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The Sound House
BBC Radiophonic Workshop

Electronic Soundmaker & Computer Music, April 1984

A guided tour around that temple of electronic music, the BBC Radiophonic workshop.

Brian Hodgson

The BBC Radiophonic Workshop has probably done more than any other single body to bring electronic music to the attention of the public, and yet it exists and works far from the field of contemporary pop, performing an almost 24 hour routine of providing sounds and effects for national and local radio and television all the year round. Its current organiser is Brian Hodgson, who joined as a composer in 1962, left to form his own company, and rejoined in his present post in 1977.

The Workshop was founded in 1958 with, among others, studio managers Desmond Briscoe and Daphne Oram, who had collaborated on an innovative Samuel Beckett radio play, 'All That Fall'. The instrumentation at that time consisted largely of record decks, early tape recorders, razor blades and sticky tape, but electronic instruments gradually began to dominate in the form of banks of oscillators controlled by simple keyboards. In 1968 the BBC purchased its first synthesizers, a pair of EMS vcs3's, having apparently become embarrassed at having to borrow one off Brian Hodgson and Delia Derbyshire, who in 1963 had recorded the first version of the Dr Who theme for which the Workshop is still best known.

Although the larger Moog synthesizers were considered, the BBC then purchased the more versatile EMS Synthi 100, or Delaware, which was the size of two double wardrobes and still came without a handbook! This served for many years, including during a live concert of Radiophonic music at the Royal Festival Hall before the Queen and the Duke of Edinburgh. However, some felt that the dominance of purely electronic sound led to a rather stale period of Radiophonic music. Now this has been corrected by the addition of the sampled natural sounds of instruments such as the Fairlight and PPG Waveterm. The purchase of these instruments was largely due to the influence of Brian Hodgson, who takes up the story...

At the time that I rejoined the Workshop, making music here was a major problem because we only had a Synthi 100, an ARP Odyssey, two VCS3's, loads of oscillators and mono tape recorders. The Synthi 100 was nine years old, the VCS3's were 11 years old,

and we had a Yamaha SY2 which was shared with the Radio Orchestra. This was about January 1978; the three eight track studios we had were stereo capable because they had B62's fitted.

One of the first things we did was to take apart the Synthi 100 because we intended to rebuild it, but technology changes and what seemed like a good idea one year turned out not to be a good idea the next year. We wanted to keep the Workshop completely flexible and adaptable to new technology, and of course we were doing a job, making music for television and radio, and unless we could respond to that there was no reason to have us.

At the moment we do 75% television work. Last year we did about 200 projects — a sig tune for the Arabic service, a feature on castles and palaces which needed Big Ben playing 'Home Sweet Home', a score for a film about the Channel Island, music for a radio production of 'The Day Of The Triffids', a lot of bubbles for a feature on lavatories — the list is endless. We do fewer sound effects nowadays, because the simpler ones are done in the TV studios — we still do special sounds for Dr Who though. Producers of individual shows come to us with their problems, and we get stretched by trying to cope with problems we haven't come up against before. It's no good somebody ringing us up and asking for 20 minutes of music for the next day — we don't run a library service, this is strictly Savile Row!

We have six composers working at the moment and I help to choose who's best suited to completing a particular piece of work in the time available. Then the composer is put in touch with the producer, and after that nothing interferes — I don't get between them in any way. All they're asked to do is to finish it at a particular date, and since they're being asked to do a creative job under pressure there is no regimentation — they can work at any hour of the day or night. A composer, or 'producer' as we call them, is his or her own engineer, so they're working more or less alone. It sounds like a dreadful creative sausage machine and that's really what it is — they're under a terrific strain and they're

working by themselves to incredibly difficult deadlines, and they all love it so much that there are seldom any jobs vacant.

Brian then took us on a conducted tour of the individual rooms within the BBC Radiophonic Workshop.

