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# Pingoes and The Northwest Passage

[THE HISTORIC DISCOVERIES OF THE SCIENTIFIC SHIP HUDSON]

A pingo is a cone of antediluvian ice, coated with frozen muck, a thousand feet at the base, one to two hundred feet high, sticking up like a dirty knife from the bottom of the arctic sea to within forty feet of the surface. It could pierce and rip the bottom of an unsuspecting deep-draft ship the way a kitchen knife can gut a fish. In one dramatic half hour on a summer morning in 1970, the Canadian scientific ship *Hudson*, plotting the shape of the Beaufort Sea's basin with a side-scan sonar, found seven pingoes in a row. A few days later, the sonar watchers found a picket line of them stretched across the Northwest Passage.

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The discovery meant that the long-sought passage around the top of North America was at that time a dead end for supertankers and that the *Manhattan*, which had pioneered the route less than a year before, could be the last as well as the first to make the run.

The Hudson is a floating oceanographic labora-



tory, and during that eventful week in August, it was moving into the last phases of a year-long, 58,000-mile trip from Halifax to Halifax, down the east coasts of the Americas, around the Horn, up (or down) to Antarctica, along the west coasts to Vancouver, through the Beaufort Sea and Baffin Bay, around Newfoundland and home. It carried a computer; instruments to measure currents, gravity, sonic waves, microscopic organisms and chemical traces in the sea; a dog and, at one time or another, 120 scientists of all stripes and several nationalities.

The voyage of the Canadian scientific ship Hudson was one of the most significant explorations in the history of the oceans. The Department of Energy, Mines and Resources budgeted \$1,500,000 for it, and Dr. Cedric Mann, a physical oceanographer from the Bedford Institute of Oceanography, began planning it in 1967. It was to be called Hudson 70 and was to be a major, broad-scale oceanographic exploration involving a variety of scientific disciplines, with a heavy proportion of biologists. It established Canada, appropriately, as a leader in a relatively new field, oceanography. Canada has oceans on three sides (the Atlantic, the Arctic, and the Pacific) and the longest coastline in the world. Its continental shelf, the part of the land mass which extends like a submerged threshold into the seas, is 1,400,000 square miles, half as big as the country itself. The shelf is also a storehouse of natural resources, including oil.

The Hudson left Halifax on November 19, 1969, with Capt. David W. Butler in command, Dr. Mann as Chief Scientist, scores of other scientists on board or expected, each with his own mission, and a crew composed mostly of Newfoundlanders. Dr. Mann would attempt to lay current metres across the five hundred mile wide Drake Passage (the passage which in navigational terms corresponded to the Northwest Passage) between Cape Horn and the northernmost tip of Antarctica; Carol Lalli, a biologist from McGill University, would come aboard at Rio de Janeiro to collect samples of two species of tiny sea creatures called pteropods; Peter Beamish, a biologist with an acoustical engineering background, would try to record the ultrasound emitted, he believed, by baleen whales; Bill Sutcliffe would measure the ribonucleic acid in zooplankton; Bill von Arx, of Woods Hole Oceanographic Institution in Massachusetts, would try to measure the gravitational shape of the Pacific.

In the next eleven months, the sailors and scientists would work their way through hundreds of stations—places where the scientists dropped instruments into the deep while the *Hudson* stood still. (To keep the ship from moving with the current, the *Hudson* had a propeller in the bow to balance the push of the water.) The voyagers suffered the mild hardships of twentieth century seafaring: bouts of seasickness despite the ship's stabilizers, the discomfort of a malfunctioning air conditioning system, and the exasperation of constant exposure to each other. They visited some of the world's stranger ports: the abandoned British base at Admiralty Bay in

Dr. Bosko Loncarevic checks the geophysics console while surveying the Beaufort Sea. The Hudson and her sister ships found ancient ice pinnacles jutting up from the bottom, as indicated at right, and deep cuts in the bottom caused by keels extending down from the ice pack, as evidenced below.



PHOTOS: ATLANTIC OCEANOGRAPHIC LABORATORY



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  - d. should have more art, shorter stories.

