SUNDAY EXPRESS
magazine
9 DECEMBER 1984

STING'S SCI-FI CLASSIC

Unique among historic British societies, the little-known Royal Institution makes an annual splash with spectacular Christmas-holiday lectures on TV. Robert Temple visits this

THEATRE OF SCIENCE

PHOTOGRAPHS BY JULIAN NIEMAN

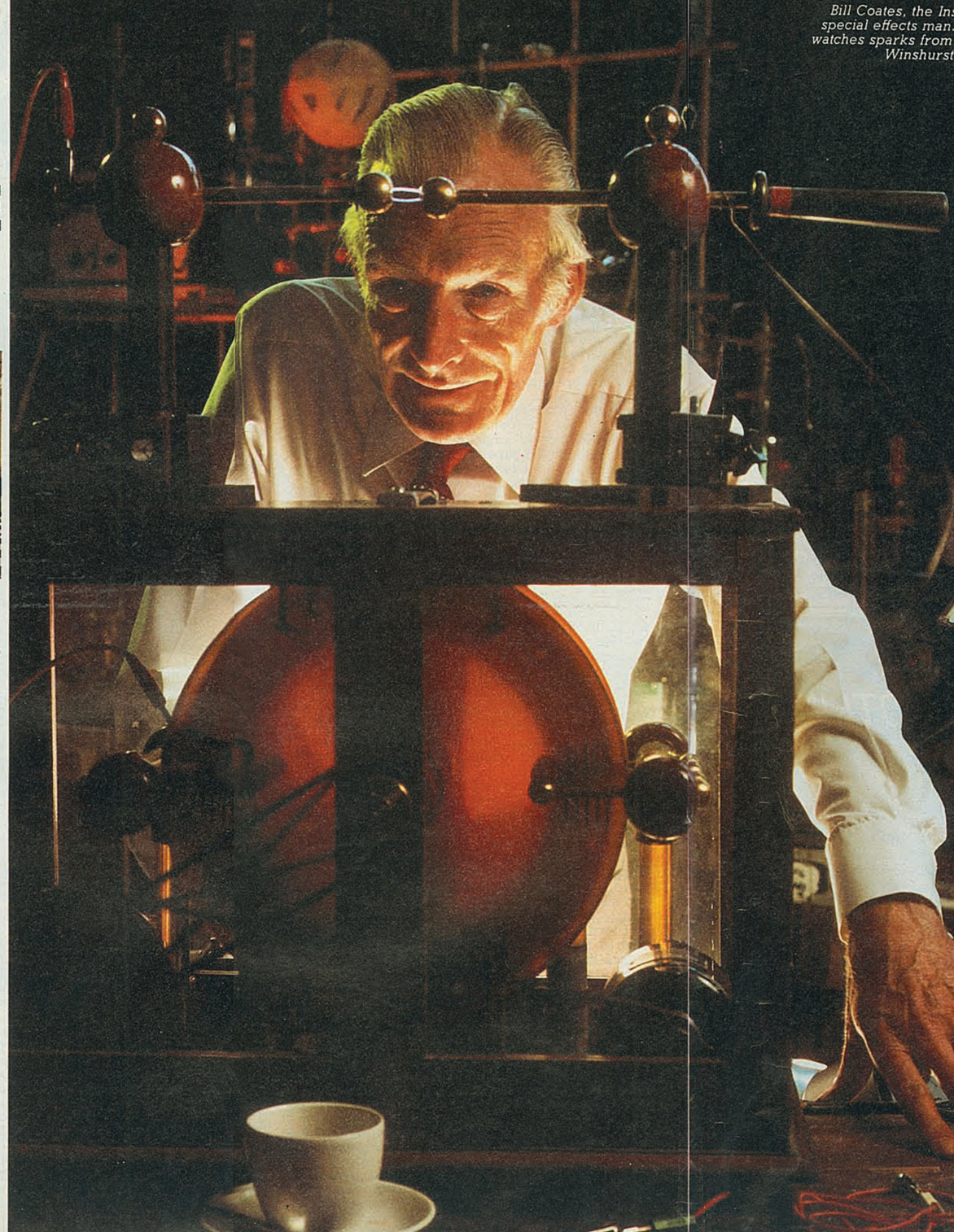
The most remarkable scientific building in the world is better known as the home of television's Christmas lectures for schoolchildren. This year's series of six begins on 20 December, but few of the 450 or so youngsters who will fill the tiered seats of the lecture room may be aware of how history surrounds them. More great scientific discoveries are associated with the Royal Institution of Great Britain than with anywhere else on earth. Here hydrogen and oxygen were first liquefied, the elements sodium and potassium were discovered, and the wave theory of light was worked out.

