



Exploding The Phone

db341

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Bibliographic Cover Sheet

Title **Days at the Old Bailey**

Publication *Interface magazine*

Date 1974-04-00

Author(s) Hill, Robert

V/I/P Vol. 8, No. 1, p. 10

Abstract Description of the October, 1972 British phone phreak busts.

Keywords British Post Office (BPO); British phreaking; Robert Hill; Neil McKinnon (Judge); October 1972 British phone phreak busts; British legal system; Old Bailey

Notes Article is 3 pages; our copy includes a copy of the Table of Contents page.

See also db340

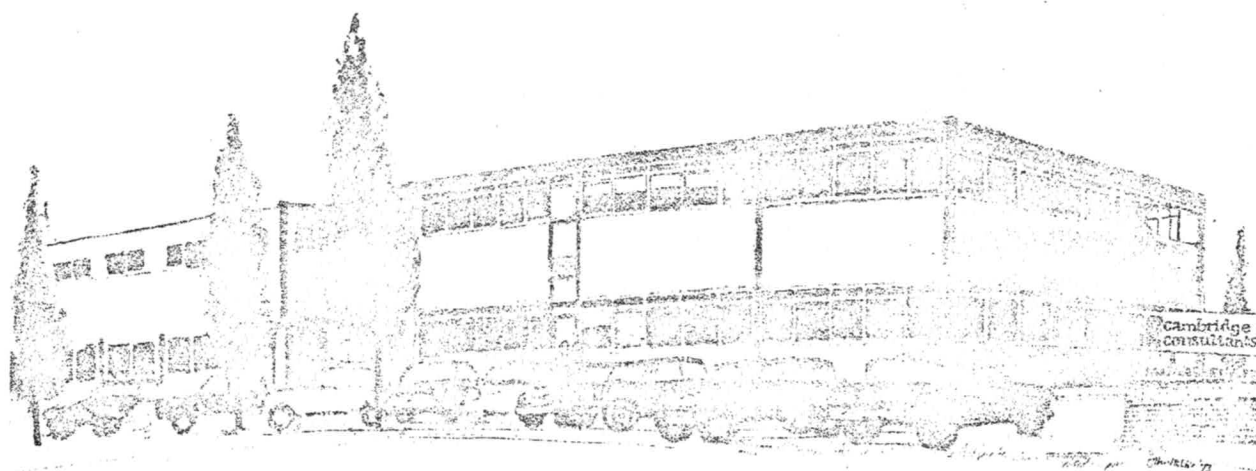
Source Alan Rubinstein

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interface

Volume 8 No. 1

April 1974



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Interface is the house journal of Cambridge Consultants Ltd. All correspondence, MSS etc should be addressed to: The Editor, *Interface*, Cambridge Consultants Ltd., Bar Hill, Cambridge.

Editors: Hugo Davenport and Pat Preston
Art Editor: Ken Vail

Printed by: Cambridge Instantprint

Editorial

Over the past year a number of readers have commented on the introspective nature of *Interface* contributions, especially the non-technical articles and quotes. The Editors hereby acknowledge those comments but feel impelled to point out that a house journal must be inherently introspective to some extent. The question is merely that of degree.

The current Editorial feeling is that *Interface* reflects the ambience of CCL and while this is so the current almost non-existent Editorial policy will continue to be followed. As a concession, however, the Editor will try to avoid lavishing praise on the elegant shoulders of the Editrix (partly, it must be admitted, in deference to her own feelings on the matter).

Away from these introspections.

It's interesting to observe the development of public consciousness in the National Press. Take two examples: Pollution and The Fuel Crisis. Both these issues hit the headlines in the national dailies for the first time last year. What, the reader may ask himself, is so significant in that? Well, the significance is that both were being widely discussed in only slightly less universal periodicals, e.g. *New Scientist* and *Scientific American*, over two years previously.

Assuming that fuel, pollution and other technological issues are important to the public it seems a pity that they are publicised only on the eve of disaster, as it were. On the other hand there is little point in alarming the public unless some material advantage ensues (i.e. starting a resources conservation/utilisation programme at an earlier date than would otherwise be the case), and it is difficult to imagine any government making long range plans which extend beyond the next election date in the absence of desperately compelling reasons. Let's hope that really long range planning is a habit developed by government and industry alike.

can call a queue up, at the inappropriate to the initial STD call, for as long as the telephone is off the hook. This occurs because the equipment mistakes the forward clear for an answer signal. For this reason the initial STD call is chosen to give a low metering rate. If one now restricts one's activities to such areas as, for example, experimenting with different signalling systems then the law is very unclear on the subject. There is certainly a good argument against one's activities being illegal.

