

CHEMISTRY

Italy's Chemists Gave Her Weapons for War in 1934

Permits Issued for 118 New Chemical Plants; Problems of Dyes, Fuels, Medicines, Were Studied

THAT Italy's mind was occupied with the possibility of future war in 1934 is indicated, according to well-informed observers, by the great strides her chemical industry took that year. When Mussolini finally decides to put on the gloves with Abyssinia, his country will find nothing neglected in the way of laboratory preparation. Synthetic gasoline is only one of the weapons his chemists have given his army.

A report just issued by the Chemical Division of the Bureau of Foreign and Domestic Commerce details this chemical progress. It shows that Italy has joined the race to prepare more quickly and efficiently in the laboratory what Nature does out-doors. Nor have Italian chemists been concerned chiefly with such melodramatic contributions as the supposed chemical which will be sprayed upon the ground where Ethiopians march and thus burn their bare feet.

Italy in 1934, the report states, issued

permits for the erection of 118 new chemical plants during 1934, bringing the total number to 874 at the end of the year, with an aggregate capitalization of 2,426,500,000 lire. Her foreign trade in chemicals followed the course taken by her general trade. She imported heavily and allowed her exports to drop.

During the year the Montecatini Chemical Company, Italy's largest, constructed two huge research laboratories, on a scale hitherto unknown in that nation. The company reported that important advances were made in the production of synthetic dyes and medicines, methanol, formaldehyde, synthetic resins, artificial cryolite and synthetic camphor.

The company claimed to have produced a satisfactory synthetic gasoline from domestic lignite—a big boon to petroleum-lacking Italy—and an important new explosive derived from methanol and nitric acid. It is also reported to have solved the problem of producing a

domestic cellulose suitable for nitration and the rayon industry—a big help to timberless Italy. And as far as cellulose for the manufacture of paper is concerned, Mussolini's chemists have found it in rice and wheat straw.

Other chemists attacked the problem of gasoline from another angle. They have not found a new way of preparing it. They have eliminated its use. They have met the possibility of a future national emergency by studying the production of sugar-beet alcohol for motor fuel.

On another front of the laboratory race to outdo Nature, scientists reported new progress in the separation of gases from natural steam geysers. In addition to getting carbon dioxide, they obtained valuable quantities of hydrogen, nitrogen, methane and helium—all highly strategic weapons for the war chemist.

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PSYCHIATRY

Mental Disorder Is Viewed As Disease Of Old Age

MENTAL disorder is primarily a disease of old age. It may be considered a result of the general lowering of vitality and the wearing out process which causes certain physical diseases of old age.

This new view of mental disease results from statistical research by Dr. Neil A. Dayton of the Massachusetts Department of Mental Diseases. Study of more than 61,000 admissions to New York and Massachusetts mental hospitals over several years shows that most of the cases of mental disease occur in older persons.

"In ages over 70 the admission rates are four times as high as those of middle age," Dr. Dayton stated.

"Mental disease," says Dr. Dayton, "is now placed squarely in line with failing physical processes. Mental disorder is quite removed from those diseases which are supposed to be due to the many strains imposed by our present civilization. In the younger and middle ages, when the stresses of life are most pronounced, the population does not present large proportions of mental disease.

"However, the older ages, accompanied by lesser degrees of business and social activities but with increased physical impairment and lower vitality, show admission rates for mental diseases which are the highest of all.

"Mental disease should not be accepted entirely as an abstract disorder of the



LOG 60,000,000 YEARS OLD

A log of petrified wood, dating back to somewhere around the time when the great coal beds were still tangled swamps, has been turned up in the Ozarks—a rare find for that region. Studies by Prof. J. E. Cribbs of Drury College disclosed some portions still uncrushed, showing microscopic details of structure quite clearly. It is regarded as probably a new species of fossil tree. The photograph is by Wm. J. Gibbs.

mind or the emotions. The condition is inextricably linked with failing physical processes, and may be considered in the same category with the degenerative diseases.

"If mental disease is purely a reaction on the part of the individual to certain social, environmental and emotional situations, why do we find the close linkage between mental disease and the general wearing out process which is encountered

as the older ages are approached? Mental disease appears in increasing proportions when death begins to appear so conspicuously in the latter middle ages and the senium. This association suggests that the physical conditions which the brain and body need for the maintenance of sound mind disappear with the failure of the whole organism in vitality and valid function."

