minutes it behaved almost as a dry powder much like sugar. Although it was found to be still a little damp it was not thought advisable to keep it longer under room conditions and it was analysed with the above results.

Another portion of the material was washed in alcohol and ether at near 0°C. on a filter. After drying it at 125°C. for 24 hrs. the water determination was carried out, which gave 50.4 per cent. A sample dried on paper as described above and then kept 15 minutes between filter paper in the refrigerator appeared dry when subjected to analysis, the result of which was 53.0 per cent.

This compound has not been mentioned before as occurring in nature, although some other calcium hydrates have been described, e.g., the pentahydrate, the existence of which seems chemically impossible, as stated by Krauss and Schriever (see Ref. 3). According to the same paper a monohydrate has been synthesized. Its field of stability seems to allow its occurrence in nature and it is suspected in the Ika material.

The material found in Ika Fjord, South Greenland, thus represents a new mineral and it is proposed to call it "Ikaite" (which has been approved by the I.M.A.) after the locality where it occurs in great masses and where it is apparently still being formed through the action of bicarbonate-carrying springs at the bottom of the fjord. The new mineral may, if the theory about its formation is right, turn out to be of widespread occurrence in arctic and other cold waters.

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NOTES ON CULTURE CHANGE AND PERSONALITY ADJUSTMENT AMONG THE NORTH ALASKA ESKIMOS

During the past century the Eskimos of northern Alaska have been greatly influenced by the impact of western civilization. Whalers who arrived in the 1850's, traders, missionaries, school teachers, doctors, nurses, construction and military personnel who followed, have all contributed to the Eskimos' growing awareness of Anglo-American technology and culture. For many years the changes brought about by this knowledge were relatively slow, resulting in a gradual modification of the traditional native culture. This was largely owing to the newcomers having to adapt much of their way of life to that of the Eskimos. In the early contact period many of the adjustment problems were more the concern of the former than of the latter.

Recently, however, this situation has undergone an almost complete reversal. Today the majority of the northern Alaska Eskimos tend to identify themselves more and more with western society and culture, discarding in the process much of their ethnic heritage. As the anthropologist Margaret Lantis[1] has stated: "Eskimos are trying just as hard today to adapt as they did 500 or 900 years ago; the difficulty is that they are adapting not to the Arctic but to a Temperate Zone way of living."

What does this decision mean for the future of the North Alaskan Eskimos? Are the newly acquired goals and values capable of realization or will they eventually lead to social and psychological frustration, conflict, and disorganization? In an attempt to gather specific information on these and similar questions I began in 1958 a long-term study of the Eskimo community of Kaktovik. Situated on Barter Island on the arctic coast, approximately 400 miles northeast of Fairbanks, this small village of a little over 100 inhabitants is one of the geographically most isolated Eskimo villages in Alaska, and until recently its members had to rely on

hunting, fishing, and trapping for their major means of livelihood. Though many of the residents were raised in the area, they did not come together to form a permanent village settlement until the late 1940's. Only when the U.S. government agencies began hiring local Eskimos for surveying and construction work did Kaktovik become formally recognized as a community.

In 1953-4 when construction began on a nearby DEW Line radar installation, the Barter Island Eskimos experienced the period of greatest change. Since there were not enough local residents to fill the new positions, a number of families moved to the area from other communities such as Barrow and Aklavik.

Within the next 3 years major construction work on the radar base was completed but extensive maintenance is still required and may be expected to continue indefinitely. In 1958, when the study began, approximately 75 per cent of the Barter Island Eskimo men were earning relatively permanent salaries working as labourers and semi-skilled technicians, and this pattern is continuing today. Furthermore, many of the Eskimos have come to identify themselves increasingly with Anglo-American society and culture. This new identification set the stage for the first major hypothesis of the study: *that rapid acculturation may be more conducive to community integration than slow or moderate change if the newly desired goals are clearly perceived and capable of being integrated into existing social and cultural patterns.*

Since a detailed analysis of this hypothesis as applied to the Barter Island Eskimos has already appeared in the literature[2,3,4] it will suffice here to state that, although very dramatic changes were found to have occurred in the areas of subsistence, shelter, medical care, education, mechanisms of social control, and the like, the degree of village integration — as measured by extent of morale and sharing of common norms and goals — was not adversely affected (or at least not until quite recently when a new series of problems arose, which will be discussed in a later publication).[5]

