regarded as 'tears wept by the Sun' and the latter as 'tears of the Moon'[241]. These notions subsequently became corrupted into dragons guarding gold and other treasures.

But fanciful and distorted though these ancient memories may now be, they unquestionably date back to the time when a severely heated Earth ran with streams of molten and magnetised metals, derived, perhaps, as much from its cosmic assailants as from existing terrestrial lodes and veins of ore. Later, after solidifying once more, men came to believe that all had been produced by terrible celestial monsters. Magnetised iron, incidentally, was the first iron known to have been worked by man.

10

THE RAINS OF DEATH

As long ago as 1872, the Challenger oceanographic expedition, which sailed over 68,000 nautical miles in circumnavigating the globe, recorded the presence on the world's ocean floors of myriads of small, black, nickel-rich magnetic spherules having diameters in the order of 10–50 microns (u). They appeared to be especially abundant in the deepest basins. The existence of these tiny objects was repeatedly confirmed in the late 1940s by the Swedish marine exploration vessel *Albatross*, the observations made then rekindling interest in the spherules. Indeed, after considering all relevant factors, both E J Opik[242] and Kurt Frederickson[243] independently concluded that the spherules were very probably of meteoric origin.

Also covering much of the floors of the deep ocean basins is a distinctive deposit which, though usually tinted a rusty brown, is known as the *red* clay. It occupies "...about 102 million km^2" and represents a prodigious tonnage since "...at an average depth of about 200 metres, there would be some 10^{16} tons of red clay on the ocean floors"[244]. Naturally radioactive, this clay derives its colour from ferric hydroxide and a small amount of manganese oxide[245], and consists of very fine-grained sediments mixed with coarse silt and sand fractions originating in the oceans, as well as hydrogenous minerals, volcanogenic debris and ferromanganese concretions[246].

Sea-bed clays and muds from the Arctic are coloured brown due to the presence in them of enormous quantities of oxidised ferric iron particles, while those from the seafloor near the New Siberian Islands, in the White Sea and the Barents Sea contain a notably high percentage of manganese oxide[247]. Examining clay samples from the bottom of the Pacific Ocean, Pettersson discovered that they contained layers of volcanic ash and *large* amounts of nickel and radium – two elements almost completely absent from sea water. He observed that "nickel is a very rare element in most terrestrial rocks and continental sediments and is almost absent from ocean waters"[248]. Pettersson attributed the origin of the iron and nickel in these clays to "...very heavy showers of meteorites in the remote past"[249]. He also added:

> Assuming the average nickel content of meteoric dust to be two per cent, an approximate value for the rate of accretion of cosmic dust to the whole Earth can be worked out from these data. The result is very high – about 10,000 tons per day, or over a thousand times higher than the

value computed from counting the shooting stars (meteors) and estimating their mass.[250]

In many areas, however, the red clays possessing this unexpectedly high nickel content rest directly upon geologically very recent lavas and basalts, indicating that they (and their nickel content) must be younger still. At some places these clays form only thin veneers or are altogether absent. Thus, considering all these details in unison, not only must the supposed meteor shower have been recent rather than ancient, but its occurrence must have been sudden, its volume enormous and – in view of the wide distribution of the clay – its operation global.

This last factor is contrary to the normal behaviour of the average meteor shower, even of an exceptionally large one. Meteor showers inevitably enter the terrestrial atmosphere from one quadrant only at any given time. However, owing to the rotation of the Earth, most, if not all, parts of the world's surface could theoretically receive meteoric material over a twenty-four hour period. To account for the enormously high tonnage here, we must imagine either a veritable meteor blizzard continuously pounding the Earth for weeks on end, or the Earth passing through (or being passed by) a vast cloud of metalliferous debris which enveloped more or less every part of the planet's surface almost simultaneously. On remembering that, at this phase of the disaster, Earth had either been braked to a halt, or its rotation was markedly slowed, such near-instantaneous global falls of huge quantities of ferruginous dust becomes easier to understand.

