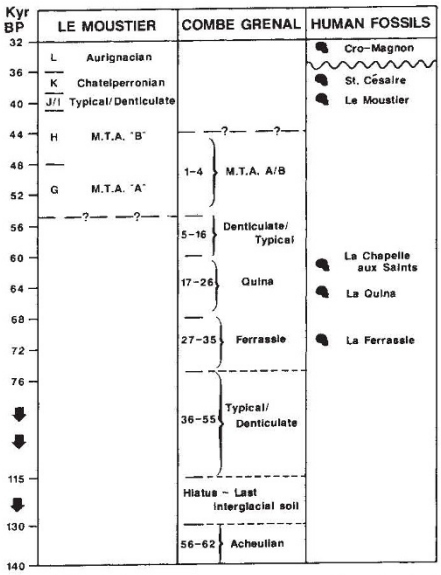

Fig. 2 Correlation between the archaeological sequences at Le Moustier and Combe Grenal implied by the new thermoluminescence dates for Le Moustier. The inferred chronological distribution of the principal Neanderthal remains from south-west France is shown in the right hand column (from refs 5, 10, 14, 15, 17). The sequence of Ferrassie and Quina Mousterian horizons at Combe Grenal is interrupted by a single level of 'Denticulate' Mousterian in layer 20, and three levels of either 'Typical' or 'attenuated Ferrassie' industries in layers 28-30; see ref. 17). M.T.A.; Mousterian of Acheulian Tradition.

occupation levels at Combe Grenal (see Fig. 2). The geological, archaeological and thermoluminescence evidence now converge in suggesting that the two sequences at Le Moustier and Combe Grenal represent essentially successive episodes in the total sequence of Mousterian occupation in south-west France, and together provide a largely complete record of human occupation in the area over a period of at least 70–80,000 years (Fig. 2).

This new chronology has radical implications for almost all aspects of our current understanding of the Mousterian period. In the first place it is now clear that any attempt to force the total pattern of climatic fluctuation during the earlier part of the last glaciation into a simple, two-fold scheme (that is, the 'Wurm I' and 'Wurm II' episodes referred to above) must be seen as a serious oversimplification of a much longer and more complex climatic succession. This in turn has direct implications for the interpretation of the archaeological record. Now that the archaeological sequences at Le Moustier and Combe Grenal can be seen to be successive rather than parallel, there can no longer be any objection to the hypothesis of a basic chronological sequence within three of the major industrial variants of the Mousterian within south-west France (that is, Ferrassie, followed by Quina, followed by Mousterian of Acheulian Tradition) — as the sequence recorded at Combe Grenal had already suggested (see Fig. 2)[3,5,6]. The same archaeological sequence is repeated in at least twelve other sites in the same region[6].

Probably the most significant implications of the new dating however, are for the relative and absolute chronology of the various Neanderthal remains recovered from sites in south-west France. The famous Neanderthal skeleton from Le Moustier itself is known to have come from the uppermost part of the Mousterian sequence[14] and therefore dated at about 40–45,000 years BP. By contrast, most of the other well-preserved Neanderthal finds are associated with archaeological material which is quite different from that recorded anywhere within the Le Moustier sequence but which compares closely with that recorded in the sequence of Ferrassie and Quina Mousterian levels at Combe Grenal[14,15]. It would now appear that all of these finds — including the famous 'classic' Neanderthal skeletons from La Ferrassie, La Quina and La Chapelle aux Saints — most probably date from the period of extremely harsh, glacial conditions represented by stage 4 of the ocean core sequence. If so, these finds must be dated at about 60–75,000 years BP. This is at least 15,000 years earlier than the Le Moustier skeleton, and probably 30,000 years earlier than the oldest finds of *Homo sapiens sapiens* forms from Cro Magnon and elsewhere (see Fig. 2).

Exactly what implications this dating may have for current views on the relationships between the various Neanderthal finds and their ultimate relationships with the Cro Magnon forms remains to be seen[16]. It is already clear, however, that our whole perception of the chronology of human developments during the earlier part of the last glaciation is beginning to change and it may well be that further application of absolute dating techniques will reveal further surprises. □

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Adrian Edmund Gill (1937–1986)

ADRIAN GILL, who died in hospital on 19 April after a sudden illness, will be remembered for his insight, and the almost uncanny ability he possessed to ask apparently very simple questions about ocean and atmosphere.

During the 1970s Gill — who took his doctorate under G.K. Batchelor at the University of Cambridge — began work on a seminal textbook (*Atmosphere–Ocean Dynamics*, published in 1982). The wide reading of both current and historical research that this involved led to the publication of many of the elegantly simple papers for which he will be remembered. His subjects included stability theory, thermal convection, internal and edge waves, and interactions between atmosphere and ocean. The lucidity of his book encapsulated his thinking for the current generation of students and researchers, and rapidly became a best-seller.

Simplicity was the key to the man and his thinking: Gill was a superb mathematician, yet one whose ability was seldom demonstrated, as this would confuse the message that he was anxious to get across not only to his theoretical colleagues but also to seagoing observationalists worldwide. He was perpetually enthusiastic about discovering more of the physical world in which he lived. Those in Cambridge during his time there will recall the stub of pencil which lived in his jacket and which would always be in evidence at tea-time when some fluid dynamical problem would be hotly debated by those around him; or the essay on anomalous tidal flows in Greece that resulted from a family holiday in that country.

Gill travelled widely in the cause of science, and served on innumerable international working groups and committees. His concern with the world climate led to his becoming a founder member of the Committee for Climate Change and the Ocean, and to the conviction in the last years of his life that a model which coupled the global atmospheric circulation to the tropical ocean was the minimum necessary to understand short-term climatic variations such as El Niño. At the time of his death he was serving as the chairman of the Tropical Ocean–Global Atmosphere programme, one of the main components of the World Climate Research Programme, and had just been elected to the Royal Society.

Peter D. Killworth