

X-RAY HAS MANY USES NOT COMMONLY KNOWN

Its Ability to See Inside Objects Without Destroying Them Has at Last Been Appreciated by Industrialists—Can See Through Steel.

The days when the X-ray was considered useful only to a doctor or dentist have passed. Its ability to see inside objects without destroying them has at last been appreciated by industrialists, and now, as an aid to inspection, it is used in factories of all kinds. An article in the Review of Reviews states:

"The effect of different methods of production can be determined quickly by means of a photograph. Flaws and defects may be detected before costly machining operations have been performed. The relative suitability of various materials, shapes and sizes may be readily determined beforehand. X-ray inspection is already being applied to cast steel, brass and bronze, magnesium, aluminum, rubber, ceramics, glass, and such raw materials as coal. The increasing use of welding and of airplanes opens two great fields where X-ray inspection ought to play a vital part in protecting life and eliminating uncertainty.

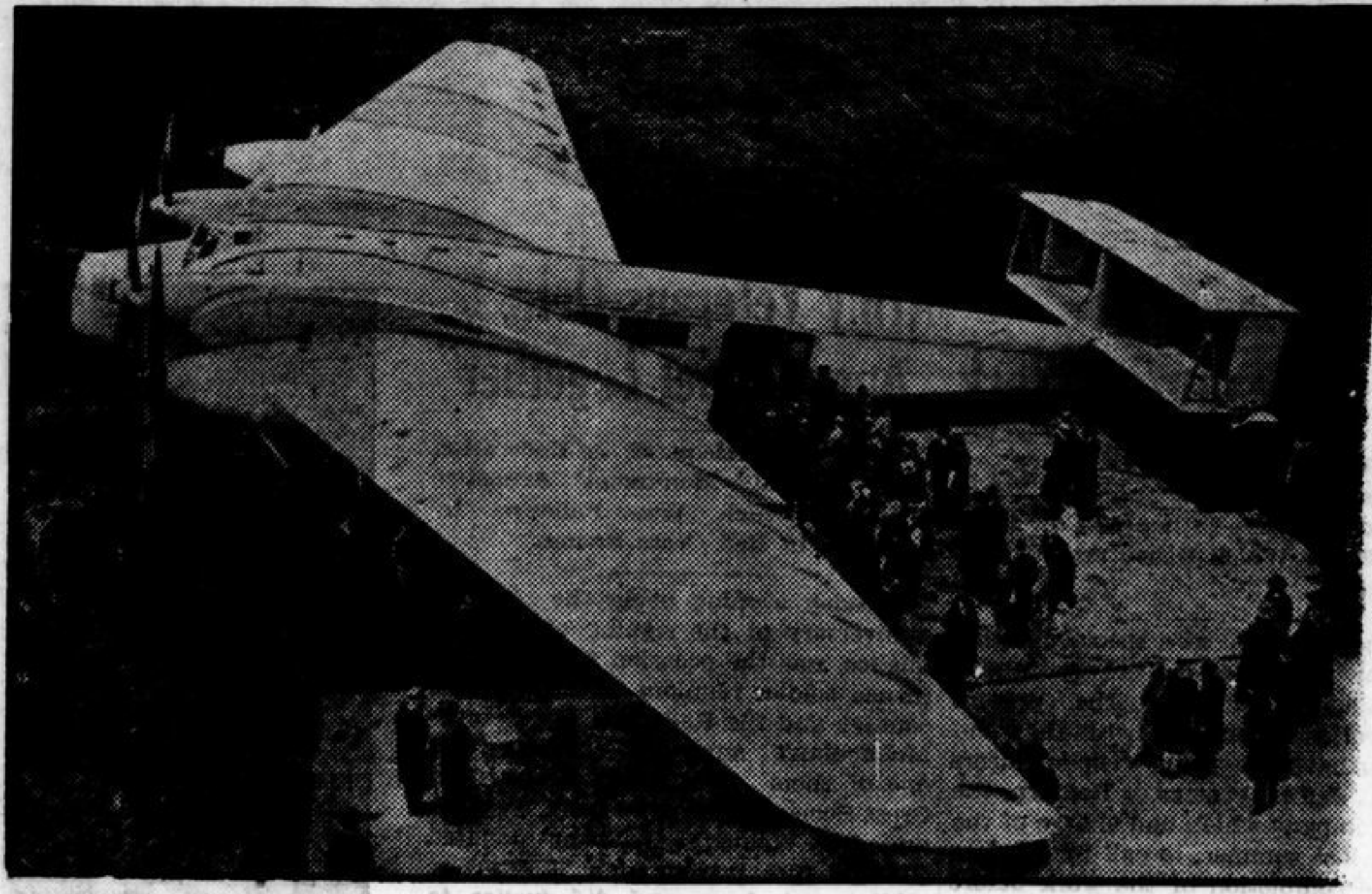
"Until about 1918 X-ray examinations were limited to steel not exceeding one inch in thickness. But the modern X-ray can penetrate mild steel 3/4 to 4 1/2 inches thick, or show an internal flaw of 3-10 of a diameter, that distance from the surface. Within these limitations, therefore, it is no longer necessary to destroy materials or products to determine their internal conditions. Radiography places a new inspection tool at the service of the sincere, progressive and honest manufacturer.

