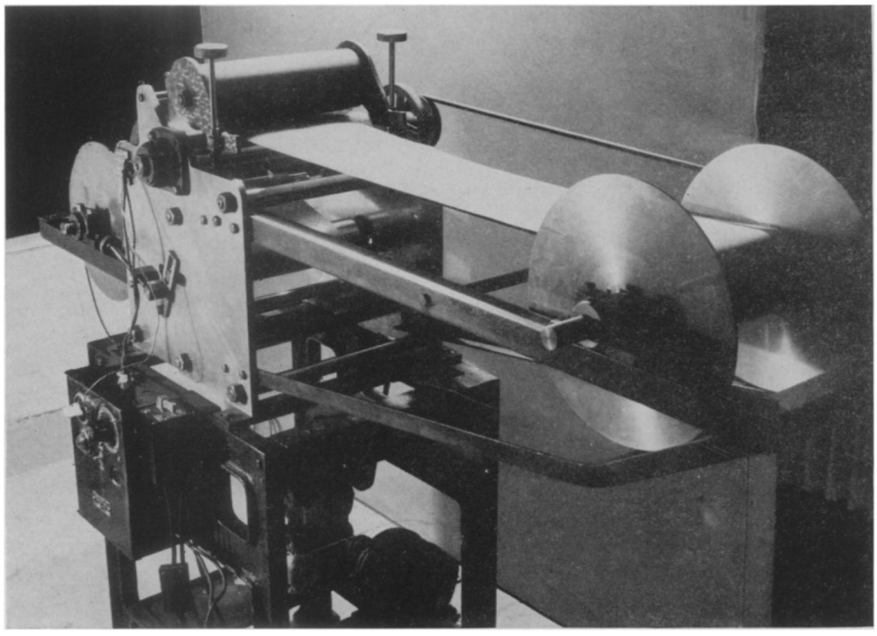


TREATS THE FILM

This is the original embossing machine with which Douglas Winnek made his first lenticulated film that makes his three-dimensional pictures possible.

PHOTOGRAPHY

Revolution in Photography May Come From New Process

Lenticulated Film of Young Inventor Makes Pictures With Depth; Can Be Used in Ordinary Amateur's Camera

PHOTOGRAPHIC prints that show amazing three-dimensional perspective; medical X-rays that tell surgeons just how deep to cut and where, subway and other advertising signs that peer at you with lifelike reality and magazine covers that do the same thing—these are only a few of the applications of the improved system of stereoscopic photography, known as trivision, invented by young 33-year-old Douglas F. Winnek of Mamaroneck, N. Y.

Passing around amazing colored transparencies at recent meetings of the Temporary National Economic Committee in Washington the young Westchester inventor astounded the Monopoly committee members with the apparent magic of his invention.

Out of those hearings came the awareness of the U. S. Navy to the invention and its applications to aerial photography and to medical X-rays for Navy doctors. As a result the Navy is writing a contract for young Winnek to construct a film magazine for one of their standard Fairchild aerial cameras so that the invention can be tried in accordance with the Navy's rigid standards of perfection.

Masterpiece of Winneck's trivision, as he chooses to call his new advance instead of the tongue-twisting stereoscopic photography, is a brilliantly colored figure of little Pinocchio. The sense of perspective and depth is so great in this picture that one instinctively puts up a hand to the wafer-thin sheet of film expecting to find it about two inches thick.

If you move the picture of Pinocchio or rotate it slowly, you will see trees in the background disappear behind his body. One has the illusion of looking slightly around the figure as with normal binocular vision in real life.

What young Winnek showed at the T. N. E. C. hearing were film transparencies, but the new process, he claims, can be adapted to the creation of photographic prints, either in black and white or in color, with an amazing illusion of depth.

Key to the Winnek success that now seems imminent has been the development of an embossing machine which takes the photographic film of any manufacturer and puts the lenticulated ridges on it that are the secret of the three-dimensional trivision effects. The film, in its long uncut rolls from the factory, is simply run through the machine and comes out with the vital ridges on it.

At the recent T. N. E. C. hearing Mr. Winnek showed pictures having 200 ridges per inch and he is now perfecting 300 ridges to the line. He says if this can be obtained the eye will be unable to discern the ridges and by making the film thin, it can become virtually invisible to the eye.

Principle Not Original

Mr. Winnek makes little claim for unique originality in his use of the lenticulated ridges on film to produce the illusion of depth in film transparencies.

What he does believe is important is the simple virtually automatic trick of producing the ridges on a practical commercial scale.

Ridges on a separate screen and in the film itself have a respectable history in the photographic art. The whole system of Kodacolor motion picture photography, used so widely by amateurs, is built up around ridged film although not in the same fashion as the new trivision. Also Dr. Herbert E. Ives, scientist of the Bell Telephone Laboratories, has patents on systems of stereoscopic pictures using ridged screens. One commercial application of the Ives patents has been the development of advertising display transparencies known as Depthograph which you may have seen in store windows.