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ENGINEERING

New Instrument To Measure Light Intensity Developed

A NEW, simplified instrument for measuring precisely the intensity of light has been developed by Prof. Parry H. Moon, of the illuminating engineering department of Massachusetts Institute of Technology.

Known technically as an alternating current bolometer, Prof. Moon's instrument is so sensitive that it will measure the light from distant stars but will have its chief use in research on the various forms of lamps and lights in the field of illumination.

The bolometer is a small instrument looking exactly like the ordinary vacuum tube in a radio set. Inside the tube is a small piece of blackened metal known as the "target." When light falls on the target, its blackened surface absorbs some of the heat present in the rays. This heat change, while minutely small, is sufficient to vary the nature of the tiny alternating current flowing in the tube. Measurement of the change is made possible by an al-

ternating-current amplifier, similar to those employed in radio sets which have been brought to a high state of technical perfection.

Prof. Moon's new bolometer overcomes some of the older handicaps encountered in working with research in light measurement. Its chief advantage is that it dispenses with high-sensitivity galvanometers demanding delicate laboratory technique.

In addition, older devices developed slight differences of temperature when two different kinds of metals were connected in the measuring circuit and false currents were set up. These false currents, like parasites, attached themselves to the true current being measured. This condition is not experienced with the new instrument.

The theory and design of the apparatus was worked out by Prof. Moon. W. R. Mills, Jr., student in his department, constructed the instrument.

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SPECTROSCOPY

Spectroscope Proves Aid In Study of Hemoglobin

EXCEPTIONAL progress toward a solution of science's old problem of the structure of hemoglobin was reported by Dr. David L. Drabkin of the University of Pennsylvania, who spoke at the Third Annual Conference on Spectroscopy meeting at the Massachusetts Institute of Technology.

Hemoglobin is that complex constituent of the blood which acts as a conveyor of life-giving oxygen to the various parts of the body.

Its importance, Dr. Drabkin said, is exceeded only by the difficulty of studying it. With the spectroscope, however, Dr. Drabkin has been able to conduct analyses far in advance of any carried on previously and although the problem is still unsolved, tremendous steps toward the ultimate solution have been made.

Spectroscopy is the investigation of matter by a study of the light it emits. It has proved a powerful and accurate method of research in various scientific fields.

Further proof of this was added by Dr. Drabkin when he described the comparative ease with which spectroscopy had enabled investigators to study vitamin B₁, the oldest known yet most elusive vitamin. The next step, he said, would be a method of studying the reflection spectra of tissues directly to replace the present method of studying biological substances in solution. This would be a great aid toward solving the hemoglobin problem, he said, since the very fact that it is now possible to work with it in solution only, is the main obstacle to a complete understanding of its mysteries.

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ARCHAEOLOGY

First Americans May Have Been "Redskins"

THE EARLIEST Americans may have been real "Redskins."

So it appears from discovery of the red paint—which later Indians spread and striped in patterns on their faces—among the camping effects of America's ancient "Folsom hunters," in Colorado.

Dr. Frank H. H. Roberts, Jr., of the Smithsonian Institution, who is now exploring more intensely the Folsom camp site he found last year, is not able to say conclusively yet how the red paint was used. It is, however, the same red, earthy hematite, or red chalk, which was widely used by Indians.

Dr. Roberts found several pieces of this red chalk at the camp ground. Each piece had smooth and worn surfaces from rubbing, indicating that they supplied red ochre for paint. A flat, slightly concave stone with traces of red clinging to it was also found, suggesting that this was an old paint dish.

What Did They Paint?

If Folsom hunters were like Indians of later times, they were partial to red, and used it not merely to make their faces fearful for war, or beautiful, but also to color animal skins, arrows, shields and tents. The hematite was powdered and mixed with grease or saliva to form paint.

Stone "gravels" found by Dr. Roberts are further evidence of Folsom Man's interest in art. This kind of tool was used by Indians to engrave designs in bone or other material, and, while none of Folsom Man's art products have yet come to light, the archaeologist believes that the engraving implements may foreshadow such discoveries. These implements had no other use, to archaeological knowledge.

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