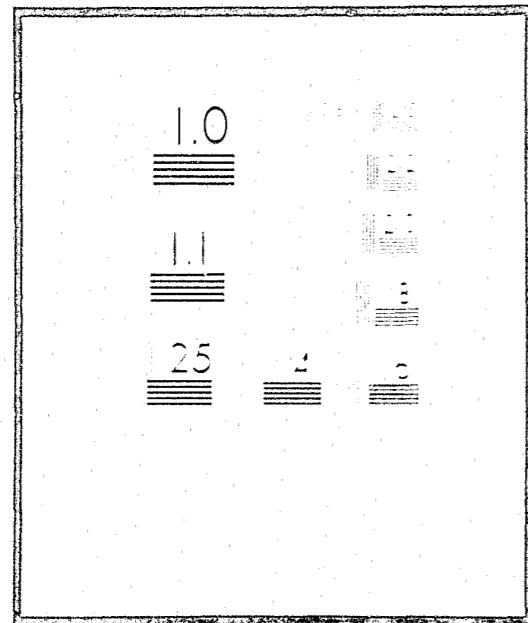


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PATROL OPERATIONS OF RED DEER/RURAL RCMP DETACHMENT

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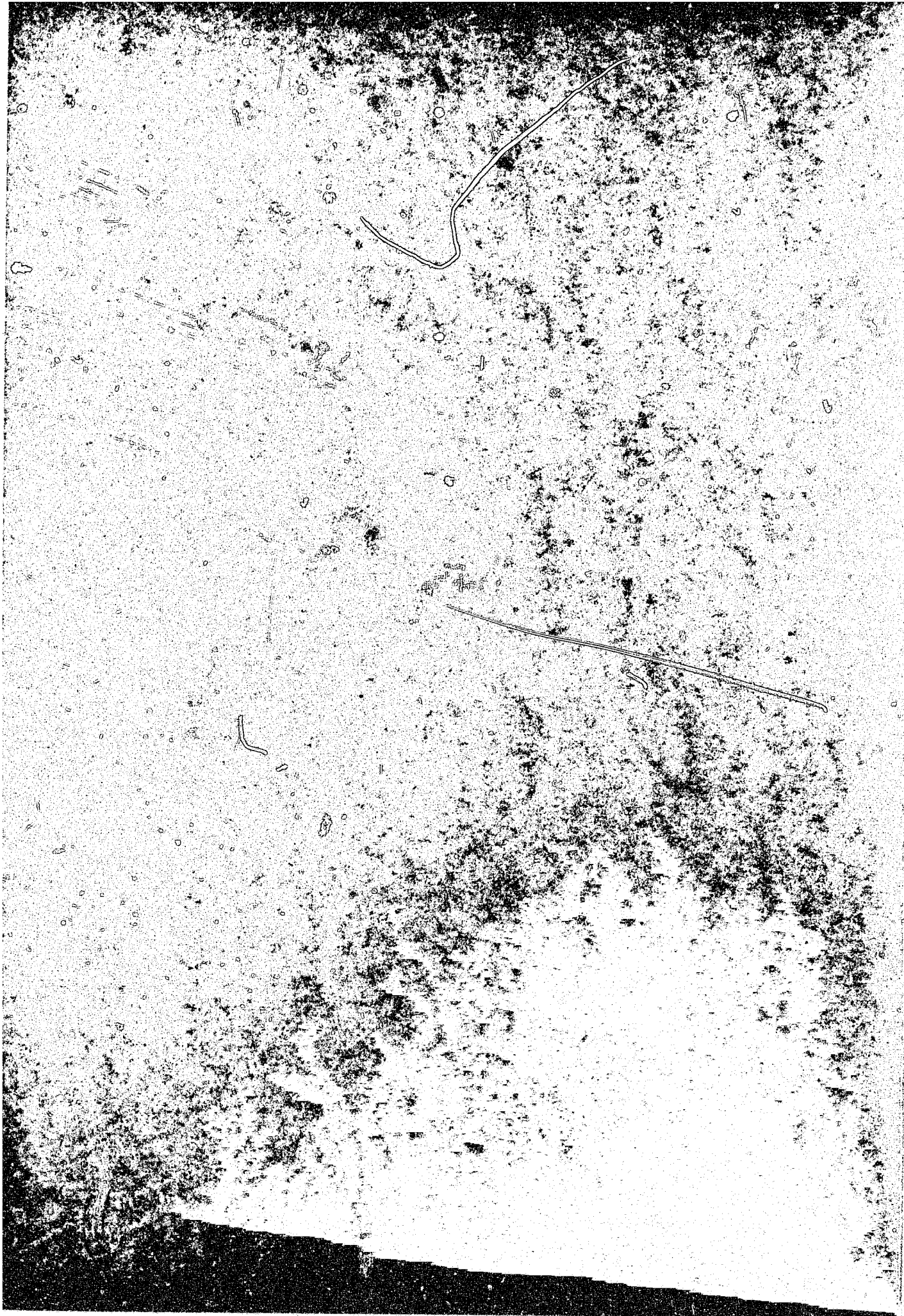
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ABSTRACT