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  - c. education.
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  - e. other\_\_\_\_\_
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  - b. \$7,000-\$9,999.
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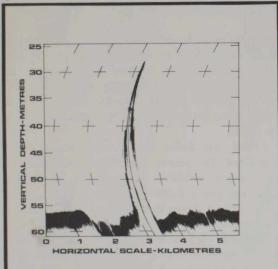
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#### **Canadian Embassy**

Office of Information 1771 N Street, NW Washington, DC 20036 Antarctica and the remnants of the multinational base at Deception Island, which was abruptly closed when the island volcano erupted in 1967. The *Hudson* also steamed into a great natural harbour which was literally steaming itself, the water hot enough to blister the paint on the ship's dory, the beach covered with warm ashes and pocked with mysterious cone-shaped depressions.

Much of the work the scientists were involved in would take years to complete, but along the way they were able to draw at least some tentative conclusions: baleen whales (the largest) as well as dolphins (the smallest) do converse in ultrasonic waves, though by mischance they were unable to record them; the sea is not ever likely to be converted to a vast farm to feed the world; the sea, on the other hand, does not seem to be losing its ability to produce oxygen, a disaster feared by some.

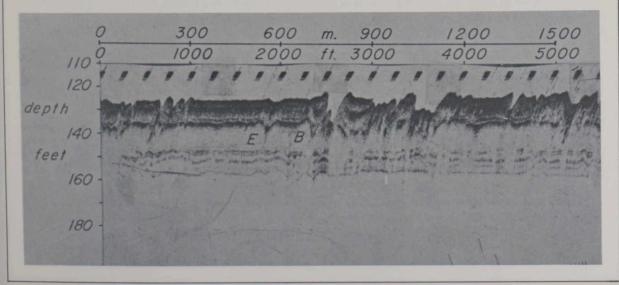
The most exciting and challenging phase of the long voyage came when the ship swung east at the top of its oblong track and sent its special one and five-eighths inch hull (twice the

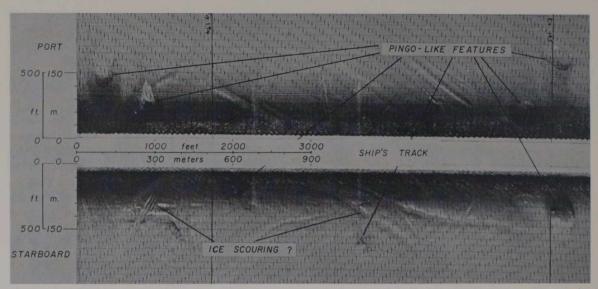


thickness of an ordinary one) smashing full speed into the Arctic ice pack at Point Barrow. After two hours of relatively easy going, the *Hudson* stopped dead. It charged again, the bow rose up on the ice, and slowly the ice groaned and split under the weight of the ship. The *Hudson* emerged forty-two hours later, on August 25th, near Herschel Island in the Beaufort Sea. Bernie Pelletier, of the Geological Survey of Canada, was the chief scientist during this phase of the voyage and the interest was in oil and ice. How was Canada to get the first past the second? The conclusion reached in one exciting week was that it was going to be much more difficult than anyone had imagined.

Jim Shearer was waiting at Herschel and the first thing he said was, "Wait until you see what I've got." Shearer had been working aboard the smaller ship, the Richardson, charting the basin of the sea with side-scan sonar. Side-scan sonar does more than register the depth of the bottom directly beneath the ship; it gives a three-dimensional picture of what the whole bottom is like. Shearer had some startling pictures and he laid them out on the chart house table: the bottom of the Beaufort Sea was criss-crossed with deep gashes. The ice pack which covered the sea most of the year was so thick and subject to such enormous pressures that "keels" of ice formed extending down to the bottom. As the pack shifted, the keels gouged deep valleys in the sediment of the continental shelf, some twenty to thirty feet deep. The gashes were of appalling significance. The oil reserves were in the shelf, twenty, thirty, sixty miles from shore. The assumption had been that once tapped, the oil could be brought to shore by pipeline, as it is from all other offshore fields. It was soon apparent to Pelletier that there could be no pipelines in the Beaufort Sea.

Any pipeline laid on or beneath the ocean floor could be sliced by the first passing keel—the





Side scan sonar gave graphic pictures of the newly found perils to navigation. The pingo-like peaks could rip open ship bottoms and the threat of new gouges in the bottom made conventional pipe-lining impractical.

keels hit the bottom even sixty miles out where the water was three hundred feet deep.

