

**MEMORIES OF THE
PHYSICS DEPARTMENT**

K. F. Tindall

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by

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Foreword

My memories of life at the H.H.Wills Physics Laboratory in the University of Bristol span forty-one years. There are gaps, for I was not there for the whole of that period; indeed, in 1940, although I was in the building, I was there as an Admiralty visitor, and between 1949 and 1951 I was at St Mary's Hospital Medical School, Paddington.

The urge to record some of the happenings in the department over the years has been with me for a long time. I promised myself I would do it when I retired but other interests affected my motivation. In December, 1989, I met Professor Thompson in the laboratory who asked me if I'd started writing. When I said I was thinking about it he encouraged me greatly, saying, "GET ON WITH IT!"

I have tried to verify all facts and dates and am very grateful to all my colleagues throughout the University who have supplied information. From outside the department those whom I thank include Sir Alfred Pugsley, Mr.Evan Wright, Mrs.Molly Sanders, Chris Harries and Brian Jenkins. Don Carleton advised me to include everything I could remember. I have followed his advice but there are bound to be omissions.

My thanks certainly go to Eleanor, my wife, who has not only tolerated my disappearing from the domestic scene for hours at a time while I applied fingers to keyboard, but has aided my memory and criticised, helpfully, my results.

If a dedication be needed it is to all those whose personalities and activities are described in this account. They helped to make life pleasant and enjoyable and I am most grateful to them.

Kevin Tindall
Bristol, 1991

CONTENTS

| | | Page |
|------------|---|------|
| Foreword | | 2 |
| Chapter 1 | Strangers in the Camp | 4 |
| Chapter 2 | 1946 - 1951 | 13 |
| Chapter 3 | July 1951 - July 1956 | 20 |
| Chapter 4 | 1956 - 1987 | 25 |
| Chapter 5 | Heads of the Physics Department 1946 - 1987 | 33 |
| Chapter 6 | Some Very Close Colleagues | 44 |
| Chapter 7 | Sydney Harold Venn, M.A. | 53 |
| Chapter 8 | My Lads | 57 |
| Chapter 9 | Lecture Theatre Matters | 62 |
| Chapter 10 | The Student Body | 67 |
| Chapter 11 | The Party Spirit | 73 |
| Chapter 12 | Aspects of Technician Training | 79 |
| Chapter 13 | Photography and Photographers | 88 |
| Chapter 14 | Projectors | 94 |
| Chapter 15 | Dr. C.R. Burch | 102 |
| Chapter 16 | Security Matters | 106 |
| Chapter 17 | The Maintenance Men | 113 |
| Chapter 18 | The Physics Extensions | 121 |
| Chapter 19 | St. George's Day, April 23rd 1980 | 125 |
| Chapter 20 | A Bit About Balloons | 127 |
| Chapter 21 | Conferences and Exhibitions | 128 |
| Chapter 22 | Occasions of Unusual Interest | 133 |

[Photographs: in the original hard-copy version of this essay, a number of photographs were included, showing among other things various scenes from Christmas parties. Unfortunately, we have been unable to trace the original photographs, and the photo-copies in the hard copy are too poor in quality to reproduce.]

Chapter 1

1940 - Strangers in the Camp

"If you look over there, on the skyline you'll see a fairy castle with four turrets. That's where you people will be stationed".

It was mid-June, 1940, and the train was approaching Temple Meads, the vista of Bristol unfolding slowly as we neared the platform. The speaker was a Royal Navy Lieutenant who was accompanying a party of Admiralty scientific staff moving from Portsmouth. This move was part of a policy of dispersal which followed the Dunkirk evacuation and the consequent threat from the presence of German forces occupying the coast of Northern France.

Our destination was the H.H. Wills Physical Laboratory of the University of Bristol where the entire second floor (less the darkroom adjoining the lift) was to become H.M. Signal School Extension, Royal Fort, Bristol, and was to remain so until 'wound down' after the end of the war.

Initially, there were three groups, the largest of which was the Sutton Group, led by Dr. Sutton, carrying out valve research and which developed, among other projects, the Klystron valve and the Cavity Magnetron, of great importance in the story of Radar.

Of the other two, much smaller, groups one was led by Dr. Derek Chesterman, himself a Bristol Physics graduate, who later became Professor of Physics at Bath University. He was investigating infra-red phenomena and occupied the Optics cubicles; the other was an advance party for the Transmitting Section.

This group was headed by Mr. Anderson, assisted by Mr. Norman Bell, both of whom were Scientific Officers, and also listed an Experimental Assistant, John Brown, and a Laboratory Assistant, myself. We had, as working space, the whole of the Main Junior teaching laboratory, now Room 2.13, Stage I teaching laboratory. Messrs. Anderson and Bell had their desks in a small room opposite which also housed a Civil Service clerk, Charlie Ellis, who dealt with all administrative matters, and the telephone. As things turned out, our Transmitting Section was not expanded and we were recalled to Portsmouth in December, 1940.

When we left the train at Temple Meads we went directly to the laboratory in a fleet of taxis, ours being the last to set off due to a little difficulty with the driver over accommodating my bicycle on the roof of his taxi. I had been unable to work it into the manifest for our official crates of equipment which had travelled separately by R.N. lorry, but had managed to have it included in our personal luggage. During this mild hiatus I learned a few new (to me, anyway,) Naval expressions given gratuitously by our escorting Lieutenant. However, we reached the laboratory and were able thus to locate the place and check that our crates of equipment had arrived safely. Strangely, they had! In the late afternoon we were taken to our allotted billets, or lodgings.

It will be remembered that, at the outbreak of war, children had been evacuated from cities and areas of potential danger to be settled in country districts. This was not a happy situation for them, frequently they were unable to be visited by their parents except on rare occasions and it was, initially, out of the question for them to return home. All this has been well documented and the power of the Billeting Officer was great. Even though this facet of bureaucracy was not popular it was able, virtually by a form of dictatorship, to achieve effective results. If a house-holder had spare room and adequate facilities he was directed to act as host to one or more enforced lodgers. Some were able to show just cause why they should be exempted but a plain refusal was not acceptable. In such a manner was our immediate accommodation decided for us.

The area chosen for our reception was Westbury-on-Trym and centred in and around Falcondale Road in homes rather outside the usual 'bedsit' districts and, in the main, our people were fortunate. Once emotive barriers were broken down co-existence was comfortable and good friendships resulted.

I was certainly fortunate with my situation. I was billeted with a Mr. and Mrs. John Hodge in a house about halfway down the upper part of Falcondale Road, on the south side. The Hodges were a childless, middle-aged couple who showed me much kindness. Our meeting was embarrassing to both parties: I had been wondering where, and with what sort of people I would be planted and they had been on edge all day as to what sort of person would, literally, invade their home and their privacy. There was a little rather enforced jollity as they showed me to a comfortable room overlooking the garden, which was to be my bedroom, and then invited me to 'take tea' with them. By then I, a healthy eighteen year-old lad, and not having had any lunch, was ravenous and did justice to the food even though an unusual discretion warned me not to overdo things. I think Mrs. Hodge was a little alarmed at my appetite as she inquired if I would be able to have a good lunch while at work. Sensing her concern, I assured her this would be so. They did their utmost to make me feel at home, gently inserting a few house rules into the conversation. I suppose there were hopes expressed that I should not be too noisy, not come in the worse for drink nor seek to entertain wild company, but the only request that I remember well was that I should change my shoes for slippers on entering the house. I was happy to conform to these conditions.