Work carried out under the NRC-RCMP Patrol Deployment Project, whose objective was to optimize patrol operations, is described. The map of the area patrolled by the Detachment was divided into 62 small areas called 'atoms'. Some atoms were towns or lakes, while others were comparatively large regions bounded by roads. The speed of a patrol car travelling between towns was measured on bare winter roads. Details of calls made by officers in radio patrol cars were taken during the period 15 November to 31 January 1975. It had been planned to simulate the patrol operations of the Detachment with a computer, but the data obtained did not permit this. Also the style of operation of the Rural Detachment was so dissimilar to that of urban forces, of which simulations have been made, that a simulation would have been of little benefit. Other research possibilities are briefly mentioned.

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PATROL OPERATIONS OF RED DEER RURAL RCMP DETACHMENT

by

F.R. Lipsett, A.F. Dalley*, and J.G. Arnold

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INTRODUCTION

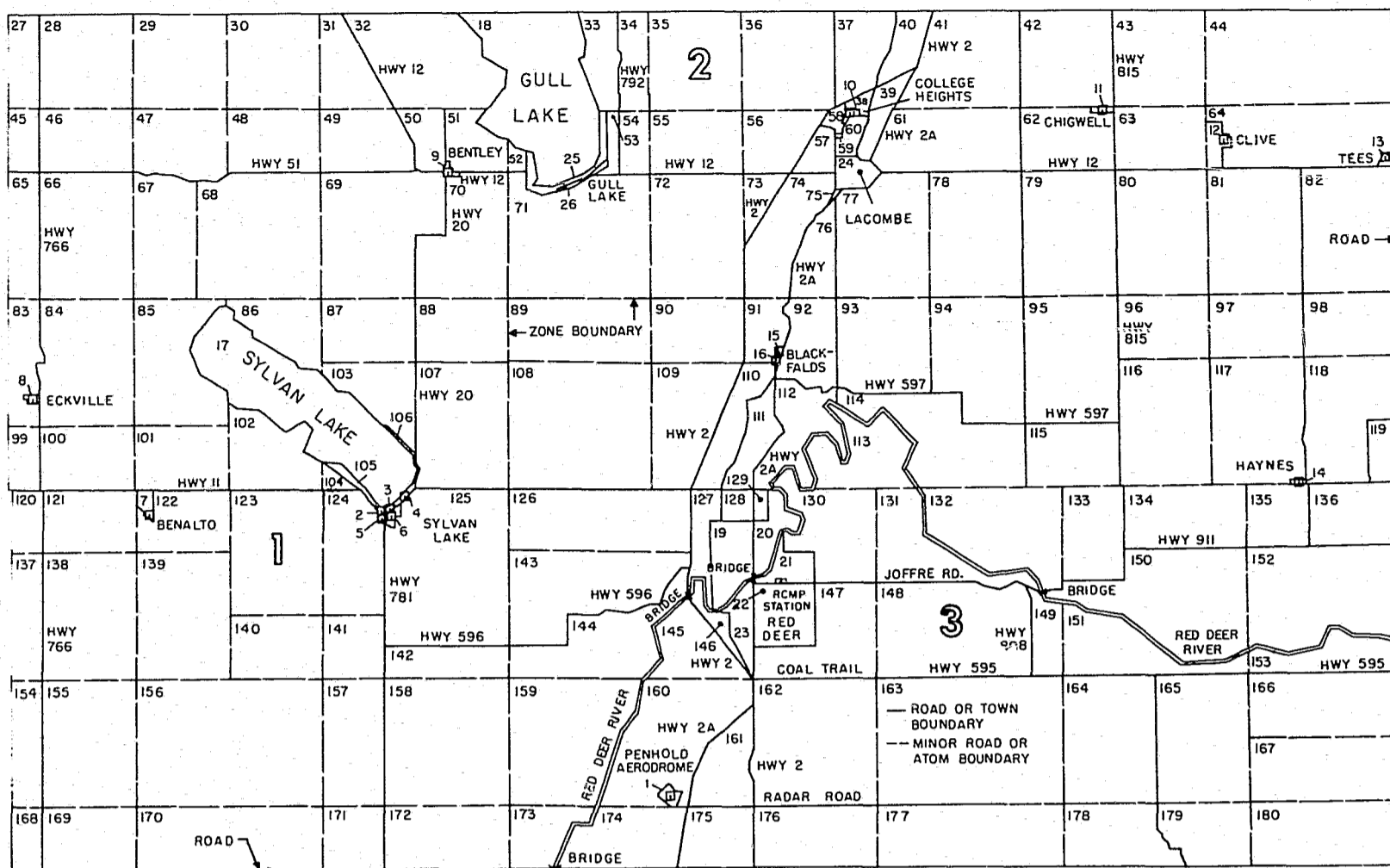
This report describes work carried out under the NRC-RCMP Patrol Deployment Project whose objectives were to optimize patrol operations and to seek new research results. The Project included two RCMP Detachments - Burnaby and Red Deer Rural. The program was a continuation of work carried out with the Gloucester Police Force^{1,2} and is similar to a project in progress with the Ottawa Police Force. The results of the Burnaby research have been published^{3,4} and an article reviewing work to date with all four forces has been prepared⁵.