The following week the *Hudson* found that, for a time at least, tankers were as impractical in arctic waters as pipelines. The previous summer a Canadian ship, the *Sir John A. Macdonald*, had escorted the *Manhattan* on her historic voyage. The *Macdonald's* sonar had picked up an unexpected shoal, rising to within fifty-three feet of the surface. Rear Adm. A. H. G. Storrs, who was aboard, had been so startled that he poked his finger through the sonar chart. The shoal was informally named the "Admiral's Finger."

The Hudson would now find that the name was more appropriate than imagined-the side-scan sonar showed that the Admiral's Finger was not a proper shoal but a pingo, a finger of ice sticking up from the bottom. It was within fifty-three feet of the surface, and, since the Manhattan drew fifty-six feet, the pingo could have opened up its hull from bow to stern. In the next few days, the Hudson and the smaller ships working with her, the Richardson, the Baffin and the Parizeau, would find that there were more dangerous fingers in the Beaufort Sea than at a convention of eye gougers. They could (and would) be charted, but there was no way (or at any rate no way yet imagined) by which the Beaufort Sea could be made safe for deep-draft ships. Any ship in the Sea must contend with the ice pack. Once locked in the pack, a ship moves with the pack and the pack could drag the ship across the pingoes.

As a result of the *Hudson's* disconcerting discoveries, the Canadian government is now very reluctant to have ships travel through the Northwest Passage. Also, it cannot allow pipelines (as now conceived) on the continental shelf. One tanker ripped open by a pingo or one offshore pipeline sliced by an ice keel could disrupt the fragile ecological balance of much of the Arctic.

The last leg of *Hudson 70* began at Resolute, an outpost just about at the center of the width of the Americas (if you dropped a line down from Resolute, it would go through the Hudson Bay and the Gulf of Mexico; most of North America would be to the left and all of South America to the right).

Ahead was Baffin Bay, a loop around Newfoundland (to please the Newfoundlanders in the crew) and Halifax. There was to be one last major discovery: Baffin Bay is not a bay at all but an ocean. An ocean is a body of water between two distinct land masses. Each land mass rests on its own plate and each plate moves, though slowly, on the molten core of the earth. The Hudson, working with the Baffin and a U.S. Coast Guard cutter, the Edisto, took seismic, gravity and magnetic readings across the Bay. They found that the Bay indeed separated the North American plate from the Greenland plate. Its own bottom was much thinner than the two plates, having been formed (probably) by new material seeping up from the plastic mantle of the earth, as Greenland and Canada drifted apart.

On October 16, 1970, the *Hudson* came home to Halifax, having gone 57,956.5 miles and having determined or discovered along the way the scientific facts listed above and no doubt a good many others which will take some additional time to work up. To a Canada which has become increasingly aware of the fragility of the Arctic ecology, and to a world which shares common problems of pollution, fuel and food, it was a voyage of historic importance.

## The LeDain Commission Reports

[CONSIDERED CONCLUSIONS ABOUT THE NON-MEDICAL USE OF DRUGS]

The addictive use of drugs is a complex of problems, and as 1974 got under way, Canada had a new and complex set of recommendations for dealing with them. The LeDain Commission of Inquiry into the Non-Medical Use of Drugs sat four and a half years, held public hearings in twenty-seven cities and cost more than \$3 million. Its final 1,172-page report estimates that there are now 15,000 "daily users" of opiate drugs (such as heroin) in Canada and recommends new laws to replace the Narcotic Control Act and the Food and Drugs Act.

Specific recommendations-which range from

"lenient" to "harsh"—have stirred sharp controversy across Canada. They include:

• The elimination of all jail sentences for firsttime possession of cannabis (marijuana or hashish); the removal of cannabis from the category of "hard drugs" such as heroin and cocaine; and the general lowering of penalties involving cannabis use.

• A stop to the expansion of the number of drugs which it is against the law to "possess." Specifically, it recommended that amphetaminelike drugs not be added to the list and, in general, that less emphasis be put on "possession"



CARTOON: AISLIN, CONTENT PUBLISHING

by police and prosecutors. It suggested that the maximum penalty for possession of heroin, other opiates and strong hallucinogens (LSD, for example) be two years.

• The arrest and detention of persons believed to be addicted to heroin. Suspects would be examined by court-appointed doctors and if found to be addicts, could be detained for three months during which time they would be offered various treatment options. If they refused treatment, they would be released but would henceforth be subject to criminal charges if found in possession of opiates.