A tour round the Workshop facilities in Maida Vale Studios consists of a series of glimpses into individual studios, engineering rooms, editing facilities and storerooms for semi-retired instruments (any of which are likely to be called upon at odd occasions, particularly for sampling purposes). Firstly we looked at Peter Howell's studio, which is equipped with a circle of synthesizers, mixers and effects. Peter joined the Workshop in 1974 after a background at Glyndebourne Opera and as a BBC sound recordist, and perhaps his greatest achievement to date is the music for Johnathan Miller's 'The Body In Question', consisting of 130 individual cues, and including the very popular 'Greenwich Chorus', realised with a vocoder over a background of ticking clocks.

Peter Howell

This room uses a sort of standard layout for a studio... synthesizers, mixing desk, multitrack tape machine, treatments and echo. In here we've got a Yamaha CS80, Elka Synthex, ARP Odyssey, Jupiter 4, a custom Wavemaker modular system, a rack of treatment devices (flanger, phaser, digital delay, compander and harmoniser) an EMT plate echo (installed down the corridor) and a multitrack tape machine with BEL noise reduction. That's a dbx-type system, which for the sort of thing we're doing here is 90% excellent and 10% terrible — it's absolutely hideous at classical guitar for instance, I think, because the extra harmonics trigger it off and it squashes the sound.

Sixteen tracks for me is very useful because I use an awful lot of information tracks. When you're working to television you start off with a time code track and a rough sound track, and I use a machine which reads the time code and delivers blips or a

standard metronome click. Usually we get a VHS videotape of television programmes with a time count superimposed on the bottom of the screen, and often that's accurate enough to compose the music straight off.

Peter Howell with Synthex, CS80 and cue sheets

The newest keyboard in this studio is the Elka Synthex. The CS80 is primeval compared with the Synthex — it's a marvellous machine but the Synthex has got digital chorus for instance, which is completely noiseless whereas the noise level on the Yamaha chorus is getting to be a problem now that we've got noise reduction on the tape. It's got a cassette interface and can remember 80 sounds at a time — also I use split keyboard patches on the Synthex more than I thought I was going to, because I do an awful lot of stuff 'live onto tape', although that sounds like a contradiction. We had a burst of looking at synthesizers including the DX7 which we've got in other rooms, but Roger and I liked this one because the chorus lets you produce more diffused sounds which are good for speaking over — the DX7 is a much more declamatory synthesizer!

The Wavemaker is a modular system built by Ken Gale and intended to replace the EMS Synthi 100. The keyboard can control ten sets of voices and there's a digital control voltage recorder which allows information to be stored on tape for subsequent overdubbing. The oscillators and filters have an enormous number of options including voltage-controlled pulse width, so the system does even more than the EMS 100 in some ways, but by the time it had been delivered it had been partly superseded anyway — at the moment the modules are quite often used to process external voltages and music signals.

The Jupiter 4 has certain sounds which are still useful and if anything comes up that needs that sounds I'll use it — there's no one box that does everything, even the Fairlight which we bought in 1981 and which spends some time in this studio. We've had to put it on wheels because it needs to be moved about so much! We looked at the Synclavier and in the best of all possible worlds we'd have one of those as well — it's particularly set up for using the SMPTE time code which is beginning to dominate now, and we've got a film reader which allows us to apply it to film as well as videotape.

Malcolm Clarke

Malcolm Clarke joined the Workshop in 1969 after studying both arts and science — in fact he studied A level Physics, Art and Music. He won an award from the Society of Authors for his music for 'August 2026', based on Ray Bradbury's 'There Will Come Soft Rains', and more recently has been working, as most of the Workshop members do at some time, on episodes of Dr Who.

At the moment I'm working on two episodes of 'Dr Who' which have to be dubbed in three days' time, so it's a very tight schedule. I spent one dub virtually unconscious due to overwork, because what happens is that the cast have their end-of-series party,

everybody goes home, and the Workshop are the only ones left working on it!

