

TV Series Designed for Junior High

"What's the Matter" now being beamed to California students, soon to be available for national viewing

"What's the Matter," a television series aimed at introducing experimental chemistry to junior high school students, will soon be shown nationally through National Educational Television (NET). The program of 14 lectures and demonstrations (20 minutes each) by University of California's Dr. Richard E. Powell is already a success in 17 counties of northern California, where it is shown by KQED, San Francisco's instructional channel. Prints of one of these shows will be placed in NET clearinghouses at Boston, New York, and Lincoln, Neb.

The series was financed by about \$5000 contributed by the ACS California Section and \$3800 donated by local industries. KQED started the

effort two years ago after educators requested a companion show to a successful physics series.

Actual preparation and videotaping of the program began last summer. The series was worked up by Dr. Powell and a consulting board consisting of Dr. George Pimentel and Dr. R. H. Lindquist of the California Section, and Wesley Gordon, science curriculum coordinator of the San Lorenzo Elementary School District.

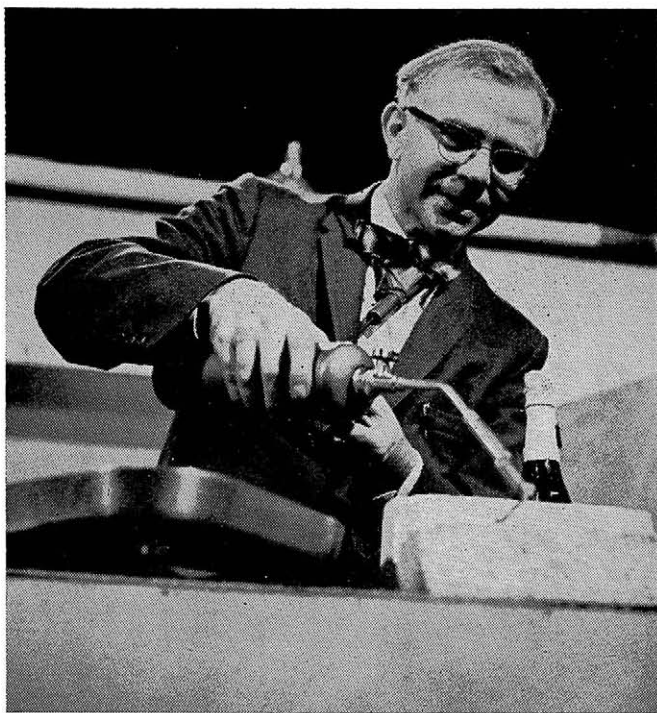
The programs hinge on how chemists identify various substances. Dr. Powell demonstrates density, freezing points, melting points, boiling points, and solubilities using simple apparatus and inexpensive chemicals.

Paper Clip. For instance, a hy-

drometer is made by putting half a paper clip inside a straw, painting a line with nail polish, and snipping off the top of the straw until it floats to the line in water. Grape juice on paper makes an indicator strip, changing to pale green in a base. A wooden coat-hanger and new nickels (5 grams mint) make an equal arm balance. Subsequent course sessions go into typical reactions of acids, bases, and indicators, properties of soils, and identification of metals.

Junior high school general science is the last required course that covers chemistry in California public schools. At this age, children find the idea that they can learn things for themselves almost wholly new, and they respond to it enthusiastically, Dr. Powell says. With the series of simple experiments, the California Section hopes to stimulate their interest and instill an early awareness that chemistry is useful and vital.

A teacher's guide that supplements the instruction includes follow-up experiments. Only this way—that is, if the student does something with his own hands—will the lesson serve its proper purpose, Dr. Powell believes.



DEMONSTRATIONS. Dr. Richard E. Powell uses compressed propane torch (left) to melt zinc as part of a demonstration of how approximate melting points of unknown substances can be determined by comparing them with known melting points. Zinc, lead, and tin melt rapidly in propane. Aluminum melts if enough time is allowed; iron and copper do not melt. At this point, students can be given melting temperatures of



these metals, then told that borosilicate glass softens much faster than aluminum (which melts at 660°C .) but not nearly as fast as zinc (419°C .). The students are then asked to guess the softening temperature of the glass ($500^{\circ} \pm 50^{\circ}\text{C}$.). On the right, Dr. Powell heats Epsom salts and sugar in an electric frying pan to demonstrate an approximate comparison of melting points. Both substances are in aluminum pill boxes