It is so easy to make STD or international calls free of charge, even with no electronic aids, that anyone wishing to do so would certainly not use a 'blue box'. In this country at least, the 'blue box' user is generally a telephone enthusiast and fairly harmless.

About once or twice a year such enthusiasts hold meetings and one of these, in October 1972, was memorable. I was standing around drinking the home-made wine, which was always provided, when I noticed that there were more policemen present than one normally expects at such meetings. These policemen kindly helped us downstairs and then took us to the local police station. The strange things that happened to us subsequently are the basis for the following article.

OBITUARY

2 August 1949 - 27 January 1974

Robert Hill was educated at St Peter's College, Radley, and won a senior scholarship to Trinity College, Cambridge.

Apart from winning a design competition with a paper on a 'machine for simulating change-ringing', he was a member of a wide variety of organisations from debating societies to sailing clubs: and with other interests from gliding to stage lighting.

Whilst at Cambridge, he took part in a Land-Rover expedition to Afghanistan, and spent four weeks walking in the Hindu Kush mountains and living with the Nieristani people.

He accepted the offer of a job with CCL on a postcard from Istanbul, and joined the company on 28 September 1970. Before making his decision, he had rejected the idea of doing a PhD at Cambridge, or working for the Engineering Branch of the Post Office, neither course seeming to offer him the environment for making best use of his wide range of talents and interests.

All who came into contact with him were impressed with his always unusual and frequently brilliant approach to the technical problems on which he worked at CCL. His perpetually level-headed cheerfulness was always an inspiration to those around him.

Whilst at CCL, he took a planned 3-month vacation in Ethiopia at the beginning of 1972 and an unplanned four weeks at the Old Bailey in 1973.

One of Robert's spare-time interests, it should be explained, was the telephone system, and as a result of this interest he found himself with eighteen fellow enthusiasts - so-called 'Phone phreaks' - in the dock answering charges described below. When he died, as the result of an accident at his Dry Drayton home, he was writing an account of the Old Bailey trial for *Interface*.

I am grateful to his brother Peter for lending me Robert's documents and notes on the trial, and to Robert's fellow telephone enthusiast Andrew Marland for giving me copies of additional material. The story is told in Robert's words, since most of them are his, though I have in places, perhaps, been less modest than he would have been.

Rodney Dale

Days at the Old Bailey

ROBERT HILL

On 2 October 1973, I found myself (with eighteen others) in the dock of Court 12 at the Central Criminal Court - or Old Bailey - before Judge Neil McKinnon (Big J) facing the charge that ROBERT SEYMOUR HILL on the 7th day of October 1972 and days prior thereto conspired with . . . other persons dishonestly to use the public telephone system . . . with intent to avoid payment . . . and . . . to use electricity the property of the Post Office without due authority.

The telephone system is the largest machine in the world, extending as it does over the whole surface of the earth. It is so easy to gain access to it - just pick up a telephone - and having done that, you can then explore ways of finding your way around the world. Some people are interested in the gadgetry of the system; some in gadgetry that they can build to affect the system. Some study the system as geographers, some as computer programmers. Some are interested in information retrieval, some in travel. The telephone system offers many types of intellectual challenge.

Unfortunately, the majority of people not hooked on telephones ('some people take to heroin - others to telephones' - Big J) and officials of the Post Office, are under the impression that the only interesting thing about telephones is that they enable people to talk to each other (usually). Anyone who explores the system, therefore, must be trying to find ways of making calls on the cheap.

Before going any further, I will describe some of the experiments which can be done on the telephone system - I call these probes. A simple but instructive probe is to lift the handset of a telephone and listen to the dialling tone. Slight differences in the quality of the tone or the pattern of the clicks heard are often sufficient to identify the type of equipment used in the exchange - perhaps even its vintage.

A sophisticated probe might involve dialling an STD number, and then employing a tone simulator, or 'bleep', to dial numbers into the distant exchange. As in the simple probe, you gather your information by listening to the various clicks and changes in line noise which occur if you simulate different digits. It is not necessary to complete a connection at any stage. This probe is charged at the normal rate for the original STD number dialled.

