AVRO AIRCRAFT

BIG WHEEL TRANSPORTER

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A DIVISION OF A. V. ROE CANADA LIMITED

MALTON, ONTARIO, CANADA

INTRODUCTION

As part of its policy of diversification, Avro Aircraft of Malton, Ontario, a Division of A. V. Roe Canada Ltd., has for the past year studied the problem of development of the Canadian North. Transportation presents one of the major problems to be solved before large-scale development of this rugged two-thirds of Canada can be undertaken.

One solution to this problem is proposed by Avro with the BIG WHEEL TRANSPORTER. This huge vehicle, mounted on four giant 50-foot diameter tires, can straddle the average home and is as high as a four-story office building. Well over 100 feet long, the BIG WHEEL will carry a 200-ton payload at speeds up to 35 m.p.h. Each wheel is hydraulically steered and powered by the equivalent of fifteen automobile engines. The vehicle is so large and powerful that it can push its way through virgin forest, wade across rivers and span arctic crevasses as wide as a highway. The giant wheels and massive suspension system enable it to negotiate 10-foot deep holes and boulders as effortlessly as an automobile riding potholes.

Fully laden with payload, crew and fuel, the BIG WHEEL grosses over 500 tons—more than the weight of 250 automobiles.

Extensive use of lightweight aluminum alloy materials in its construction, combined with the very large tires, result in a ground footprint pressure only half that of the standard auto.

The BIG WHEEL is designed on the modular principle so that despite its great size, the vehicle, including the tires, can be quickly disassembled into small components suitable for air transporting. On arrival at the nearest established airstrip, the vehicle can be quickly assembled and despatched to the region under development.

One version of the BIG WHEEL proposed by Avro, carries an oil drill rig over 100 feet high plus the supporting pumps and drilling equipment. Drill crew accommodation built into the vehicle is equivalent to eight large motel units. This accommodation provides living quarters for a drill crew of forty and includes a modern kitchen, dining room, bedrooms, recreation lounge, showers and washrooms. Electric power for heating, lighting, air conditioning and cooking is supplied from the vehicle's generators. Fully equipped workshops are also carried on the vehicle. Standard off-highway vehicles can be carried and launched from the BIG WHEEL to carry out survey and exploration work. Helicopters for supply, survey and emer-

gency operations can be operated from the flat top deck of the vehicle.

Another version of the BIG WHEEL will transport ore in 200-ton loads from inland mining sites across country to ore ships and barges. The amphibious design of the BIG WHEEL enables it to off-load its cargo directly into the ore ship's hold.

A further version envisages a mobile oil and gas pipe manufacturing plant, in which coiled metal strip is formed and welded into a continuous length of tested pipe which is then fed into trenches to form the pipe line.

A combined tree harvester, lumber mill and lumber transporter is proposed in yet another version.

The BIG WHEEL is aimed at converting and transporting Canada's vast mineral wealth from the remote northland to the consumer market in a big way.

"BIG WHEEL" DATA

DIMENSIONS:

LENGTH 125 FT. HEIGHT 50 FT. WIDTH 75 FT.

WHEEL DIA. = 50 FT. TIRE PRESSURE 15 PSI

TIRE SECTION 10 FT. WIDE X 9 FT. DEEP

GROUND CLEARANCE TO UNDERSIDE OF DECK 29 FT.

LOAD DECK SIZE 100 FT. LONG X 30 FT. WIDE

WEIGHTS:

GROSS VEHICLE WEIGHT = 540 TONS

EMPTY WEIGHT = 330 TONS

PAYLOAD = 150-200 TONS DEPENDING ON RANGE REQUIRED

SPEED:

CRUISING TO 35 M.P.H.

POWER:

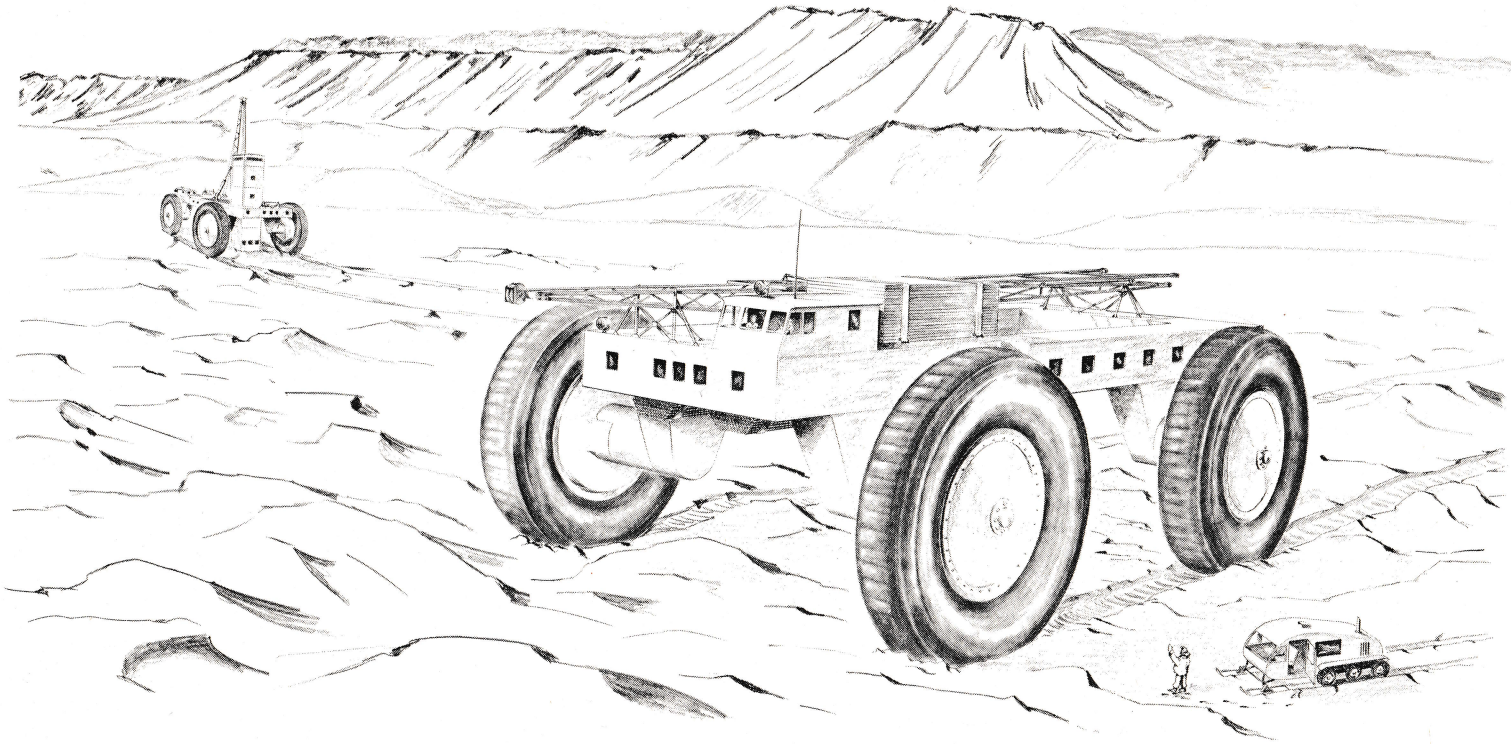
SIXTEEN 750 H.P. GASOLINE ENGINES, FOUR IN EACH WHEEL, TOTAL H.P. 12,000. ENGINES DRIVE 32 HYDRAULIC PUMPS POWERING 48 HYDRAULIC MOTORS LOCATED AT DRIVE RACK ON WHEEL RIM.

STEERING:

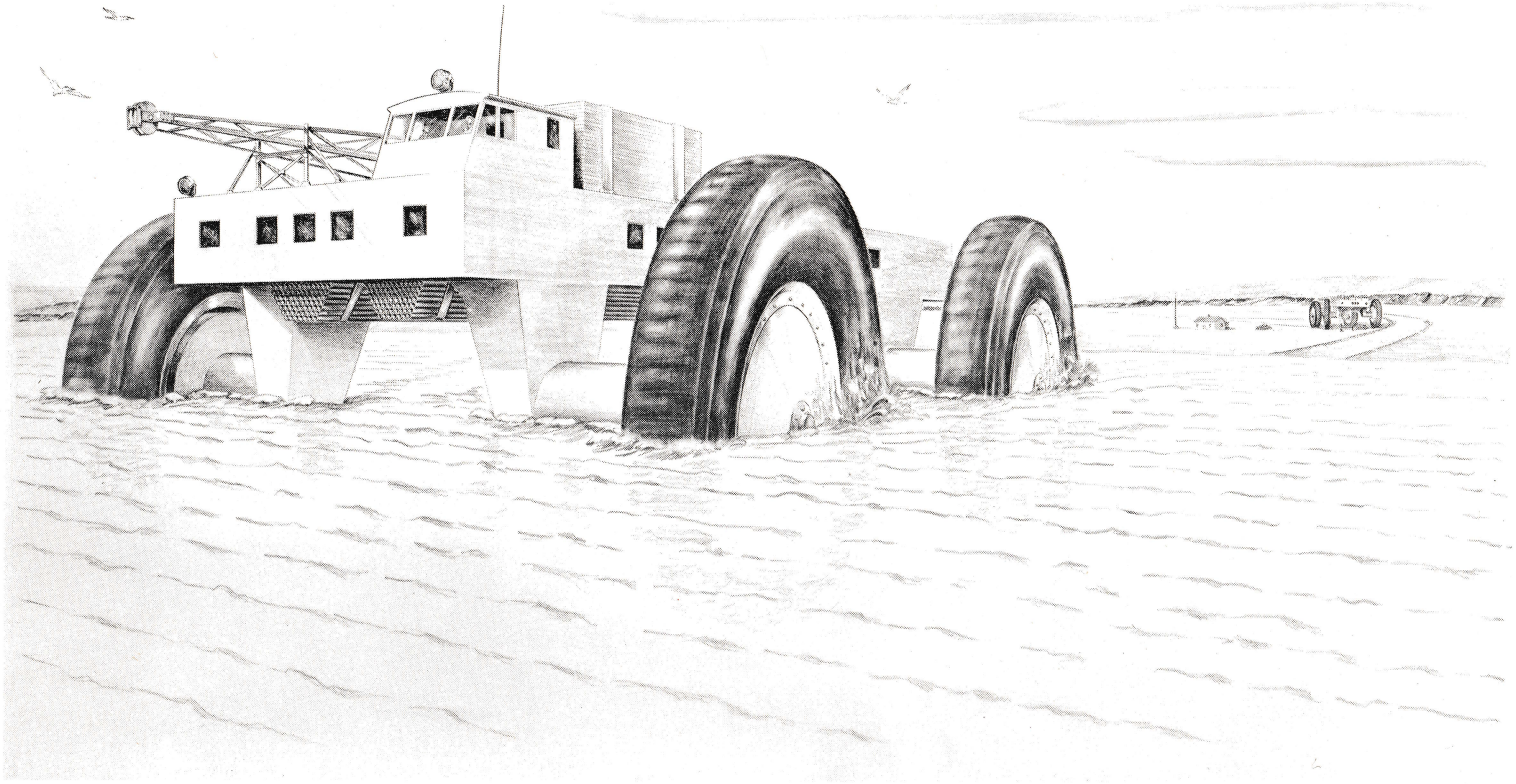
HYDRAULIC ON ALL FOUR WHEELS, TURNING RADIUS 150 FT.

SUSPENSION:

