

ferment, hemin, takes up the atmospheric oxygen, which was transported by the hemoglobin, and transfers it to certain organic substances which in turn become oxidized. The respiration ferment is found in all living cells.

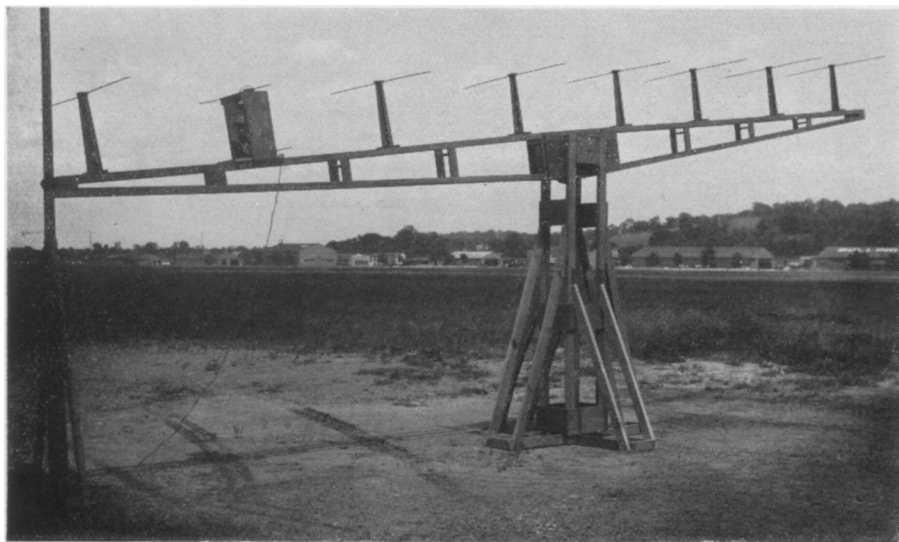
Prof. Fischer's synthesis of hemin made possible the artificial production of hemoglobin itself, which is indispensable for the life of animals, especially mammals.

When Prof. Fischer announced this synthesis last year, scientists hailed it as an important contribution to the chemistry of living matter. Some claims were made for it on practical grounds, but Prof. Fischer himself did not agree with these views.

"Contrary to many fantastical statements of the daily press no changes will take place in the field of therapeutics [treatment]" he said, "since hemin has been easily obtainable from blood for a long time. It is improbable that the intermediate products of the syntheses and the numerous isomeric hemins, on which work is being done, will gain a practical importance but their investigation is of interest from a theoretical viewpoint."

Prof. Fischer was born at Hoechst-am-Main in 1881. He studied at the University of Lausanne, at Marburg, where he received the degree of doctor of philosophy, and at Munich, where he was made a doctor of medicine. He has been on the faculties of various German universities and is now head of the Organic Chemical Institute of the Munich Technical High School.

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#### SENDS SIGNALS FOR AIRPLANES TO GLIDE DOWN

*Airplanes can land in the densest fog if the field is equipped with the apparatus shown above and the plane with the proper receiver. This is the directive antenna which transmits a very high frequency signal in a very narrow beam. The plane coasts down this beam like a sled down a snowy hillside.*

AVIATION

# Pilot Can Now Land His Plane Without Seeing the Field

## Curved Course to the Ground is Indicated on Instrument Board by Ingenious Use of Short Wave Radio

**A**VIATORS can not only fly from city to city without ever seeing the ground, but now it is possible for them to make a perfect landing on a field completely enveloped in the densest fog, that not even the most powerful light beacon can penetrate. That is, they can do so if their plane and the field are equipped with the newest radio apparatus developed by the Bureau of Standards. By experiments made at the College Park airport, near Washington, H. Diamond and F. W. Dunmore, two of the Bureau's radio engineers, have developed the new system.

Two radio sets are used. One is the same set used for receiving the powerful radio beacon signal in flying between cities. This is also used for the reception of spoken orders, and other signals received with head phones. For landing at the proper angle, an ultra-short wave receiver is used, as the signals for this are of about  $3\frac{1}{2}$  meters wave length, or 93,700 kilocycles.

The system developed several years ago for guiding the plane over the route makes use of two beam antennae. Each

sends out a signal mainly in a certain direction. The two are oriented at right angles to each other, one to one side and the second to the other side of the route. As the plane flies half way between the two beams, the two signals are received with equal intensity, but if the pilot wanders to one side or the other, one signal becomes more powerful.

The bureau has developed two types of indicators for this arrangement. In one, a pointer on a dial remains at zero when both signals are equal, and moves to the proper side when one becomes more intense. In the other type, there are two vibrating reeds, the ends of which appear as two white bands on the instrument board. When both are the same length, the pilot knows that he is flying the proper course, but if one becomes longer, it indicates that the ship is off in that direction.