The city of Red Deer is located midway between Edmonton and Calgary in central Alberta. Red Deer Rural Detachment covers an area of approximately 1260 square miles (which does not include the city) with a rural population of about 23,000. It includes several small towns with populations of a few hundred separated by substantial distances. It also includes Sylvan Lake, and part of Gull Lake, which attract large cottage populations during the summer.

ATOM MAPS

When the project was started two maps covering the area were obtained from the RCMP Detachment. These were unsuitable for atom maps since they were on different scales and lacked some necessary details. A set of topographic maps on a scale of 1:50,000 was then obtained from the Department of Energy, Mines and Resources in Ottawa and a mosaic was assembled which included the area. A few features such as new highways and patrol zones were added. This map has been retained by the Detachment for planning.

The pertinent features of the topographic map were traced and the area was divided into 180 atoms as shown in Fig. 1. The small towns which lie in the area were divided into one or more small atoms and the land elsewhere was divided into large atoms. This tracing was thought to be more detailed than necessary so a second simpler tracing was made of the first with 53 atoms. Both tracings were digitized and plotted and after consultation with members of the Detachment a revised version of the second tracing, with 62 atoms, shown in Fig. 2, was adopted for the research. A version of this map with the atom numbers deleted, given in Fig. 3, was also prepared for everyday use.