Malcolm Clarke with Casio and Yamaha SY2 in Studio C

On the first day of this series of 'Dr Who' the DX7 arrived and it's been a real life-saver. It's remained absolutely reliable in every way. The Prophet 5 which is quite an old model now suffers from tuning problems both in relative pitch and in span, and the Casio 201 is stable in pitch but tuned to A442 which means everything has to be tuned up to that pitch. I've got a Yamaha SY-2 here, it's a beautiful instrument and I don't know what I'd do without it; it's a monophonic synth with touch sensitivity and you have to think in terms of solo voices. Coming through that era of synthesizers has protected me from thinking of synthesizers in terms of clusters of notes, because however sophisticated a synth is, if you play chords it can start to sound like an organ.

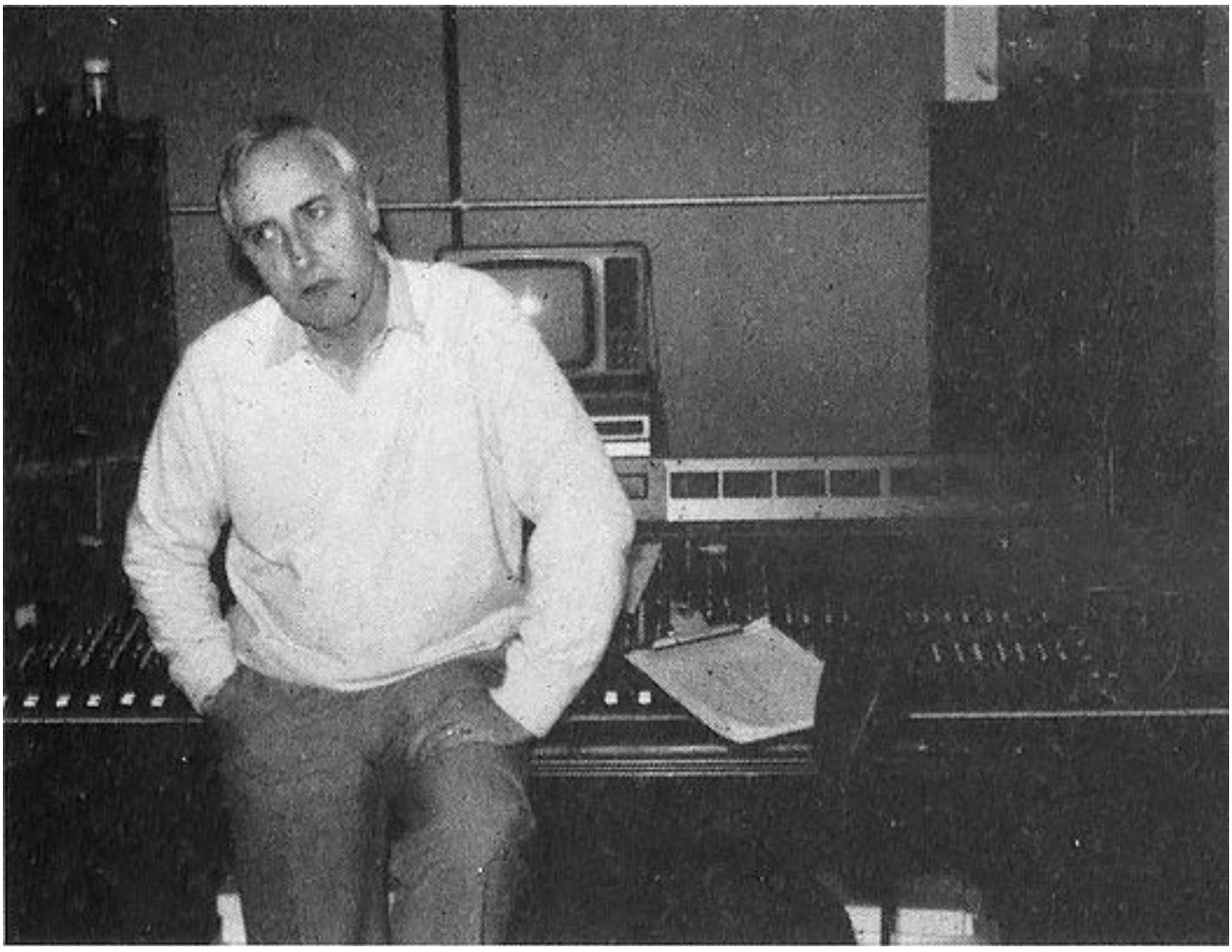
The Casio was a bit of a departure and I use it rarely since I got the DX7, but at the time it was inexpensive and had one or two voices which were well worth having for its hundred-odd quid. Everything's an octave too high though, so the engineers put an octave divider on it which gives some very interesting sounds.

