Seek to Unmix Oil and Water

Chemistry

Following are additional reports from the Institute of Chemistry of the American Chemical Society meeting at Evanston, Ill.

The old adage that oil and water can't be mixed makes the oil producer smile wryly when he hears it. For like many another proverb it is very far from the truth, and in this instance it is a most expensive joke on the oil man, according to Dr. Gustav Egloff of Chicago.

Oil and water do not mix as a chemical compound, it is true, but they often come out of oil wells together in that very intimate physical mixture known as an emulsion, wherein very fine droplets of one are suspended in the other and won't come out without the most troublesome and expensive of treatment. Thus it has resulted that Nature every year burdens the oil industry with 200,000,000 barrels of intimately mixed oil and water as emulsified crude oil. Such oil does not separate its water even after years of storage. To refine emulsified crude oil into dry oil and water is both difficult and expensive.

"There are at present over 100,000,000 barrels of emulsified crude oil in storage tanks and in sump-holes in the ground, and the refiner is at his wits' end as to how to separate the oil from the water," Dr. Egloff stated. "Thus over $100,000,000 is tied up in stored emulsified oil for whose utilization no really economical method has been evolved, which is applicable to all situations.

"Not alone do we have Nature producing highly stable emulsified oils, but they are also produced in the refining process, particularly in the manufacturing of lubricating oils. As a matter of fact extremely thorough refining is necessary to produce lubricating oils which will not emulsify under service conditions in motors and turbines."

Inhibition, one of the bogey-words of Freudian psychology, has an entirely different and beneficent meaning as applied in industrial chemistry. Minute amounts of chemicals are in some way as yet imperfectly understood able to slow down the multifarious processes lumped under the head of "spoiling," and these are known as inhibitors. Dr. N. H. Alyea of Princeton University explained what is known of these inhibitors and their action.

The most familiar inhibitor is tetraethyl lead, which inhibits ordinary gasoline from causing engine knock. A thimbleful of this added to a gallon of gasoline turns the trick. Other inhibitors make tires live longer, keep dyes from fading and prevent the important new industrial chemical furfural from spoiling. An inhibitor has been found which will prevent butter from becoming rancid, but unfortunately it is a poison, so chemists will have to resume the search for one that will do the same work without making the butter dangerous to the consumer's peace of digestion.

"The quest for synthetic rubber may be compared to the quest for the Golden Fleece, the Fountain of Youth, or the Philosopher's Stone, in so far as the objective appears exceedingly unlikely of attainment, but the quest has been very fruitful in secondary results for the general improvement of rubber technology and scientific knowledge."

This was the theme of Thomas Midgley, Jr., of Dayton, Ohio, noted as the inventor of ethyl gas.

Rubber is, chemically speaking, a multiplication of an organic compound known as isoprene, and many attempts, some of them successful on a laboratory scale, have been made to make rubber out of this substance. But none of these isoprene rubbers has the stretch and bounce and other physical qualities needed for full-fledged commercially successful rubber. In the investigation of the differences between the artificial and the natural products, however, chemical discoveries have been made that now have wide application in rubber manufacture and in certain other industries as well.

Liver, once given away by country butchers, has climbed into a top place in the aristocracy of the meat market, and chemists are ardently wooing it to learn its secret. This is the result of the recently discovered value in the treatment of human ills, especially pernicious anemia, Dr. David Klein of Chicago told the Institute.

At present pernicious anemia sufferers in pursuit of health have to eat liver by the pound, the speaker said, but it is the hope of the chemist to find out the particular small fraction of its mass that makes it "good for what ails you." His ambition is to get it out in pure form, analyze it, give it a long, hard name and then make it in the chemical factory. And what he hopes to do for liver he also wants to do for the thyroid, suprarenal, pituitary, parathyroid, and all the other ductless glands, whose influence on our health and often on our very character is pronounced though as yet only partly understood.

Goldenrod pollen does not cause hay fever, and roses do not cause "rose fever." This is the verdict of Edgar B. Carter, Indianapolis specialist in pollens. These plants and all others with bright, attractive flowers, do not shed their pollen into the air to drift into sensitive noses, but intrust it to insects for carriage to other flowers.

It is the air-borne pollens, the speaker said, that cause the trouble.

"Many plants, especially trees, grasses and weeds, bear blossoms that are quite inconspicuous and quite unattractive. . . . From such plants the pollen is shed into the air in such profusion that it carries for miles as an invisible cloud. During the time when some of the plants are pollinating, particularly the grasses in June and early July, and the ragweed in August and September, the air is literally filled with this invisible pollen which affects so profoundly those human beings who happen to be sensitized to it. It has been estimated that at times during the fall hay fever season there have been more than 1,000 granules of ragweed pollen in each cubic yard of city air, even to the height of the tallest buildings."

When we look at a photograph, or at a movie film, we are really crystal-gazing, although we may not be aware of it. We do not see the crystals, because they are too small to be distinguished separately without a microscope. Dr. C. E. Kenneth Mees, of the Eastman Kodak Company, explained how the new knowledge of photographic crystallography is being used in obtaining better pictures.

"A single motion picture examined under the microscope is found to be composed of tiny particles of silver which look like little masses of coke," he said. "These are derived from the crystals of silver bromide in the creamy-white sensitive layer exposed in the camera, and there are more crystals on a square inch of the film than there are human beings on the surface of the globe.

"Recently, scientists have determined how the atoms build up the crystals and have (*Turn to next page*)

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measured their sizes and shapes in different kinds of film. By careful adjustment of his processes, for instance, the manufacturer includes a great range of sizes of crystals in his negative film, which enables the beautiful gradation to be obtained. A more uniform size of crystals in the positive film gives life and sparkle to the pictures."

The speaker explained how a chance impurity in the photographic chemicals has worked to the advantage of the picture-making professions. "The sensitiveness of the grains of silver bromide is increased by the presence of specks on them produced by an accidental impurity in the gelatin derived from plants eaten by animals from whose skins the gelatin is made. It contains sulphur, which reacts with the silver bromide and forms specks of silver sulphide on the crystals. Under light, this produces a trace of metallic silver and during development is a nucleus on which more silver deposits; finally, the whole crystal becomes silver. These grains of silver compose the picture projected on the screen."

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Ills We Do Not Have

Immunology

J. B. S. HALDANE, in *Possible Worlds* (Harper):

As I ate my gorgonzola cheese I attempted to console myself for a violent cold in the head by meditating on some of the ills that human flesh is not heir to.

For that cheese was very ill. It had first been attacked by a gang of most ferocious bacteria and finally by a green mould. But to all its diseases I was immune. If I had eaten a slice of mutton equally full of bacilla they would certainly have proceeded to attack me, while a cheese of milder character would have caught the green malady from the gorgonzola.

Fortunately, however, man is immune not only to the microbes of cheese but to most of those which attack animals. We do not get distemper from our dogs and very rarely foot-and-mouth disease from our cattle; though we share with the latter a liability to tubercle, and there is a rare and generally fatal lung disease which old ladies occasionally get from parrots.

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More than four-fifths of Greenland is buried beneath a great continental glacier.