but require the strong intervention of the chemists.

For example, in the work of Sievers and von Kiedrowski, special groupings are used to block reaction on the termini of the hexamers, and the oligomers are coupled together via a phosphoramidate grouping which forms more readily than the corresponding phosphodiester bond found in living systems. In both experiments, the templates and replicating oligomers are carefully chosen and synthesized, the condensing agent is added at the proper time and, in the case of replication via the triple helix, the double-helical product is purified between replication cycles. The chosen oligomers are of DNA rather than the RNA which is thought to have preceded DNA, as DNA is easier to synthesize. And Li and Nicolaou's system uses only palindromic sequences, so that the newly formed strands are identical to the starting pyrimidine oligomer (that is, they have the same 3′- and 5′-terminal groups). In addition, there is the question of the prebiotic pathways to the activated mononucleotides from which the oligomers are constructed.

An optimist, on the other hand, would note that the oligomers required for replication could have been formed by the mineral-catalysed condensation of activated mononucleotides[7]. The sequence information present in these 10- to 20-mers could have been preserved by the above replication processes and the chains elongated by occasional condensation reactions, as Li and Nicolaou suggest. Eventually the oligomers could have evolved in size and catalytic versatility so that they could carry out the synthetic processes required to initiate the RNA world[8,9].

My own view is one of cautious optimism. The new work demonstrates that the unsolved problem of information storage by RNA replication is not as intractable as it previously appeared, and we are a small step closer to understanding possible pathways to life. But my guess is that catalysts other than RNA oligomers were involved if replication processes similar to those described here eventually led to the origins of life. □

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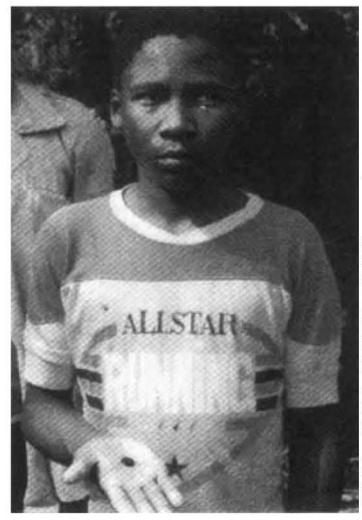
METEORITICS

Mbale impact shower

NINETEEN ninety-two was a good year for meteorite observers. Following the tale of the car-crunching Peekskill meteorite in the United States (D. Hughes *Nature* 367, 596; 1994, and P. Brown *et al. Nature* 367, 624–626; 1994) comes a detailed report by P. Jenniskens *et al.* of the meteorite that broke up over a heavily populated area of Uganda on 14 August 1992, raining debris for kilometres around (*Meteoritics* 29, 246–254; 1994). The young boy shown here has the distinction of being the first person known to have survived being hit on the head by an extraterrestrial. He was lucky: the fragment in his hand weighs a mere 3.6 g, and had the edge taken off its speed by the leaves of a banana plant before it hit him. Had it been one of the larger chunks shown below, he might not (as the researchers put it) have "remained in a position to recover the stone."

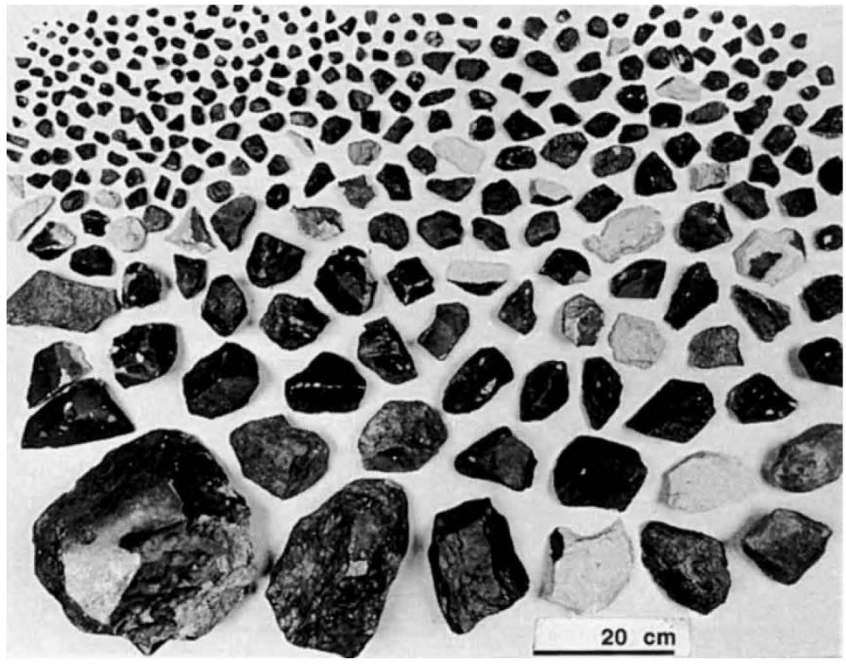


P. Jenniskens/Dutch Meteor Society

Eyewitness accounts of the fall were dramatic. The first intimations came in the form of a rumbling explosion at 3:40 pm local time, at which many industrial workers fled, mistaking it for a bomb blast. For the following few minutes, a "smoke trail" and a compact cloud of dust were visible in the sky, and stones rattled down in and around the city of Mbale accompanied by a sound "like gun fire". The shower caused no casualties and surprisingly little damage: one fragment punched a hole through the roof of the Mbale railway station, another crashed into a cotton factory and a third hit a house roof. Other fragments were less easy to find, but a week-long field expedition shortly after the event located nearly fifty impact sites, and a fine collection of fragments ranging in mass from 0.1 g (top left in the photograph below) to 27 kg (bottom left).

In the months that followed, when they were no longer hampered by the dense vegetation and swamps of the rainy season, members of the local population gathered a further 41 kg of material. Including finds bought from dealers, the tally by October last year was 863 fragments with a total mass of 150 kg. The mass distribution over the strewn field (3 × 7 km) allows a rough estimate of the original trajectory and orbit, which apparently just reached the asteroid belt. And analyses of short-lived radioactive isotopes, whose production depends on the size of the original meteorite, give an upper mass limit of about 1,000 kg.

Lindsay Matthews



National Museum of Natural History, Leiden