RED DEER DETACHMENT
ATOM MAP
10 SEPT. 1974
NRC-RCMP Patrol Deployment Project

FIGURE 1
First atom map of Red Deer Detachment, with 180 atoms

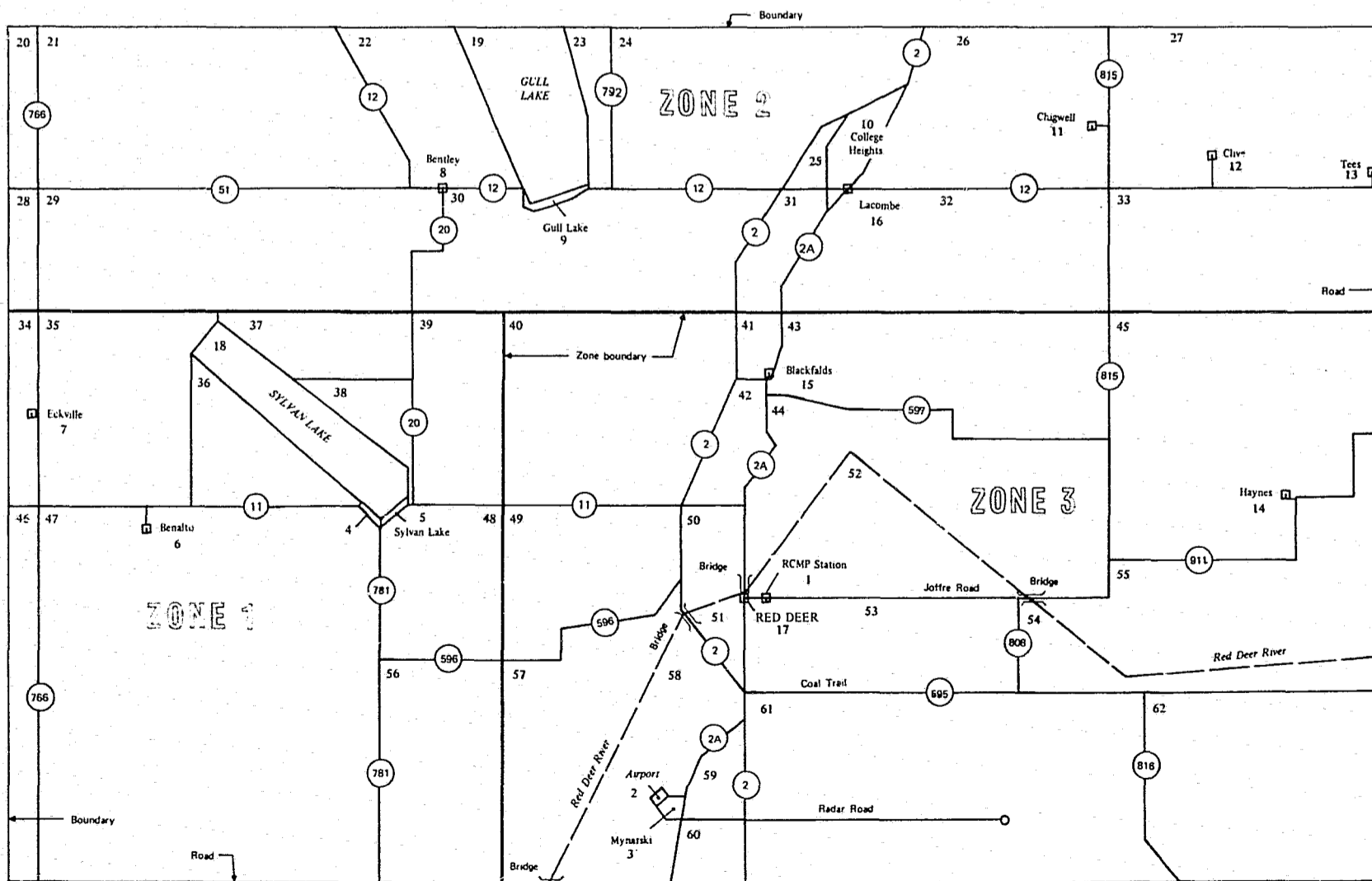
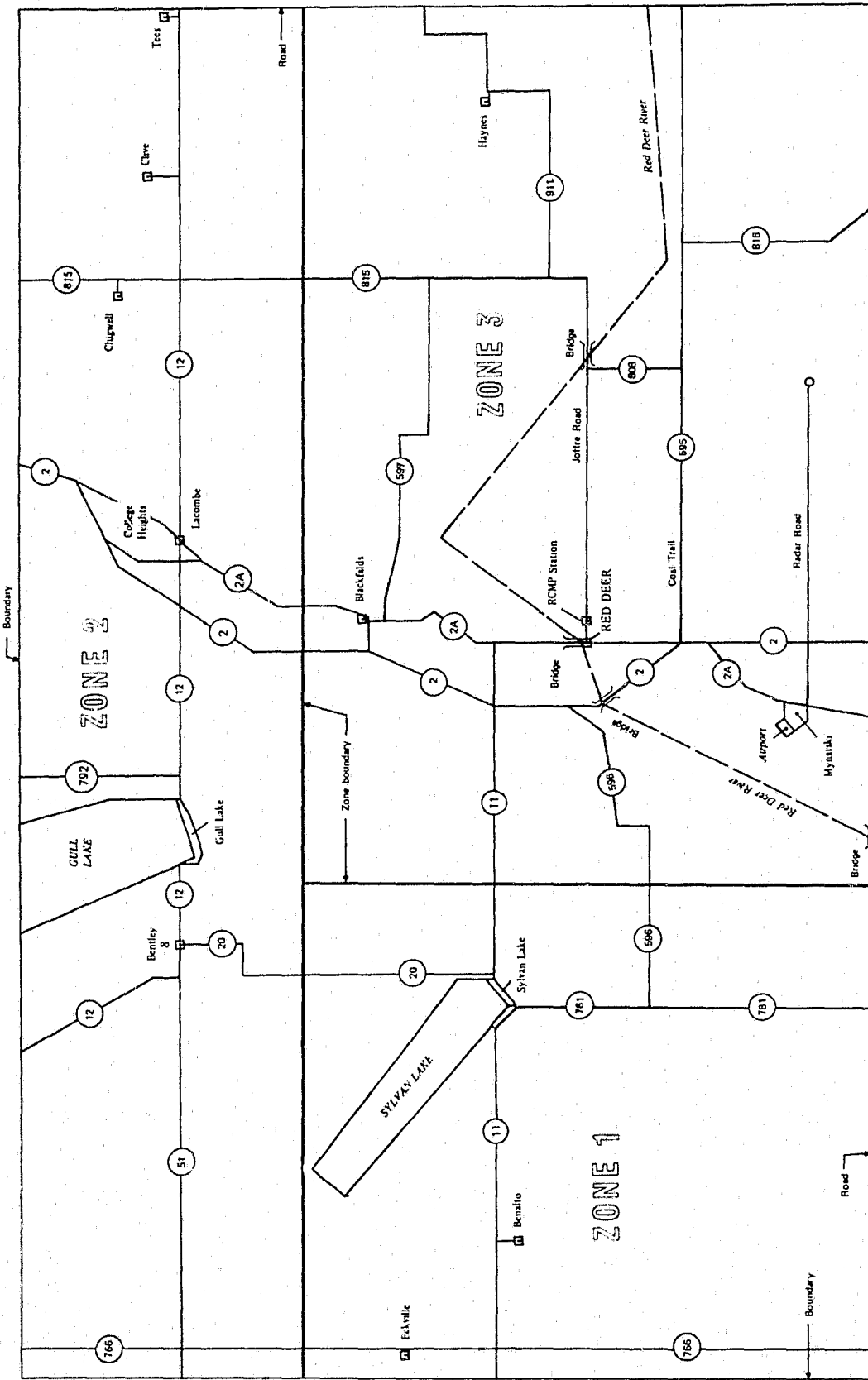


