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This summer the Royal Observatory at Herstmonceux

found new life as a science centre. Andro Linklater

celebrates a partial victory for the heritage

THE SIGHT of a child's top spinning unsupported in mid-air should have been

surprising. Rotating there in space, it not only defied the rules of gravity,

it defied common sense, and at least three Fellows of the Royal Society gazed

at it in something close to wonder.

But this was Fabricators' Week at the Herstmonceux Science Centre, with

exhibitors from science centres all over Europe arriving to demonstrate

prototypes of experiments they hoped to produce as hands-on displays - a tube

of rocket-propelled rubber balls, a solar-powered toy car, a model of planetary

movement. They had a much tougher audience in mind. Would it astonish a child?

"Well I certainly found it surprising," Prof Michael Berry FRS, an expert in

gravitational physics and the top's demonstrator, said a trifle indignantly.

"The physics of why the top doesn't topple over are extraordinarily complex,

and so far as I know, no one has ever demonstrated the experiment before."

So challenging are the physics indeed that Berry has written a paper on the

spinning top, invented by Bill Hones of Seattle, for the scientific journal

Nature. Its position in mid-air was maintained by the straightforward method of

positioning a magnet beneath it with reverse polarity, but its stability was

acquired in far more complicated fashion, through the interaction of the

magnetic field and the forces created by its spin. In technical terms, it had

become an adiabatic trap.

"A child brought up on cinema special effects might think it quite normal to

have a top spinning in space"

But Prof Richard Gregory, another FRS and emeritus professor of

Neuro-Psychology at Bristol University, was not convinced that this was enough

to surprise a more blasŽ audience.

"A scientist might be impressed," he objected, "but a child brought up on

cinema special effects might think it quite normal to have a top spinning in

space. The problem, then, would be to demonstrate how surprising it really is."

For Gregory, one of the world's leading authorities on the psychology of

perception, the challenge presented by the encounter of science with a child's

imagination has long been a passionate interest. In 1987 it led him to set up

the Exploratory, Britain's first hands-on science centre housed in Temple Meads

station in Bristol. All the exhibits, demonstrating phenomena as diverse as the

electrical effects of lightning and the length of sound waves, were designed to

be operated by children.

"The point about a science centre is that the exhibits should be fun," he said.

"By which I don't mean frivolous but interesting. They should trigger some

response in the child's mind - what I call a 'cortickle'."

This taste for deplorable puns belies Gregory's standing as a scientist whose

work on lunar photography, for example, made possible the successful docking

and landing of Nasa's Moon mission, but it is crucial to his achievement in

making science enjoyable. Both the Exploratory, which attracts 150,000 visitors

a year, and other centres inspired by its success, such as Birmingham's "Light

on Science" exhibition, all betray the same puckish outlook.

Herstmonceux, which opened in April this year, represents his most ambitious

attempt at cortex tickling. This time he aims not only to make science

entertaining but to rescue an irreplaceable part of Britain's scientific

heritage.

Much more challenging is the attempt to rescue a piece of scientific heritage

To judge by the response of both children and adults absorbed in working the

exhibits already in place, ranging from an Archimedes screw lifting water to

light-sensitive acoustic chimes, its success as a science centre is not in

question.

"Doesn't it make you feel sick?" demanded eight-year-old Robin Montgomery

enthusiastically as he gave instructions on how to use an experiment in optical

illusions. "When you look away you should see the floor rise up, and feel

yourself going bleeargh."

Whether or not that was precisely the illusion intended by the centre's

director, Steve Pizzey, whose Science Projects company devised the exhibits,

there is no doubt about the enjoyment of the 15,000 customers who have already

visited the centre. Pinned to the noticeboard were letters from local schools

filled with phrases such as "the best trip ever", "a brilliant day",

"absolutely fabulous".

Much more challenging is the attempt to rescue a piece of scientific heritage.

Until 1990, Herstmonceux, in East Sussex, was the site of the Royal Greenwich

Observatory, which moved there after the war in an attempt to escape London's

lights and pollution. At its height it boasted no fewer than six telescopes on

site, including the country's largest reflecting telescope, the 98-inch Isaac

Newton telescope, and a bank of atomic clocks which used to be responsible for

producing the pips of the BBC's time signal.

Its role came to an end after the Newton telescope was relocated to still

clearer air on top of an extinct volcano in the Canary Islands, and the

Observatory team was sent to Cambridge.

Left behind were the remaining telescopes, the Observatory's main building and

the 15th-century castle of Herstmonceux, all of which appeared doomed to decay

or conversion to timeshare property development. To Patrick Moore, who spent

most of the 1950s and 1960s at Herstmonceux mapping the Moon's surface, this

remains an act of scientific vandalism.

To fund the serious side of Herstmonceux customers must be attracted to the

entertainments

"It was a crack-brained idea to break up that team and to abandon the

telescopes," he exclaimed angrily. "They're still useful even today. There's a

desperate shortage of large telescopes for testing new astronomical equipment

and for training young astronomers, and they remain valuable for observing very

small bodies like asteroids and cosmic debris on the edge of the universe."

The chance to save Herstmonceux occurred after a property developer, who had

bought the estate for timeshare development, went bankrupt. The castle and the

park were acquired for Queen's University in Ontario, enabling Gregory and

Steve Pizzey to buy the Observatory building with its garden full of

telescopes. Even with generous financial help from the local authorities, they

were taking on an enormous task - over £150,000 has been spent on setting up

the centre and making a start on the refurbishment of the telescopes, but to

restore them to working order will cost close to £1 million.

"It could finish us" Pizzey admitted. "It's bigger than anything we have dealt

with before, but we have so many skills and such experience in this area that

I'm sure it will succeed."

To fund the serious side of Herstmonceux, therefore, customers must be

attracted to the entertainments. It was this that made the Fabricators' Week

with its display of potential new attractions so significant. It was clear that

the spinning top had potential if it could be made more surprising.

"What about this?" Prof Berry suggested. "I'll show you how to cut it down."

Drawing a Swiss army knife from his pocket, he sliced through the air beneath

the top, and with the magnetic force interrupted, the top dropped to the

ground.

That's the sort of cortickling thing you learn at science centres - a Swiss

Army knife not only has a tool for removing stones from horses' hooves but one

for destroying adiabatic traps.

\* Herstmonceux Science Centre is open daily 10am-6pm (tel 01323-832731),

nearest stations Battle and Polgate. The International Study Centre offers

limited accommodation (01323-834444).