

and a similar feature 35 m. to the south; the latter comprises 6 boulders with maximum dimensions of 35 cm. set on the arc of a rough circle about 2 m. in diameter. The site is protected to the south by a cliff in bedrock to a height of about 100 m. In the middle of the central hearth, with minimum disturbance of the floor, we made a small collection of charcoal and charred bones for radiocarbon dating. Radiocarbon analysis of the charcoal, performed by courtesy of Dr. W. Blake, Jr., and Mr. J. A. Lowdon of the Geological Survey of Canada, has yielded an age of 1070 ± 270 yr. BP (GSC — 1770). Three pieces of charcoal were examined; all were coniferous and two appeared to be from *Larix* sp., i.e. driftwood.

The discovery of the Wood River site raises the question of how many others remain to be discovered on the north coast of Ellesmere Island. Very little is to be seen at the surface, and it is likely that similar sites in the Alert area to the east have escaped notice, although by now they may have been destroyed by the passage of vehicles. On the long coast of northern Ellesmere Island no other archaeological sites have been found but then few people have had the interest and opportunity at the right time of year to look for them. Again in the course of other work in the 1972 summer, we traversed on foot the whole shoreline of the upper 40 km. of Disraeli Fiord, and found no evidence of Eskimo occupation, although there are a number of excellent potential sites on delta terraces. But this is the only one searched of eight major fiords along the coast.

Two further comments are offered with diffidence, since I am not an archaeologist. First, the radiocarbon age of the charcoal, if it can be accepted as a maximum age for occupation of the site, belies what appeared to be a distinctive feature of the Independence culture, namely the central hearth. Can it be that this was a feature that persisted to the end of the Dorset period in certain areas? Secondly, on the question of the movement north of these Eskimos, they may all have crossed the plateau southwest of the Grant Ice Cap from the Lake Hazen area and then followed the valley of the Wood River to its mouth, thus by-passing the Robeson Channel coast. From excavations in 1958, Dr. M. S. Maxwell concluded that hunters from the south visited the Lake Hazen area during the period from about A.D. 1000 to 1450². However, sites of both Independence and Thule cultures have since been found at the head of Tanquary Fiord^{3,1}, and in August 1965 Knuth and I found an Eskimo site of uncertain age on the north shore of the lake on the Lewis River, halfway between Tanquary

Fiord and Lake Hazen. Thus, although Maxwell found no evidence that Eskimos had made the passage from Tanquary Fiord to Lake Hazen, it now seems certain that immigration came from that direction at some time, thus completely by-passing the Smith Sound route.

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Pollutant and Shell Thickness Determinations of Peregrine Eggs from West Greenland

A preliminary survey of breeding peregrine falcons (*Falco peregrinus*) in West Greenland in 1972 indicated both a high nesting density (one pair per 100 square miles) and a high production rate (2.25 young per pair or 2.57 per pair with young)¹. Reporting of peregrine reproductive success varies, depending upon timing, the nature and intensity of the study. Exact comparisons are therefore difficult, but the rate of reproduction reported for this group of West Greenland peregrines is apparently comparable to that found earlier along the Colville River in Alaska during 1952 and 1959².

Peregrines in the eastern United States and southern Canada experienced an increasing incidence of reproductive failures throughout the 1950s and early 1960s, culminating in the disappearance of the breeding populations by 1964³. Studies were therefore carried out in the Northwest Territories and Alaska in 1966 to determine the status of the northern birds. No apparent abnormalities were found, and the reproduction was considered to be normal^{4,5}.

The breeding success of the Colville River peregrines has been followed since 1966 by Cade and colleagues^{5,6,7}. The number of pairs remained steady through 1969, but

reached the lowest figure known for the area in 1971. An increasing proportion of breeding pairs has failed to produce any young, lowering the average production rate^{6,7,8}.

Studies of the peregrines in Ungava suggested that a decrease in reproductive success had occurred between 1967 and 1970. The number of young fledged per occupied site was estimated to be 1.5 in 1967 and 1.0 in 1970⁹. The latter level of production might be considered to be critically low for peregrines.

Thin eggshells have been a characteristic of all the declining populations^{10,11}. The degree of thinning is closely associated with levels of the DDT compound p,p'-DDE in the eggs; apparently healthy populations such as those in the Aleutians show lower levels of DDE and only moderate shell thinning⁶.