FIGURE 2
Final atom map of Red Deer Detachment, with 62 atoms

RED DEER DETACHMENT
NRC RCMP Patrol Deployment Project
20 September 1974
0 5
MILES



RED DEER DETACHMENT
NRC RCMP Patrol Deployment Project
20 September 1974

FIGURE 3
Map of Red Deer Detachment. Same as Fig. 2 with atom numbers deleted

AVERAGE SPEED

When simulating the operations of police patrol cars it is essential to know their speed. The average speed of a Red Deer car between several towns was therefore measured, on 20 March 1974. The road conditions were generally bare, with packed snow on a few minor roads. The average speeds are given Table I, and the towns visited may be seen on Fig. 2. For calculating the average speed, the time was read from a stopwatch carried in the car and the distance was calculated from measurements on the topographic map. The overall average speed was 46.3 mph. This was substantially higher than the speeds found in Ottawa⁶, which were 26 mph for a suburban car and 16 mph for a downtown car.

TABLE I
Average Speeds on 20 March 1974

From	To	Distance Miles	Average Speed Miles per Hour
RCMP Station	Sylvan Lake	16.7	42.0
Sylvan Lake	Benalto	7.75	44.3
Benalto	Eckville	7.7	46.2
Eckville	Bentley	20.8	48.9
Bentley	Gull Lake	4.8	45.5
Bentley	College Heights	15.2	46.1
Lacombe	Chigwell	10.15	50.75
Chigwell	Clive	4.8	39.75
Clive	Tees	6.4	53.0
Tees	Haynes	13.9	42.8
Haynes	Joffre ^a	16.2	41.2
Joffre	City Limits	14.85	39.7
Joffre	RCMP Station	16.2	37.3
RCMP Station	Airport	9.15	36.6
Mynarski	Highway 11	13.2	68.9
Mynarski	Blackfolds	18.9	63.0
Blackfolds	City Limits	5.55	41.6
Average			46.3

a. Outside Detachment boundary.

TABLE II (cont'd)

Type	Description	Number			Total
		Nov.	Dec.	Jan.	
35	Landlord-tenant dispute	1	0	0	1
36	Lost child or elderly person	1	1	1	3
37	Lost or missing person	1	2	2	5
37	Loud parties or noise	1	0	4	5
	Medical emergency				
39	- man down, person sick	0	0	0	0
40	- inhalator, asphyxiation	0	0	0	0
41	Motor vehicle offences	33	25	22	80
42	Murder	0	0	2	2
43	Obscene or threatening phone calls	1	4	1	6
44	Obstruction - of laneway	0	0	0	0
45	- of snow removal	0	0	0	0
46	Officer in trouble	2	0	0	2
47	Parking - municipal	0	0	1	1
48	- private	0	0	0	0
49	Person using weapons	8	7	3	18
50	Possession of stolen property	5	2	3	10
51	Property check, insecure	38	44	53	135
52	Purse snatching	0	1	0	1
53	Recovery of property	0	3	1	4
54	See complainant	37	45	36	118
55	Sexual offences	0	1	3	4
56	Shoplifting	0	0	0	0
57	Statutes or bylaws - federal	10	7	29	46
58	- provincial	111	444	438	993
59	- municipal	2	0	4	6
60	Stolen motor vehicle	3	3	8	14
61	Suspicious character, prowler	3	6	18	27
62	Suspicious noises	0	0	0	0
63	Suspicious smells, gas	0	0	1	1
64	Suspicious vehicle	11	14	7	32
65	Theft in progress - commercial	0	1	6	7
66	- domestic	2	1	3	6
67	Theft after the event - commercial	11	12	18	41
68	- domestic	28	37	9	74
69	Traffic accident - fatal	0	3	1	4
70	- injuries	13	14	1	28
71	- other types	11	26	18	55
72	Serve warrant, summons, subpoena	19	64	44	127
Totals		448	921	895	2264

