ANTARCTIC IRON METEORITES: AN UNEXPECTEDLY HIGH PROPORTION OF FALLS OF UNUSUAL INTEREST: Roy S. Clarke, Jr., Division of Meteorites, Smithsonian Institution, Washington, D.C. 20560, U.S.A.

The inhabited and explored areas of Earth have contributed 725 iron meteorites to our collections, accounting for 28% of the 2611 authenticated meteorites known of all types. This percentage is known to be weighted in favor of iron meteorites over other types if frequency of fall is considered. Their greater resistance to weathering and the higher probability of recognition of irons after long residence times on the ground is responsible. Observed fall statistics give a much different view of relative abundance. The 42 historic iron meteorite falls spanning 230 years suggests a frequency of one fall per 5.6 years and represents only 4.9% of the total 853 known falls. For statistical purposes, 42 is a small number when compared either to the total number of falls or to the 14 recognized iron meteorite classification groups. Estimates, therefore, of either the relative abundance of iron meteorite falls or of the relative frequencies of falls of various iron meteorite types must be considered as unsatisfactory approximations. The numbers used herein for non-Antarctic meteorites were taken from the recent summary of such data in the "Catalogue of Meteorites" by A.L. Graham, A.W.R. Bevan and R. Hutchison (1985).

Antarctic iron meteorite recoveries offer promise of providing a new perspective on these aspects of the influx problem. Neither ease of recognition nor resistance to weathering seem to have the same importance for Antarctic recoveries as they do for other environments that have produced meteorites. Small meteorites are recognized on the ice almost as readily as large ones. The weathering of Antarctic irons seems to be restricted mainly to exterior surfaces and to penetration along major grain boundaries. Although these meteorites may have had long terrestrial residence times compared to non-Antarctic irons, no really severely internally weathered irons have yet been recovered. The pairing problem is, of course, severe in Antarctica, but it may prove to be less severe for irons than for stones.

At least 42 iron meteorite specimens have been found during the last 25 years by various field teams working in Antarctica. Most of these specimens have not been described in detail, but the available data indicates that 21 separate falls are represented, 50% of the number of recovered specimens. Twelve of these falls have been both structurally classified and placed into chemical groups. On the basis of incomplete data, 8 of them appear to be anomalous, not to fit into one of the defined chemical classification groups. This leads to an interesting comparison with non-Antarctic recoveries. Meteorites of the three most common iron meteorite types (IAB, IIIAB and IVA) comprise 50% of finds, 40% of falls, and 33% of Antarctic irons. Anomalous meteorites comprise 11% of finds, 12% of falls, and 38% of Antarctic irons. This may be an indication that the Antarctic recovery area produces a more representative proportion of small and compositionally unusual iron meteorites. The 21 separate iron meteorite falls may also be extrapolated using available fall statistics to suggest that a total of 430 meteorite falls have occurred in areas that have provided meteorites to the collecting sites. This is a crude figure that seems to be consistent with what is known of stony and stony iron meteorite recoveries and pairing.

Twelve of the 21 falls have been both structurally classified and placed into chemical groups. They are listed in order of increasing structural complexity and/or Ni content. The hexahedrites (IIA) are represented by

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Yamato-75105, Allan Hills A78100, and ALHA81013; coarsest octahedrites (IIB) Derrick Peak A78001* and Elephant Moraine 83245; coarse octahedrites (IA) by Neptune Mountains (1964), ALHA76002*, ALHA77283, Purgatory Peak A77006; medium octahedrites (IIIA) by Y-790724 and Reckling Peak A80226; and the fine octahedrite (IVA) by ALHA78252.

Anomalous and/or ungrouped meteorites are: the medium octahedrite Lazarev (1961); the fine octahedrite ALHA81014; the plessitic octahedrites Y-75031* and ALHA80104; the axatites ALHA77255 (12% Ni), EET83230 (∿15% Ni), Inland Forts 83500 (∿20% Ni), and Y-791694 (∿36% Ni). The meteorite Y-790517 is severely reheated.

*Indicates paired meteorites: DRPA78001 is paired with DRPA78002 through DRPA78016; ALHA76002 is paired with ALHA77250, ALHA77263, ALHA77389 and ALHA77290; Y-75105 is tentatively paired with Y-791076.