ability is unaffected by LTP and argue, therefore, that LTP is postsynaptic in origin. This conclusion agrees, as expected, with the results from paired-pulse facilitation experiments.

This work is also likely to have its critics, however. First, LTP was monitored as a change in the AMPA receptor component of the EPSC rather than of the NMDA receptor component. The latter would have been preferable because it is this which, of course, is used to monitor the MK-801 block. Second, LTP was induced by pairing; this is a procedure which may selectively induce LTP at synapses that already have a high release probability[8]. Third, the MK-801 was applied at least an hour after LTP had been induced so that the possibility of presynaptic changes at earlier times could not be assessed. Nonetheless, the fact that this measure of presynaptic function provided a negative result, at a time when the postsynaptic AMPA-sensitivity study[6] provided a positive result, points strongly towards postsynaptic modification in LTP.

So can the starkly contrasting conclusions of Stevens and Wang and Manabe and Nicoll be reconciled? One possibility that they can is if, indeed, the increase in reliability is due to rapid recruitment of AMPA receptor clusters. But Stevens and Wang never saw multiple quanta EPSCs, so there would have to be a mechanism to restrict release to one active zone per action potential (otherwise sometimes simultaneous release from multiple sites would result in multiple quantal EPSCs).

Regretfully, one must conclude that the locus of expression of LTP has not yet been unequivocally identified. LTP is a stubborn problem — on that one can rely. □

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OBITUARY

André Lwoff (1902–1994)

ANDRE Lwoff, who died on 30 September, was one of the fathers of molecular biology. He began his scientific life at the age of 19, and during the course of his career made a major contribution to the transformation of biology from a collection of dispersed disciplines into a single, unified science. In 1965, together with Jacques Monod and myself, he was awarded the Nobel Prize in Physiology or Medicine for "discoveries concerning the genetic control of enzyme and virus synthesis".

André Lwoff was born to parents of Russian origin; his father was a psychiatrist, and his mother a painter and sculptor. His taste for research was probably influenced by his father who, in the late nineteenth century, had had to escape from oppression by the Tsarist regime like many progressive people of the time. His father believed unshakeably in science, and particularly in Darwinism.

When André Lwoff started in biology, he worked under a great protozoologist, Edouard Chatton, and was fascinated by the beauty and the strangeness of the forms that appeared under the microscope. At the age of 20, he entered the Pasteur Institute, in the laboratory of Felix Mesnil, who had been the secretary of Pasteur himself. During the 1930s, Lwoff spent time in two centres of biochemistry (with Otto Meyerhof in Heidelberg and David Keilin in Cambridge) and in 1938 became head of the Service de Physiologie Microbienne located in the attic of the Pasteur. During the first year of the war, he was in the army. He then came back to the Institute, where his laboratory became an active centre of the Resistance, and only at the end of the war did he resume serious scientific research. In 1959, he was appointed professor of microbiology at the Sorbonne.

Successively a protozoologist, a bacteriologist, a biochemist, a geneticist and a virologist, Lwoff produced a substantial scientific opus that includes two main discoveries. The first was to do with the status and role of vitamins. To multiply, some microbes require traces of certain compounds which other microbes do not need. Before the war, Lwoff showed that these compounds — vitamins — are actually components of all living organisms. They are indispensable to life. If some organisms but not others require vitamins in their culture medium, it is because the latter but not the former are able to manufacture them. This was a far-ranging discovery — with the results stemming from the work of biochemists, it showed that the same molecules with the same functions are found throughout the living world.

Mary Evans

Lwoff — a real Renaissance man.

The second discovery was the demonstration that the genetic material of a virus, a bacteriophage, can become a component of the genetic make-up of the host bacterium. The whole progeny of this bacterium inherits this property. Yet the equilibrium between the virus and the host cell can be broken by treatments which force the cell to produce virus particles. This notion underlies much of today's work on cancers and retroviruses.

André Lwoff had few students. He liked to work by himself, with the help of his wife Marguerite, and of a technician and one or two collaborators (who, after the war, included Jacques Monod, Elie Wollman, Pierre Schaeffer and myself). In the Pasteur attic, there was an uninterrupted stream of foreign researchers and visiting students, and André generated an exceptional ambiance, an atmosphere mixing enthusiasm, clear-mindedness, non-conformism, humour and friendship. Those who had not worked in the attic were unable to perceive the warmth and generosity of this remarkable personality, who shielded himself behind a haughty reserve.

A real Renaissance man, André Lwoff liked to paint, especially in his later years, and he also wrote several books (*L'Evolution physiologique*, *L'Ordre biologique* and *Jeux et Combats*). He functioned more by intuition than by method, and practised science as an art. Indeed, this great scientist was above all an artist.

François Jacob

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