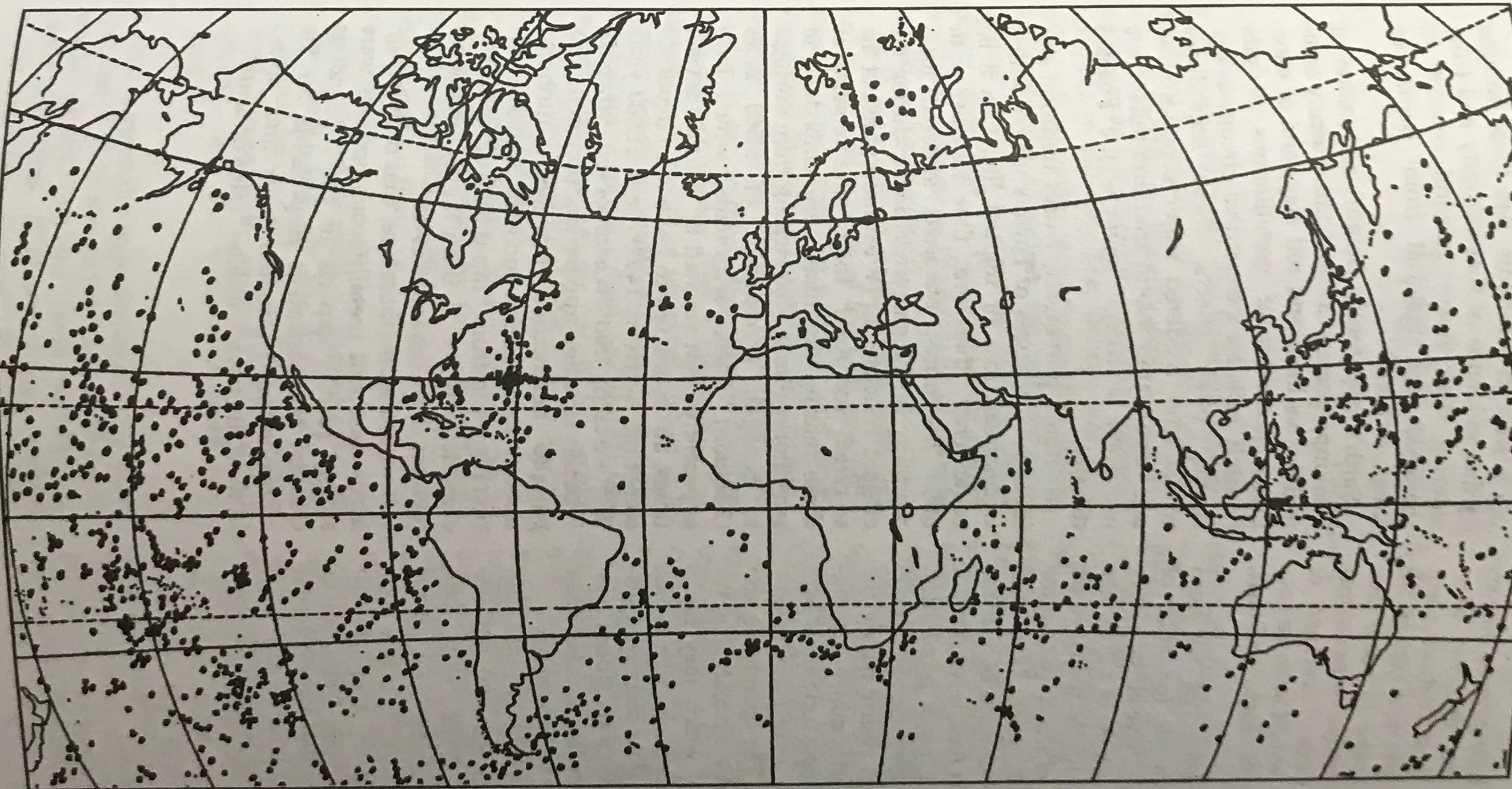
New significance thus attaches to the Finnish tradition that, when the Sun and Moon once disappeared and 'red milk' was sprinkled over the world, 'hailstones of iron' fell *prodigiously* – likewise to those recollections of fine dust falling endlessly from the skies while the Deluge waters swept across the Earth. In turn, these indicate that we are not dealing here with a meteor shower but with a gigantic cloud of cosmic debris, the origin of which we have already suggested.