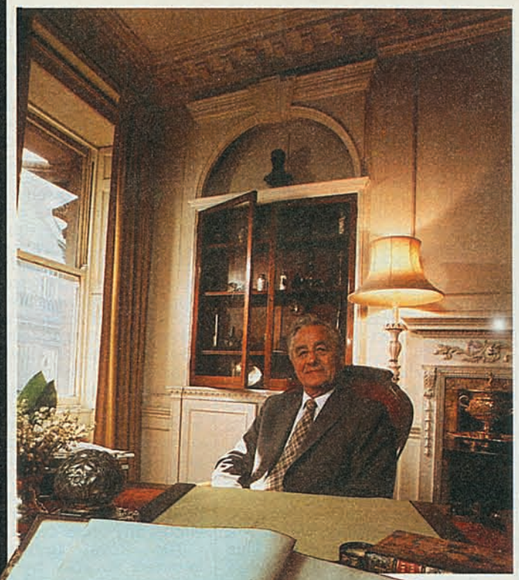
What attracts the children however is the scientific lectures, and in particular the physical demonstrations that go with them. These are arguably the best of their kind anywhere, though done without great expense. "You don't need elaborate apparatus," says Bill Coates, who for many years has arranged the effects. "You can do interesting demonstrations with tin cans and all sorts of things."

Coates has been there since 1948, and was trained by Sir Lawrence Bragg, a former Director of the Institution, who started the children's lectures. This year, to mark his 65th birthday, Coates was invited to give a lecture himself, with the present Director, Sir George Porter—a Nobel Prize winner—acting as his demonstrator. "I always think of a lecture as an hour's science drama," says Coates. "Bragg had a saying, 'Never talk about it if you can show it to them', and I think that's the crux of what we do."

Some of his best effects are achieved with junk gleaned from rubbish tips in the street, and Coates is always scavenging for bits and pieces. "I was going home one night," he says, "and down the road there was a brand-new dummy, the bottom half of a female torso with the top half of the legs. So I quietly picked it up and put it in the ▶40

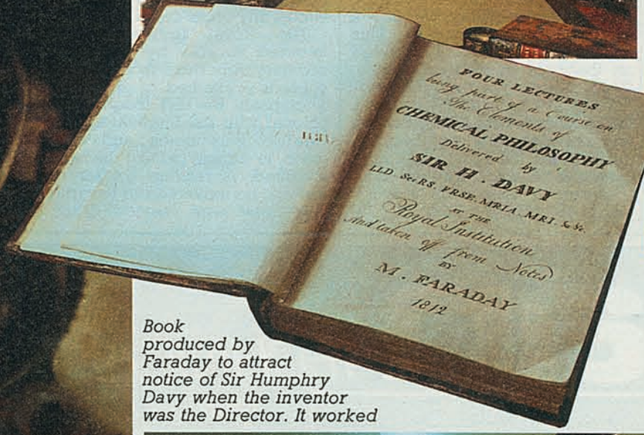
Bill Coates, the Institution's special effects man. Here he watches sparks from the lab's Winshurst machine