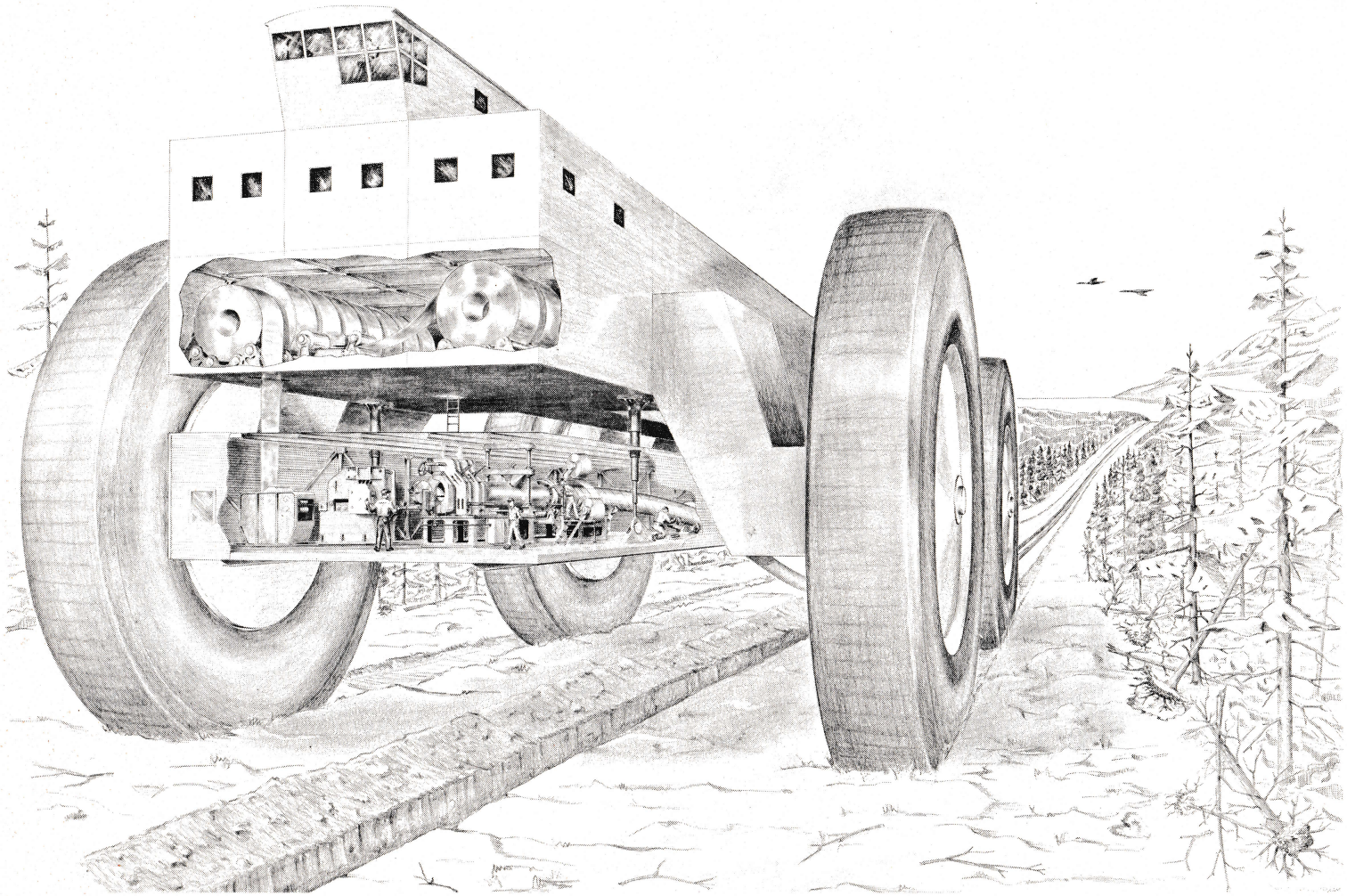
HYDRAULIC SHOCK STRUTS



BIG WHEEL - OIL DRILLING VERSION



BIG WHEEL - AMPHIBIOUS OPERATION



