SCIENCE AND TECHNOLOGY

Reinventing Kodachrome

Amateur night

OLD fogies often bemoan technological advance. For some audiobuffs the johnny-come-lately transistor will never replace the purity of the valve, nor the compact disc the long-playing record. And in photography it is generally agreed that nothing recent has been as good a colour film as Kodachrome--which turns 62 this year. The thinner gel, tighter grain structure and purity of the emulsion used in Kodachrome makes for sharper detail and richer colour than either the rival "E-6" slide films, such as Ektachrome and Fujichrome, or any colour-print film.

But in a world that prizes immediacy (another thing that fogies despise) Kodachrome has a problem: it is a nightmare to develop. Bringing out those perfect images requires 18 different photochemical processes. As a result, the machines used to develop Kodachrome are huge, expensive and rare. Most people have to send the stuff away by post and will probably not see the results for a week or more. Not surprisingly, many prefer to use a lesser film that the local chemist can develop and return in an hour.

Now, though, the Kodachrome process has been revamped into something that corner-shop developers can afford. And, since many old fogies also believe that a gifted amateur is worth a dozen slogging professionals, they will probably be pleased to learn that the job was done not by Kodak's own engineers but by a dilettante chemist (albeit one who is also a professional photographer).

In making his invention, Richard Mackson is merely following tradition. Kodachrome itself was devised by two gifted amateurs--Leopold Mannes and Leopold Godowsky. Their day jobs were as classical musicians, and they timed the steps in the development process by whistling the final movement of Brahms's C Minor Symphony. But the method they came up with--though a big advance on the multiple lenses and filters that had previously been required to take colour photographs--was still fiendishly complicated.

Even a modern Kodachrome processor is a behemoth. It is 33 metres (100 feet) long, costs $1m, occupies 1,000 square metres of floor space and needs to be served by a staff of ten, including an analytical chemist to formulate fresh solutions. Moreover, it uses thousands of litres of chemicals a day, and must run the film through high-pressure sprays at speeds in excess of 100 metres a minute in order to produce a sufficiently strong chemical reaction.

Mr Mackson had his idea in 1988, after returning to America from photographing the Seoul Olympics. Kodak had set up a temporary Kodachrome-processing centre in South Korea to allow him and his colleagues to turn their film round quickly. Back home, he was unwilling to go back to the original level of vice.

Like the two Leos half a century before him, Mr Mackson worked on his ideas alone before he approached Kodak. The main problem he had to overcome was the build up of waste products from the development process on the surface of the emulsion. These have to be swept away quickly enough to allow fresh chemicals to do their work. After a number of false starts he realised that he could do this by enclosing the film in a small container instead of an enormous vat. That would let him reduce the speed at which the film had to pass through the reaction vessel, and he could therefore shrink the whole apparatus.

The heart of Mr Mackson's innovation is a series of metre-long plastic tubes-within-tubes. The chemical developers are pumped into the space between the tubes and out through holes in the inner tube into the central chamber. Here, the turbulence created by the spray forces an intimate contact between the film and the developer. As a consequence, the film need move at a mere two metres a minute.

The result is a machine that, in all relevant departments, beats the old one by a factor of ten. It costs a tenth of the price, requires only one technician to operate it (the chemicals are pre-mixed by Kodak, and their concentration is monitored by computer) and can fit into a 60-square-metre room. A film can be processed in under 40 minutes. The result, Kodak hopes, will soon be in a high-street developer near you. Fogies should cheer.