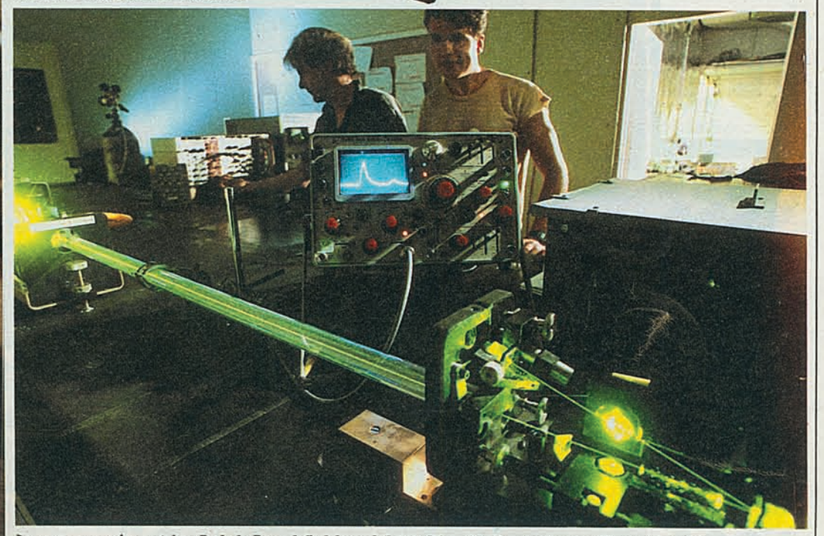
Sir George Porter (left) in the flat that goes with his job as Director of the Royal Institution. He is a Nobel Prize winner. His desk and other furniture belonged to Michael Faraday, a famous predecessor

The gold vessel (below) was given to Sir Humphry Davy by the Czar in recognition of Russian miners' lives saved by his important invention of the safety lamp



Book produced by Faraday to attract notice of Sir Humphry Davy when the inventor was the Director. It worked

The bottle at left survived the Great Fire of London and still has some wine in it. The one at right contains a solution mixed by Faraday, which surprisingly remains a colloid after 130 years



Laser experiment by Ralph Brookfield and John Ide, Ph.D. students. They test the effect of light on a plant, using an argon laser in their studies of solar energy conversion

39◀ store. Now that thing has even been to the States with us. One of our professors, David Phillips, gives a lecture on atmospheric pollution, the idea of acid rain. We put a pair of tights on this model and spray acid on her. It burns the tights and they split right off. Very spectacular."

Visiting senior scientists sometimes come and tell Coates how they remember when he did so-and-so. "They often don't remember what the lecturer said or who he was, but they remember the demonstration."

The Royal Institution occupies numbers 20 and 21 Albemarle Street, a turning off Piccadilly. Behind its row of Greek columns the miner's lamp, the thermos flask and the electric motor were invented, along with the modern fireplace, the dynamo and the transformer and other wonders. Or, if they were not actually invented on the premises, their inventors once lived here. Sir George Porter is devoted to the Institution and enjoys talking about his distinguished predecessors, in particular Michael Faraday, the founder of electrical engineering.

"Faraday came here as a boy and lived here till he was 70. Everything he ever did was done here. He slept here. This desk was his. We have his diaries and almost everything he wrote. You really feel the place is inhabited by distinguished ghosts."

Faraday affixed brass plates engraved with his signature to each piece of furniture, and Sir George's second-floor flat is still equipped with the great man's furniture. Several water colours from his day hang on the walls and show the place little different from how it still appears.

In the basement visitors may see Faraday's laboratory, more than a century and a half old and still intact. Now there are six rooms full of lasers, and the basement hums with advanced research into physics and chemistry.

But you don't have to be a boffin to be a member of the Royal Institution. Children over 11 can join for a mere £2.40 a year, 16-year-olds for £5.50. Members can drop in any weekday till 9.45pm, or on Saturday mornings. They can sink back into a spacious leather armchair in the Conversation Room, a perfect Victorian library. This has all the comforts of a lounge in the best gentlemen's clubs. The main newspapers and periodicals are provided, besides a large library with book-borrowing services. Any member can turn up for tea at four and chat with the director and the staff.