I gathered later that, since the concept of having a lodger, or 'paying guest', was quite alien to their lifestyle and to that of their neighbours, they had discussed among themselves at length as to what they might reasonably require of such boarders in order to minimise the inevitable disruption of their hitherto placid routine. Apart from the overall trauma of my presence the only dismay Mrs. Hodge registered was when she learned that I had to be at work by eight in the morning. Most nobly, she rose to the occasion and would call me in time to enjoy an early breakfast. It was not lost on me that Mr. Hodge, who started work at nine o'clock, had his habits adjusted to enjoy the same early breakfast 'to save extra work'.

Although petrol rationing had yet to be imposed the road traffic was very light indeed, when compared with today's saturation level, and travel to and from the centre was fairly painless. Before eight in the morning one could buy a 'workman's return'

for the cost of a normal single fare which covered the journey home in the evening. From the top of Falcondale Road to the Victoria Rooms cost twopence halfpenny, about one penny in today's coinage. The Westbury bound bus stop was then on an island opposite the Victoria Rooms at which point Queens Road veered left towards Clifton and, to the right, Whiteladies Road began. Even in 1940 it was quite an adventure to cross the road to reach it; in 1946, when I returned, it was terrifying.

Cycling was my normal method of travel and Blackboy Hill was my delight. Given a following wind and a short pedal spurt at the top I would reckon to free-wheel easily to Clifton Down station and frequently as far as the Territorial Centre. Of course, cycling home was another matter.

There was a billeting allowance of £1 per week paid directly to our hosts and the individual usually paid a further ten shillings (50p) to top this up to the average charge for board and lodgings at that time. This might seem trivial today but the laboratory assistants' wages were thirty shillings (£1.50) per week, rising to £2 at the age of eighteen. The average salary for Scientific Officers was around £350 per year! In discussions with our opposite numbers in the University we discovered that they, at age seventeen, received twenty-five shillings (£1.25) per week. Despite this we were able to live fairly comfortably provided we were not extravagant. John Brown and I used to take lunch regularly at 'Mac's Cafe', a first floor dining room in Park Street which provided a three-course lunch for two shillings and threepence (11p).

Although the Transmitting Section was recalled to Portsmouth in December the intervening six months were quite eventful. On the lighter side, it must be realised that there were about half a dozen of us, all young laboratory assistants, and all infected with the irreverence of youth, who welcomed any chance to score a trick against authority.

Among the many duties performed by Charlie Ellis, the clerk, was that of timekeeper. Arriving at work by eight o'clock sometimes presented difficulties and, every now and then, Charlie would decide that we should be brought into line. Little wars of attrition would develop when he would lurk at the entrance and, quite literally, pounce upon miscreants. We accepted this as a challenge and various ploys were devised to thwart his endeavours. It became a point of honour that a lad who had managed to arrive early would monitor Charlie's activities and, if he showed signs of lurking, arrange a distraction to draw him from his vantage point so as to allow those assembling in concealment without to enter and appear, the pictures of innocence, at their appointed places. Sometimes we could keep him well stirred all morning.

In those days the fourth floor, between the turrets, consisted of a large, open space and housed a Cockcroft Accelerator, a massive construction of insulated columns and aluminium spheres. Even as late as 1987 there remained relics of this machine in the department; a couple of the huge porcelain insulators being tucked away beneath the back stairs to what is now the Arthur Tyndall Lecture Theatre. Once, by careful timing and co-ordinated action, we managed to send the lift, full of senior staff, to the top floor instead of their chosen destination on the second floor. We gambled on the known fact that they chattered away to one another in the lift and just assumed they

would be delivered as expected. We were delighted to hear them disembark at the fourth floor and wander about asking each other how they got there.

Air raid precautions were maintained at a moderate level and a total black-out was in force. There were no streetlights, no neon signs and cars and cycles used hooded lamps which indicated, dimly, their presence but did little to light their way. Personal torches were essential but batteries then became in short supply. Windows were covered at night with screens or dark curtains and we, in the laboratory, were subject to the Naval order, "Darken ship!"

The South East turret contained a small room approached from the flat roof area between the turrets. It was not normally used but had within it a well-top above a shaft which began at the ground floor and which had openings at bench level on each floor. There were little windows but no blackout method as it certainly wasn't likely to be used at night. A certain experiment in the Transmitting Section required that some equipment should be assembled and sited as high from the ground as possible and it was put in the turret room. The operating parts were in the second floor laboratory connected by cables running up the shaft to the top assembly. Part of this assembly contained a large radio valve, a very common-place item, but one known as a 'bright emitter' from its filament glow. When leaving time came it was still broad daylight and the equipment was left running overnight so as to be stable when we resumed the next day.

The next morning two very large policemen called to discover who had been signalling to enemy bombers. It appeared that a suspicious light "in a high window" had been detected by the Royal Observer Corps stationed on Dundry Hill and an explanation was, quite rightly, being sought. We had to take the policemen up to the turret to show them the apparatus. Luckily, indeed, it was a fine day and the sun was shining almost directly on the equipment and the filament glow was greatly reduced by the ambient light. We expressed shocked amazement that such a weak glow could be seen from such a distance, with which opinion the police agreed, and they left us with a stern warning to be very much more careful. We felt suitably chastened but, this being a Service establishment, recriminations set in and someone had to be blamed, if only for the record. In these cases the finger always points first at the most junior. Happily for me, as it turned out, while we were setting up the equipment I was assisting Mr. Bell and I had offered an unsolicited opinion on what we were doing. He had growled, "Just pass me the solder; you're not paid to think". So, when the finger pointed at me and he said, "You didn't think, did you?" I could reply, with wide-eyed innocence, "No, Mr. Bell, I didn't". The moving finger, having writ, moved on. Apart from an Admiralty injunction emphasising the need for stricter observance of the precautions, nothing more was heard.

During August the air-raid sirens began to sound more frequently, mostly because enemy aircraft were passing over on their way to targets in the Midlands. On one occasion, however, a raider was apparently being chased by fighters and dropped its bombs over Westbury-on-Trym to gain speed. One of a stick of, reputedly, fifty-pound, bombs fell in the back garden of the Hodges' house close to the rear wall. Mr. and Mrs. Hodge, with the wisdom of their years, had sought some shelter under the stairs when the siren sounded. I, with the brashness of youth, had remained abed. The sequence of events is etched indelibly in my memory. The explosion woke me

instantly; I sat bolt upright in bed to notice the ceiling and roof opening above me. In that same instant I heard the window go and, by what instinct I'll never know, I heaved the blanket up in front of me. I felt the broken glass from the window crash into the blanket while the broken ceiling fell upon me. As I struggled to gather my wits I heard Mrs. Hodge calling to see if I was alright. Apart from a few minor cuts and bruises none of us in the house was hurt but the building was badly damaged. Within minutes an ARP rescue team arrived and we were taken to a First Aid post set up in a house in Grange Court Road, only a few hundred yards away. There we spent the rest of the night and I was thanking the powers above for my having come through unscathed when, on being offered some breakfast, I passed out. I spent the whole of that day in Southmead Hospital being cosseted by some very homely VAD's. During the afternoon the sirens sounded again and three ladies gathered around me ready to pounce had I shown signs of panic. I reassured them and then helped two of them to minister to the third who was beginning to find things all too much.

Although the Hodges' house had been badly damaged it was eventually repaired and stands today, showing no sign of the events of that night.