The early work on the method was carried out by Dr. Ives and independently by Dr. C. W. Kanolt, formerly of the National Bureau of Standards. This work was reported to the meeting of the American Optical Society in October 1928. The system was a modification of an early invention of Dr. Ives' father, Frederic E. Ives, pioneer in the invention of the halftone process of reproducing photographs in newspapers and magazines.

Born in Eau Claire, Wis., Douglas Winnek started in as an usher in a motion picture house in Madison. Thoroughly inoculated with the germ that is the motion picture, Winnek worked himself into a publicity job for the Old Orpheum

circuit in Chicago. There he did his first serious thinking about three-dimensional pictures.

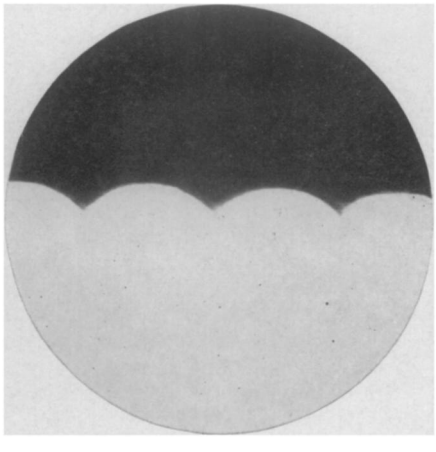
The old Orpheum circuit was gobbled up into Radio-Keith-Orpheum, power in the motion picture business, and with the financial backing of RKO officials Winnek set up shop in a theatre in Rochester, N. Y. For months he worked and shot up 12,000 feet of film before convincing himself and his backers that the faint appearance of depth in his experiments was merely a fuzziness introduced by vibrations.

Photographic Engineer

From RKO Winnek went to New York and opened up shop as "photographic engineer," a term of his own coining which kept enough money rolling in to live on. Late in 1935 he seriously started to find a way of embossing lenticulated ridges on photographic film so that one could get stereoscopic pictures. Winnek himself prefers the simpler term trivision as descriptive of these depth pictures.

Struggling along from one pot boiling job to another, Winnek used the cellar of his Mamaroneck, N. Y., home as the laboratory for his research on trivision. With a few intimate engineering friends he fashioned a compact and close-knit little research organization whose combined talents did what scientists have said couldn't be done: perfected a simple, easy and cheap way to make three-dimensional photoprints.

While trivision photographic prints represent the large commercial market for his depth pictures, Winnek is momentarily keenly interested in his transparencies in connection with X-ray film. It is possible, he says, to mark this X-ray film with a faint cross hatch of blue lines which, on the margins of the film, can be calibrated in terms of the actual depth perspective of the X-ray picture. This means that a surgeon can look at such a picture directly and can determine where and how deep his surgical objective may be.



LIKE TINY LENSES

Each of these little ridges (shown here greatly enlarged) picks up a separate image and this permits the eye to see the resulting picture as though it were an actual three-dimension scene.

Keenly interested is the Navy in this same technique, also, for certain military applications which need not be entered into here.

Asked how his little ridges on the film produce the amazing three-dimensional effect, Mr. Winnek gave this explanation:

"Trivision, three-dimensional pictures, are achieved by the use of an invisible transparent screen which is an integral part of the picture. This screen consists of a series of microscopically small lens bars, or ridges.

"These ridges on the film negative break up the single image of an ordinary photographic impression into a whole series of multiple images on the film emulsion.

Developed in Usual Way

"The film is developed in the ordinary way as though the ridges were not present at all. When developed and fixed, the transparency is viewed through the ridged, or lenticulated side. Your right eye sees one particular image out of the infinite number of panoramic glimpses present in the fixed emulsion.

"Your left, however, sees a slightly different set of panoramic glimpses. The effect, for both eyes, is that of seeing slightly around the edges of the object in the picture. This fulfills the basic requirement of binocular, or normal, vision."

Try this simple experiment to discover how greatly different are the two pictures which your eyes observe in normal vision. Hold up a thin object like a playing card or a package of cigarettes edgewise, and about one foot from your nose. Look at it with the left eye alone and then with the right eye alone. It is the combination of these two very different views in your brain which enables you to know that the playing card or cigarette pack has a depth. Your two eyes, as the scientists say, see in perspective.

There are undoubtedly many unforeseen "bugs" in the eventual development of trivision into its many ramifications but the pathway ahead, while perhaps difficult, seems straight forward. The interest of the Navy ought to do much to get inventor Winnek over the "hump" up which he is now plodding.

Here, in summary, are the possible applications of trivision to photography. All applications, remember, possess depth.

1. Film transparencies, as X-rays for medicine and industry.
2. Photographic transparencies for portraits and display advertising.
3. Paper print trivision for magazine covers and insert advertising within a magazine.
4. Display advertising in subways and windows.
5. Reproduction by printing press so that some day pictures in your newspaper may stand out with amazing depth.
6. Aerial photography with much greater depth perspective than pictures now taken.
7. Still projection of pictures so that they have depth.