BIG WHEEL - MOBILE PIPE PLANT AND PIPE LINE LAYER

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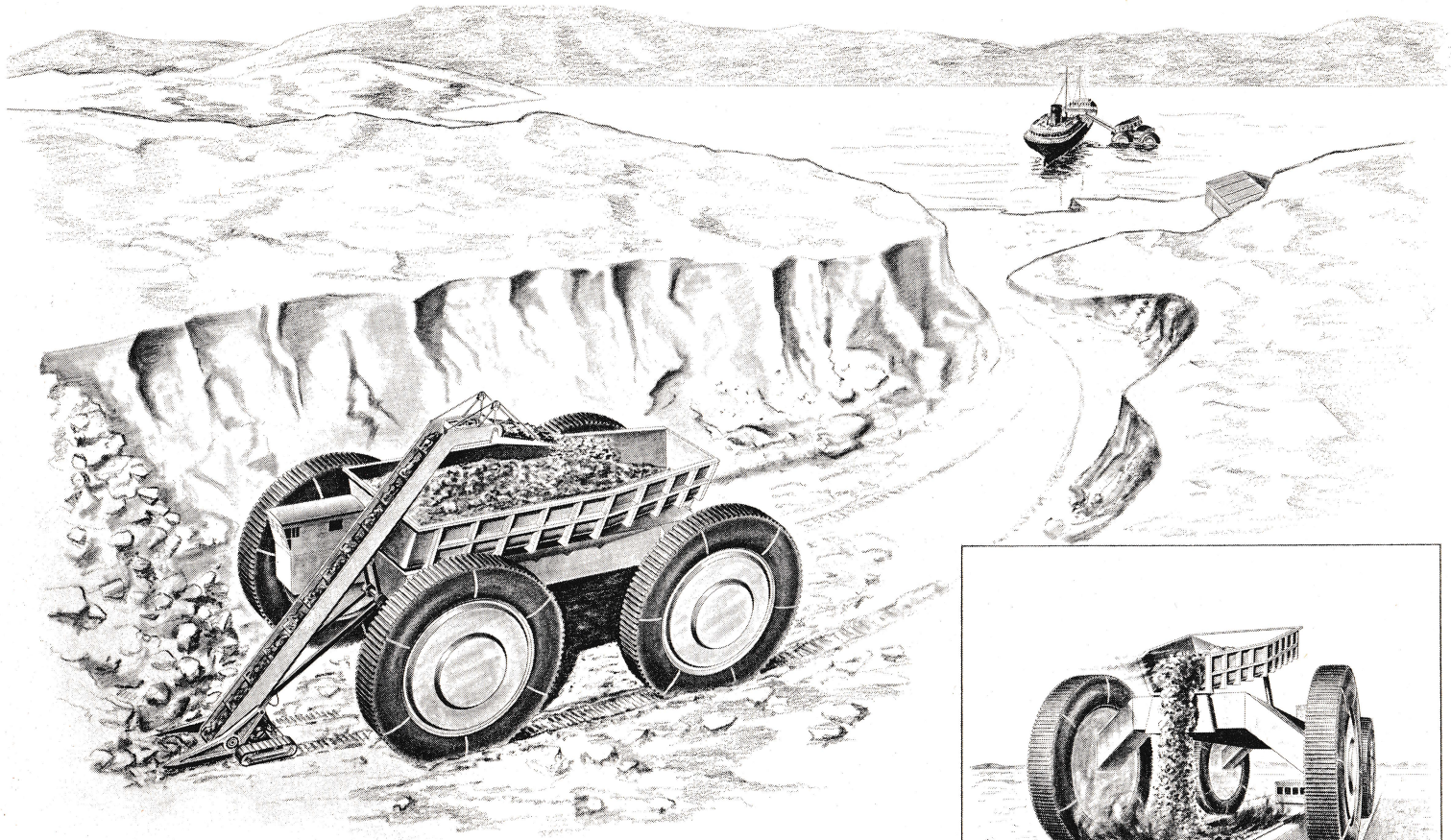
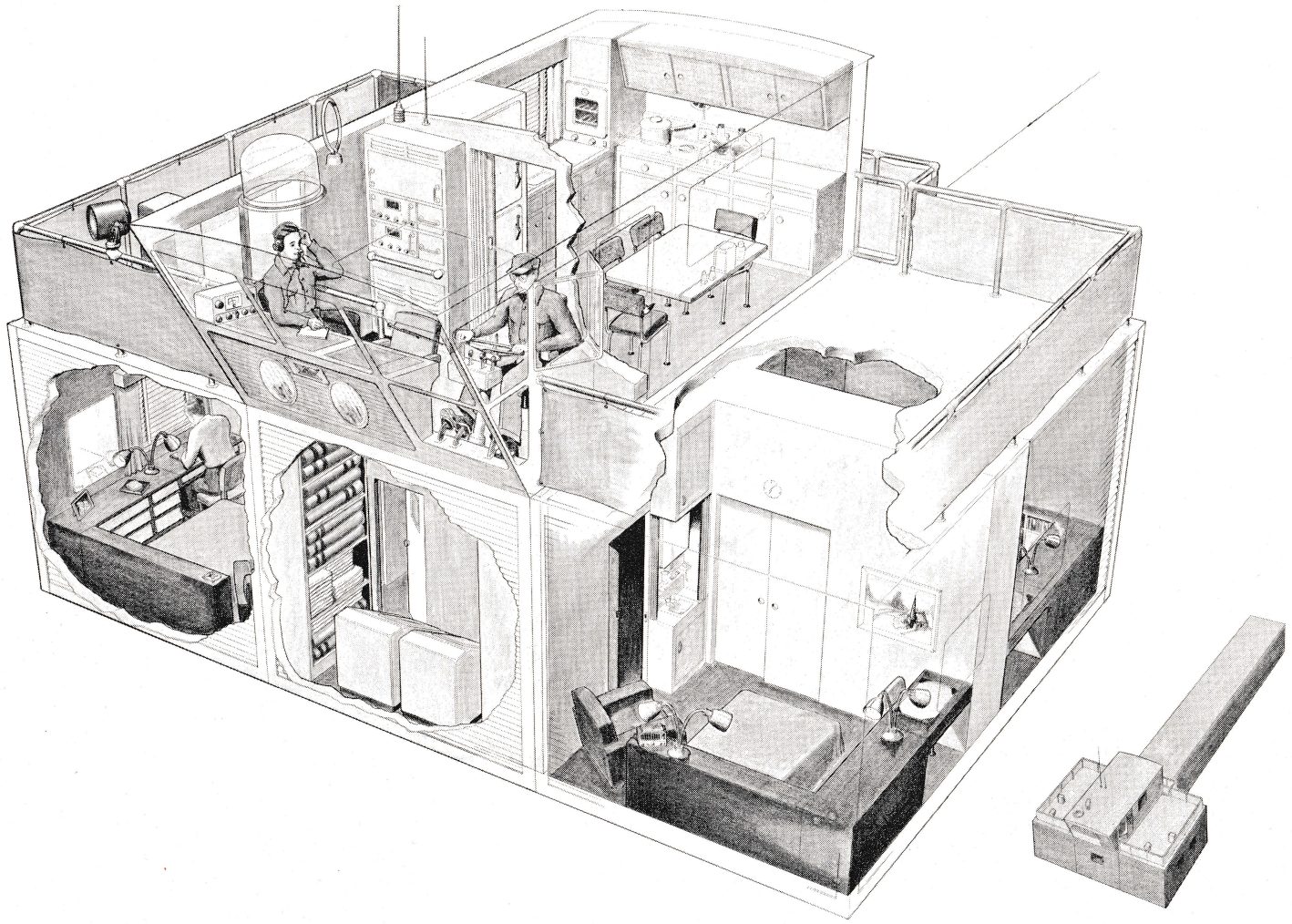
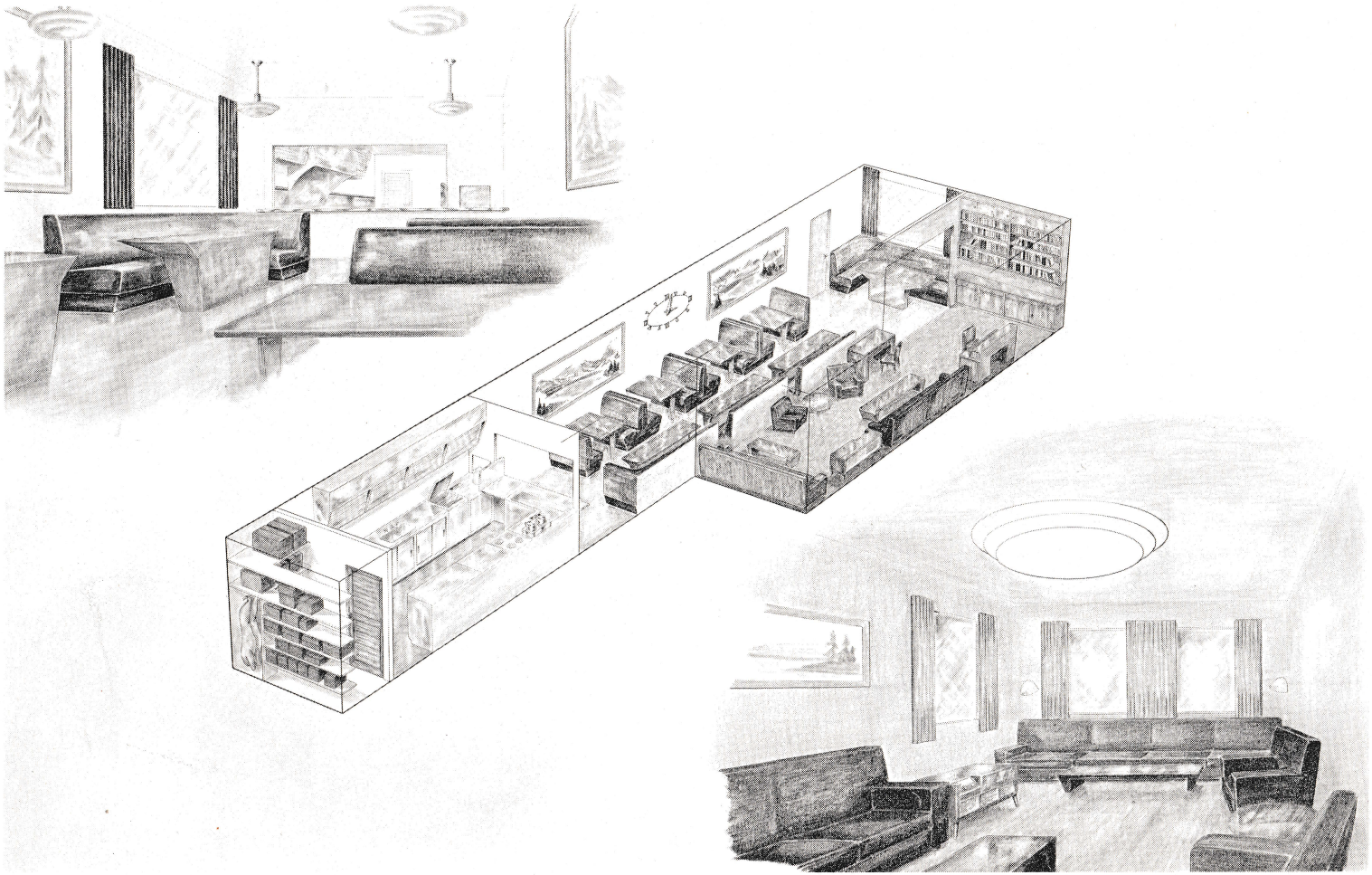