The way I work with the DX7 and SY2 is to start with a preset sound and move away from it if I need to. Some of the DX7 presets are fantastic — the Tubular Bell is better than the real thing, at least it's better than we can put on tape, because it's directly injected rather than going through a microphone. Also I've got a Yamaha CS5 here, which is intended as a replacement for the EMS vcs3 which is now sitting in the corner — it's mainly for sound effects, but I still turn to the EMS sometimes for things like really gritty white noise because it's so imperfect. I've used the Fairlight once, for a programme on Percy Grainger where the score required the musicians to play on glass bowls, but for reasons of space and an awkward set of stairs it isn't used in this studio.

I usually work with a bank of sounds which I know are standard and which I can go to and modify. Between the DX7, SY2 and Prophet and occasionally the Casio I can get almost any sound I want, and then I have to convert my master tapes to studio tapes using the noise reduction system we've got here, which nobody else in the BBC uses. When I do that I always perform to the video, and

do a pretend mix using a small television speaker which gives a better idea of what the music would sound like in the home than a monitor system would. In other words I'm pre-empting some of the sound supervisor's job, because he's got a lot to think about in terms of the dynamic levels of the music. The music should be composed dynamically in the first place; I used to make the mistake of boosting the bass to compensate for the quality of the TV speaker, but that just means they have to decrease the overall level. You can only get real bass if you're composing for the cinema — then you can use sounds that you can feel but you can't even hear!

Dick Mills



Dick Mills with Studio D mixer and TV monitor

Dick Mills joined about six months after the Workshop was created, firstly as a Technical Assistant and later as a sound effects specialist.

The longest-serving member of the Workshop at present, since 1972 he's been particularly involved with the sound effects for 'Dr Who'.

I'm about as far as you'll get from electronic music within the studio because I don't do electronic music as such. I might do peculiar backgrounds of a musical nature but you can't whistle any of my tunes! I do the sound backgrounds for 'Dr Who', 'Captain Zep', and anything else for schools broadcasting and so on. People come to me if they require special stylised sound effects for unusual dramas for example, but I'm on every episode of 'Dr Who' 28 weeks of the year whereas the others will only do a couple of episodes of the music at a time.

For 'Dr Who' or for film I get a videotape to watch. I did one entire episode of 'The Goodies' where they were being chased by excavating machines, and after doing that section I went beyond it a bit and ended up doing a complete synchronised soundtrack using sprocketed film, but that's not my usual job. On 'Dr Who' I don't normally have the music soundtrack to listen to before I start work but we have to make sure that the type and frequency of sound I 'm making doesn't overlap with the music. When Peter Howell and myself are working together it's almost telepathic. We do things completely independently and when it comes to the dub they fit together perfectly — we have the same ideas of what could be a mysterious chord or harmony.

The 'Dr Who' episodes are largely either historical, which usually needs effects records and music, or futuristic, which needs synthesizers, or more to do with the mind, which needs treated sounds and a more nebulous feel. That's where the effects devices such as Harmonizer and keyboard or Roland echoes and flangers are used. Most of the effects are off-the-shelf now, because by the time our engineers could design and build something it would be superseded, which is purely because of the interest of pop people in effects over the last few years.