Although a great number of factors was involved in this positive adjustment to rapid change, six appeared to be paramount: first, the Barter Island Eskimos had a predisposition to change already built into their sociocultural system in that a greater value was placed on adaptability than on conformity; second, they voluntarily chose to change large segments of their social and cultural life to fit a western model; third, most of the newly defined goals associated with these changes were capable of realization, including economic affluence and positive interethnic relations; fourth, the community members participated in these changes together as a group, thereby circumventing the problem of inter-generational factionalism so frequently found in situations of acculturation; fifth, most of the major alterations of previous cultural patterns occurred together in such a manner as to preserve a total cultural balance; and sixth, the people were able to control their own internal village affairs without outside coercion. It was noted, however, that although the Barter Island women were very active participants in the new village life, they had less contact with the "outside world" than the men, and if this acculturational gap continued to increase in the future, it could seriously affect the internal stability of the group.

This finding stands in rather sharp contrast to most other studies of rapid acculturation where the disruption of group norms and values and other measures of community conflict have been frequent by-products of this process. The fact that many investigators[6,7,8] have also found correlations between rapid acculturation and increased symptoms of emotional disorder raises the extremely important question of whether it is rapid acculturation as such or the disorganizing element often inherent in rapid acculturation that has a damaging effect on personality adjustment. Viewed in this frame of reference it is particularly fortunate that the Barter Island Eskimo data enable us to bypass

the problem of the extent to which community disruption is a major intervening variable, and instead focus on other important factors that may have a bearing on the psychological health of a rapidly changing population.

In this study two key variables, vital to every process of acculturation, were chosen for particular attention: first, the extent of Eskimo-white inter-cultural *contact* that had taken place among the villagers, and second, the extent to which this contact has brought about a shift in Eskimo *identification* toward the Anglo-American model. By contact I mean the amount of exchange of cultural ideas that enable the Eskimos to have greater understanding of the white man's way of life. In other words, contact is thought of in terms of communication. By identification with the Anglo-American model I mean the process that takes place when an Eskimo, or group of Eskimos adopt behaviour derived from western society because this behaviour is attractive to them — it is valued by them. As the psychologist Kelman[9] has suggested, identification in this sense may be distinguished at least conceptually from "compliance" where the individual or group acts like the outsider simply to gain favour or personal advantage — without its affecting his value system, and from "internalization" where the new behaviour is not only attractive but becomes consistent with other basic beliefs and values.

When an Eskimo identifies himself with members of western society, he wishes to look and behave like members of that society so as to maintain the pleasing self-defining relationship it provides him. An Eskimo woman who goes for a walk over the tundra in high-heeled shoes and western skirt, or an Eskimo man who plays volleyball in a double-breasted blue serge suit, is not gaining any practical advantage from this action, nor is he forced to do it. He is not, in Kelman's term, complying. On the other hand, it is possible that this behaviour reflects an internalization of western values. However, the indices used in this study simply do not reach this deep a psychological level and the extent of western identification alone was chosen as the unit of analysis.

At the beginning of the research it was hypothesized that if all the adult village residents could be ranked on a scale of inter-cultural contact and a separate scale of western or Anglo-American identification, *those Eskimos who were found to have had relatively little contact with western society and yet strongly identified themselves with that society, would evidence more symptoms of psychological maladjustment than those Eskimos who had a greater degree of inter-cultural contact irrespective of whether they identified themselves with western society or not.* In other words, even where the newly defined goals could be achieved (and the hypothesis is applicable only to this situation), the stresses placed on those Eskimos whose western identification was greater than their knowledge and understanding of Anglo-American culture patterns, would be such as to encourage more symptoms of psychic distress than among a culturally comparable group whose western knowledge enabled them to feel more secure in their identification. Furthermore, it was felt that those Eskimos who had extensive contact with the "outside world", but still chose to identify themselves with their traditional way of life had a realistic basis for their decision and therefore would also show few maladaptive symptoms on a scale of psychological adjustment.