• An experimental program (modeled on a program in Great Britain) in which confirmed heroin addicts would be given regular injections legally under carefully controlled conditions.

• The banning of liquor ads or if that proves impractical, closer Federal supervision of advertising claims and the printing of a warning in all ads that "Danger to your health increases with the amount consumed."

The report stresses a fact generally recognized but seldom stressed: Alcohol is easily Canada's most dangerous drug and the one most consistently and strongly related to crime. It cites studies indicating that alcohol is implicated in half of all pedestrian deaths, half of all automobile deaths, and 30 per cent of severe injuries in road accidents, and that in 1971 there were an estimated 1,259 deaths in Canada from alcoholic cirrhosis. (By contrast the Commission noted that chronic use of heroin and other opiates causes little direct, permanent physiological damage. Major complaints centre around persistent constipation and reduced sexual performance during chronic use. The report suggests that health problems associated with heroin use—hepatitis, tetanus, cardiovascular and lung abnormalities, scarred veins and skin infections—are caused by impure drugs or septic needles. It said the cause of "sudden deaths" associated with heroin is not clear, but that impure drugs and allergic reactions are suspected.)

The Commission report was supported by three of its five members: Chairman Gerald LeDain, a law professor at Toronto's Osgoode Hall; Montreal psychiatrist Heinz Lehmann; and J. Peter Stein, a Vancouver authority on juvenile delinquency. The dissenters, Marie-Andrée Bertrand, University of Montreal psychiatrist-criminologist, and Ian L. Campbell, Dean of Arts at Montreal's Sir George Williams University, split in opposite directions. Bertrand argued against treating possession of any drug as a crime and insisted that the proposed attempt to treat addiction by arrest and semi-compulsory treatment would be futile. Campbell proposed that drug use-as well as possession-be treated as a crime and he said he would prefer that all hard drug users with more than two convictions be given indefinite prison terms.

The Minister of National Health and Welfare, Marc Lalonde, said that legislation on the cannabis proposals will be introduced in Parliament soon and that more comprehensive drug legislation will be submitted later on.

### Incomes

The average Canadian family had an income of \$11,311 in 1972, just a shade below the average in the U.S.

The average "unattached individual" made \$4,605, and the average man made more than the average woman—\$7,647 to \$3,223.

In terms of income all jobs are not, of course, equal. Below we list some incomes by occupations, as compiled by *Management Compensation in Canada*, 1972/1973, published by H. V. Chapman & Associates, Ltd., Toronto. They are, to be sure, still averages:

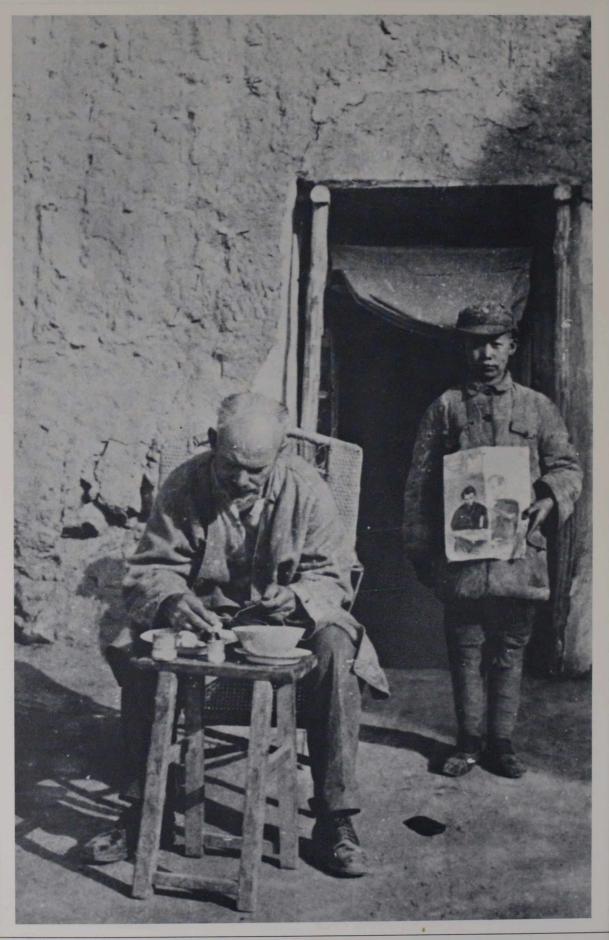
Waiter in hotel with 200 or more			
employees (before tips)	•	•	\$ 3,990
Store clerk (female) in dry cleaner's			\$ 4,210
Vamper (female) in shoe factory			\$ 4,450
Chocolate hand-dipper (female) in			
confectionery-making	•	•	\$ 4,746