Towards evening, while I had been wondering vaguely what I should do about accommodation, Mr. Reith, one of the Scientific Officers, and John Boddington, a lab.assistant colleague of mine, called to collect me. The Boddingtons took me into their flat in Durdham Park where I stayed with them for several weeks before moving into digs in Jacobs Wells Road, sharing with Harry Foster, one of our workshop staff, and under the care of a Mrs. Towells. For a few days I enjoyed the notoriety of being one of the Admiralty's first air-raid casualties but this was very soon to be overtaken by far more serious incidents involving, not one or two victims with trivial injuries, but many, many people killed or badly injured.

In those far-off days the Physics Department had no frontage on Tyndall Avenue and the original blank end wall is still to be identified by the doors which separate the 'old wing' from the newer sections. While this is true from the first floor upwards, the ground floor extended to a point about half-way along what is now the corridor wall of the Preparation Room, G.39. Below this was a short flight of stone steps leading to the basement. Here was Dr. Jackson's Low Temperature experimental laboratory and also one end of a service tunnel which ran the length of the building, passed under the courtyard and terminated in the boiler-room in Royal Fort House. There was much less pipework in the tunnel roof than there is today and, from after the war until it became impassable in the 1960's, it provided weather proof passage to theoreticians based in Royal Fort House. In 1940 it was lined with bench seating and served as a local air-raid shelter. Tyndall Avenue had houses on both sides, from the Hiatt Baker garden (now the site of Senate House) to St. Michael's Hill on the north side and from the then end of the Physics building to St. Michael's Hill on the south side.

One November evening I was a member of the Fire Watch party; we were taking our ease in comfortable chairs in the office of the department secretary, Miss Masters, when the alarm sounded to herald an air attack. To begin with, it seemed that the main targets were the Filton aircraft factories; we could hear the drone of the bombers passing over and the anti-aircraft guns were maintaining a terrific barrage. We raced round the building to check for damage but, so far, there was none. I was told to go

and see that people were settled in the shelter and to attend until the shelter wardens arrived. There I found a young lady in some distress having left her parents in their home in Tyndall Avenue while she brought some blankets and pillows to make places ready for them. Her distress was caused by an increase in the barrage with its consequently increased noise and showers of shrapnel. Her cry of, "Somebody! Help my parents!" left me no option. I managed to calm her and set off during a lull in the noise with my little tin hat on my head. Her home was two doors away and her parents were anxiously awaiting her return. Assuring them that she was safe, I escorted them the very short distance to the shelter and to the welcoming embrace of the young lady. In her delight and relief she then embraced me warmly, gave me a smacking kiss and said, "How can I ever repay you?" Being but a callow youth I could but mumble that it was nothing much and I couldn't find words to give the sort of answer I'm sure such a question deserved! The shelter wardens having arrived, I rejoined the team. I found the shelter depressing, not from any feeling of claustrophobia, rather from the enforced inactivity when so much could be happening outside. We moved about the building in order to have somebody somewhere if any fire started and I was at the bottom of the stairs when a bright glow appeared outside. Thinking that Royal Fort House had been hit by an incendiary bomb, I went out by the side door and looked around. The house was untouched but the light was strangely bright. I looked up and, to my horror, saw a parachute flare coming slowly down to the courtyard. For a moment I stood rooted, thinking "My God! They can see me!" before dashing back inside for cover.

This raid had occurred on the night of November 24th and there were altogether three major air-raids during the six months I spent in Bristol and the details as to what happened in which are now rather hazy. I can remember three particular instances but not exactly when each occurred. On one occasion we turned up for work only to be sent away as it was thought that there was an unexploded bomb on the side lawn, where now stands the workshop block. It turned out to be but a large piece of debris which had almost buried itself in the ground. This was probably after the air-raid of December 2nd.

After one long, and very fierce, night's bombardment with high explosive and incendiary bombs the 'All Clear' eventually sounded and we went up to the turrets to see if the roof had been damaged. I remember, vividly, standing on the top of the turret above the stairs and looking out across Bristol towards Temple Meads and the south-east of the city. Within an arc of more than ninety degrees in this direction there wasn't a line of sight that wasn't interrupted by a major fire, with smaller clusters of fires in most other directions. The Great Hall had been destroyed, other damage had been done to the Main Building, but the Physics Department suffered only shrapnel wounds to the walls and the loss of a great many windows.

At the start of the raid on the night of December 6th Harry Foster and I were in our lodgings, chatting by the fire. Our instructions were that we should, if possible, report for fire duty as soon as the siren sounded. We set off towards Queens Road and were about half-way up the hill when the guns opened up and incendiaries began to fall. A stick of them seemed to be marching up the road behind us and overtaking us rapidly. We took shelter! There was a solid looking archway just to our right and into which we ducked. From this haven of vantage we watched as another stick of incendiaries

came popping along the road. Apart from melting the tarmac they weren't having much effect and Harry and I felt safe and secure. We observed, with interest, the actions of a young lad from a house opposite. An incendiary had settled in the gutter and this lad went forward bearing a loaded sandbag which he proceeded to empty over the fire-bomb. The sand did little but his sandbag caught fire! Things quietened enough for us to proceed and it was then we discovered that our shelter had no roof! When we realised we had been 'sheltering' under the open sky it was, as the saying goes, nearly a job for the laundry!

There were three more severe air-raids on Bristol in 1941; on the nights of January 3rd-4th, March 16th-17th and April 11th-12th but I had left the city before those took place.

It was inevitable that we Admiralty visitors should develop links and friendships with the University staff within the Physics Department. Already, John Burrow had been taken over for his glass-working skills and his famous glass to copper seals were helping immensely in the development of the new valves. John Priest, who tended to the building's electrical needs and looked after the giant banks of accumulator cells which supplied up to 115 volts D.C. throughout the laboratories, was also retained. Our first meeting occurred while fire-watching together.

Mr. Harold Venn was the Laboratory Steward. Among his many duties he made lantern slides in a darkroom on the first floor. One evening while we were both fire-watching (again!) he invited me to watch the process. He had become aware of my interest in photography through some conversation we'd had about my amateur cinematography and, typically, was prepared to spend some time fostering this interest. On several occasions I was able to join him to have the mysteries explained further. Neither of us could have foreseen the future!

Bill Crompton, in those days, was the laboratory's cleaner. In a year or so he was to become steward to the teaching laboratories until he left, in the late 1940's, to join RRE at Malvern, this being where many of the Admiralty people went after they left Bristol. I remember once seeing him clean the upper windows by cunning, if illegal, use of the fire hose.

The Physics Department was blessed with an amiable and very efficient porter, Mrs. Sarah Greed. She had been a parlour maid to the Misses Tyndall in Royal Fort House and her husband had been the coachman and gardener. When the estate was purchased by Harry Wills towards the end of the First World War Mr. and Mrs. Greed were living in the Lodge at the gate. In 1927 Mr. Greed died and Mrs. Greed became the porter to the newly-opened Physics Department. In Professor Tyndall's memoirs he writes: "Until her retirement in December, 1950, she spent her days in giving personal attention to all of us. The Laboratory, through us, became her life and she did not survive long after ageing years forced retirement upon her (and died in 1954). But from her savings, through a life during much of which parlour maids and porters were ill-paid, she bequeathed the sum of £1,000 to give assistance to those members of the non-academic staff of the Wills Physics Laboratory 'who may be in misfortune or distress either by reason of accident, ill-health, old age or otherwise'".