When Brian Hodgson rejoined the Workshop he asked all of us which synthesizers we would like to have for the sort of work we

did, because at that time everybody was using the vcs3 and the big Delaware — the Synthi 100. What I've got now is a small Roland 100 modular system, a Wasp Deluxe for the filter and the random effects mainly, a DX7 with a breath controller, and a dual record deck for using sound effects recordings. There's also an Oscar monophonic coming, which will have the advantage of programmable presets. I've got the Roland system split to two outputs with different triggers, and I don't need keyboards in the musical sense — for instance, the 'shimmer' preset on the DX7 is a great sound effect and I can change the thickness of the sound in many ways.

The effects are rack-mounted, but not in a standard 19" rack and nothing is screwed down. That makes it possible to move in equipment very easily from other studios — for instance four Harmonizers played from a polyphonic keyboard. I still use some very old top cut and bass cut filters which knock great holes in the sound, so I don't need things like graphic equalisers which are a bit subtle for the sort of sound treatment I need to do. At the moment my tape machine is eight-track with 16-track capability, but I don't think it will go up to that before the whole Workshop is brought up to 24-track to be in line with the rest of the BBC. The advantage of 16-track is not so much that you'd use 16 tracks of programme on it but that you can have a lot of control tracks — apart from backgrounds where you do two or three minutes I work in very short spot effects, so I haven't got any equipment here to put a time code on tape because playing them in by hand on a visual time code is accurate enough — and they don't go on for long enough to get out of sync.

Elizabeth Parker

Elizabeth Parker took a post-graduate course at East Anglia in electronic music and acoustics, joined the BBC as a studio manager and became a permanent member of the Workshop in 1978. She spent two and a half years working on sound for Blake's Seven, left to have a baby, returned, left to have another baby, and since that

time has been working on music for Richard Attenborough's ecological series, 'The Living Planet'.

Elizabeth Parker working on 'The Living Planet'

I've been working on David Attenborough's documentary 'The Living Planet' and if you listen to the programme it's done almost entirely on a PPG Wave 2.2 with a Waveterm computer, a Roland 100 modular system and a rack-mounted vocoder. I've used the computer an awful lot for putting in natural sounds, and I've used the old Yamaha SY2 and a Godwin string synthesizer. The Godwin produces a certain sound at particular moments like a thick wodge to fill in a background, which the PPG could do but not quite so well. The PPG's great at what it does but you'd never say you could use that exclusively, otherwise all your sounds would begin to have a distinctive quality which is almost bell-like.

I've got quite a lot of my own sounds in the keyboard and I can offset that quality by combining them with natural sounds sampled by the computer. I haven't done any really hard-edged signature tunes on the PPG but I think it would excel at that sort of thing.

One of the PPG sounds is very good for sequences involving drops of water or something like that, but most of them have to be modified an awful lot because although the programme wanted music by the Workshop they wanted to avoid anything that sounded like a synthesizer or an organ. I haven't really experimented yet with combining sampled and synthesized sounds because I got this system when I was absolutely up to my eyes in work — it was in the building at 12.30 one day and I was using it on the series by two o 'clock! Since then the pressure hasn't let up once, but as soon as I've finished this series in March I 'll be experimenting with the PPG a little more.

Loading disks of sounds is very easy but it's slow compared to the Fairlight. However, in the last year I've done only The Living Planet using this, and in fact I've managed to satisfy myself as well as the producers — once I worked out the style they wanted I adapted myself to it, which is what you have to do here all the time anyway. This sort of music doesn't need a complete sync-ed up system, but if you're working to something like butterfly wings obviously you have to get that right. Also you've got to cope with the narration on the programme, but if a particular cue isn't more than about two and a half minutes long I haven't had any problem transferring my master tape to Mag Track and lay- ing directly onto the film. You've got a little more leeway than you have on a programme like 'Dr Who' where you have to be very accurate, but I still use a tape click on track eight with a vocal count, and a sheet of notes to tell me exactly where I am.

