



### Forestry's Magna Charta

**D**URING the past ten years a quiet revolution has taken place in this country. It has little or nothing to do with the socio-political field—there has been a revolution there, too, if you like; but nobody could claim it was a quiet one.

Our quiet revolution nevertheless affects the lives of all of us and will continue to do so for a long time to come, for it is in the field of forestry. Ten years ago Congress enacted the McSweeney-McNary bill, which placed forestry research in this country on a solid, systematic basis. During September, foresters celebrated the decennial of their Magna Charta, and a special issue of the *Journal of Forestry* (Sept.) is devoted to a discussion of scientific progress in all branches of forestry during that period.

There is much more to forestry than just going out and planting a lot of new trees where old ones have been cut down. Managing a forest is a more complex job than managing a factory—or even a whole chain of factories, for forest products cover a range all the way from timbers and turpentine to such intangible services as watershed protection and fun for fishermen. And forest research must take all these things into account.

Basic idea of the research program is stressed by Dr. Earle H. Clapp, associate chief of the U. S. Forest Service:

"The Act and the various things that have grown out of it have helped drive home the concept that the forest of any area is a biological entity, all the elements of which are integrated with all the others and are influenced by them.

"The biological elements of the forest of an area or region extend in the same way into the social and economical field. All of this exceedingly complex interrela-

tionship has emphasized the need for conducting research on the basis of these relationships, or in brief, the need for cooperation by groups of specialists in

co-ordinated, well-rounded-out many-sided attacks in contrast with isolated and purely individual work."

*Science News Letter, October 1, 1938*

### CHEMISTRY

## Radioactive Iron Atoms Give New Way to Diagnose Anemia

### Act as Tracers to Show Absorption of Iron in Blood; Non-Anemic Test Animals Show No Such Absorption

**B**OMBARDED iron atoms, made artificially radioactive until they give off radiations like radium, hold the possibility of serving as a test for anemia, it was reported to the Milwaukee meetings of the American Chemical Society, by scientists from the University of Rochester School of Medicine.

In studies on anemic dogs it was found that these radioactive iron atoms, serving as tracers of absorption of iron in the body, entered the blood plasma and later the red blood cells. Six hours was all that was needed to show first evidences of this absorption and by the end of three days virtually all the absorbed iron was in the protein of the blood cells.

In contrast in the case of non-anemic dogs, there was practically no absorption of the iron into the blood plasma and cells. This is therefore the key to rapid diagnosis. The new test was reported by Drs. William F. Bale and Frances L. Haven, of Rochester, N. Y.

"It would appear," they reported, "that, at least in the dog, iron absorption from the gastro-intestinal tract is governed by the need of the body for iron. It seems certain that this radioactive iron will in the future prove a valuable tool in anemia and blood regeneration studies, since in the past studies of iron assimilation and use have been difficult and the results uncertain because of the difficulty of chemical analysis with the small amounts of iron involved."

Participating in the experiments were Dr. P. Hahn and Prof. G. H. Whipple, of the University of Rochester, and scientists of Prof. E. O. Lawrence's laboratory at the University of California.

### New Treatment at Mayo

A more scientific treatment for the dangerous ailment of intestinal obstruction in man was suggested in a report by Mayo Clinic chemists and physicians.

From experiments on animals it has been shown previously that during such obstructions the amount of potassium in the blood serum increases and it has been postulated that death in these animals, not given remedial treatment, was due to potassium poisoning, said Drs. Arnold E. Osterberg, J. A. Bargaen and M. A. Falconer, reviewing their past studies and those of other workers.

On patients at the Mayo Clinic having this serious affliction, the scientists tested out this hypothesis to check human against animal behavior. Contrary to findings in animals the human patients showed, not an increase in potassium in their blood serum, but an actual decrease.

These new studies emphasize the differences which sometimes exist between conditions found in animals and the clinical findings in man and show how slow medicine must be in any attempt to translate discoveries on animals into conclusions on human patients.

At the Mayo Clinic now, instead of making every effort to decrease the potassium content of the blood serum in cases of intestinal obstruction, the patients are being given injections of solutions containing small amounts of potassium, calcium and sodium salts as well as sugar for its quick energy content. These injections are given following the removal of the obstruction by surgical or other means.

### New Growth Substance

A new growth chemical, known as "biotic acid," has been discovered at Oregon State College by Prof. Roger J. Williams and Robert E. Eakin, who described its properties and action in a technical report to the chemists.