TABLE III

Number of Occurrences per Atom
15 November 1974 to 31 January 1975

Rank	Number of Occurrences	Atom	Description
1	255; 152	5; 4	Sylvan Lake
2	237	7	Eckville
3	181	8	Bentley
4	161	15	Blackfolds
5	130	16	Lacombe ^a
6	122	17	Red Deer City
7	68	1	RCMP Station
8	49	6	Benalto
9	48	49	Rural
10	44	42	Rural
11	42	44	Rural
12	41	12; 47	Clive, Rural
13	40	50	Rural
14	35	52	Rural
15	34	58	Rural
16	33	2; 40	Airport, Rural
17	32	30	Rural
18	31	48; 61	Rural
19	28	9	Gull Lake (Town)
20	27	53	Rural
21	25	51	Rural
22	24	32	Rural
23	22	57	Rural
24	19	60	Rural
25	18	3; 43	Mynarski, Rural
26	16	35	Rural
27	15	38; 59	Rural
28	13	36	Rural
29	12	21; 37; 56	Rural
30	11	10; 39	College Heights, Rural
31	10	24; 26; 46	Rural
32	9	13; 33; 45	Rural
33	8	25; 34	Rural
34	7	29; 41	Rural
35	6	14	Haynes
36	5	20; 31	Rural
37	4	27; 28	Rural
38	2	11; 18	Chigwell, Sylvan Lake,
		19; 54	Gull Lake, Rural
39	1	22; 23; 55	Rural
40	0	62	Rural

a. Lacombe has its own police force but calls for assistance are frequent and administrative calls are made.

TABLE IV
Percentage of Incidents of Criminal and Non-Criminal Nature, Occurring in Towns or Rural Areas. Towns are Atoms 1-17

Nature	Description	Occurrence Types	Percent of Incidents	
			Towns	Rural
Criminal	Assault	6, 7, 8	0.9	0.2
	Assist other police force	9, 24	0.7	0.2
	Break & enter - in progress	12, 13	0.2	0
	- after the event	14, 15	2.2	0.5
	Damage to property	18	1.8	0.7
	Federal statutes	57	1.2	0.8
	Fraud	28	0.6	0
	Murder	42	0	0.1
	Obscene or threatening phone calls	43	0.1	0.1
	Officer in trouble	46	0	0.1
	Person using weapons	49	0.4	0.4
	Possession or recovery of property	50, 53	0.5	0.1
	Robbery	30	0	0
	Sexual offences, indecent acts	55, 32	0.2	0
	Theft - in progress	16, 52, 56, 65, 66	0.5	0.3
	- after the event	60, 67, 68	3.7	2.0
		(Subtotal)		(13.0)
Non-criminal	Animal calls	3, 4, 5	0.2	0.2
	Assist general public	10	1.8	1.1
	Disturbance - loud party, loitering	34, 38	0.4	0.3
	Domestic trouble	20, 35	0.5	0
	Drowning, death	19, 21	0.1	0
	Drunkenness	22	0.5	0.1
	Fire alarm	25, 26	0.3	0.5
	Followup, interview, see complainant	54	3.7	1.5
	Medical emergency, industrial	11, 33, 39, 40	0	0
	Missing persons	23, 27, 36, 37	0.3	0.1
	Municipal statutes	59	0.3	0
	Patrol	58	28.1	15.7
	Property check, insecure	51	5.0	1.0
	Suspicious character, vehicle, noise, smell	61, 62, 63, 64	1.3	1.3
		(Subtotal)	(42.5)	(21.8)
Traffic	Accidents	29, 69, 70, 71	2.5	1.8
	Motor vehicle offences	1, 31, 41, 44, 45, 47, 48	3.4	2.0
	(Subtotal)	(5.9)	(3.8)	
Administrative	Administrative	2	1.0	0.2
	Serve summons, subpoena, warrants, CPIC	17, 72	4.1	1.8
	(Subtotal)	(5.1)	(2.0)	
	Sum of Subtotals		66.5	33.1
	Total		99.6 ^a	

a. Differs from 100.0 due to rounding off error.

The average rate of calls was 2264/78 = 29 per day, substantially lower than in urban Burnaby and Ottawa, with approximately 100 per day and 170 per day respectively. Two-thirds of the calls (66.5%) were to the towns rather than the unpopulated sections. The proportion of calls on criminal matters, 18.8%, was also lower than for Burnaby and Ottawa at approximately 45%.