The other instrument I've used quite a lot is the vocoder, to suggest air and space because there's a lot in the programme about volcanoes and birds in flight. Luckily my voice seems to go into it quite well, and it's usually coded against a basic string sounds on

the PPG to produce a soft, airy sound. The modular system is basically used for white noise in this series, for instance following a bird in flight. I might also use a phaser for that sort of effect, but not too much, because the basic idea of the music is not to sound too electronic.

Roger Limb

Roger Limb recording an unconventional sound source

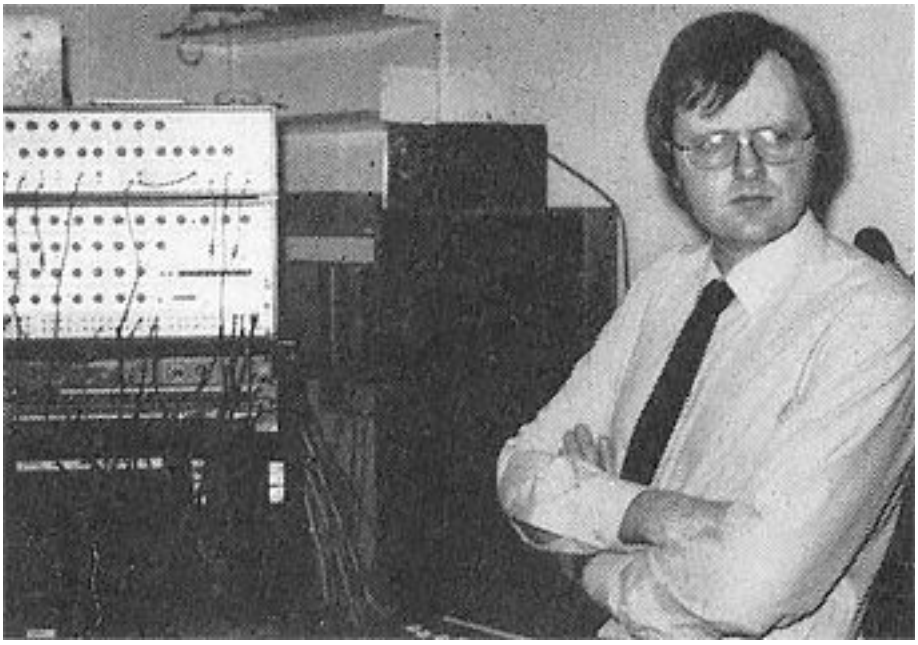
Roger Limb studied and taught music for many years before joining the BBC in Belfast, progressing to the Overseas Service and coming into contact with the Workshop in the early seventies. He was advised to apply for an attachment to it by Paddy Kingsland, one of the most successful members of the Workshop and now an independent studio operator who at the time was a fellow studio manager. After a period as a television announcer Roger joined the Workshop permanently in 1972, and proceeded to make a name for himself not only for spacey music but also for more conventional pieces for the Natural History Unit and others.

I've got a couple of episodes of 'Dr Who' to finish at the moment for dubbing in a few days' time. As usual I've got a videotape of the edited footage and on this occasion I'm using the Fairlight, the

Oberheim OBXa and an Elka Synthex. For a long time I used the Oberheim alone and we've only recently got the Synthex — they only overlap very slightly and there are still a lot of very useful sounds I can get on the Oberheim. To be honest you can't get such a it's a little bit lacking in bass body but it's got a lot of very interesting mid and upper-range sounds which the Oberheim can't do.

I use the Fairlight's page R (rhythm page) facilities quite a lot, so there are no other sequencers in this studio at the moment. Most of the other effects on my pieces are played by hand, with a standard 16-track tape recorder and the Workshop's own sync code device also in this studio.

Jonathan Gibbs



Jonathan Gibbs with Wavemaker modules and effects

Jonathan Gibbs is the latest permanent recruit to the Workshop staff, having covered for Elizabeth Parker during her maternity leave, during which time he recorded music for 'Tales From The South China Seas'. He became a permanent member of the staff in 1983 and will be responsible for assimilating new items of equipment such as the Yamaha DX7.