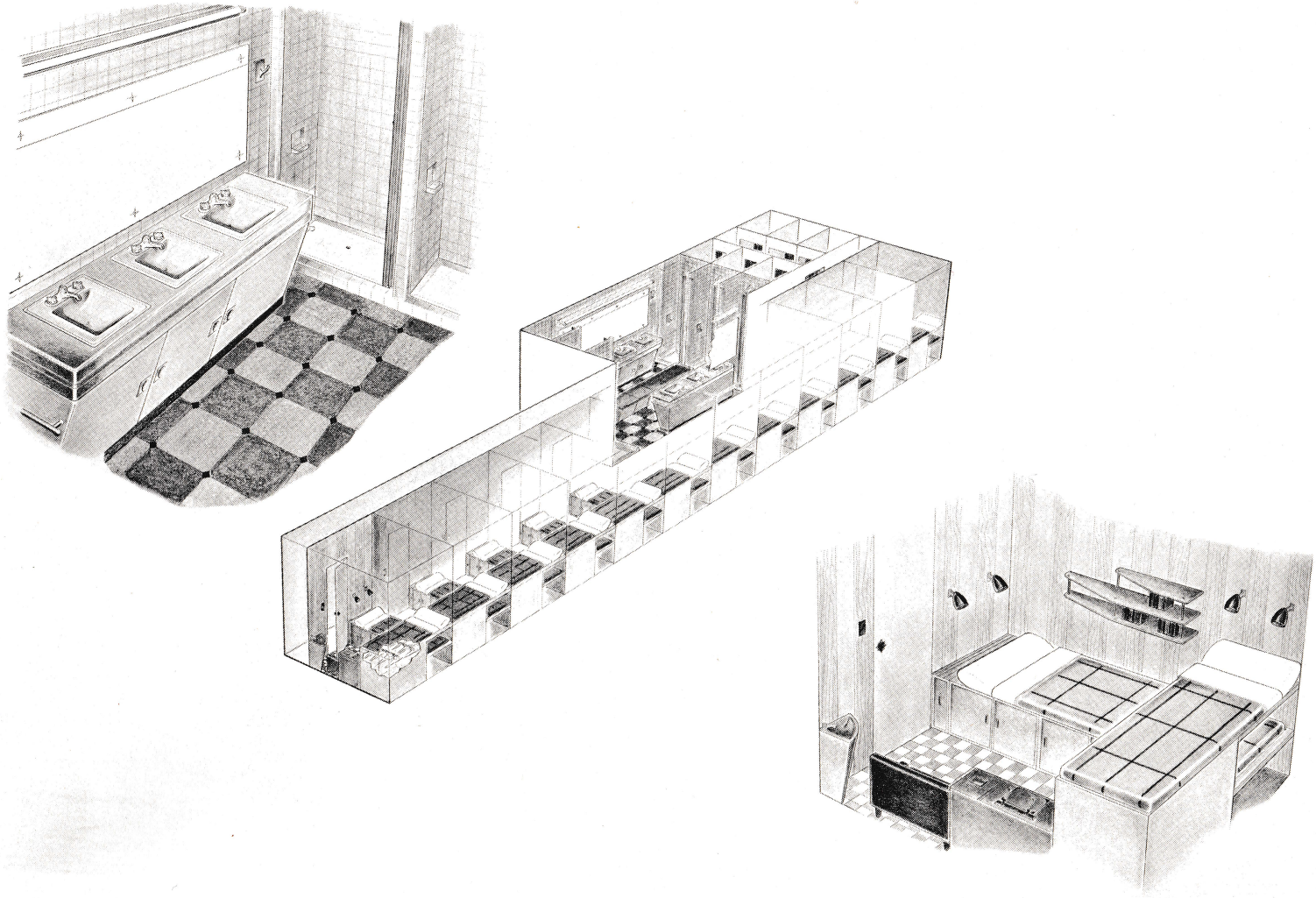
BIG WHEEL - ORE CARRIER



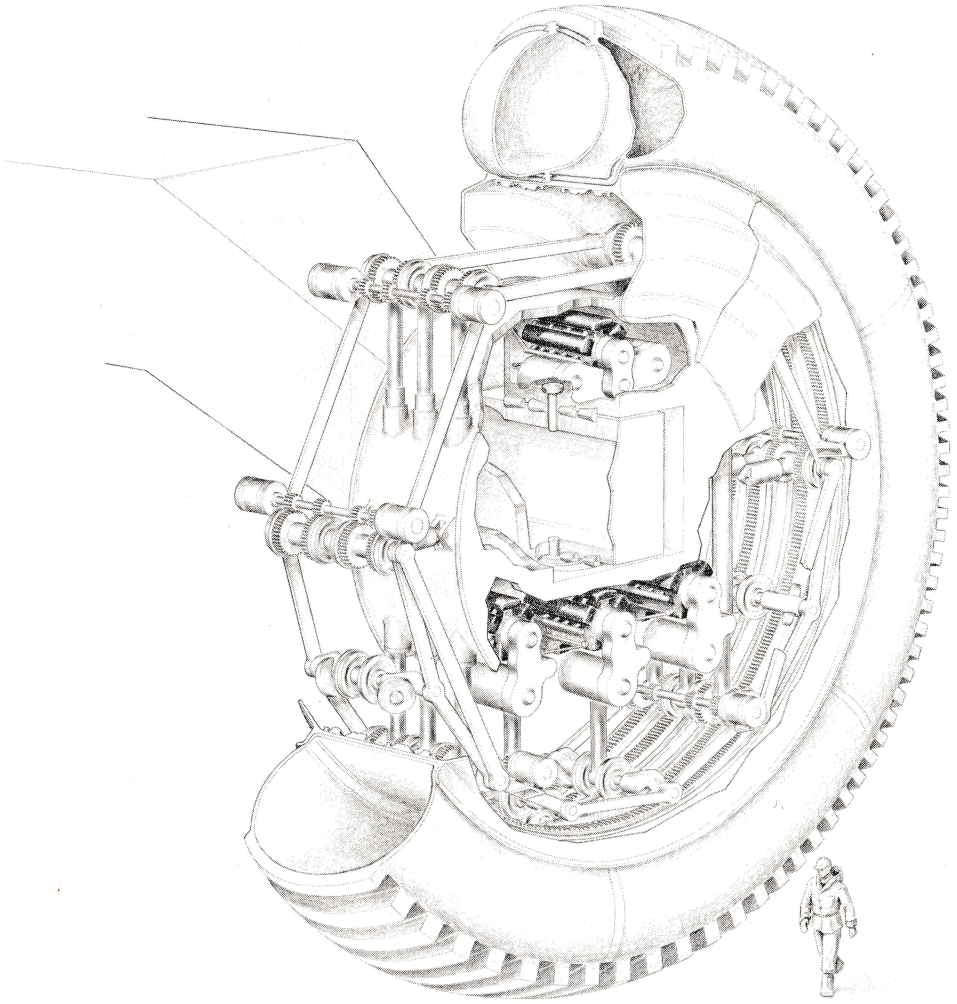
BIG WHEEL - CONTROL CAB AND CREW ACCOMMODATION



BIG WHEEL - KITCHEN, DINING ROOM AND RECREATION LOUNGE ACCOMMODATION FOR 40 MAN DRILL CREW



BIG WHEEL - BEDROOM AND WASHROOM ACCOMMODATION FOR 40 MAN DRILL CREW



BIG WHEEL - SECTION THROUGH WHEEL

"BIG WHEEL" DIRECT OPERATING COST INDICATION

These estimates are based on an initial cost for the vehicle of $1.5 million. Direct Operating Costs for two fuel prices are shown — (a) at $2.50 per gallon which assumes the fuel flown into the North from Southern bases. (b) at 25 cents per gallon for local well supply requiring little or no transportation. This estimate is based on 35 m.p.h. cruise speed with a payload of 200 tons.

	HOURLY D.O.C.	
DEPRECIATION		
10% Residual Value after 5 years 2000 hours annual utilization	$ 135.00	
INSURANCE		
10% Initial Vehicle Cost per year	$ 75.00	
CREW PAY		
Crew of five — Driver, Co-Driver, Nav/Rad. Op., 2 Mechanics, at $3.00 per hour	$ 15.00	
FUEL		
66% power setting — 8000 h.p. at 0.5 lb/hp/hr	$1,337.50	(at $2.50/Gall.)
	OR	
— 535 g.p.h.	$ 133.75	(at 25c/Gall.)
MAINTENANCE AND OVERHAUL		
Vehicle — 10% initial cost every 2000 hours	$ 43.40	
Power Plants — $2,000 per engine every 2000 hours	$ 16.00	
Tires — replacement every 20,000 miles	$1,050.00	
TOTAL HOURLY DIRECT OPERATING COST	$2,671.90 at $2.50/gall.	$1,468.15 at 25c/gall.
CAPACITY TON-MILES GENERATED PER HOUR	7,000	
DIRECT OPERATING COST PER TON-MILE	$0.38	$0.21