Laughingly Winnek admits that three-dimensional motion pictures—the thing which started him off on his investigation—is still far in the future.

What will interest most people in trivision is the possibility—that should become a reality by next fall—of buying trivision film, putting it in their own cameras and being able to get three-dimensional prints.

Mr. Winnek says that owners of wide aperture lens cameras will obtain the best pictures but that almost any old camera will give an astounding degree of perspective. He estimates that at an increased cost of only 5 per cent it will be possible to process ordinary film into trivision film. This means on a 25-cent film roll that the cost will only be an extra cent or two.

Factory Processing

After you expose the film you will, at first, have to send it back to the trivision factory for the processing and production of prints. Later Winnek hopes to lease special printing machines to the hundreds of professional photographic laboratories which have drugstore pickup service. It will then only be necessary to take your film to the nearest drugstore. Eventually the serious amateur, who wants to make his own prints, will be able to buy or lease printing equipment.

A development of Winnek and his group is a low cost wide aperture camera especially adapted for trivision pictures. Wide aperture lenses of glass cost a small fortune, but Winnek believes that an inexpensive lens of this type can be made out of the new transparent plastics very cheaply.

Big trouble of Winnek's group now is

how to go through the final stage of development without selling stock, or selling rights to the whole process for a sum not commensurate with its importance and real worth. Potentially they are like a man sitting on a treasure chest but without a hatchet to break the lock. It looks, however, as if the box might burst of its own potentialities.

Science News Letter, June 15, 1940

PHYSIOLOGY

Negro's Ability to Stand High Temperatures Important

Harvard Fatigue Laboratory Studies Reveal That Negro Can Better Stand Hot, Humid Weather

NATIONAL defense plans might well call for Negro tank troops and Negro submarine crews in view of studies reported by Prof. D. B. Dill, Sid Robinson, F. G. Hall and J. W. Wilson of Harvard's Fatigue Laboratory, at the joint meeting of the American Association of Industrial Physicians and Surgeons and the American Industrial Hygiene Association.

The popular idea that the Negro can stand working in hot, humid weather better than the white man has apparently been proved by Prof. Dill's studies. The immediate practical application of his findings, Prof. Dill suggests, is in connection with national defense plans.

"The prospects are that many hundreds of thousands of American citizens will take their places in a defense army within the next few months. These men will have to do hard physical work; however highly warfare may have become mechanized, it continues to require the expenditure of physical energy at high levels for long periods and frequently at high temperatures. A large fraction of our armed forces is stationed in the tropics or sub-tropics, another large fraction experiences hot humid heat in the summer, and another and increasingly large fraction must become adapted to the uncomfortable and at times very hot interiors of tanks or submarines.

"War and sport are to some extent dependent phenomena, unpleasant as the implications may be . . . The most heroic war of modern times was waged by a nation of athletes—the Finns. The records of the Germans, French, English, Japanese, and Chinese in the last Olympic Games show a high correlation with their performances in the present wars. The fact that the United States won the track and field championship in the last Olympic Games should therefore be a source of some comfort to us in the present world situation."

Without the points scored by the Negroes in the last Olympic Games the United States could not have won, Prof. Dill stated.

Proof and explanation of the Negro's superior ability to do physical work, whether in industry, sports or war, at high temperatures was obtained from studies of Negro and white sharecroppers in Mississippi.

Crucial experiment was a two-hour walk on a treadmill in which each man covered seven miles and climbed about 3,000 feet at a temperature of 87 degrees Fahrenheit and a humidity of about 80%. During this test, the Negroes lost less salt and water from their bodies in sweat than the whites, did not get quite as hot as the whites as shown by body temperature readings, and in consequence did not come as near exhaustion as measured by the heart rate.

Under conditions such as this experiment, when the heart rate reaches 180 beats per minute, Prof. Dill explained, not come as near exhaustion.

At the end of the two hours, the mean value for heart rate for 20 Negro sharecroppers was 152, while for the seven white sharecroppers it was 173.

Science News Letter, June 15, 1940

ENTOMOLOGY

NATURE RAMBLINGS by Frank Thone

Strident Songsters

BILLIONS of 17-year cicadas, longest-lived of all insects, are emerging from the earth over the greater part of the country between the Mississippi and the Atlantic coast, to fill the warm air with their shrillings throughout the month of June. They have lived underground for 17 years, sucking juices from tree roots. Those emerging now will mate, produce their eggs and die, and the tiny grubs that hatch from the eggs later in the summer will dig into the earth to repeat the same strange, hidden life cycle.

Heaviest outbreaks this season are occurring in the Tennessee and upper Ohio valleys, with outlying groups ranging from northern Illinois to Cape Cod, and south along the Appalachians into the northern counties of Georgia. This year's crop of 13-year cicadas, Southern cousins of the 17-year species, will be exceedingly scanty, past records indicate.

There are 17 broods of the 17-year cicada, and 13 broods of the 13-year kinbug, so that every year there are some