Added to the normal portering duties were others which Mrs. Greed had adopted, such as repairing overalls and curtains, making tea for Physics seminars and looking after the orders for milk. No Civil Service establishment can survive without its essential intake of tea and coffee so our milk supply was attended to by this good lady. It was sensible that the bottles for the different tea schools should be labelled with the designation of the particular groups, rather than with individual names, and so it was that I became known as 'T3', and by that title only. Mrs. Greed, as might be expected from her life and experiences, had a fund of interesting tales to tell of life in the region of the old Royal Fort and it was often my delight to spend a few minutes, when collecting the milk, to listen to her.

I was very much influenced by the men in the mechanical workshop. This was then housed where the Cryogenics Group now have their ground floor laboratory. The floor itself had been so constructed as to minimise the effect on the rest of the building of machine vibration. What is now a corridor leading to the ramp outside the new (1956) workshop block was then a small workshop housing wood-working machinery. Before the Admiralty came on the scene Harry Tressider, the workshop manager, with "Mac", Mr. MacKeegan, and possibly one other, coped ably with the mechanical demands made upon them by the research workers. The Admiralty installed three more; 'Jock' Phillips, who had been a Glasgow fireman at some stage in his career, a real rough diamond but with a great heart and an evil sense of humour; Bert Stocker, who was an artist in brass-working; and Harry Foster, a quiet, pleasant man with whom I shared lodgings in Jacobs Wells Road. These men introduced me to the rudiments of workshop practice in the short time I was there. I remember entering the workshop one morning after an air-raid to find 'Mac' sweeping up glass from the broken windows. Instead of his usual friendly greeting he rounded on me and cursed me, and the whole of the Admiralty staff, blaming this trouble on our having our mail addressed, 'H.M. Signal School Extension, Royal Fort' etc., claiming that this had betrayed our presence to the enemy and drawn his awful attention to the building. I reckoned the enemy knew all our locations without this aid but, 'Mac' could have been right!

One job we put into the workshop from the Transmitting Group was for a metal chassis to hold circuitry. Normally, this would have been made in folded aluminium, but aluminium was scarce, being reserved for the aircraft industry. Bert Stocker made a beautiful chassis in brass and delivered it, to Mr. Bell's absolute horror, with every surface very prettily covered in delicate tracework in patterns of whorls, etc. This was not a difficult thing to do, Bert had shown me the technique earlier, and he had become so engrossed in his beloved brass that he just wanted to give his job that distinctive personal touch.

To further the defence of the realm there was formed nationally, in 1940, an armed force known as the Local Defence Volunteers. There was, apparently, no upper age limit and it was open to all males who were not already members of the uniformed branches of any of the services, either military or civilian. One such group of Local Defence Volunteers was formed within the Admiralty staff in the laboratory.

Items of denim were issued as uniform but not enough to outfit everybody. Garment pieces were shared out among those they would fit; few of us had a complete

kit but we all had an armband with the letters 'LDV'. Those who had been in OTC units at school or university were expected to act as instructors; a case of the near-sighted leading the blind!

After a short while this national force became better organised as the Home Guard with normal khaki uniforms, professional adjutants and instructors and effective, if very outdated, equipment. I understand the University had its own Company.

These developments were still to come when the Transmitting Section received orders in December to close down the Bristol operation and to return to Portsmouth. We packed our equipment and, about a week before Christmas, my masters departed by train, leaving me to see the gear loaded into a small Navy van and to accompany it back home. This time my bicycle travelled in the van with me. The driver told me he'd had a few difficulties finding his way to Bristol since all the signposts and town name-boards had been removed to hinder the progress of possible enemy paratroopers, a ploy which seemed quite likely to succeed if the trouble it gave the natives was any guide. Having relatives in Bath, and having been at boarding school there, I was fairly familiar with the road so I offered to navigate. On the unlit roads of a December evening it wasn't as simple as I'd hoped but we made reasonable progress and I managed, with low cunning, to find a route which enabled me to drop off at my parents' home near Portsmouth.

My feelings on leaving Bristol were mixed. I was, naturally, happy to be returning to my family and friends but Bristol had been a pleasant place and there was much there to attract me, even allowing for the restricted war-time conditions. I'd had little opportunity to absorb the feeling of the University as a whole, being, as we were, in, but not of, the academic world. I promised myself that I would return some day to re-visit the places I had known to see what changes had occurred. I did, in fact, call in for a brief visit in 1943 while passing through Bristol on the way to Weston-super-Mare but I had time only for a chat and a cup of tea with Charlie Ellis before leaving.

After returning to Portsmouth I spent the next six years in Admiralty service having transferred to the Mine Design Department of HMS "Vernon", some of it on detached duty in Scotland on the shores of Loch Long. During this time I met two men, both temporary scientific staff in the department, who were to help shape my future. One was Dr. Norman Thompson from Bristol, who had been recruited to swell the ranks of Admiralty scientists, and David Tanfield with whom I was to be associated through most of the war.

When the war ended most of the temporary people went back to their peace-time occupations as soon as they could. Dr. Thompson returned to Bristol and David Tanfield also went to Bristol to work in the Physics Laboratory. Some months later I received a letter from Dr. Thompson telling me the department was recruiting laboratory staff and he felt I might be interested. I was, and I applied for a post as a laboratory assistant in the summer of 1946.

Chapter 2

1946 - 1951

I was interviewed by Dr. Stephen Piper who was, in the words of the Head of the Laboratory, Professor Arthur Tyndall, "my right-hand man". In 1948, on Professor Tyndall's retirement, he was given the title of Assistant Director and, in 1954, was appointed a professor.

The interview followed the usual pattern and I was eventually offered the post of Laboratory Assistant at a weekly wage of £5 with two weeks annual holiday, to work in a research group led by Dr. Thompson. Dr. Piper took me on a tour of the building to meet some of the staff and to see the facilities. We met first of all Mr. Venn who remembered my interest in photography and made me welcome. On the way down to the workshop we passed Mrs. Greed's lodge. She came out and said, "Why, it's little T3!", somewhat to my embarrassment and Dr. Piper's amusement. In the workshop I was pleased to see Harry Tressider whom I had come to know quite well in 1940. Harry had been away for some time during the war but had recently returned. Also with him was 'Jock' Phillips who was then assisting Dr. Burch with his highly sensitive optical measuring equipment.

I returned to Portsmouth, resigned my temporary post with the Admiralty, and came to Bristol in October, 1946, taking lodgings with a Mrs. Morgan in Devonshire Road, Westbury Park.

My fellow lodgers were two technicians employed as Flight Test Observers with Bristol Aircraft Corporation and a young Welshman, a Theology student. He was a very quiet and gentle young man but he had an alarming habit of talking in his sleep. He would sit up in bed and utter foul obscenities and swear like the proverbial trooper but would know nothing of this the next morning, despite our earnest endeavours to convince him. It was so alien to his normal character that he wouldn't believe us. We gave up mentioning it in the end although he went from strength to strength in his nocturnal soliloquies.

The technical staff in 1946 were few in number. The senior people were Mr. Venn, John Priest, Ron Gattiker, John Quarrington and Bill Crompton with Harry Tressider managing the workshop. The juniors were myself, Denis White, a lad or two in the teaching laboratories, whose names escape me, and one or two new men in the workshop.

Ron Gattiker was an ex-RAF photographer working for the Cosmic Ray Group headed by Professor Powell. Ron had a reasonably well equipped darkroom on the third floor and had in his care a Leica 35mm camera, the only 35mm camera in the whole department.