To test the hypothesis it was necessary to develop a psychological screening instrument as well as scales of inter-cultural contact and identification. Following discussions with epidemiologists, survey researchers, and anthropologists familiar with problems of cross-cultural health research, the Cornell Medical Index questionnaire (CMI)[10] was chosen as the main instrument to use in the study. The CMI is in essence a medical history form designed to elicit responses from the respondent concerning his past and present physical condition and family life history, as well as indicate feelings

of the individual's own perception of his state of mind and health. The questionnaire has been used primarily in the United States on various normal, psychiatric outpatient, hospital, and military groups[10], although it has also been used as a measure of physical and mental health in relation to culture change in the American south[11], in Peru[12], and among the South African Zulu[13]. A detailed discussion of the various conceptual and methodological problems involved in the cross-cultural use of a health questionnaire standardized on an Anglo-American population, and of the revised CMI used in the Barter Island Eskimo study has recently appeared and will therefore not be taken up here[14,15].

Since the primary concern of this phase of the study was to determine the effect of rapid acculturation on personality adjustment, only those parts of the questionnaire dealing with symptoms of emotional difficulty will be discussed. The degree of personality adjustment for each Eskimo in the village was calculated according to the number of "no" responses given to the 62 questions dealing with symptoms of emotional disturbance.

Questionnaire procedure

In 1960 the CMI was given to 91 per cent of the adult Kaktovik residents, i.e., those over 17 years of age. Those not interviewed were temporarily absent owing to assignment at other radar sites, were hospitalized, or were away for other reasons. Only one Eskimo family, a source of conflict in the village for many years, refused to participate in the survey. All others were quite co-operative. Because many of the older people had little knowledge of English the local Eskimo leaders recommended several young native men and women as survey interviewers, who were then thoroughly trained for the task. In addition, two brief talks were given to members of the entire village in which the questionnaire was explained. Translations of the talks were made by two of the village leaders, thereby showing their support for the proposed survey. It required about 3 weeks to obtain answers to the questionnaire from all residents.

Contact and identification scales

Indices used to determine the extent of Eskimo-white contact for each village resident included the following: (1) amount of formal education, (2) knowledge of English, (3) residential mobility, (4) hospitalization, (5) salaried employment, (6) access to mass media, (7) National Guard or military service.

Indices used to determine the extent of identification with western society included: (1) preference for traditional Eskimo as opposed to western-oriented activities, such as making of Eskimo objects, hunting and fishing when not working, participation in Eskimo games and dances rather than western games and dances, spending leisure time with whites at the DEW Line site and the like; (2) preference for Eskimo foods, such as caribou, uncooked fish, etc. as opposed to western foods, that is, canned foods, potatoes, etc.; (3) preference of Eskimo clothing (Eskimo parka, mukluks, etc.) over western clothing and hair styles (sports clothes, suits and jackets for men, high-heeled shoes and make-up for women, and the like).

Where possible, information was obtained from school, hospital, employment, census, or village records. In a number of instances, however, subjective judgements had to be made, particularly on the identification scale. To resolve this problem two Eskimo "judges" were used. They were both well-known and respected members of the community and were chosen for their objectivity, perception, and willingness to participate in the study. Before asking them to rank the sample members, each index was discussed thoroughly and criteria given so there would be little question where a person should be placed on the scale. Separate judgements were also made by the two anthropologists in the community at the time. In the few instances where evaluation differed, joint discussions were held and a common agreement was reached. Numerical weights were given to all

contact and identification indices and a final contact and identification rank was then determined for each Eskimo in the sample. His or her final placement into a "low", "medium", or "high" contact rank and separate "low", "medium", or "high" western identification rank was determined according to the total numerical score in each of the two scales.

Finally each person in the sample was placed in one of the nine possible categories (obtained by combining the two scales, such as "low contact-medium identification" or "high contact-low identification"). Owing to the nature of the classification and the size of the sample, some categories were vacant and two had only one representative each. Then the mean emotional disturbance symptom rate on the CMI was calculated for each category and t tests for the significance of the differences between the means of the various categories were made.