Finally, we must consider more fully the ferromanganese concretions found in the red clay. Usually referred to as manganese nodules, these irregularly-shaped objects range in size from that of a garden pea to lumps up to 3ft (0.9m) in long diameter, and exist in countless numbers on the sea-bed worldwide[251]. Like the associated red clays, the nodules are naturally radioactive[252], and at some localities are astonishingly abundant, forming veritable 'fields' and 'pavements'. Some 'fields' consist of nodules packed so densely that they totally cover almost 100% of the sea-floor[253]. The wider distribution of the nodules is patchy, however. We are told, for example, that in the eastern central Pacific Ocean:

> ...records were taken with bottom-near television cameras, for hundreds of kilometres. For 5% of the records the sea-floor was covered to more than 50% by nodules, that is up to 25kg of ore per square metre. Conversely, 5% of the records showed the sea-floor free of nodules. Elsewhere, the cover varied, sometimes considerably, even over distances of only 50m. The reasons for the patchiness are not clear...[254]

The areas richest in nodules occur in the north-equatorial Pacific region[255]. Globally, however, it has been estimated that the nodules represent between 100 and 200 *billion* tonnes of material[256]. Map 5F shows the main areas from which they have been reported[257], the concentrations in the Pacific and the western Atlantic, east of the Carolina 'bays, being immediately noticeable.

Manganese nodules are rich in cobalt, nickel, copper and other heavy elements[258], a factor suggesting to several authorities the idea that the nodules, which are thought to grow through natural chemical accretion of these and other elements in sea water, are very old. A very slow growth – one estimate suggests "a few millimetres per million years, at most"[259] – has been postulated because these metal are rare in sea water, and long ages must have passed for the nod-



Map 5F. Ocean floor areas from which ferromanganese nodules have been reported. Each dot represents a separate locality, not an individual nodule. Many areas have yet to be searched for nodules – the expectation being that the final number of nodule-yielding localities will be appreciably higher than shown here.
Compiled from Berger, Horn, and other sources. Van der Grinten's projection. Scale: 1:220,000,000 at the Equator.

ules to have attained their present size by such processes. The fact that the overwhelming majority of these nodules occur on the surface or uppermost layers of the red clay has suggested to some that they have formed principally in areas of low sedimentation rates, since "...because of their slow growth they would soon be covered up in regions of high sediment supply"[260].

No plausible explanation has yet been advanced to account for the formation of nodules in such areas. We have already seen, however, that the twin notions of a great age and slow deposition rate for the red clays are apparently erroneous – especially where the clays overlie geologically *young* lavas and basalts – and the inference must be that the associated nodules are at least as youthful if not more so. In any case, major geophysical changes to ocean floors approximately 11,500 years ago (see Part One) clearly nullify the concept of sea-bed deposits slowly accumulating under generally stable conditions over very long periods of time, or of a similar slow growth for the nodules. The abundance and distribution of the nodules is remarkable, yet if the sea water below which they lie is almost devoid of the materials from which they allegedly form, and if the associated sea-floors and bottom sediments are indeed geologically youthful[261], then the nodules must have formed under other circumstances.

When all these factors are taken into consideration, they suggest that the nodules have been dumped *en masse* rather than accumulating slowly. This implies a cosmic source which, if correct, signifies that they arrived suddenly and in vast numbers. We recall that several traditional memories of that frightful event agree that some celestial object disintegrated into innumerable fragments while in the vicinity of Earth, showering it with its remnants. Are these nodules further evidence of that calamity and (considering their heavy mineral content) of shattered core material from Tiamat, or Kingu, or both?

Earth's apparently 'recent' acquisition of iron-impregnated matter (subsequently accumulated as loess and red clay) and of enormous quantities of metalliferous nodules certainly calls for exceptional circumstances. Among other effects, these acquisitions would have rendered water supplies bitter and unpalatable. World tradition remembers just such a 'recent' event – the Phaeton disaster.