Cake icer (female) in bakery .	•	•	\$	5,550
Chute blaster in gold quartz mine			\$	6,090
Trim saw operator in furniture				
manufacture		•	\$	6,850
Farmer	•	•	\$	6,990
Cashier (female) in retail food store		•	\$ !	7,160
Self-employed artist or entertainer	•	•	\$	7,890
Owner of wholesale trade business			\$1	0,900
Troubleman in electric power company	ny		\$1	1,140
First Class Police Constable .			\$1	1,280
Bricklayer and mason			\$1	4,060
Owner of real estate business .		•	\$1	4,550
Corporate planner in manufacturing			\$2:	1,390
Self-employed lawyer			\$32	2,500
Chief executive in mining		•	\$74	1,780

A third of all Canadians speak French. They write plays and novels and love letters in French. They make movies in French. They think in French. But their French is not the French of Paris. It is the French of Montreal, Quebec City, Trois Pistoles and Ottawa. We are indebted to Messrs. Sinclair Robinson and Donald Smith who have just published, through Macmillan of Canada, A Practical Handbook of Canadian French or Manual Pratique Du Francais Canadien. It shows how varied French can be, and it is divided into practical sections: "Cuisine"; "Maison, Batiments" (Home, Buildings); "Quincaillerie" (Hardware); "Ville et Spectacles" (City and Entertainment); and so forth. We have chosen a few extracts beginning with the seventh section, "L'Amour" (Love), to indicate the magnificent sweep of the work. The words and phrases are the ones found most often in offices, shops and among informal friends rather than at college seminars.

## French Canada Has A Tongue of Its Own

[CANADIAN]	[FRENCH]	[ENGLISH]	
	L'amour (Love)		
aller voir les filles	courtiser les jeunes filles	to go out with girls	
faire manger de l'avoine a quelqu'un	supplanter quelqu'un comme amoureux	to steal someone's girl	
vieux boque	vert galant	elderly lady killer, gay dog	
loup, maquereau	coureur, seducteur	wolf	
marcou	entreteneur	lover	
sauteux de clotures	don Juan	woman chaser	
tripoteux	peloteur	to cuddle someone	
etre trotteuse	etre un peu coureuse	to be boy crazy, to be a flirt	
	Le Temps (The Weather)		
abatage de pluie	rafale de pluie	cloudburst	
bordée de neige	forte tombée de neige	heavy snowfall	
doux-temps	temps relativement doux suivant un grand froid	mild spell	
été des sauvages	été de la Saint-Martin	Indian summer	
temps des sucres	période du printemps où on fabrique le sucre d'érable	maple syrup time	
	Le Bureau (The Office)		
affile-crayon.	taille-crayon	pencil sharpener	
agrofe	trombone	paper clip	
dactylo	machine à écrire	typewriter	
faire du bureau	travailler dans un bureau	to do office work	
papier ligné	papier réglé	lined paper	
saucer une plume	tremper une plume	to dip a pen	



This year marks the thirty-fifth anniversary of the death of a Canadian of remarkable and indeed unique achievements. He was controversial in life and has been obscure in death. Now, as relations between his native land and the People's Republic of China grow closer, he has begun to emerge from the shadows.

### **On Norman Bethune**

[1890-1939]

It may be that to the Chinese all North Americans look alike—when Norman Bethune died near Mao Tse-tung's front lines on November 11, 1939, the Chinese, unable to find a Canadian flag, hung an American flag behind his head. He was buried as an authentic hero of the Chinese Revolution. Today only the name of Mao is more familiar to the Chinese.

In 1972 the National Historic Sites and Monuments Board officially designated him a Canadian of "national historic significance" in a ceremony at his birthplace in Gravenhurst, Ontario. This touched off public controversy with letters to editors and columnists; some Canadians said recognition had come too late, others that it should not have come at all. The attitude of most, however, may have been expressed by a Toronto newspaper which said: "A few Canadians, not blinded by the fact that he was a Communist, have long been aware that Dr. Bethune was an idealist who practised his ideals and an exceptionally dedicated and courageous man." He was that and a lot of other things too.