Results

Examination of the CMI responses showed that the Barter Island women tended to have many more symptoms of emotional disturbance than the men. The difference between the means was significant at the 1 per cent level. Consequently, men and women were considered separately throughout the remaining part of the analysis. It is probable that the much higher (mean) scores for Eskimo women reflect the greater stress placed on most of the women as a result of their loss of many traditional roles without adequate replacement and the problems associated with their slower rate of acculturation as contrasted with that of the men. However, with the small sample, the major variability of the scores of the women makes it difficult to establish this statistically. Other investigators who have used the CMI with both sexes have for the most part found higher scores for women than for men, although in the South African Zulu study by Scotch and Geiger the men scored higher than the women on the psychological part of the test and they related this to greater social stresses among men than among women.

Examination of the men's group showed that in those instances in which a test could be made all critical tests of the hypothesis were statistically significant. That is, in all pertinent categories groups whose contact rank was lower than their identification rank showed more symptoms of emotional disturbance than did groups whose contact and identification ranks were the same or whose identification rank was lower than the contact rank.

Because of the small number of groups that resulted when women were placed in the contact-identification categories, only one test of the hypothesis was possible; those women who fell into the low contact-low identification group showed a mean emotional disturbance score (i.e., mean number of "yes" answers to questions having to do with symptoms of emotional disturbance) of 13.13, whereas among those in the low contact-medium identification group the mean score was 18.71. Although this difference is in the direction postulated by the hypothesis, it is not statistically significant ($t = 1.26$).

To determine whether demographic factors such as age, amount of education, marital status, ethnic descent, or number of kin in the village, affected the rate of emotional disturbance, t tests were run with respect to these variables. Interestingly enough, no individual correlations could be found, indicating that none of these factors, when viewed separately, had an important influence on symptoms of emotional disturbance.

Finally, it is also important to note that neither the degree of contact, nor the degree of identification, when considered *by themselves*, revealed significant differences with respect to emotional disturbance. It was only the *combination* of lower Eskimo-white contact and higher identification rank that produced the stresses conducive to emotional difficulties in the individual.

Conclusion

Since most causes of personality maladjustment are multiple, it is extremely

difficult, if not impossible, to pinpoint any one factor or specific set of factors and simply call on these to explain the level of adjustment of an individual. Certainly, the adjustment of the Barter Island Eskimos is affected by many factors other than rapid acculturation with which this phase of the research is concerned. Except for the demographic variables of age, marital status, and the like, no attempt was made to cover other possible etiological conditions. It is thus not surprising that considerable variability is found within the village in the various response to questions concerning emotional disturbance.

It is even more important to note that, although the study shows some very interesting results, it does not provide a definite test of the hypothesis. The small size of the sample, particularly when subdivided into sex and contact-identification groups; the problem of differential weights given to the various contact and identification indices; the fact that the equivalence of the final contact and identification ranks cannot be assumed; and finally, the reliance on a single questionnaire given at a particular point in time to determine the extent of personality adjustment, are limiting factors that cannot be ignored. Nevertheless, the findings do suggest that the relation between degree of western identification and knowledge and understanding of western society are important factors to be taken into account in the study of personality adjustment and acculturation of the Eskimos of northern Alaska.

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SIPRE ICE-CORER FOR OBTAINING SAMPLES FROM PERMANENTLY FROZEN BOGS

The Geological Survey of Canada is currently making studies of the surficial geology in several arctic and subarctic areas, which are supported by palynological investigations. These are difficult because of the necessity of sampling permanently frozen bogs. Preliminary tests indicated that the SIPRE ice-corer is the most promising of the readily available sampling devices and its effectiveness has been demonstrated subsequently in the field and in a field laboratory.

In the 1962 field season O. L. Hughes, assisted by V. N. Rampton used a hand-operated SIPRE ice-corer in northern Yukon Territory to obtain continuous cores through a variety of materials (moss peat, sedge peat, gyttja, and woody peat) to depths of down to 94 inches. Much of the organic material contained minor amounts of silt and sand with occasional pebbles, and one hole was drilled 4 inches into stony clay below the bog. Hand drilling produced excellent cores, which after

Fig.1. SIPRE ice-corer with McCulloch chain-saw motor.

light scraping with a sharp knife showed clearly the component organic layers, interstitial ice, and ice segregations. Since the cored material was frozen, only little care was required to obtain uncontaminated samples for pollen studies and radiocarbon dating. Samples were placed in plastic bags until thawed, after which surplus water was decanted.

Two deficiencies were found in the ice-corer as used: (1) mineral matter in the deposits dulled the cutting teeth so that after drilling about 20 ft. of