting to Army routine. Information given concerning inoculation reduced the faintings due to fear from 40 to two or three per hundred.

"When the United States entered the First World War in 1917, wide ignorance and indifference, and some antagonism, existed among both civilians and soldiers about her war aims," said Dr. Fryer. "In contrast with the British and French, American soldiers at the front were not sure for what they were fighting. Responding to German propaganda, some mountaineers of the South were convinced that a revolution was necessary to take America out of the war.

"For this reason civilian and army morale work in the United States in 1917-18 was aimed primarily at establishing conviction of evils to be averted in an intolerable situation which would result from an enemy victory.

"This, interestingly enough, is the conviction giving popular support to military activities of the United States in 1941."

But education or propaganda are effective in building morale only when the biological and economic foundations of morale are assured to the people, Dr. Fryer indicated.

"The Republican Army of Spain," he explained by way of example, "finally lost its morale because of one thing, insufficient ammunition, which changed an efficient army into a rabble that catastrophed a whole population into France. Propaganda had not affected this morale, cold and hunger had not destroyed it, but the loss of the means of immediate personal defense did just that. The one remaining support for biological adaptation was eliminated."

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ENGINEERING

Turbine Shell Resembles Machine Gun and Mortar

See Front Cover

NOT a new development of science in a combination machine gun and giant mortar, as it would appear, but the upper half of an 80,000-kilowatt turbine shell being built by General Electric Co. for the Duke Power Company in North Carolina, is shown on the front cover of this week's SCIENCE NEWS LETTER. Instead of destructive projectiles, this mammoth machine will hurl kilowatts of useful electricity to keep the wheels of industry turning in grinding out the country's defense program.

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The Bureau of Mines has exploring parties searching for usable deposits of manganese ore in the Appalachian region.

PSYCHOLOGY

When Youngster Pleads for Sweets, He May Need Them

WHEN Mary or Bobby pushes away the nice meat and spinach and pleads tearfully for dessert, mother may be wise if she gives in to the childish demands.

Small humans are like other animals, recent research indicates, in naturally craving the sort of foods they need at the time. When a child is tired and emotionally upset, his digestive apparatus is incapable of caring for the foods of his regular diet. Sugar is easily digested and a quick source of energy for the tired child.

Suspecting that emotional upsets cause the unusual craving for sweets and loss of appetite for more substantial food displayed by small children who have "feeding problems," Dr. Weston A. Bousfield, child psychologist of the University of Connecticut, decided to test out this theory in laboratory experiments.

The humble laboratory rat was selected as subject because Dr. Curt P. Richter, of Johns Hopkins Medical School, and other scientists had already demonstrated that when a rat is given free choice of foods he will pick a diet that is good for him.

Dr. Bousfield's task was to discover whether emotionally roused rats would choose more sweets than usual. In order to keep strict account of the animals' food intake, he kept each one in a cage by itself. Fortunately for the experiment, this "solitary confinement" made ready fighters of the rats so that it was easy to

produce an emotional situation. Whenever two of the rats were brought together, there was pretty sure to be a rousing fight. After the fight, sure enough, the sugar intake was stepped up in relation to the amount of regular dinner eaten.

An interesting sidelight of the experiment was the observation that the rats in "solitary confinement" even before the excitement of the "quarrel" were gradually increasing the amount of sugar they ate.

Dr. Bousfield hesitates to say that those rats living alone become chronically emotional or excitable. Nevertheless, they did fight more readily than rats caged together. Perhaps there may be some significance in the fact that the feeding problems of youngsters often disappear when they are put with others in the nursery school.

These rat experiments in general confirm the findings of nutritionists that if children are given free choice to eat what they want and to go without if they wish, they will generally adapt their diet to their individual physiological needs.

When the child wants candy and refuses his dinner, it is probably a sign that he needs rest and soothing more than he needs food, Dr. Bousfield concludes. A scene at the table only increases his desire for sweets and his distaste for regular diet.

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RADIO

Ocean Cables, Like Radio, Affected By Static

TRANSATLANTIC cables, just like radio circuits, are subject to static interference, J. W. Milnor, of the Western Union Telegraph Company, told members of the American Institute of Electrical Engineers in Philadelphia.

He explained technical details of the apparatus used for sending photographs from England to the United States by cable. Interference becomes especially objectionable, he said, where current varia-

tions are faster than 110 times a second, so slower vibrations are used.

The pictures are scanned by an electric eye in London, which sets up a fluctuating flow of electricity. This varies from the maximum negative current, corresponding to blacks in the original, to the maximum positive current for whites. Intermediate positions, including no current at all, correspond to grays.

Land wires carry the picture signals to