Until recently it was the custom to manufacture a few sample specimens that could be cut up for inspection. Now the X-ray may be used. This eliminates the expense and time for making the additional pieces. All the valves and piping required on a steam system designed to work at unusually high pressure were recently inspected by X-ray. Several pieces were rejected because defective. And there has been no breakdown or trouble whatever with the pieces that passed the X-ray test. One shutdown, of course, would have cost many times over the cost of one X-ray picture.

"It can be seen immediately what an important factor X-ray inspection will ultimately be in airplane construction, and in checking up the welds of buildings and other important structures. X-ray inspection tells the story without ruining the product or destroying the evidence.

"One rubber company uses X-ray inspection on its golf balls to determine the centering of the core. Another impregnates the cord or its tire with lead salts, making possible an X-ray examination to determine the condition of the union of cord and rubber, to eliminate any faults suffered from strains during the manufacturing process.

"Another company examines its metal radio tubes for the proper spacing between filament and grid each tube being viewed in two directions at right angles to each other. Thermometers are now being X-rayed to make sure that the glass meets specifications and is not a cheaper glass containing soda. The amount of tetra-ethyl lead in commercial gasoline is being determined by means of X-ray. Ammunition also came in for radiographic examination to determine the correct position of the fuse and the internal mechanism. Ball bearings, heavily insulated cables and wires, grinding wheels that are subjected to great strain, firebrick that may possess internal flaws, or metallic particles, can be inspected internally with the radiograph—without injury. Even coal can be examined by X-ray to determine its



ANOTHER OF GERMANY'S GREAT PLANES
This giant Junker plane G-38 (also known as the D-2000), is the largest land plane in existence at the present time. A remarkable feature of the ship is the manner in which the hollow wings have been utilized in creating engine rooms and accommodation for passengers. The plane is said to have a capacity for covering 2,000 miles without stopping. This picture was taken when the G-38 went on a tour of Europe.

ash content, consisting largely of calcium and iron salt. These are opaque while carbon is transparent to the X-ray. Electrical insulators may be examined to determine incipient and internal cracks.

"There is another side to the X-ray in industry, a more human side, of probably wider, more general application. That is for inspection, for routine supervision and observation. The radiograph shows up the careless worker, compelling him to be more careful or lose his job. It acts as a deterrent to the over conscientious inspector who finds fault needlessly for his own gain, just as it shows up the careless inspector. Being vastly more sensitive to differences in intensity than the human eye, the photographic process is able to detect flaws which otherwise would be invisible. These pictures may be made in the fraction of a second, so enabling rapidly moving parts to be inspected. Moreover, the photographic process has the advantage of affording a permanent record of actual conditions. It is not subject to the whims, moods, or alertness of the individual.

"Another industrial application of the X-ray, less known than its application to detect flaws is that of studying minute particles too small for study by the human eyes and unsuited even to the microscope. The human eye can never hope to see objects smaller than 100,000th of an inch. But with the X-ray it is possible to see the most minute object, because the ray is an electromagnetic disturbance of the same general nature as visible light. It is 10,000 times as short or only one hundred-millionth of an inch in wave length—about the size of atoms themselves.

"Methods of X-ray diffraction are now in use to study the performance of fibrous materials such as rayons, silks and wool when stretched, as well as for investigating metals and chemicals. The X-ray is a new tool for industry. But it is vastly more. It is the key to undiscovered worlds and undreamed of opportunities that lie still hidden in the maze of doubt and mystery of an undiscovered world."

APPLE EXPORTS AHEAD OF LAST YEAR

The market report of the Dominion Fruit Branch shows that Canadian apple exports this year are well ahead of last. As at October 10 the relative standing was: Barrels, 1930 265,078, 1929, 157,558; half barrels, 1930, 19,225; 1929, 10,405; boxes 1930 166,865; 1929, 64,457.

Increased efficiency all around is the outstanding characteristic of the fruit industry in Canada for 1930.

ONE MILE OF ICE COVERED THE COUNTRY

Professor A. P. Coleman, M.A., L.L.D., F.R.S., for many years Professor of Geology at Toronto University and now Professor Emeritus, internationally known in the field of research, recently spoke to the Kiwanis Clubs of Orillia and Barrie on the waterways of this portion of Canada in their relation to the ice age. Professor Coleman spoke as the guest of the Barrie Club which went to Orillia for an interclub visit. Wilfred McKinnon presided and about 47 Barrie Kiwanians were present.