As noted previously, world tradition also links the bitterness of Earth's waters with a widespread loss of marine life. Can it be coincidence, therefore, that together with other life-forms, *pteropods* suffered mass mortality in the eastern Atlantic during the alleged Weichselian (Würmian) phase of the so-called Ice Age? Today, the remains of these marine organisms are embedded in sea-floor sediments stretching from Portugal to Senegal, a distance of 1,560 miles (2,500km). These sediments, which have apparently been washed by *red tides* several times, are estimated to have been deposited sometime between 14,000 and 11,000 years BP[262] – exactly that division of time when the Phaeton disaster apparently occurred. This *pteropod* destruction has been attributed directly to a sudden increase in sedimentation resulting from "rapid hydrographic and climatic changes"[263], both highly prominent features of the Phaeton event!

It would seem, therefore, that both ferruginous dust and metalliferous nodules were simply further aspects of the tremendous celestial bombardment responsible for the aforementioned oriented 'bays' and 'lakes'. In short, they were indeed 'rains of death'.

218. Buckley, A (tr). 1861. "To Minerva", in 'Orphic Hymns', in Homer's *Odyssey* (New York), xxx + 432pp.
219. Holmburg, V. 1927. *Op cit.*
220. King, L W. 1902. *The Seven Tablets of Creation*, 2 vols, (London).
221. *Book of Revelation*, chap 8, v7.
222. *Apocalypse of Thomas*, found in *Summa Theologica*, tr from the original Latin; 1st American edn, 3 vols (New York), 1947–48.
223. Bourbourg, Brassaeur de. 1957–59. *Histoire des Nations civilisées du Mexique*, 2 vols, (Paris); see vol 1, p30.
224. Langdon, S. 1923. *Enuma Elish: The Babylonian Epic of Creation* (Oxford), n p.
225. *Book of Revelation*, chap 4, v6.
226. *Book of Revelation*, chap 8, v7.
227. Merck, C. 1876. *Excavations at the Kesslerloch near Thaygen, Switzerland, a cave of the Reindeer Period*, tr by J E Lee, (London), viii + 68pp; see p7.
228. Molnar, R E. 1980. "The Fossils of Tea Tree Cave", *Tower Karst*, no 3, pp9–15.
229. Busk, G. 1872. "On the Animal Remains found by Col Lane Fox in the High- and Low-Terrace Gravels of Acton and Turnham Green", *Q Jl Geol Soc Lond*, vol 28, pp465–471, pp465–6.
230. Heer, O. 1866. "On the Miocene Flora of North Greenland", *Rep Brit Assoc Advmt Sci* (Nottingham), pp53–55; see p53.
231. Corser, C E. 1978. "The Sand and Gravel Resources of the country around Abingdon", *Inst Geol Sci Lond Min*, assessment rep 38, iv + 105pp; see p14.
232. Lee, J S. 1939. *The Geology of China* (London), xv + 528pp; see p421.
233. Lee, J S. 1939. *Op cit*, pp202, 368, 371.
234. Watkins, W I. 1945. "Observations on the Properties of Loess in Engineering Structures", *Amer J Sci*, vol 243, pp294–303; see p297.
235. Bates, R L, & J A Jackson. 1980. *Glossary of Geology* (Amer Geol Inst, Virginia), vii-x, 749pp; see p367.
236. Grieve, D A, & W K Fletcher. 1976. "Heavy Metals in Deltaic Sediments of the Fraser River, British Columbia", *Canad Jl Earth Sci*, vol 13, pp1683–1693, p1693.
237. Wright, G F. 1889. "The Idaho Find", *Amer Antiq Orient Jl*, vol xi, pp379–381.