John Quarrington was the technician to Dr. Jackson's Low Temperature Group and was a man of many skills and great ingenuity. On one occasion he had need of a large rubber gland of a special shape and form. It was not the sort of item one could obtain

from any local manufacturer and to order one as a 'one-off' would have been extremely costly. He took a piece of pressure tubing of acceptable bore and large outer diameter, fitted it to a wooden mandrel and turned the shape he wanted in a lathe. In order to give the rubber sufficient rigidity to withstand the cutting tool he sprayed it continuously with liquid air. I saw this operation and made a mental note to remember this technique for possible future application. Alas, although I remembered it in great detail, I had never any occasion to make use of it.

John and his wife, Phoebe, became friends of mine and it was through this friendship that I rode a tandem bicycle for the first time, in fact, for the only time. For a while it became our practice on summer Sundays to cycle into the country beyond Brislington, I on my bicycle, they on their tandem and I admired the drill they employed to ensure a smooth gearchange on hills. During the war John was also in H.M.Signal School, but at Haslemere in Hampshire, and he and Phoebe lived in a village not far from where I was living, and where Phoebe taught in the local school. We'd not known each other in those days but found that the shared neighbourhood gave us much in common. In the early 1950's John left Bristol to join RRE at Malvern whence they later retired to live in the sun in Taranto, Southern Italy.

John Priest looked after the electrical needs of the department which included the main laboratory battery and its charging dynamos in the old Power Room with a beautiful vintage switchboard of slate base with great copper leaf-switches. He tutored me in its operation and I would take over his duties when he went on leave. John also produced electrical and electronic devices for the laboratories. He and I came to an arrangement in which each would check the other's circuits for wiring faults. This was sensible because when checking one's own circuits it was only too easy to overlook a mis-connection and to assume the job was complete. The consequences of switching on a mis-connected circuit could have been unfortunate. The system made us more careful and a spirit of mild competition crept in, also.

There were three members of the academic staff for whom I was assistant; Dr. Thompson, Mr. David Gibbs and Mr. Geoffrey Fertel.

A colleague of Mr. Gibbs', a Dr. Van der Plank of the Zoology Department, was interested in the problem of the tsetse fly in Africa and Mr. Gibbs had agreed to produce a powerful electronic flash to enable him to take high-speed photographs of their flight. The scheme was to arrange a large box with two beams of light at right-angles crossing about the centre of the box. Each beam was received by a photo-electric cell and a fly interrupting the beams where they crossed would react on both cells and trigger the flash. A camera would be focussed on the intersection.

Electronic flash tubes were relatively new developments and Dr. Jack Mitchell had brought from America an Arditron flash tube giving a flash of around one microsecond, but requiring an operating voltage of 6kV. This was achieved using an induction coil from a Ford car engine, probably a pre-war one since, as I recall, the coil was cased in wood. A 2-microfarad, high voltage capacitor about the size of a small suitcase was used to store the charge. The whole assembly was contained in a war-surplus box with folding legs obtained from Thomas Best's surplus stores in Bath. The finished article was a two-man lift. The first test firing was made with a camera

set up in the laboratory focussed on a dribble of water from the tap. The flash, though brief, gave me green spots before my eyes for several minutes but the picture of the water drops was most satisfactory. At the end of the afternoon, having put away the precious Arditron, we realised that the great capacitor was still charged to around 6KV and held an unhealthy number of joules. We hadn't got around, in our excitement at the success, to fitting a safety bleed resistance so the system was lethal. Neither of us felt like shorting the capacitor with a screwdriver, a common enough trick with much lower energies involved but not one to try on our only giant capacitor. There was only one thing to do so we left the room, locking the door behind us, in the hope and expectation that natural leakage would make it safe by the morning. Even so, when I, very cautiously, shorted the terminals the next day there was still a respectable spark albeit a small one. Safety measures were installed and Dr. Van der Plank took it away to Africa. That Christmas he sent Mr. Gibbs a card, the insert to which contained a magnificent picture of a tsetse fly photographed with the apparatus. I say 'magnificent' but a giant enlargement of the head of a tsetse fly is not a pretty sight except, perhaps, to its mother.

In common with many other educational establishments Bristol University, in particular the Physics Department, was the recipient of many and varied pieces of war-surplus equipment. Much of this was British or American but a quantity of German instruments and electronic components also came our way. Some of the latter Mr. Gibbs adapted to make monitoring equipment for Professor Harris of the Department of Zoology and I carried out the construction as an extra-mural commission.

From British sources, I believe from the BBC field units, came two large wooden boxes containing disc recording machines, supposedly portable equipment, which were used to record events and interviews with front-line units of the Forces. It would hardly be described today as truly portable; transportable, yes, for each box had two rope handles at each end, weighed over a hundredweight, and required two men per box to lift.

Tape recording was yet to become readily available, indeed, I had only read of its possibilities but I'd had a little experience in wire recording. In this system a fine steel wire, some hundreds of yards long, wound on a drum about three inches in diameter, was drawn past a recording head, much as is tape today, and on to a take-up drum. The quality was reasonably good for speech recording and tolerable for music. The main disadvantage lay with the problem of keeping the wire on its drums. If a coil or two sprang loose the resulting tangle was a nightmare! Such recorders were reputed to have been used by the Intelligence Services and carried in certain low-flying aircraft which would circle over locations in France to receive messages from agents on the ground via their small, low powered, equivalents of today's walkie-talkies. Be that as it may, I was quite interested in the disc recorders.

Of the two boxes, one contained a pair of recording turntables and the other a pair of play-back turntables. Each box also held the electronics and controls associated with its purpose. The play-back units were fairly straightforward record players with light-weight pick-ups. The recording units were more complicated. The turntables were heavy duty and, behind each, was a fine-thread traversing screw which moved

the recording heads radially across the disc surface. What surprised me was that the action meant that the recording started near the centre of the disc and moved outwards. There had to be a reason for this unusual tracking and I learned the purpose behind it. The track speed of the disc coating past the cutting chisel at the outer edge of the disc would be around four times its speed at the start near the centre. The disc coating was a fairly tough black wax which received the oscillations from the recording chisel cutter as it tracked a fine spiral course controlled by the traversing screw. The cutting chisel, though nice and sharp to begin with, would wear slightly during recording and the gradually increasing track speed helped to smooth out the effect and maintain good recording quality.

In January, 1948, Mr. Gibbs informed me that Professor Tyndall, who would retire that year, was to give a talk to the Student Physical Society about the history of the University and his time in the Physics Department. It would be a memorable occasion and he, Mr. Gibbs, intended to record the talk. The recording equipment was assembled and action was taken to re-vitalise the amplifiers and drive systems to the recording cutter heads. I have a feeling that Margaret Hingley re-built the amplifiers, but that might have been later on. My task was to make cases for the microphones. No suitable microphones existed in the department but Mr. Gibbs produced two moving-coil microphone elements which needed to be cased and suspended in sprung frames. These were still times of austerity and, when I told Harry Tressider I wanted some mild steel bar about two inches in diameter he was, at first, not amused. However, we were able to carry out a useful bit of recycling by using one of the very worn bearing shafts from the lift which had just been replaced, due, according to David Tanfield, to the lift having been overloaded by my erstwhile Admiralty colleagues. From one of these shafts I was able to turn a pair of substantial casings for the microphone elements which were then fitted into the aforementioned sprung frames.

On February 27th, 1948, all was made ready and arranged in the projection booth behind the Main Theatre. Tests proved satisfactory, blank discs were to hand. Mr. Gibbs and I were in the booth, garbed in headphones, and Professor Tyndall began his talk. Some three minutes into the lecture I suddenly heard Mr. Gibbs swear! The signal was not reaching the revolving disc but was switched to the other head! A quick action corrected this but those original minutes were lost. In all the years I have known Mr. Gibbs that was the only occasion on which I have ever known him to cuss but, had I been the one to notice, I, too, would have cussed, probably evilly and at some length. The rest of the recording went without a hitch.