Three or four days a week about 450 children pour into the RI for a scientific lecture. Then on Friday evenings the famous Friday Discourses (started by Faraday) bring a crowd of adults from all walks of life to what is essentially a theatre of science. More formal members wear black tie and the ladies swan about elegantly in long dresses.

Sir George Porter explains: "The Friday Discourse is an occasion rather like going to the theatre. It's not education. I prefer to call it inspiration. The schools and universities do the education, but they don't always inspire. So the majority of people don't do any science at all after school. Here we specialize in the popularization of science. Some people think that's an uncomplimentary term—I don't. It means getting people interested in science, and understanding science. And my goodness, that's needed. The total ignorance of most British people about all things scientific is appalling, and holds us back. It's worse than in almost any other country."

The Royal Institution was founded in 1799 by an extraordinary American from Massachusetts named Benjamin Thompson. He had fought as a colonel with the English against George Washington and then came to Britain where he was knighted. A restless soldier of fortune, he moved on to Bavaria, where he was created Count Rumford and sent back to Britain as Bavarian Ambassador. But George III refused to accept this, saying that Rumford was his own subject. So Rumford was left with nothing much to do in London, and to fill in time he founded the Royal Institution.

Rumford's idea was to bring science to the working classes. But within a few years, he had been outvoted by other board members and he left the country. His demonstration rooms for carpentry and cooking for the workers were taken out. The RI concentrated more on scientific lectures and demonstrations for the prosperous classes who were able to contribute needed funds. Before he left, Rumford appointed Humphry Davy, a poor boy from Cornwall who had been an apothecary's apprentice, to a key lectureship. Davy turned out to be one of the most brilliant scientists in history, a founder of modern chemistry. He became Director of the RI. He was also one of the most scintillating and inspiring lecturers it has ever had. Fashionable London was carried away on a wave of near-frenzy as everybody who was anybody queued for tickets to hear him.

Michael Faraday came on to the scene as a bookbinder's apprentice whose parents lived over a London stable. A rich customer gave him some tickets ▶42

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40◀ to hear the last four lectures Davy ever delivered at the RI. Faraday not only went along but took down the lectures and wrote them up in a fair hand later. Having handsomely bound them he sent the volume to Davy at the RI (where it is still preserved) and asked for an interview. Davy was delighted, but there was no job. Then Davy was temporarily blinded by an explosion caused by one of his riskier chemical experiments, and needed a private secretary. He remembered young Faraday, who went on to be the Director himself, and became an even more famous figure than Davy.

The present Director, Sir George Porter, comes from a similar background: "My father was a builder. I was born in the south of Yorkshire, and I got a scholarship at the age of ten to go to a grammar school which taught science."

Today Sir George spends much of his time fund-raising. The RI receives no public financial support, though some of its research is funded by grants from bodies like the Science Research Council. So the Institution has to raise money to survive. "One of our tasks," says Sir George, "is to be the trustees of an historical building. I wish the nation would recognize this and give us the means to look after it. Most of the schoolchildren who come here are from the Greater London area, but we don't get a penny from any of its councils. Instead we have to pay them rates."

This year Bill Coates is providing demonstrations to illustrate the Christmas lectures by Dr Walter Bodner on "The Message of the Genes". He lies awake at nights pondering his effects. One year he had to compete with a chimpanzee. The subject was how animals move, and the lecturer, Dr Napier, wanted to compare the abilities of man and chimp. "I used to be a parachutist," Coates recalls, "and one of the things I could do was a standing leap on to a table. In the lecture theatre I stood by a table and jumped on to it, but chimps cannot leap. So I beat him at this but he was obviously better at climbing a rope.

"The BBC wanted me dressed as an ape. So they gave me a full skin with a realistic face. Unfortunately it frightened the chimp. I let him play with the mask and I found that if I blew through it into his face he would come towards me. So I was able to enter from the gallery by swinging down a rope." ■

For tickets apply to Secretary, Lectures, Royal Institution, 20 Albemarle St, London W1. Tickets for the course of six lectures cost non-members £12 (adults) or £4 (children aged 10-17).