Here you are between two lakes, said Professor Coleman, in introducing his subject, on the Trent Waterway, which you expect soon to be carrying the grain of the West to the seaport. Barrie even now was planning docks and elevators, he said, with a humorous twinkle in his eye, and if memory served him right Newmarket and Bradford were connected with the waterway. As he came along through the country to Orillia observing the evidence of spring in the autumn in the green fields of wheat, he also noticed the stones and large boulders in the fields. Some of these weighed tons. How did they get there? There must have been a powerful force to move some of them. There was a time, said Prof. Coleman, when the climate of this region was considerably warmer than at present, the average being five or six degrees higher temperature. Gradually the winters lengthened and became longer and longer due to the great ice field whose cap started near James Bay and slowly moved south over all this portion of Ontario and into New York state, below Niagara Falls. There was ice one mile thick, said the speaker with conviction. As the ice moved down it spread boulders and fertile clay over the whole region. For tens of thousands of years it changed the whole surface and the animal life and forest growth which had been suited to a warmer climate were completely altered.

After fifty or one hundred thousand years this ice field, whose tremendous weight had bent the earth crust in upon the lower regions, melted, forming a very large lake which geologists have named Lake Algonquin. This lake spread out over the region now occupied by Lake Superior and Georgian Bay and had an outlet through the Trent Valley into the ocean, which at that time reached as far west as the site of the city of Toronto. Toronto was then a sea port, Hamilton being off the water, said the Professor with a smile. Another outlet of Lake Algonquin was through the thumb of what is now called Lake Michigan, into the Mississippi Valley. "You have heard of the Chicago Drainage Canal, the terrible steal," interjected the speaker, amid laughter. There was good evidence that Lake Algonquin lasted for nine thousand years.

Another great waterway which existed at that time was the Nipissing Great Lakes which extended from the Georgian Bay down the Ottawa valley and emptied into the ocean above the site of the city of Ottawa.

After thousands of years the plastic surface of the earth, which had been weighted down with the ice, slowly getting lighter and lighter as the ice melted away, came up again, and set free from water the land as it is now. The present adjustments of the earth's crust were, of course, brought about during tens of thousands of years, explained the speaker. All the old shores were deformed, but there were still these old shores in evidence in many places. How did he know the sea extended above Ottawa? Professor Coleman said by reason of the fact that he had discovered small fish of the sea in concretions found at Lake Coulogne. Clam shells were also found. The fact that there were interglacial times when the temperature was five or six degrees higher than at present in this region was proven by the discovery of the remains of forest and animal growth pertaining to the state of Pennsylvania. Likewise the age of ice and cooler climate was revealed by the finding of remains of the grizzly bear and the giant beaver as well as a type of deer between the elk and the moose.

Our Ottawa Letter

The establishment of stable markets for the products of Canadian farms, agriculture and livestock—presents the most important and, in many respects, the most difficult problem confronting Canada today. At the present time the marketing end of the problem is being attacked by the Departments of Finance and Trade and Commerce. The Finance Department is endeavoring through tariff adjustments to build up the home market and at the same time to conserve it for the benefit of the Canadian farmer. The first move in that direction was made in September. Steps are now being taken in gathering information upon which more widespread plans will be built for submission to Parliament this winter.

The Department of Trade and Commerce has its entire staff abroad searching for new or greater outlets for grain, dairy products and livestock and at home it is prosecuting a national campaign in favor of the use of made-in-Canada goods.

Those activities, however successful they may be, do not meet all the requirements of the situation. It is necessary that farm producers fit their production in kind, quality and quantity to the consumptive capacity of the available markets and that they conduct their operations along methods which will yield them a profit as well as a market for their labor.

It is to thus complete the program of the government for the stimulating of agriculture that a new and highly important program will be launched within a few weeks under direction of Hon. Robert Weir, Minister of Agriculture. Mr. Weir's plan will bring the federal department into a more direct contact with the farmer than has hitherto been the case. To launch the campaign the Minister will shortly make a tour of Canada, meeting provincial agricultural officers and leading political farmers. He will discuss with them the methods he proposes to use, methods used by himself as a successful farmer, and others suggested by the information which has come to him as a minister of the crown.

An exhaustive study with all the facilities of Government, covering three months, plus many years practical experience, has shown conclusively that the future of farm life depends upon energetic development of markets and the lowest possible production costs of products for which there is a market. The Government plan is to locate the markets, to advise the farmer what can be sold in them and to assist him in producing the quality of goods demanded at a cost which will allow him a profit.

No system of bonus offers any solution. This year, for example, to give the farmer \$1.10 a bushel for his wheat—not much profit at that price either—would cost the country approximately \$120,000,000, or more than is spent annually on all services apart from fixed interest on war debt and the money going into pensions and soldiers' re-estabishment.

At least Nova Scotia and Alberta are deeply interested in studies now being made of methods by which the distribution and sale of Canadian coal can be extended in the Canadian market. A plank in the Bennett platform was the active encouragement of the use of Canadian fuel and an investigation is proceeding to determine along what lines that policy can be made most effective. Those who have the work in hand expect that it will be concluded before Parliament meets and that 1931 will see the inauguration of a more expansive machinery to promote the economical use of Canadian fuel in Central Canada.

Sign Language

The celebrated soprano was in the middle of her solo when little Johnny said to his mother, referring to the conductor of the orchestra: "Why does the man hit at the woman with the stick?" "He is not hitting at her," replied the mother. "Keep quiet." "Well, then, what is she hollerin' for?"

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