A bleep usually comprises an electronic oscillator, a telephone dial and a loudspeaker. When you have obtained your trunk line, you hold the loudspeaker near the mouthpiece and dial your experimental numbers with the bleep: it squeaks into your telephone and the exchange equipment thinks that it is receiving signals from some other exchange equipment.

My own interest in the telephone system goes back many years. Of course, I knew many others with a similar interest. In 1971, some of us had produced some computer printouts of dialling codes, and the Post Office Investigation Department found out. Three men from the ID came to see me in March and after a couple of hours chatting, they were convinced that it had been an academic exercise and not an attempt to defraud the PO.

The ID men must have been impressed with my enthusiasm, however, because in May they came to see me again to see if I could build a bleep to simulate a new PO signalling system, MF2. I had read several articles on MF2 and agreed to try and build them a bleep.

In June it was finished. The ID men came to Cambridge, took me out for a meal, and borrowed the bleep to study. I heard nothing from them for two months, and then they telephoned me because they wanted to buy the device, but we couldn't agree on the price. (As Big J said to the ID man in the witness box 'Worth £150, Hill wanted £25, you offered

£5 .. you must be from the Inland Revenue') So the ID men brought my MF2 simulator back, and took me and another enthusiast out to dinner. We spent a happy evening discussing ways of defrauding the telephone system.

Following this meeting, my friend and I wrote to the ID man, suggesting ways in which we might assist the PO by finding loopholes in the system. The following month - November 1971 - the ID men visited Cambridge yet again, saying that they thought that we could make a useful contribution to PO security, but that their supervisors had vetoed the idea, and that was that. Of course, we continued with our experiments. . . .

On 6 October 1972, I returned from ten days site work on the Norfolk coast, and telephoned a friend in London. He told me that there was to be a tea-party the following day, at which there would be a number of people interested in telephones. In particular, there would be two cameramen who hoped to make a film about telephone enthusiasts. I didn't like that idea much, but decided to go to the party, as a lot of my old friends would be there. So the following day I went to the party, which was very crowded, so I and one or two others took refuge in the comparative quiet of the front bedroom. We chatted, and after a time, I went to look for a glass, when suddenly the door burst open, and what seemed to be the entire metropolitan police force poured into the flat.

One of the policemen went to the telephone and said 'Have you got this call?' into it. I could hear the dialling tone coming from an amplifier, and he got no response. A PO man came in and said 'They won't reply unless you use the codeword' but the policeman gave up and went away. Then the detective inspector spoke: 'This won't take long. I want you all to consider yourselves cautioned'. Soon, we were all taken to the police station: Hammersmith, Division F. My pockets were emptied into a bag, and I was searched. They asked me if I wanted to make a statement and I replied in the affirmative, but before anything happened, we were all led off and incarcerated in the women's cells.

Later, I was allowed to write my own statement without assistance or comment, but the PO man said 'It is a bit stupid of you to be caught twice' to which I made no reply because it seemed too much like a trick statement in a bad detective film. Much later, we were all taken to the charge room, and formally cautioned and charged with the theft of electricity. During most of the proceedings, I thought it wiser to make no comment, but when the policemen who was taking our finger-prints got his forms muddled up I did say 'that doesn't matter, we've been charged with the same offence'. I was allowed to leave at 10.00pm, and after a cup of coffee, I drove back to Dry Drayton.

There followed a total of five separate visits to the West London Magistrates' Court over a period of four months, a wait of eight months on bail and finally four weeks of actually being tried starting, as I've said, on 2 October 1973. I was therefore a little surprised when halfway through the case the prosecution spontaneously petitioned that the charge against me should be dropped owing to lack of evidence.

This was after I had been cross examined on Monday 29 October. It had been an amazing build-up, ending with a lame, but by no means unpleasant, phut! Within a minute of leaving the box, I was outside the court, free. The end seemed very casual; Big J turned to me and said slightly ambiguously 'I would like to congratulate you on getting off'.

Of the eighteen other defendants, by the way, ten changed their plea to 'guilty' during the second week of the trial, and the remaining eight were eventually acquitted by the jury.

The PO view

The PO, as one of their investigators pointed out in court, 'thoroughly enjoyed aspects of this investigation'. And they did a grand job. They had a special monitoring machine

built for monitoring calls made from the flat where the party was. They had an observation vehicle outside taking photographs of people going in to the party, and they had mobile radios. They even had a little man in Fulham telephone exchange who tapped the telephone line - but only when he saw an 'illegal' call going on since he had no Home Office licence! There were police at the back, and police at the side, two Black Marias, and the PO's tame hired detective inspector - a particularly pleasant chappie actually.

