METALLURGY

Steel Tests Rushed

Pearl Harbor Navy Yard completes tests on samples at speed of one hundred a minute to fill immediate need for high-speed alloy from stock.

➤ HOW STEEL SAMPLES were tested as fast as one hundred per minute during work at the Pearl Harbor Navy Yard was reported to the Hawaiian Academy of Science meeting by W. Haskins Hammond, head of the Testing Laboratory at Pearl Harbor, and Lawrence Boggs, junior chemist.

Some months ago there was an immediate need at Pearl Harbor for some high-speed alloy steel. It was thought that this could be found among a large stock of rivet rods in a local storage yard. The Pearl Harbor Testing Laboratory was asked to make a rapid test of each piece of steel in the stock without disturbing its place in the pile. The time limit set for testing these thousands of pieces precluded use of ordinary chemical methods.

The speed with which the job was completed was attained by combining spark tests—sometimes used by mechanics and stockmen as a shop wrinkle—and a spot test for manganese adapted from a standard volumetric technique.

When steel is placed against a rapidly revolving grinding wheel a stream of sparks is given off whose form and color are dependent upon the type of steel.

Pure iron, or a steel with carbon below 0.2%, gives a spark picture of straight, unmodified carrier lines. At 0.2% carbon the lines begin to develop a few forks or primary bursts. With more carbon present, sufficient carbon dioxide is formed by oxidation of the incandescent particles to form increasingly brilliant bursts of typical forms.

Molybdenum in such a steel causes the formation of a detached orange-colored spear-point to the line. Nickel gives tiny blocks of brilliant white light; nickel and molybdenum together partly suppress the carbon bursts. Silicon, tungsten, and chromium give characteristic modifications. Plain low carbon steel gives a characterless stream with a minimum of bursts.

For the tests a field kit was made containing a portable grinder with an alundum wheel, spot test equipment, and samples of Bureau of Standards analyzed alloy steels to use as test controls.

During the tests one or more laborers moved ahead in order to shift the rods in the stock piles into a position so that the chemist could touch one end with his rapidly revolving grinding wheel.

When a spark stream was found that in any way looked unusual, the bar of steel was given a spot test. Drillings were taken from those bars which showed evidence of being high-speed steels, and full spectrographic analysis of these were made later in the laboratory.

"Success of these methods," Mr. Hammond stated, "is largely dependent on the judgment of the operator and his skill in matching the spark patterns of the unknown samples with those of the controls."

Science News Letter, August 7, 1943

PSYCHOLOGY-PHYSIOLOGY

Preventing Airsickness Problem in Air Transport

➤ PREVENTING airsickness is one of the problems of air transport of troops, it appears from a report by Comdr. Leon D. Carson, U. S. Navy, Dr. Walter R. Miles of Yale University School of Medicine and Dr. S. S. Stevens of Harvard to the Federation of American Societies for Experimental Biology.

"To arrive at the scene of battle with a load of thoroughly ill troops contributes nothing to fighting morale and effectiveness," they comment.

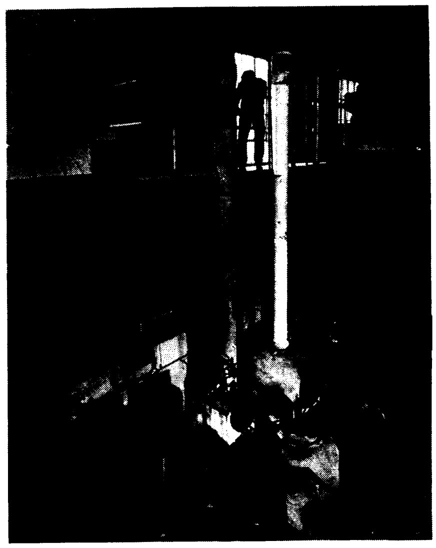
This unfortunate situation can to some extent be prevented, they believe, by giving the troops a chance to look out of the transport plane or glider.

Factors contributing to airsickness are the unavoidable motion stimulation of the vestibular mechanism of the ear, rapidly changing forces of gravity acting on internal organs, muscles and joints, and apprehension and past experience.

"All of these upsetting stimuli are as a rule less disturbing," the scientists declare, "if those affected can see out and establish visual contact with the horizon, with cloud formations and with the ground scene below."

Many troop-carrying glider crafts, the scientists state, give virtually no opportunity for this.

Science News Letter, August 7, 1943



"CRACKING" PLANT—Here the medium oil obtained in the first stage of coal liquefaction is "fractionated" or distilled to produce more gasol'ne, Diesel oil and other products. The photographs on this and the facing page and the front cover are of the U. S. Bureau of Mines coal hydrogenation plant at Pittsburgh.

CHEMISTRY

Gasoline Made From Coal In Bureau of Mines Plant

See Front Cover

➤ CRACK APART the molecules of ordinary coal, take out some of the atoms, add some hydrogen—and out comes gasoline and oil. It's not such an easy chemical job as it sounds but the Bureau of Mines has set up a small hydrogenation plant at Pittsburgh for the purpose and it is now in experimental operation as a pilot for future possible commercial use.

The control room of the plant is shown on the front cover of this week's SCIENCE NEWS LETTER. The valves and gauges control the process which takes place in a concrete chamber. In the first stage, coal yields about 20% gasoline and 80% medium oil. The oil can also be converted to gasoline by further treatment.

Experiments have indicated to the Bureau of Mines experts that the nation can develop enormous amounts of gasoline and oil from its coal reserves. If hydrogenation could be applied to our entire coal reserve, enough oil would be produced to supply the nation's needs for almost 3,000 years.