Unfortunately the completed log sheets failed to give enough times of receipt and times of arrival of calls to calculate response times. This apparently resulted from the method used by officers to carry out their day's assignments. This was to call at the detachment office at the beginning of their shift to receive outstanding complaints, and to plan an appropriate route for patrolling their zone and dealing with these complaints at the same time. Thus the sequence of telephone call-dispatch-travel-arrive-service-return to patrol, standard in an urban setting, was not followed. Duties tended to be divided into investigations during the day shift and preventive patrol during the evening and night shifts.

Another difficulty with the log sheets was that it was impossible to tell whether a call was original or a follow-up. Therefore the number of follow-up calls in Tables II - IV is unknown and doubt may be cast on the accuracy of the numbers.

Because of these deficiencies in the data it was considered impossible to simulate the patrol operations as had been done for Gloucester and Burnaby, and the project was terminated.

REAL-TIME GRAPHIC SIMULATIONS AND THE FILM 'RED DEER PATROL'

Most cities, including Ottawa and Burnaby, are large and complex and their police patrol operations can best be simulated with a large computer giving printed-out results. The simulation is done as one of a series of jobs at the computation centre and the results can only be seen on the printout. With a smaller force, however, it should be possible to represent the force's area on a storage oscilloscope, or some other display device, and to carry out a simulation in speeded-up real time (as opposed to 'simulation time') and to observe the movements of patrol cars on the screen as they occur. Red Deer Rural Detachment offered an opportunity for trying this, since it could be represented by a simple map of only 62 atoms, as opposed to 368 and 579 atoms for Burnaby and Ottawa respectively.

A five and one-half minute silent colour film was made to illustrate this idea.* The atom map was drawn on a storage tube as shown in Fig. 5. Programs for making a symbol follow a line were used, in this case representing a patrol car following a highway. After the introductory section, the simulation begins with three patrol cars on duty for three zones. Calls for service are received and one or more cars are dispatched in answer. The film ends with a situation in which the viewer is asked which car to dispatch to the last call.

* Produced by F.R. Lipsett, computer programs—J.G. Arnold, photography—G. Crabtree and J. McAulay



FIGURE 5

Atom map of Red Deer Detachment shown on a storage oscilloscope

The film was shown in Ottawa, Red Deer, Burnaby, Toronto and Puerto Rico to a general lack of acclaim. After consultation with experts on graphic displays it became evident that the proposed simulations would not be straightforward, and might require much time and expensive equipment. It was therefore not practical to attempt them as part of the NRC-RCMP Patrol Deployment Project. Because of their potential uses in research, training and display, however, it is hoped to work on this subject as a separate project.

CONCLUSION

The Red Deer project was ended before substantial results were obtained because it proved impractical to carry out a computer simulation of patrol operations similar to those done elsewhere and because a graphical method of simulation could not be developed within a reasonable time at reasonable cost. What other course might the research have followed? What type of research is likely to be useful for a rural force?

A different method of obtaining data might have been better. This could have been to use the normal complaint forms filled in by officers for most incidents. These forms include the date, time, place and occurrence type. However, they do not include the time of arrival of the officer or the atom. Alternatively, a different style of research might have been to establish

zones using point-to-point travel time matrices and response time matrices similar to those used by Jarvis *et al.*⁷ for the allocation of ambulances in semi-rural areas. However, reliable travel times are required for this method and the location of ambulance stations is not closely analogous to rural police operations.

Most probably there is a minimum population density and police force size for carrying out the type of computer simulation described elsewhere. Gloucester Township, Burnaby and Ottawa with populations of 45,000, 150,000 and 300,000, respectively, in relatively small areas evidently exceed this minimum density. Red Deer, with a rural population of 23,000 spread over a very large area, evidently does not. Appropriate methods of analysis for this optimization of rural patrol operations therefore remain a subject for future research. The subject is one of potential benefit for many rural forces and it is hoped that it will be actively pursued.

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