I've been working on a programme called 'An Alien's View Of Earth' which involves a lot of slow motion footage. The Yamaha DX7's been ideal for that, because it can produce some slowly developing organic sounds. In this studio I've also got a Roland Jupiter 4, a Yamaha CS40M and some Wavemaker modules with an EMS DK2 keyboard. The Yamaha was quite useful when we got it, because although it was only duophonic it had programmable pre-sets and a cassette dump for sounds. Elizabeth Parker did some of the sounds for Blake's Seven on it, which was one of the first things she did at the Workshop.

This studio is equipped with a Soundcraft 16-track, as opposed to the Studers in the others. It's got remote control and a search and play facility which is very useful, and it costs around £5,000 as opposed to £9,500. For that sort of money you can always expect good recording quality these days, but in terms of reliability we'll have to see when we've had it a little longer.

The Rays (White & Riley) *have built a time code unit which can recognise any one of 80 points on the tape and produce a bleep, start a synthesizer or whatever. It can work in frames or seconds, so it's a very versatile unit. In the future I'll be evaluating all the incoming equipment, learning how to use it and then passing on the information to the other members of the workshop, as opposed to the previous situation where they all had to learn from each other and it was a little haphazard. I had to do that with the Fairlight over a period of a week or so — the Fairlight seems to have a strange effect at first in-that it slows down your metabolic rate. When I first used it I sat at it for ten hours before I realised I hadn't had anything to eat!*

Studio F

Studio F is not a recording studio but is set up for film dubbing. Peter Howell was at work there, making notes on cues from a 16mm film on parasites for a forthcoming documentary. His major problem was to find words to describe the various filmed and

computer-animated sections, which showed microscopic organisms like 'a barrage balloon' or 'a flight of space invaders'. Having logged all the cue points he could return to his studio and complete the sound effects without further reference to the original film — 'space invaders' sounds could come from the Wavemaker set to produce triggers of varying lengths, for instance. In doing this he had to carefully avoid duplicating pitches used in the music or narration.

Studio F contains a couple of oddities including an old EMS vocoder, originally powerful enough to analyse sounds into their component parts as well as producing voice-like musical effects. This had been largely retired in favour of more modern instruments, such as Roland's rack-mounting vocoder.

Next to Studio F is the engineers' room, staffed by Ray White and Ray Riley, affectionately and collectively known as The Rays. One major task is the maintenance of all the Workshop's equipment, but there are also a lot of modifications and original designs to be done. Most incoming equipment has output modifications to bring them up to a standard level, and some devices such as digital echoes are adjusted for a wider range of delays, both longer (for echoes) and shorter (for flanging and other effects). The addition of vernier controls for more exact settings is another popular mod, particularly on sequencers where commercial items of equipment often have very vague control settings which are difficult to reproduce.

Another interest is the use of the BBC computer, and in the future it may be used for various control functions, possibly in conjunction with the tape sync system which was developed specially by Workshop engineers.

In 1979 the Workshop reached its 21st birthday, and celebrated with the release of an LP, 'Radiophonic Workshop 21' (BBC Records REC 354). Last year a new LP was released, partly to show the influence of the Fairlight on the composers in the Workshop, and like the previous album this contains a selection of pieces together with some specially recorded material — the title is 'The Sound House' (BBC Records REC 467). Also available is 'Dr Who — The

Music' (REH 462), an album including contributions from most of the present members of the Workshop including Peter Howell's 'modern' arrangement of the famous theme along with the original version, and Sound Effects No. 19 — Dr Who, catalogue number REC 316. Elizabeth Parker's music for The Living Planet is on a new album of the same name, and an excellent book on the history of the Workshop, The BBC Radiophonic Workshop — The First 25 Years' by Desmond Briscoe and Roy Curtis-Bramwell has just come out priced £7.75 from bookshops and from BBC Publications.