The new substance stimulates the growth of yeast cells and appears to aid another growth chemical, known as

pantothenic acid, in producing a very swift growth.

Pantothenic acid is another discovery of Prof. Williams which was reported several years ago. Pantothenic acid and perhaps the newer biotic acid also, are believed to be "indispensable cogs" in the machinery of living cells.

From the laboratories of many workers throughout the world a number of yeast growth stimulating substances have been discovered, Prof. Williams said. As yet these are known only as Bios IIA, Bios IIB and so forth, the general designations merely marking different substances without real knowledge of their actual identity.

In this respect the situation is about like that of the vitamins where the letters A, B, C, D, and so on have been used. Gradually the vitamins are being identified as definite chemicals and it appears probable that the Bios factors, too, may some day be given exact chemical identity.

One vitamin recently made synthetically is vitamin B<sub>1</sub>, now known as thiamin, which was created by Dr. Robert R. Williams, chemist of the Bell Telephone Laboratories. He is the brother of Dr. Williams of Oregon State.

The new "biotic acid" discovered by Oregon's Dr. Williams is different from

all other growth substances and is characterized by very definite acid properties, low molecular weight and easy oxidation by hydrogen peroxide.

### Antiseptics More Effective

It should be possible to increase many-fold the germ-killing effectiveness of commercial antiseptics.

The gain in the germ-combating properties can be achieved by changing the acidity of the solution containing the antiseptic and making it more acid, reported Purdue University chemists, W. A. Bittenbender, Prof. E. F. Degering and Prof. P. A. Tetrault.

Potent phenylmercuric nitrate, known in the trade as P.M.N., is about 60 times more effective at an acidity rating, or pH, of 3 than it is at an acidity rating of 7, corresponding to the acidity of water. Acidity rating 3 is about as acid as tomato juice.

Under the same experimental conditions, reported the chemists, much-used hexylresorcinol, better known as S.T. 37, is about 30 times more effective. Similarly merthiolate shows a germ-killing gain of seven times, tincture of iodine a gain of four times and carbolic acid a gain of one and a half times.

"Although it has been known for some time that acidity has an enhancing effect on the bacteriostatic properties of benzoic acid in so far as its use in tomato juice and similar preparations is concerned, it was not realized that some micro-organisms are much less resistant to destruction by certain chemicals with an increase in acidity," the chemists declare.

"As a result, it should be possible to buffer the acidity of our commercial antiseptics so as to make them much more effective than has been possible heretofore."

### Heat Increases Weight

When you get on a scale on a hot day you appear to weigh more than you really do, it was explained to the meeting. If you really weigh 150 pounds you will appear to gain a quarter ounce in weight on a hot day as compared with your weight on a cool one.

Rev. Francis W. Power, professor of microanalysis at Fordham University, explained this weight discrepancy in his report on the difficulties of micro-weighing where weights as small as 1/50,000 of a postage stamp can be measured.

When you weigh yourself on a beam balance with sliding brass weights, Prof. Power said, both you and the weights are buoyed up a bit by the air surrounding you both. The buoyant effect of a given volume of warm air is less than the buoyant effect of an equal volume of cold air.

"To say that the body is buoyed up less (in warm air) is the same thing as saying that it apparently weighs more. And there you are," added the chemist.

Prof. Power used his example to emphasize that in micro-weighing it is possible to obtain extreme accuracy only when the work is carried out in a constant temperature room.

### Heavy Oxygen As Tracer

Prof. Harold C. Urey, 1934 Noble Prizeman in chemistry, reported the increasing use of heavy oxygen atoms as tags or tracers in a variety of organic chemical reactions never before completely understood by chemists. In his report to the meeting of the American Chemical Society, Dr. Urey with Dr. Irving Roberts pointed out that prior to the recent use of heavy oxygen as a means of tracing reactions, there were only about a half-dozen organic reactions completely understood, out of the hundreds which chemists can produce.

To this small stock of exact knowledge, scientists have now added five compounds whose reactions are understood. Thus in one spurt, in research that has been conducted at Columbia University, the University of Chicago, and Manchester University in England, chemistry has almost doubled its stock of exact knowledge of how various atoms in simple molecules are put together.

But this, gratifying as it is, is only a beginning. When Columbia's 200 cubic centimeters of heavy oxygen has been increased, the scientists will be able to supply other workers with the oxygen tracer atoms, and scores of scientists can

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## New Vitamin Test

A new method of testing the presence of vitamin B<sub>1</sub>, which removes the human element in the investigation and makes a photoelectric cell do the work was described to the chemists.