He was very much the child of his age, the age of Eugene O'Neill and Scott Fitzgerald, as well as John Reed. He was egotistical, discontented, unlucky in love, enormously skilled, both sickly (like O'Neill he spent formative months in a TB sanitarium) and tough, impatient and ambitious, and he did not suffer fools gladly. He was born in a Presbyterian manse in Gravenhurst, on the edge of the Muskoka Lakes district, one hundred miles north of Toronto, on March 3, 1890, a circumstance which he, in time, did not find surprising. Forty-five years later he wrote to a friend: "You must remember my father was an evangelist and I come of a race of men violent, unstable, of passionate convictions and wrongheadedness, intolerant yet with it all, having a

Bethune, though a determined champion of the oppressed, accepted master-servant relationships with apparent ease. Ho Tzu-hsin, standing rear, was his personal servant. Bethune taught him with much difficulty—to cook eggs and when he succeeded, Bethune celebrated by having this picture taken. The English-language magazine Ho is holding was his reward from Bethune.

vision of truth and a drive to carry them on to it even though it leads, as it has done in my family, to their destruction."

He clashed with his mother (an evangelist too), whom he loved, and his father, whom he did not. Extraordinary attempts to make him conformonce his father pushed his face to the ground and made him eat dirt-taught him to rebel. At age nineteen he took a job teaching in a one-room school at Edgely, Ontario, where he was remembered as a stern disciplinarian. The next fall he enrolled at the University of Toronto, where he shocked an occasional professor and received indifferent marks. In 1911, after two years of college, he got a job teaching English and rudimentary academic skills to immigrants working in the lumber camps. When the logging season was over, he got a job as a reporter on the Winnipeg Telegram. The next year he was back at the University, where he was admitted to the School of Medicine. His marks improved. When Great Britain entered the World War, Canada and Bethune more or less followed automatically, Bethune to join the Number Two Field Ambulance Army Medical Corps. In April, 1915, he was hit by shrapnel in the left leg and sent to convalesce in Cambridge, England. With the demand for medical doctors incessant, he was asked to return to Toronto to complete his studies. He graduated in December, 1916. A fellow student remembered him clearly:

"... I would class him as a good student. He always dressed well and he always seemed to have other things on his mind besides medicine. We used to think he had quite strong socialist ideas and no doubt many of them were wellfounded. He was always very interested in the need of the common man. ... We always felt he was a bit of an enigma."

The classmate was a good diagnostician—he saw the early marks of the fully developed Bethune. He would remain a student and become a teacher; he would become, and remain for years, a dandified dresser; he would become first a socialist, then a communist; he would remain committed to the common man and he would remain an enigma. In 1920 he met beautiful, insecure Frances Penney in London. They married in 1923, despite the resistance of her parents; they divorced, married again and divorced again and remained obsessed with each other the rest of their lives.

In 1925 he found he had pulmonary tuberculosis "of a moderate extent," and he was admitted to Trudeau Sanatorium on Saranac Lake, New York.

He wrote to a friend: "I'm . . . restless . . . too much the product of my generation to conceive my situation as tragic . . . there has been no tragedy since the war. I am forced to regard the situation, if not with grimness, then at least with a shrug of my shoulders for an entirely farcical and futile world and myself as an entirely farcical and futile figure in it . . . "

In truth his time in the TB wards was one of the most significant of his life; as a result, he became an extraordinarily inventive thoracic surgeon and entered the second phase of his strangely divided life. His research led to the invention of a variety of surgical instruments and techniques, original and revolutionary. He became Clinical Assistant in Surgery at the Royal Victoria Hospital in Montreal and a consultant in TB at Ste. Anne de Bellevue Veterans Hospital. He became an international, and controversial, authority in his field. He was zealous in his care of patients-an associate said later. "He was like a father. There was actually in this man with a big ego, there was love. . . . " He was often and openly exasperated by surgeons he considered less than properly qualified. He became consciously political. Roderick Stewart, whose biography, Bethune, published by New Press, gives a full and factual picture of his complex career, said Bethune's political consciousness began stirring in the early thirties: "His clinical research discoveries and his surgery led him to imagine a glorious and beautiful paradise where disease had been eliminated. In his impatient effort to create that paradise, he viewed every obstacle as a reactionary and malign force . . . but as his own personal efforts in this direction did not

In Spain Bethune established a mobile blood bank. The mobile unit sometimes served as a bus for refugees. Here a small girl fleeing Malaga boards the bus.



seem sufficient, he focused more attention on society rather than the individual."

