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ANTHROPOGENIC ICE: NOTES ON A DRAMATIC EPHEMERAL CRYERGIC LANDFORM

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Abstract. A brief photographic history of a man-induced ice cone is given. This ephemeral feature created around a gas well on Melville Island, N.W.T., Canada, indicates that the present climate is not capable of sustaining a natural ice mass. Disappearance of the ice is projected by 1974 without intervention of man.

Résumé. *Glace anthropogenique: notes sur un dramatique et éphémère moulage par le gel.* On donne en photographies une brève histoire d'un cône de glace provoqué par l'activité humaine. Cet épisode éphémère qui s'est produit autour d'une source naturelle de gaz à Melville Island, N.W.T., Canada, prouve que le climat actuel n'est pas capable de maintenir une masse naturelle de glace. La disparition de la glace est attendue pour 1974 sans intervention humaine.

Zusammenfassung. *Anthropogenes Eis: Aufzeichnungen über eine dramatische, vorübergehende Eisbildung.* Es wird eine kurze photographische Dokumentation über einen durch den Menschen hervorgerufenen Eiskegel vorgelegt. Diese vorübergehende Erscheinung, entstanden um einen Gasbohrturm auf Melville Island, N.W.T., Kanada, weist darauf hin, dass unter den gegenwärtigen klimatischen Bedingungen sich natürliche Eismassen nicht halten können. Das Verschwinden des Eises wird für 1974, erwartet, sofern kein menschlicher Eingriff erfolgt.

Drake Point (lat. 76° 26′ 33″ N.; long. 108° 55′ 38″ W.; 34 m a.s.l.) is the name given to a natural gas well drilled on Sabine Peninsula, Melville Island, N.W.T., Canada, about 11 km inland from the topographic feature of the same name. On 12 July 1969 (*Oilweek*, 1970[a]) the drill pierced a gas zone which had sufficient pressure to rupture the drill casing and expel natural gas into the air. Mixed with the gas was drilling mud, water and water vapour which reached the surface in volcanic fashion. The

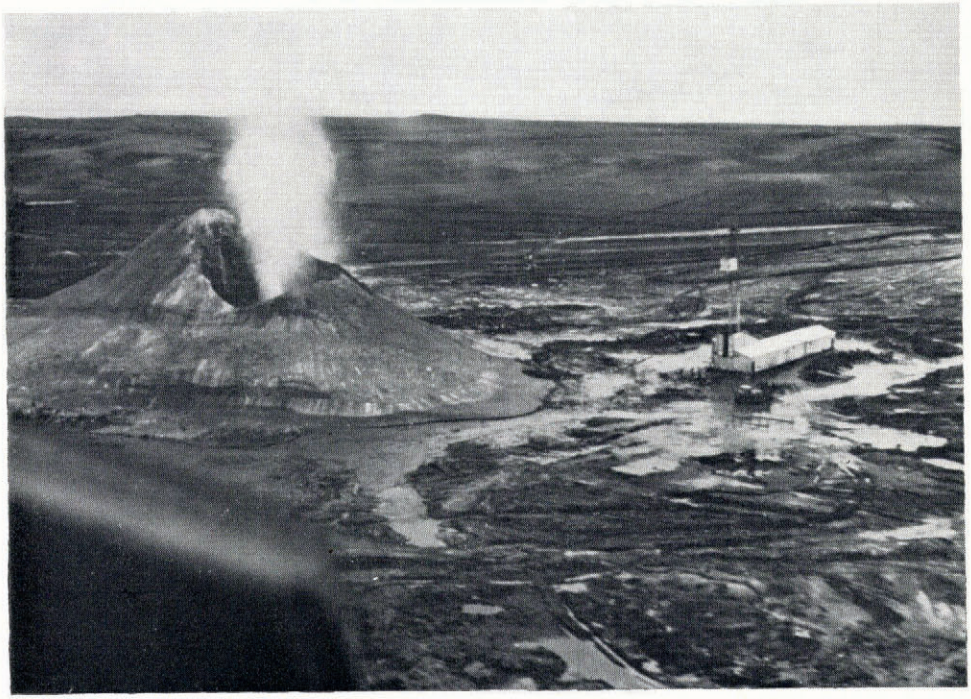

Fig. 1. Aerial view of ice cone which was estimated to be 22±2 m; 15 July 1970.