238. Heyl, P R. 1913. "Platinum in North Carolina", *Proc Amer Phil Soc*, vol lii, pp2–30, pp21, 22, 27.
239. Bellamy, H S. 1936. *Op cit*, p87.
240. *Book of Job*, chap 40, v21, 38.
241. Bellamy, H S. 1936. *Op cit*, p84.
242. Opik, E J. 1955. "Cosmic Source of deep-sea Deposits", *Nature*, vol 176, pp926–7.
243. Frederickson, K. 1956. "Cosmic Spherules in deep-sea Sediments", *Nature*, vol 177, pp32–33.
244. Fairbridge, R W. 1966. *Encyclopedia of Oceanography* (New York, v-xiii, 1021pp; see p523.
245. Kuenen, P H. 1950. *Marine Geology* (New York), x + 568pp, pp359–360.
246. Seibold, E, & W H Berger. 1982. *The Sea Floor* (New York), vii + 288pp, pp359–360.
247. Emery, K O. 1949. "Topography and Sediments of the Arctic Ocean", *J Geol*, vol 57, pp512–521; see pp516–518.
248. Pettersson, H. 1953. *Westward Ho with the Albatross* (New York), 218pp; see pp149–150.
249. Pettersson, H. 1950. "Exploring the Ocean Floor", *Scient Amer* (August), pp42–44.
250. Pettersson, H. 1953. *Op cit*, p150.
251. Seibold, E, & W H Berger. 1982. *Op cit*, p241.
252. Kuenen, P H. 1950. *Op cit*, p375.
253. Kennett, J P. 1982. *Marine Geology* (New Jersey), xv + 813pp; see p500.
254. Seibold, E, & W H Berger. 1982. *Ibid.*
255. Burk, C A, & C L Drake (eds). 1974. *The Geology of Continental Margins* (New York), xiii + 1009pp, see article by W H Berger.
256. Seibold, E, & W H Berger. 1982. *Op cit*, p239.
257. Horn, D R. 1972. *Ferromanganese Deposits on the Ocean Floor* (New York), Washington Nat Science Foundation, n p.
258. Seibold, E, & W H Berger. 1982. *Ibid.*
259. Seibold, E, & W H Berger. 1982. *Op cit*, p241.
260. Seibold, E, & W H Berger. 1982. *Op cit*, p241.
261. Ewing, M, J I Ewing & M Talwani. 1964. "Sediment Distribution in the Oceans: the Mid-Atlantic Ridge", *Bull Geol Soc Amer*, vol 75, pp17–34; see p17.
262. Diester-Haass, L, & S van der Spoel. 1978. "Late Pleistocene Pteropod-rich sediment layer in the N E Atlantic and Protoconch variation of 'Clio Pyramidata', Linne 1767", *Palaeogeogr Palaeoclimat Palaeoecol*, vol 24, no 2, pp85–109; see p85.
263. Diester-Haass, L, & S van der Spoel. 1978. *Op cit*, p107.
264. *Book of Genesis*, chap 7, v18–19.
265. *Psalms*, chap 104, v6.
266. *Psalms*, chap 33, v7.
267. Tylor, E B. 1929. *Primitive Culture*, 2 vols, (Boston), edn; see vol i, pp322ff.
268. Legge, J (tr). 1876. "Annals of the Bamboo Books", vol 3, part 1 of *The Chinese Classics* (Hong Kong).
269. Ginzburg, L. 1925. *Legends of the Jews*, 7 vols, (Philadelphia); see vol iii, p22.
270. Cambrey, L de. 1926. *Lapland Legends* (New Haven & Oxford), x + 212pp.
271. *Psalms*, chap 3, v9.
272. *Talmud*, Tractate Sanhedrin, 108b.
273. Hess, H H, & P MacClintock. 1936. "Submerged valleys on Continental Slopes and Changes of Sea Level", *Science*, vol 83, n s, pp332–4.
274. Patten, D W. 1966. *The Biblical Flood and the Ice Epoch* (Seattle), xvi + 336pp; see p56.
275. Bellamy, H S. 1936. *Op cit*, pp124–5.
276. *Book of Genesis*, chap 7, v4.
277. *Book of Enoch*, chap 89, v1.
278. *Book of Ezekiel*, chap 13, v2, chap 38, v22.
279. West, E W (tr). 1880. "The Bundahish", chap 7, in part 1, in *The Pahlavi Texts*, 5 vols, (Oxford).