An arrangement exactly the same, but using lower power and smaller loop antennae in the transmitter, is used to give the pilot the direction of the runway on which he is to land. But in addition to the direction, he wants to know just when he is over the edge of the field, and when he is gliding at the proper angle.

To tell the boundary of the field, another type of transmitter is used, in which the signal, heard in the head phones, is loud as the pilot approaches the field, but disappears completely as the pilot is directly over the antenna, which is placed at the edge of the field.

To tell the proper angle at which to glide, the engineers have developed a very ingenious arrangement making use of signals at a very high frequency, or short wave length. These can be directed very accurately in a narrow beam. However, the pilot should not bring his plane down along a straight line, but along a curve, first dropping rapidly, then flattening out as he approaches the ground.

Along the center of the radio beam is the line of the greatest signal strength, but a short distance away it drops con-

siderably. However, the nearer the transmitter, the louder is the signal. Therefore, if the pilot hits the beam head on near the center, then starts to drop, and, as he does so, approaches closer to the field, the signal will remain of the same strength, because the approach to the transmitter compensates for the greater distance from the center of the beam.

The curve along which the signal maintains a constant strength is just about the same as the best landing curve. A meter on the instrument board indicates the signal strength, and is adjusted so that the pointer is at the center when the pilot follows the proper landing curve. It indicates either "too high" or "too low" if he departs from the right direction.

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**MECHANICAL MILKMAID MILKS FIFTY COWS**

*This rotolactor gives each cow a shower bath and relieves the cow of her milk automatically. There are fifty milking stalls on the sixty-foot revolving table.*

AGRICULTURE

## Rotary Milking Machine Brings Factory Methods to Farm

**New Invention, Only One of Which Has Been Made, Milks 1800 Cows Three Times in Eight-Hour Day**

**T**HE dairy farm has joined the industrial revolution and now cows are bathed, relieved of their milk and sent back to their barns by automatic machinery that resembles the constantly moving assembly line of a large automobile factory.

A rotary combine milker or "rotolactor" just put in commercial use for certified milk production at the Walker-Gordon Laboratories farm or "milk factory" near Plainsboro, N. J., milks fifty cows simultaneously with less cost, greater speed and less danger of contamination of milk than the old method of individual milking practiced for centuries.

Upon a sixty foot circular platform there are fifty milking stalls. Each cow in turn steps upon the moving platform into a stall, where she is held in place by an automatically closed stanchion. As the platform slowly rotates, the cow receives an automatic warm water shower bath while above her the milking machine and milk jar of her stall is being cleaned and sterilized by machinery. Next the cow receives the attention of the attendant whose sole duty consists of drying the udders with individual sterilized towels. Next the

cow is inspected by an expert hand milker who merely starts the milking process, which is accomplished by milking machines.

Just 12½ minutes after the cow steps on the milking merry-go-round the milking is complete, the cow is automatically released to walk back to her barn for a dinner of special dehydrated alfalfa and other feeds to give a balanced ration. The jar containing her milk automatically empties into a weighing and recording device and flows through pipe lines leading to the bottling plant.

Under this new system the cow goes to the milking machines instead of the milker visiting the cow. Even this walk that the cow must take single file through the runways leading to and from the special rotolactor building contributes to her health. For these walks for her milkings three times daily give her just the amount of exercise she needs.

Under this new system the cow barns become living and dining quarters exclusively and milking is done under the most hygienic conditions in the tiled rotolactor room which is fed with conditioned air.

In an eight hour day of continuous

operation the rotolactor when put into full time operation will milk some 1800 cows three times daily. At present there is only one rotolactor in existence, designed and perfected by the staff of the Walker-Gordon Laboratories farm under the direction of Henry W. Jeffers, president. Studies of feed production, both scientific and economic, and nutritional studies of the milk are among the extensive research projects under the direction of Dr. H. E. Van Norman of the Borden Research Foundation, of which the Walker-Gordon Laboratories are a part. These other studies supplement the development of automatic dairying machinery like the rotolactor.

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PUBLIC HEALTH

## Car Sickness Less Common

**P**OOR vision makes you more likely to get sick when riding on cars or in automobiles, although car sickness is based on irritation of that part of your ears known as the labyrinth, Dr. J. E. Lebensohn has just reported in the *Archives of Ophthalmology*. This distressing condition is becoming less common, however, as a result of smoother roads, easier riding cars and automobiles.

People who have faulty vision or eye muscle balance are more easily nauseated and have a digestive tract especially susceptible to further depressing influences. An empty stomach is particularly sensitive, so it is best not to fast when traveling. The visual disturbances should be corrected, Dr. Lebensohn advised.

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