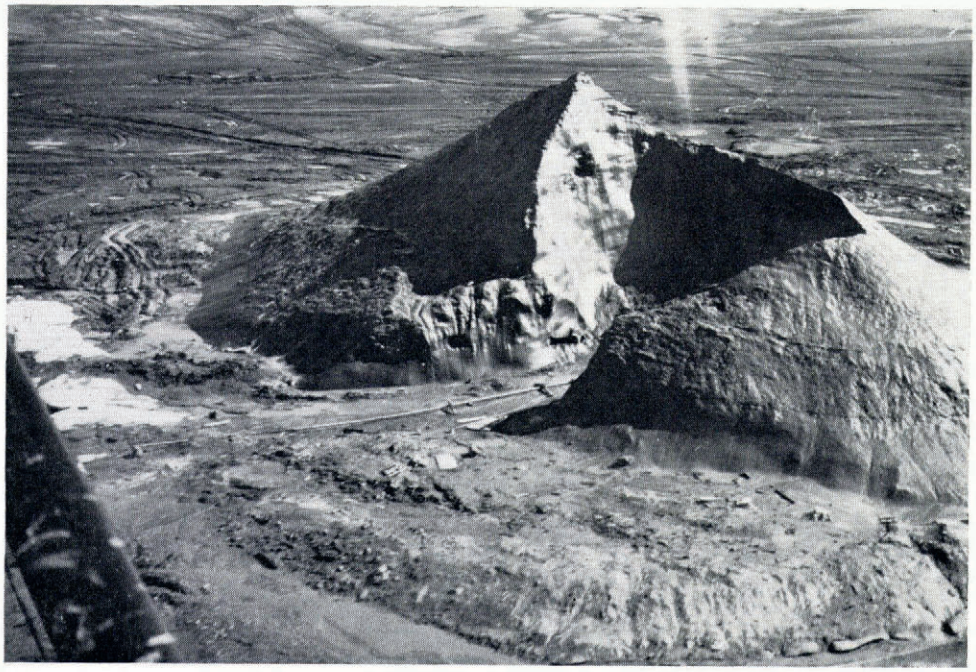

Fig. 2. "Dormant" ice cone showing marked effects of ablation; 2 July 1971.

Fig. 3. Detailed structure of ice cone; 16 August 1971.

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well continued to blow out until 9 November 1970, a total of 485 days (*Oilweek*, 1970[b]) and during the winter of 1969–70 built a cone composed of ice and mud which visual estimate suggests was dominantly the former.

This condition is shown in Figure 1 taken from the air on 15 July 1970 at which time the height of the cone was estimated to be 22 ± 2 m. The building to the right is the drill rig drilling a relief well to gain control of the gas flow. The subsequent history of the cone is shown in Figures 2, 3 and 4. Figure 2 shows the "dormant" cone on 2 July 1971 when it was already showing marked effects of ablation with a breeched northern rim. Figure 3 shows detail of the structure of the cone (16 August 1971) and the valve which has two pieces of wood lying on top of it. Three 45 gallon fuel drums give an indication of scale. The height of the cone had decreased to an estimated 16 ± 2 m. By 3 August 1972 the cone had further ablated to the condition shown in Figure 4, when the height was estimated at 12 ± 2 m. A very

Fig. 4. Condition of ice cone on 3 August 1972 after ablation had reduced its height to 12 ± 2 m.

approximate calculation of the volume decrease per thaw-month suggests that by summer 1974 no ice will be left and given a warmer than average 1973 summer it may even disappear then. Annual average temperatures are available for Rea Point about 150 km to the south-south-east which are $-17.6°$ C for 2 years of record (Canada. Meteorological Branch, 1970–72). Cumulative thawing degree days for 1970 were 227.5 (°C) which occurred between 12 June and 7 September, and for 1971 were 256.9 between 6 June and 27 August. 1972 data are 180.8 between 14 June and 4 September.

Two observations may be made on the basis of these data: (1) the current environment is not capable of sustaining a natural ice mass though four occur at an elevation of *c.* 600 m on the mountainous western part of Melville Island (Müller, 1970); (2) the presence of ablating ice has a deleterious effect on terrain sensitivity as it maintains a very high moisture content in the fine-grained surface materials which are naturally prone to mass movement (Barnett and Forbes, 1973).

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