The present method of testing vitamins is to feed them to laboratory animals, watch the effect on their growth, and then—by weighing the animals over periods of time—determining the benefits of the vitamin's presence in the diet. This bio-assay, as it is called, is a slow and tedious process, and even when complete is always subject to scrutiny because of possible errors.

Drs. Douglas J. Hennessy and Leopold R. Cerecedo of Fordham University described how, in the case of vitamin B<sub>1</sub> at least, the power of the "electric eye" can take much of the human element out of such assays.

Previously the Netherlands scientist Jansen had discovered that when vitamin B<sub>1</sub>—known chemically as thiamin—is oxidized it turns blue if irradiated with ultraviolet light. The intensity of the blue fluorescence, the Fordham investigators found, is a measure of the amount of vitamin present. With a photoelectric cell they were able to determine, without human error of judgment, the intensity of the blue color and hence the concentration of the vitamin.

*Science News Letter, October 1, 1938*

### PSYCHOLOGY

## Similarities May Provide Clue To Mental Treatment

**T**HE MANY ways in which John Smith is like Hank Jones may provide scientists with a new clue for understanding why some are successful in life and why some wind up in the mental hospital.

Bringing mathematics to the aid of psychology, Dr. Joseph Zubin of the Mental Hospital Survey Committee, told the American Psychological Association that a statistical study of like-minded people and how they resemble each other may lead to a straightening out of the present confusion between similar types of mental disease. This is of vital importance to physicians because two patients apparently suffering from the same mental symptoms may not respond to the same treatment. Although outwardly similar they really differ from each other in ways now unknown to science.

*Science News Letter, October 1, 1938*

### RADIO

# Proposes Limit to Distance For Radio Remote Control

## Devices for Distance Tuning of Radio Sets Are Really Small Transmitters Sending Out Waves and Interference

**T**HE FEDERAL Communications Commission is tackling the knotty problem of fixing distance limits over which the new radio remote control devices can operate.

You can now buy tiny radio transmitters which will play phonograph records in your home and broadcast their program to your own large radio set. You can also push a button and tune your set by radio waves while sitting across the room. And there are systems for analyzing radio listener response in which the individual listeners push a button and record by radio—a block or two away—whether they are listening to specific programs.

All these devices require small radio oscillators and transmitters which send out radio waves and hence they might under existing radio rules, require a licensed radio operator to make them work. The task of licensing the laymen users of these devices is, of course, an impossibility and so if they are to continue to serve a useful purpose some solution must be achieved.

While the simple operation of many of these devices makes a requirement for a licensed radio operator seem ridiculous, the fact remains that, in the last few years, there have been an increasing number of charges of interference with already licensed reception. The FCC's task is to fix, somehow, the limits—in distance—over which such devices shall act.

### Generally Accepted

At informal hearings in Washington the manufacturers of these devices have shown fairly general acceptance of the Commission's proposal that interference shall be construed not to exist if the tiny amount of field energy of 15 microvolts per meter is not exceeded at a distance of lambda over two pi, where lambda is the wavelength of radio wave emitted and pi has its usual numerical equivalent of 3.14.

In actual practice lambda over two pi comes out to be a distance of 157 feet for a radio wave having a frequency of 1,000 kilocycles; 78.5 feet for 2,000 kilo-

cycles and in the ultra-high frequency bands a distance of only five feet at a frequency of 30,000 kilocycles.

At the hearing the only adverse opinion on this regulation came from those concerns making remote control devices operating on the high frequencies. Most of them wish to control mechanisms some 20 feet away and a restriction limiting action to distances of 5 feet would bring sizable problems.

*Science News Letter, October 1, 1938*

### FISHERIES

## Compressed Air Harpoon Helps Keep Whale Afloat

**A** COMPRESSED air harpoon has been invented by Karl Moos, a Norwegian machinist. Instead of the gunpowder charge commonly used in present-day harpoon guns, Mr. Moos' invention is propelled by air under a pressure of more than 5,000 pounds per square inch.

Not only that, but when it is fired, the hollow harpoon is filled with air under the same pressure. As it strikes the whale a valve is opened and the air is released into the whale's body. This hastens the death of the animal and also keeps it afloat until it can be taken up by the whaling ship for cutting up.

*Science News Letter, October 1, 1938*

A government scientist has invented a device to measure the length and crimp of wool fibers quickly.

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