Afterwards, Professor Tyndall asked how things had gone. When he learned of the misfortune he suggested, typically, that if we could dub the recording, he would re-create his first few minutes for us. This was done a few days later. Now, of course, we had a set of recording master discs but no convenient way of replaying them. Through the good offices of Bristol and West Recording Company these disc were re-recorded on to standard rotation discs and kept in the department. Mr. Kenneth Mobbs, of the Music Department, re-recorded the discs onto standard quarter-inch tape and, later on, I transferred the whole recording on to a cassette. It is possible to notice a slight change in recording quality when the dubbed beginning, made under

quiet conditions, gives way to the original recording made in the presence of an enthusiastic audience.

Occasions such as this occurred quite frequently, requiring what are now known as "out of hours attendance" but which were then just part of the pattern of life. If a particular task demanded odd periods of work it was quite natural for this to happen. The concept of "Task" "Group" and "Individual" is made much of today; then I think we took it for granted.

Geoffrey Fertel I remember on two counts. He taught me to look for simple ways of solving construction problems in experimental apparatus. My first insight to this was during my interview for the position when I was taken to see him as one of the people who would employ me. He produced a piece of steel turned to the shape of a cone and asked me how I would set about drilling a small hole in the surface of the cone, but the hole to be parallel to the axis. I imagined this to be a test requiring accuracy and suggested soft-soldering a piece of brass to the cone with a flat at right-angles to the axis which would allow the drill to enter without a tendency to glide. He said, "Yes, you could do it that way, but it would be quite suitable to start the hole normal to the surface, then to turn the drill to the required angle". Of course it would, but I was being over cautious as it was an interview and had opted for a rather complicated solution. One of his dicta was, "If it takes you ten minutes to make something, is it worth spending twenty minutes looking for it when you lose it?"

The second count was that of his consideration. As lunchtime approached on my first morning, and I was wondering where to go for lunch as my old haunts had probably disappeared in the bombing, he asked me where I would be going. On discovering I had no ready plan he offered to introduce me to the local British Restaurant situated in Belgrave Road. The site was later absorbed into the BBC complex.

These eating places sprang up during the early part of the war from the need to provide midday meals for people wanting simple sustenance during the time of food rationing. Before then many folk could provide themselves with pies or sandwiches from home. Many used to go home for lunch also, but domestic food shortages meant conservation of home supplies. They were very basic cafeteria but the fare, though simple, provided a reasonable meal at low cost. Initially known as 'Civic Restaurants', they continued functioning for some years after the war ended.

High-frequency induction heating was one of his interests and, instead of the more usual coil within which the material to be heated would be placed, he was experimenting with a similar type of circuit but utilising a capacitor. The specimen would be placed between the two plates of this capacitor, the heating effect being centred within the specimen material. Mr Fertel warned me not to put my fingers between the plates while the power was on. He explained that heating took place from the centre and heat was conducted outwards. By the time the nerves near the skin surface felt the heat, and the pain, the damage within would be great. This he illustrated by putting a piece of wood in the gap. When it issued smoke we stopped the process and examined the wood. Externally it looked unchanged but when we sliced it apart the middle was a charred mass. I was very impressed and said, "Hey!

We could put a piece of bread in there and make inside-out toast. That would have people guessing!" With glee he said "Let's do it". We obtained a slice of bread and crouched to watch. A voice behind us said, "Lunchtime already?" Dr. Piper had entered unheard and his comment was typical of him. Geoffrey Fertel appeared quite embarrassed at being thus caught out and exclaimed, "It's this wretched man's fault. He has led me astray".

It was his practice to keep a small gas flame alive near his workbench and he would light this on arrival in the morning. He was out of the room once when Dr. Nabarro came seeking him. He asked, "Is Geoffrey about? Oh! I see he is. His shrine lamp is lit".

Mr. Fertel was a bachelor and had rooms close to the laboratory in Kingsdown. In his main room he installed fluorescent tube lighting, a new development of the time, and his window showed up among the other windows with its brilliant white light while the rest glowed feebly with 60 watt or 100 watt lamps. I was present in his lab. on one occasion when a colleague of his was bemoaning his own difficulties in finding a quiet place in which to study. Fertel's immediate response was, "I'm here most evenings. Use my room, it's there to be used". This practical generosity was part of his nature.

He went to Birmingham to assist in the construction of a cyclotron where an accident occurred and he was electrocuted. I had known him but a short time but was much saddened by his untimely death.

The Fertel Fund was established by his family with a sum of money being invested, the interest from which was to provide scholarships for postgraduate students to investigate phenomena in Particle Physics. This fund is operating today (1990) although inflated costs rarely allow it to support more than one student at a time; initially, there could have been two or three concurrent beneficiaries.

Dr. Thompson was much involved in the teaching and I was to make several items of equipment for the Stage II and Stage III teaching laboratories. Among such items I recall making parts for a wind-tunnel experiment and a Rayleigh's Disc experiment.

I had been attending classes at the Merchant Venturers' Technical College in Unity Street. This meant spending three evenings plus each Wednesday afternoon at lectures and laboratory classes with a view to obtaining Intermediate standard towards an external London degree. Although the teaching was patient I found the workload very tiring and quite demanding; I was not making the progress I had hoped for. It was pointed out to me that I would qualify for an FETS (Forces Education Training Scheme) grant as a result of my wartime service, which would enable me to become a full-time student at a University. In due course I applied to Bristol and was accepted and I obtained a grant to enable me to enrol for the 1948-49 session as a Physics Undergraduate. Having obtained exemption from London Matriculation in 1939 with my School Certificate examination I went through the Matriculation ceremony in the Great Hall, with the Vice-Chancellor, Sir Philip Morris, presiding.

The next year was not a completely happy one. Having worked for eight years I was what is nowadays termed a 'mature student'. I found it very difficult to adjust to the life and seemed unable to retain anything from the lectures. My examination marks were pathetic. It was with great relief that I accepted Dr. Piper's advice to abandon the project, although he said he was willing for me to have another stab at it, but didn't think it would be fruitful. He did, however, offer me my old job while I thought things over.

Ron Gattiker, the Cosmic Ray Group's photographer, had been attending certain lectures in the course I was taking and it was natural that we should be partners in the laboratory periods. A new man had joined the staff to help Mr. Venn and Denis White run the teaching laboratories; his name was Ken Goble. He persuaded a former railway colleague, one Stanley Edwards, to apply for a post as the student intake was increasing and laboratory periods were becoming more demanding. It was not long before Stan was looking after the Junior Laboratory with a young assistant, and Ken was looking after the Senior Laboratory with another assistant, Maurice Rundle. These men formed a most formidable team but, at this stage in my career, I had met only Ken Goble and then only through his stewardship while I was an undergraduate.

I resumed work in Dr. Thompson's group and was interested to note how the social life among the laboratory staff seemed to be improving. I believe this to have been very largely due to Ken's friendly, go-ahead attitude; he had made many contacts with like minds in other departments through the Employees' Association and he acted as an apostle to the cause, organising events and increasing people's awareness of the UBEA. We formed a friendship which I was very pleased to be able to resume a couple of years later.