During that day, the PO recored 222 'phone calls'. However, only three of these resulted in actually getting through to someone, and these were made correctly. The other 219 calls were made by bleep - in fact, when the police raided the flat, they found ten bleeps including the 'mighty Wurlitzer' - a sort of electronic organ built inside an old Dansette record player box.

The Wurlitzer emits suitable tones and combinations of tones to hypnotise many of the world's telephone systems: internal British lines, international European circuits, inter-continental cable and satellite routes, and the internal networks of America, Australia and Switzerland. Using it, you might set up a call from Neasden to Edinburgh and thence back to London and on to Copenhagen - pausing briefly you could pass through Frankfurt and perhaps take a satellite to Philadelphia. There, you could descend to the American trunk network and enter Oaklands, San Francisco. From there, it is a short step to Sydney, Melbourne (not near Royston) and back to Sydney. Another pause, and you can persuade the Australian machines to give you a call back to the next door 'phone box in Neasden. With three satellite lines in between, you have three-quarters of a second delay between saying 'Hello' into one 'phone and the sound reaching you in the adjacent red box.

Anyway, with these machines as exhibits at the Old Bailey comes paperwork galore: Japanese dialling code books, maps of the North of Scotland, computer printouts, xeroxed copies of the Warsaw telephone directory and even a sketch of a London underground ticket. Then there are the sundries like bent wire and an ordinary microswitch. Altogether, half-a-dozen trunks full of detailed evidence. The jury men are scarcely visible behind heaps of goodies provided by the prosecution. It is a memorable sight, the look of joy in their eyes, as the court usher delivers another heap - six copies of a photograph album of the defendants, perhaps, or six copies of the A - D section of the London telephone directory even.

The prosecution, too, is well provided: a large demonstration has been built showing how the telephone system works, glistening with flashing lights and illuminated boxes and standing some seven feet high. There is a beautiful red telephone coin box there, in case someone cannot resist a quick play. The PO failed miserably trying to obtain free calls from this - as Big J remarked: 'You would probably be better off if you asked for volunteers'.

The defence view

Everyone at the party was either actively interested in telephony, or had been previously. Two thirds of those present had done experiments prior to 1971 and then been warned off, and what is more (with one exception) they had stopped. The party was more of a reunion than anything sinister.

The prosecution made great play of a plan of a 'secret government network' (squashed when we produced a copy of *Systems Technology*, August 1972, where it had come from) and the fact that someone knew the number of Buckingham Palace (01-930-4832 - London telephone directory - A-D) and the number of the White House (*Punch Yearbook*, 1970). Almost all the paperwork could be dismissed like this (given time) and even the remainder was not illegal - though some of it was not actually published.

All the calls made when anyone actually spoke to someone

use were paid for properly. The 217 experimental calls were all paid for at some rate which would have more than paid for the electricity used.

Only about three people were interested in playing around. Several of the others made maps or collected codes, rather like collecting train numbers.

My view

The most interesting part of the trial for me was when I was in the witness box. After being warned in 1971, I spent quite a lot of time cooperating with the PO, albeit in a somewhat casual fashion. I was able to tell how I had built a bleep on explicit PO instructions, how I had lent it to them for two months and eventually got it back. I read out three letters I had written to the PO offering to help them discover loopholes in the system in various ways. These letters were all absolutely genuine - I would greatly have enjoyed helping to improve the system.

My last letter was in fact written shortly after my arrest and sent to a member of the PO board (with a courtesy copy to the ID - of course). It gave details of four types of system flaw which allow people to make free telephone calls with no apparatus and no special codes. One of these was (and still is) very widely applicable - it works in some 600 exchanges in the UK.

The final prosecution witness had claimed (incorrectly) that this letter was a wild goose chase stating that

- 1 He didn't consider the flaw to be important
- 2 You couldn't use the method without special apparatus (nonsense)
- 3 He had tried it in 40 different exchanges and it didn't work (incompatible with 1 & 2)
- 4 Anyway, they had corrected it (incompatible with 1 & 3 - and not true)

My counsel cross-examined him and had great fun: Did you consider it important? No. Why did you try it out in so many places? My boss told me to. Then your boss thought it important? No - he was told to investigate it by a member of the Board. Ah, then a member of the Board thought it important? I suppose so.