We have therefore examined the eggshells and shell fragments obtained in Greenland in 1972¹ for evidence of shell thinning and have measured the chlorinated hydrocarbons in two unhatched eggs. During the 1972 Greenland peregrine survey, 1 unhatched egg was collected from each of 2 eyries. In addition, shell fragments of 7 hatched eggs from 4 different females were collected. The mean thickness of these 9 eggs from 6 females was 0.298 mm. \pm 0.018 (95 per cent C.L.: range 0.26 - 0.33), 14 per cent lower than the mean thickness of 42 peregrine eggs from Greenland that were collected before 1940 (thickness = 0.347 mm. \pm 0.018; D. W. Anderson, unpublished data). Shell thinning of unhatched and broken eggs obtained from Ungava in 1967 and 1970 was somewhat more severe; the mean thickness was 21 per cent less than that of 59 peregrine eggshells collected in the eastern Arctic between 1900 and 1940⁹.

Both eggs were broken in transit and some of the contents were lost. The contents of one egg were decayed and no development was apparent; the other contained a large embryo which had died within a week of hatching. These were homogenized and a subsample of each was ground with anhydrous sodium sulfate. Lipids were removed by Soxhlet extraction with a hot mixture of hexane and acetone (2:1, vol:vol) for 8 hours. Procedures followed thereafter have been discussed in detail elsewhere¹². Results appear in Table 1.

TABLE 1. Pollutant Levels in Greenland Peregrine Eggs.

	% fat	DDE ppm	PCB lipid
egg contents, no development	9.88	364	403
dead embryo	3.01	300	210

DDE concentrations, expressed on either a wet weight or a lipid weight basis are within the range of those measured in peregrine eggs from Alaska and northern Canada^{4,5,6,9,13}. Polychlorinated biphenyls (PCB) have not previously been determined in peregrine eggs from the Arctic. Levels in the Greenland eggs were comparable to those of DDE (Table 1). The composition of the PCB mixture was similar to that of commercial mixtures containing 60 per cent chlorine by weight. Profiles of PCB residues in these eggs are strikingly like those of fat biopsies from peregrines in Chile¹⁴, a further example of the global nature of the contamination to which this species is exposed.

Body burdens of organochlorine compounds in the West Greenland peregrines are not therefore sufficiently high to affect reproductive success; the pollution ecology of this population might be considered comparable to that of other arctic-breeding peregrines in the mid-sixties. These also had comparatively high organochlorine levels with no apparent effect on reproduction, but many eggs approached a critical level of shell thinning. Because of the close relationships found in other populations between DDE concentrations and the degree of shell thinning and associated reproductive failures, we conclude that a comparatively small increase in the DDE levels to which these birds are exposed would endanger the population.

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The Icefield Ranges Research Project, 1972

The Icefield Ranges Research Project (IRRP) base camp (61°N., 138°30'W.) opened its doors on 3 June. (For map of the area see paper on long-tailed jaegers, p. 000). Four programs, supported in whole or in part by the project, were in the field before the official opening of Kluane base camp, and two research teams remained in the field through early September. From 3 June until 29 August base camp was in full operation. A total of 86 persons representing 23 colleges, universities, and institutions (12 Canadian; 11 U.S.) made use of IRRP facilities during that time. One student from the United States and 6 Canadian students were involved in field work leading to postgraduate degrees: 4 toward an M.Sc. and 3 toward a Ph.D. Peak occupancy was in the last two weeks of July and the first week of August when over 50 people were at Kluane and the 15 long- and short-term field camps.

The February 1972 announcement of a Kluane National Park has generated interest in a number of multi-year programs concerned with resource inventory and planning processes.

In July and August representatives from the National and Historic Parks Branch, Ottawa, visited Kluane and a number of informal and interesting discussions relating to the park took place. In addition, they worked with a team from KEG Productions Ltd., Toronto, to produce a TV documentary about Kluane National Park.

Under the auspices of the Arctic Institute's Visiting Scientists program two professors from the Departments of Geography at the University of Glasgow, Scotland, and Western Michigan University, Kalamazoo, took part in IRRP during the last week in July and first week in August. Students benefited from having these senior researchers accompany them in the field and from their being available for consultation. A highlight of their visit was a round-table discussion of the past, present, and future research programs of IRRP.

Air support for IRRP, including support for the television team and climbing expeditions, was provided by the Arctic Institute's supercharged, ski-wheel-equipped Helio Courier; by a Canadian Forces DeHavilland Buffalo; and by a chartered Bell Ranger helicopter. A total of approximately 215 hours were flown in support of all programs in 1972.

The twenty-foot long, wide-beam life boat was in greater demand this past summer than