He, too, thought highly of Mrs. Greed and I remember his saying to me one day, "You know, Kev, she's quite remarkable. I was chatting with her a week ago and she was telling me some story when we were interrupted and she had to break off. I left to go back to the lab and didn't bump into her for several days. When we met again she said, 'As I was saying.....' and carried on that very story from where she left off!"

He it was who organised a parting gift for me when I went to London, an electric alarm clock, "To scupper your excuses when you're late!", and, on my return, expressed a hope that it was still in good condition in case I felt like handing it back!

I had become engaged to Eleanor and had, therefore, to give much consideration to our future and my being able to support a wife. David Tanfield, who, with Dr. Thompson, had influenced me to make my initial move to Bristol, had gone to St. Mary's Hospital Medical School, Paddington, as Head of the Physics Department. He knew of my varied fortunes and wrote to offer me a post as a technician. This, from both a titular and a financial consideration, was a step in the right direction for me and, feeling like a latter-day Dick Whittington, I set off for London to seek my fortune in December, 1949, remaining there until July, 1951.

During my stay there I was visited on several occasions by Mr. Venn who would come to London to attend such events as the Physical Society exhibition. We would have a meal and visit the Metropolitan Theatre in Edgeware Road to see a variety

show. During these visits he would keep me up to date with the changes at the laboratory, in particular, on matters of salary and structure.

Great changes were taking place nationwide regarding laboratory staffs. Hitherto, salaries and conditions had varied considerably between individual universities and this was resulting, as it had in my own case, in people changing locations for improved pay and status, but performing similar work. After prolonged negotiations among themselves the majority of British universities, with the exception of Oxford and Cambridge, adopted a common salary scale and the title 'Laboratory Assistant' became 'Laboratory Technician'. London had already been using the title 'Technician' and I was aware, while at St. Mary's, of local and national negotiations.

Chapter 3

July 1951 - July 1956

Working in London had not been very much to my liking. The job itself was varied and interesting, the only drawback was my being employed by two departments, Physics and Physiology. While the Physics work provided the greater variety my services to the Physiology department were almost entirely in the electronics field, making amplifiers, measuring instruments and nerve stimulators. I received credits for some of these in published papers.

However, trying to apportion equal times to each department was unsatisfactory. I could reach a critical stage on one project only to have to shelve it and work on another, then shelve that and return to the previous work with an understandable loss of continuity.

"No man can serve two masters: for either he will hate the one and love the other...etc" (Matthew 6, 24) I neither hated one nor loved the other but the situation, coupled with the housing problems in the London area, made me yearn for the West Country.

Links with Bristol had been maintained socially, since my fiancée, Eleanor, lived in Bristol, and professionally, as John Burrow had been producing some special glass equipment for us to use in St. Mary's and I used to visit the laboratory in regard to this job. Eventually I collected the pieces in a cotton-wool filled suitcase, took it back to Paddington and, employing glassworking skills I had learned in one of the London Polytechnics, assembled it all into an apparatus for measuring radio-activity levels in a fluid system.

During these visits I learned that my previous position with Dr. Thompson's research group was still vacant. The upshot was that in July, 1951, I left London and, very thankfully, came back to work in Bristol.

I recall some of the informal interview with Dr. Thompson when I decided to re-apply for the post. After the details had been covered regarding salary, grade and

conditions of employment I asked if I could regard the post as permanent. I was told, yes, as long as I didn't rape the secretaries in the corridor, nor run off with the petty cash and, as I'd seen the secretaries, they'd tell Mr. Venn to keep an eye on the till! While this was hardly flattering to any of the parties concerned, I was well pleased.

My employment started on July 16th, 1951. The Festival of Britain exhibitions were being held that year and Bristol University was well represented on Durdham Down. Professor Powell had recently thrown a grand party at the Berkeley Cafe for the whole department to celebrate his award of the 1950 Nobel Prize. I arrived a few weeks too late for this but by all accounts it was a huge success with one or two looking on the wine when it was red.

The day I arrived in the department was not without incident. I knew Ken Goble from 1948 and had been introduced to Maurice Rundle during one of my visits from London. Stan Edwards I met that morning.

It appeared that the hot-water tap in the room would only supply a trickle. Mr. Venn asked Stan to go along with a wrench and ease the stopcock below the sink. He applied the wrench and turned. It made little difference so he turned yet again, thereupon the top of the stopcock shot off, hot water issuing with all the vigour provided by a 500 gallon header tank up on the roof. Stan shoved his thumb over the barrel of the stopcock, catching most, but not all, of the resulting spray with his person, the rest soaking everything and everybody in sight, while he called frantically for a bung. While this was being sought the maintenance plumbers were sent for. The bung arrived first and was inserted. The flow ceased and Stan rocked back on his heels to show us his scalded thumb. Before we could offer suitable words of sympathy three things happened. One: the bung shot out and the soaking of Stan was completed, two: Dr. Thompson entered to utter the words, "When the cat's away the mice will play"; three: Dr. Piper looked in to enquire "Are you celebrating Tindall's return?".

When order was restored Stan was sent home to change his clothes and be greeted by Margaret, his wife, who said she hadn't realised it was raining.

Before I left in 1948 John Priest had designed, and he and I had built, two sine-wave oscillators for use in the teaching laboratories. My first task now was to recalibrate these same two oscillators. It was almost as though I hadn't been away.

The next two years I spent as a research technician with Dr. Thompson and his postgraduates in the Metals Group. The title of Laboratory Assistant had been superseded by that of Technician throughout British universities while I had been in London although the work content had then altered little. There were four post-graduates in the group when I joined; Jack Rider, Michael Jorro, Joe Cuttress and Nick Wadsworth. Later, Margaret Hingley joined the group.

Margaret Hingley and her laboratory partner, Rosemary Brown, were the only Third Year female students during the Academic Year of 1946-47. Rosemary Brown did post graduate work in the Cosmic Ray Group, led by Professor Powell, and married Peter Fowler who continued work in this field at Bristol as a Royal Society

Professor. Margaret was a quiet, retiring girl when she first entered the Metals Group, in fact, Dr. Thompson was wont to observe, "If a door opens and no-one comes in, it's Margaret". Exposure to the boisterous spirits of the rest of the group had a positive result and she was soon able to hold her own among them.

If I remember correctly, the main lines of research concerned creep and yield in metals. The workshop produced metal specimens of the required shapes which were put into various jigs and subjected to cyclic stresses and strains, some at very slow oscillations, some at very high oscillations. The various experimental equipment was designed by the students and built by the joint efforts of the students, the workshop and myself. The high frequency oscillations were produced by a powerful oscillator feeding a form of oversized loud-speaker unit to which one end of the specimen was attached, the other end being held in a solid anchor. This operated at about one kilocycle (kilohertz) and produced a horrendous noise. To minimise the aural disturbance this apparatus was housed in a steel-framed asbestos-clad hut situated on what was then a flat roof extension to the rear of the building at first floor level. The entire sound section was covered by an insulating muffle.

David Bate joined the group as a technician soon after I arrived and he was the neatest layout and wiring operator I ever met. He married a girl from the Cosmic Ray group and later moved to Westinghouse laboratories near Gloucester.

This group was an extremely happy one and we mixed socially as well as professionally. Frequently, lunchtimes would be spent at the Kingsdown swimming pool, or on the courts at Woodland Lodge.

In 1952 Eleanor and I were married and I endured some pulling of my leg on two specific counts. The first arose from our choice of wedding day, June 21st, as this was the shortest night of the year. Much suggestive play was made on this fact. The second arose when, on emptying my pockets at the honeymoon hotel, I discovered that I had with me the department's masonry drill, its only masonry drill, which I had borrowed the day before for a last minute job in our flat. I felt obliged to return this, lest it be needed, by post from Falmouth. Their imaginations ran riot with ignoble thoughts!

