chaotic microstates offers a fresh perspective on the genesis of ordered structures in our own Universe. He cites as an example the evolution of Shakespeare’s *Hamlet* from the Big-Bang.

The *LIFE* universe is a cellular automaton—an array of identical cells in which each cell has only a few possible states and interacts with only a few neighbouring cells. Cellular automata have recently been used to model physical systems such as snowflakes or ferromagnets, in which the individual components are aware only of immediate neighbours, yet somehow conspire to produce highly-ordered large-scale structures. A cellular automaton was also used, by the Hungarian–American mathematician John von Neumann in the 1950s, to demonstrate that no logical contradiction is involved in the construction of a self-reproducing machine. His self-reproducing cellular configuration had to incorporate structures for processing its own blueprint twice, reading it first as a set of instructions, and then copying it. This feature was immediately recognized by Watson and Crick and others when they discovered a few years later the chemical basis of life on Earth. The chapters of the book on the riddle of self-reproduction, and the recent discovery that even the *LIFE* universe harbours self-reproducing organisms, are particularly fascinating.

I would like to have learnt more about other possible cellular automata, of which there are a huge number, even in the *LIFE* space. In this space, each of the eight neighbouring cells may be in one of two states, so there are $2^8$ possible configurations of neighbours of which any given cell may be aware. In a given set of rules, each configuration may dictate three possible futures for the central cell (live, dead or status quo), so there are $3^{256} \approx 10^{122}$ possible games, of which *Conway’s LIFE* is just one! Of course, *Conway’s LIFE* can be thought of as one of a much-reduced subset of space-symmetrical games, but the subset is not so small, and it would have been interesting to learn how he selected the rules. The number of possible cellular automata rises very fast indeed when considering spaces with larger neighbourhoods or with a greater number of dimensions, reminding us that even if we solve the ‘real’ Universe, there remains essentially infinite scope for exploration.

No aspiring Great Thinker should lack a copy of this lucid and thought-provoking book. To anyone with sufficient self-control not to become a *LIFE* junkie, I strongly recommend it.—**CHRIS BENN.**


An unprecedented array of instrumentation, much of it space-borne, was used to observe solar phenomena at the last solar cycle maximum, in particular flares and flare-associated events. There have been several conferences since then when attempts have been made to discuss and summarize the vast array of data collected. Most notable of these include those at Annecy, Maynooth, Ottawa, the SMM Workshops at the Goddard Space Flight Center and more recently the COSPAR Symposium at Graz, Austria. Proceedings of the Goddard and Graz Meetings (the latter also called *Solar Maximum Analysis*) are now available and there is much in them, as well as the publication *Progress in Solar Physics*, to guide anyone interested in up-to-date information on solar activity research. What makes *Solar Maximum Analysis* different from the others? It is the Proceedings of an international workshop held in the summer of 1985 in Irkutsk, a meeting which brought