Table 3
Comparison of two independent means of Campo del Cielo data with the mean of NWA 5549. The upper values are Campo del Cielo data published by Wasson and Kallemeyn (2002). The next line gives the mean of four Campo irons received at UCLA under pseudonyms after 2002. The final line shows that mean NWA 5549 data differ from Campo del Cielo in terms of Cr, Ga, W and Ir; relative 95% confidence limits on the listed values for these elements are <8% for Cr and W, and <4% for Ga and Ir.

	Cr μg/g	Co mg/g	Ni mg/g	Cu μg/g	Ga μg/g	Ge μg/g	As μg/g	Ru μg/g	Sb ng/g	W ng/g	Re ng/g	Ir μg/g	Pt μg/g	Au μg/g
Campo WK	38	4.58	66.8	140	93.0	394	11.8		270	1.31	370	3.55	7.6	1.490
Campo new	33	4.54	66.9	146	91.1	374	11.2	8.1	258	1.36	428	3.67	7.9	1.474
NWA 5549	191	4.55	68.8	129	81.6	370	11.9	7.3	268	0.96	399	4.08	7.1	1.488

Six North African irons are classified as ungrouped (Table 2). Two have low As and Au values and are therefore not part of the IAB complex; El Qoseir is from Egypt, the other, 4702, is from Northwest Africa. El Qoseir and 4702 have no close relatives.

The other four irons have very interesting compositions and structures. Their As and Au contents are above the IAB threshold values but, in three of them, As, Au and some other elements are so high that it seems better to treat them as special cases. Future studies (including the determination of O-isotopic compositions) are needed to determine whether they should be considered ungrouped members of the IAB complex.

The first, NWA 0859, also known as Taza, is chemically related to Butler. Both irons have beautiful plessitic octahedrite structures (Fig. 7d) and extremely high Ge (2000–2300 μg/g), As (48–54 μg/g) and Au (6.5–6.8 μg/g) contents. It is not yet clear whether or not Taza formed magmatically. Because I cannot recognize magmatic trends (such as negative Ir–Au and Ir–As trends) in the Butler-0859 data set, it seems probable that they are non-magmatic irons formed by impacts.

The second high-Au ungrouped iron is 4705; it is a plessitic octahedrite distinguished by having one the highest known Ir contents and by far the highest Pt (83 μg/g) and Ru (76 μg/g) values in my iron-meteorite data set (which, however, is very incomplete for Ru). The Ge content of 1300 μg/g is exceptionally high; The Ge/Ga ratio is 87, far above the working upper limit of 7 for IAB irons (Wasson and Kallemeyn, 2002).

The third high-Au ungrouped iron is the high-Ni ataxite NWA 6259; it is distinguished by having the second highest Ni content (426 mg/g) known in an iron meteorite (Oktibbeha County has ~600 mg/g Ni); Dermbach, with 419 mg/g is similar. Its structure is irregular with many small squiggly FeS inclusions (Fig. 7e), probably reflecting impact melting. Curiously the mass is highly magnetic, capable of picking up large steel objects; this is presumably an effect introduced by humans.

I also list metal from one mesosiderite (2676) in Table 2. The concentrations of taxonomic elements all fall within the scatter fields of mesosiderite metal (e.g., Hassanzadeh et al., 1990).

6. THE DIVERSITY OF DESERT IRONS

It is useful to compare the taxonomy of irons from the North African hot desert with that for the irons from the cold desert of Antarctica. Wasson (1990) noted that studies of Antarctic irons revealed a much larger fraction of the ungrouped irons than present in the 600 irons previously studied. At that time 15% (88 of 574) of known non-Antarctic irons were listed as ungrouped versus 39% (12 of 31) of Antarctic irons.

Wasson (2000) reexamined the taxonomic data for Antarctic irons. From a set of 40 irons he deleted six that had total recovered masses ⩽21 g; he noted that these were so small that they could easily be metal nuggets from impact-altered chondrites such as those studied by Widom et al. (1986). In this set of 34 he classified 13, or 38% as ungrouped.