I also went into great detail on my pre-March 1971 activities. I described how I first discovered that it was possible to affect the telephone system by using a plastic Woolworth's whistle. This I burnt down until it got to the correct pitch compared with a piano. Big J got very interested at this point, interposing several questions of his own on how it could actually be used.

My impressions of the Old Bailey

10.00am - report to gaoler - locked up in with other 18 in cell designed for 2. Someone presses alarm button in lift: we reach the lower basement and the doors open to reveal some 47 policemen with truncheons raised expectantly.

Each warder comes chained to a bunch of keys. This is fortunate, since the architecture is based solely on locks and bars. The Old Bailey has four independent networks of tunnels: the lawyers' side, the judges' suite, the prison cells and the public gallery. The only contact between these networks is the courtroom (with four separate doors, of course). Each network is characterised by a different uniform for the guards and a different brand of paper in the loos - Savco, Delsey, Government Property, Bronco respectively.

10.30am - the nineteen file into the dock designed for typically one prisoner with a prison officer at each end. (On one occasion, the officer on duty started to snore, and had to be woken by his charges). Each courtroom door has one of those fisheye spyholes which let you see the back of your head round the edge. Everyone else is in court waiting to go, and the proceedings are under way within seconds. Big J scowls benevolently from beneath a huge coat of arms. The centre one of the five chairs

(throne) comprising the bench is reserved for the Lord Mayor of London in the unlikely event of his dropping in. Three of the others are also empty.

If we ignore the coffee break, we come to 1.00pm - lunch in the cells. The menu is always the same, very stewed carrots, a dead hamburger, mashed potato and a slice of sliced bread. Rubber knives and forks are provided lest you turn your attention on the warders.

One Friday, we were deep in the dungeons and suddenly realised that we'd been deserted. The building had been cleared for a bomb alert and the warders had abandoned us to our fate. Three quarters of an hour later, there was a slightly sheepish return.

My impression of the legal system

I have two, strong, mutually contradictory images of the law.

- 1 I am appalled at the public money which was consumed during this case - probably around £70,000. The evidence was not in dispute, purely the interpretation. The only people who seem to have benefitted from the expenditure are the lawyers.
- 2 I have, to my surprise (in view of 1) also developed a great respect for the peculiar edifice of the legal profession. It is so intricately built that it becomes impossible to remove one brick without destroying the entirety. One such brick consists of forbidding barristers to advertise their services, another permits them to deal with clients only via a solicitor. But the edifice stands, and it does work.

I was charged with conspiracy which is an alarming offence because of its scope. A man convicted of conspiring to drop litter could be fined £10,000, in addition to a fifteen-year prison sentence (or worse!) The PO (alias the Crown) even charged with conspiracy one person who arrived at the party after the police had raided it.

Neither the prosecution barrister, nor the defence barrister, nor Big J gave any clear definition of what was needed to constitute a conspiracy, legally speaking. However, I was very impressed with a comment from one of the jurors after the trial was over. He said that they would have found anyone guilty who had been shown to have actively assisted in making fraudulent calls either by actually making them, or bringing the necessary machinery, or bringing relevant information. The jury system gives a powerful safeguard against the vagaries of the law, but it seems unfortunate that the lawyers did not back this up.

A further curiosity emerged after ten days of evidence. Big J consulted the two defence barristers and let it be known that if anyone changed his plea to 'guilty' he would be fined about £100, and a similar amount for costs. He also suggested that costs would be far higher if anyone were found guilty at a later stage. People mentioned a figure of £50 a day, but I don't know where this came from.

In view of this, ten of the nineteen defendants instantly changed their pleas to 'guilty' - for various motives, but a very strong theme ran: 'I think I have a two in three chance of getting off after perhaps two months trial (lost pay £400) In the one in three chance of conviction, I may well have very high costs (£500?) and also lose my job. Pleading guilty now (£100 + £100) seems more expedient'. At that time, it cost six of them £100 + £100, three £50 + £50, and one £25 + £25.

The nine left were characterised by being either very innocent, or very pigheaded, or both (me!) The prosecution later dropped charges against me, as I've said, and the other eight were acquitted on 13 November. Half of those who pleaded guilty were certainly less involved than some who got off: however, the former now have criminal records.

Let Big J have the final word - congratulating the last eight, and telling them that they were free to go, he said: 'I never did think you were dishonest, and never said so.'