In August, 1934, Bethune went to Moscow and Leningrad to attend the International Physiological Congress. On his return, Louis Kon, a leader of the Canadian Communist Party, asked him to become the chairman of "The Friends of the Soviet Union." He declined, writing, " . . . I am not, as yet, perfectly convinced that communism is the solution to the problem. If I were, I assure you, I should not only accept your offer but would become a member of the Communist Party. What stands in the way of my acceptance? This-my strong feeling of individualism-the right of a man to walk alone, if that's his nature . . . Second, such being the case-to jeopardize the only position-economic and professional-I possess, by even associating with a communisticleaning association such as yours would be senseless . . ."

He did, however, continue to jeopardize his professional position in more basic ways: at the 1936 convention of the American Association of Thoracic Surgery, he delivered a carefully prepared paper entitled, "Some errors in technique and mistakes in judgment [including his own] in the course of 1,000 thoracic surgical operations." To speak of surgical mistakes at a convention of surgeons was somewhat like speaking about rope in a family where someone had been hanged.

He was commended for the paper by a few of his colleagues but damned by many, and the paper was never published. The Spanish Civil War resolved his position; he left for Spain on October 24, 1936, with a quantity of medical supplies and a letter of introduction to the head of the Loyalist government. He swiftly became a major figure in the war, organizing a blood collection agency, first operating in Madrid and then as the front line shifted, moving his transfusion service, Servicio Canadiense, wherever it was needed. Politically, his success was less marked—he strongly resented taking orders, and the Communists found him insufficiently docile. After

Bethune set up training hospitals all over the Chinese front. This one was in a Buddhist temple, probably in Hopei, in 1939.



public and private clashes with the Communist leaders, he returned to Canada for a fundraising speaking tour. He was received as a hero, met by hundreds at the Toronto airport and escorted by marching bands to the lawn of the Provincial legislature where he addressed a crowd of 5,000.

The tour was a success, but not for Bethune. He decided in August that he would not return to Spain. He said he would join what he considered the real struggle, the one in China, where the Japanese occupied Manchuria and the Chinese had spent futile years fighting each other— Chiang Kai-shek's army against the persistent forces led by Mao Tse-tung. The two forces had finally joined, uneasily, but the Japanese held much of North China including Peiping.

Bethune went to China in early 1938, as the main ingredient of the Canadian-American Mobile Medical Unit. It was a nineteen-day trip to Hong Kong and he was forty-seven years old. As Frances, his former wife, would say, he was going on his "last fling." Or, as an associate said more particularly, "All of us felt he was going to his death. We knew what conditions were there. He was going to cut himself off from modern medicine...."

Bethune wound up as the chief medical man with Mao's Eighth Route Army. He showed as much concern for the sick peasant as for the wounded soldier and he lived as they did, eating the same food, sharing the same shelter. In the face of impossible odds, he founded over twenty hospitals, teaching as well as nursing hospitals. He himself described his trainees: "The doctors who run this hospital range in age from nineteen to twenty-two and not one of them has received any training in a modern hospital; the nurses are young people between fourteen and nineteen. These are our greatest resource: They study diligently, strive to improve themselves and are willing to listen to criticism. Sometimes I'm unhappy with them from the point of view of medical knowledge, but when I see their purity, their sincere efforts to study, their love of their comrades and their selfless diligence, I can always find a way to suppress my dissatisfactions. . . ."

He also operated on the soldiers brought in from the front, once sixty hours in succession without sleep. On October 28, 1939, he cut his hand while operating bare-handed on a soldier, and several days later while operating on another the cut became infected. He died from septicaemia.

Today, Bethune is still a puzzle. He was a man of peace (who served in three armies) and saved tens of thousands of lives. He was too romantic for marriage, too independent to be either an economically successful surgeon or a good peacetime communist, and too easily popular.

He became, nevertheless, a father figure to the idealistic, a pioneer surgeon and a person of political significance in two separate worlds.

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