Socially, I believe that the department was at its peak in those early years. Cricket matches were held at Coombe Dingle between teams of technicians, academics, postgrads, undergrads and workshops. Skittle matches and evening outings were frequent, parties and concerts were held but more about these activities will be mentioned elsewhere.

Events during the summer of 1953 were to effect a very great change in my life.

Mr. Venn's assistant was Denis White who was also the general photographer to the department. He announced that he wished to transfer to the Department of Pathology and become Professor Hewer's photographer at Canynge Hall. This caused a turmoil; firstly, because he would have to be replaced; secondly, because it was unheard of for members of the technical staff to transfer to other departments. To leave and take other employment was quite normal, but actually to transfer to a better

position within the University and to carry out similar work was not considered the done thing. Murmurs of 'poaching' were heard and the Establishment reacted in outrage and alarm. However, the outcome was that Denis did transfer, although not before much heart-searching among the Academic and Administrative staffs, when it was grudgingly conceded that this action might, after all, be considered reasonable under the circumstances, but ought not to be encouraged. In much later years it was to become the practice for all vacancies to be advertised internally as well as nationally.

I had just returned from my summer holiday when Dr. Thompson called me in and said, "You have a camera, how would you like to cope with the departmental photography?" Photographic equipment in the laboratory was almost non-existent: what did exist was mostly home-made so the possession of a suitable plate-camera was an essential qualification for the job. I assumed that this work would be interspersed with my duties with the Metals group, done as and when possible, but I agreed to give it a trial. Then, almost as an afterthought, Dr. Thompson said, "You might care to give Venn a hand in the theatres, as well". To use current transatlantic vernacular, this was a whole new ball-game. It meant joining Mr. Venn full-time as his assistant, leaving the research side altogether. This was a lateral move involving no change of grade and I looked to the future with interest, so I moved into Mr. Venn's room and entered upon my new duties. There was only one minus factor and this was provided by Ken Goble and Maurice Rundle. In grade, roughly my peers, and but a few years senior in age, they delighted in sending anyone seeking me to the Preparation Room with instructions to "Ask for Mr. Venn's boy!" I was then thirty-one years old!

When working in St. Mary's Hospital Medical School my range of duties had included the teaching laboratory and the lecture theatre. There the teaching had been up to 1st MB only; consequently, when Mr. Venn took me on a tour of the Preparation Room store cupboards, which occupied four half-floors, and showed me the apparatus contained therein, my level of confidence dropped abruptly. "Good grief!" I exclaimed, "I'll never cope with this lot!" "It's not that bad" he replied, "We only have four or five out at a time".

The photographic side of my work gave me no worries and is described elsewhere. There was much to learn regarding special techniques and I found the work interesting and absorbing. The lecture demonstration work, which would start in October with the beginning of the new session, was another matter. I used to offer prayers that Mr. Venn would continue to be fit, able and active at least until I had learned the names of some of the popular demonstrations, even if I wasn't able to set them out with suitable aplomb.

He began my tuition by showing me how to clean a blackboard - properly! This might sound the most menial of tasks but, as with most tasks, there was a right way of performing it. All the blackboards in the building, in the lecture theatres and in the classrooms on the third floor, had been installed before the department was opened in 1927 and were very heavy. The centre units were on sash fittings to be pushed one above the other during teaching. The side boards were smaller and fixed to the walls. The centre units were gradually taken down and replaced with roller boards, more

than doubling the writing area. Most of the remaining side boards are those installed before 1927.

Each new session was to start with freshly cleaned and, if necessary, repainted writing surfaces. This entailed giving each surface a thorough washing with soapy water, a careful rinsing and drying, then working the surfaces overall with a fine dusting of white chalk, evenly rubbed in to provide a 'tooth'. To complete this task satisfactorily throughout the whole building took about two days; after this they were expected to remain trouble-free until the next summer.

In the Main Theatre there was a long boat-hook and, in both Main and Senior Theatres there was a short boat-hook, about two feet long. I realised the long boat-hook was necessary to open and close the upper windows but the short boat-hooks were a mystery. I asked Mr. Venn if they had been broken off larger ones so he explained that he and Dr. Potter, both being of short stature, couldn't reach the handles of the upper boards if they were pushed right up. It was obvious, then, and I wasn't ashamed to use them myself on occasions.

So, now the boards were ready for the new session, having required a little skill, a fair amount of chalk for 'rubbing-in' and a great deal of patient application. Without the final 'rubbing-in' any message chalked on a virgin board will remain as a visible ghost image for several weeks.

It was held to be important that the boards should be clean and ready for use by any incoming lecturer. In those early days the lecture load was lighter, there being usually a whole hour between lectures which would be used in setting out apparatus and cleaning boards. Soon these empty periods began to be filled leaving a nominal ten minutes between the end of a lecture and the start of the next, in which time we would have to move pretty smartly to complete the tasks. On some occasions I would be working away in the darkroom blissfully ignorant of the passage of time. Mr. Venn, having been faced with two sets of boards to clean, would not be pleased and would communicate his displeasure to me.

For many years, after he retired, my little team and I managed to maintain the tradition of clean boards for each lecture. The two theatres became four, the writing areas quadrupled with new roller systems, until it became impossible to manage with concurrent use of all theatres. A Staff Meeting in the late 70's decided that we should ensure that the rooms were ready for the first lecture of the day, then outgoing lecturers would clean the boards ready for the incoming lecturer. Like all socially acceptable schemes it worked part of the time for some of the people. All was not lost, however, for increasing use began to be made of overhead projectors and prepared sheets, and soon we had one in each theatre and seminar room.

Until the lecture programme began the demonstration equipment remained in the cupboards but I was encouraged to keep looking at it so as to be able to identify where pieces relating to the various topics were kept. Physics was then taught first at Intermediate level to include not only the aspiring Physicist but also Medics, Dentists, Domestic Science students and others. This particular course was eventually dropped in favour of post-A level admissions although 1st MB teaching continues at this level

to this day. It used to be referred to by the low-minded in an abbreviated form and my colleagues might enquire "Intercourse today, Kev?" Remarks like this were almost ritual; so were some of the replies!

Many of the elementary demonstrations were familiar to me and I began to overcome my initial awe and my feeling of abysmal ignorance. Quickly the sheer fascination of the apparatus began to exert upon me a great enthusiasm for the work. I admired the flair and expertise of my mentor, Mr. Venn, and delighted in sharing the reflected glory when the more spectacular demonstrations were presented. Venn was a master of his craft and his ability to conjure success from an electrostatics demonstration under appalling conditions of humidity was something at which to marvel. He was due to retire in 1956 which gave me less than three years in which to try to become competent in this aspect of his work. It entailed very close observation of his methods, precise yet plentiful note-taking, and as complete an understanding of the function and purpose of the equipment as I could achieve.

During these remaining three years I was to experience life in the theatres to the full. I learned to cope with the meetings of Learned Bodies, of Society meetings both internal and visiting, Extra-Mural courses and lectures, the first of two meetings of the British Association for the Advancement of Science and to recognise and deal with the quirks of individual lecturers. Added to these were special duties in connection with the operation of examinations, revising, rebuilding and originating demonstration equipment, the care of the building, the welfare of its inhabitants and the provision of such services as were required.

Eventually, this was to be the pattern for the rest of my time of University service with duties expanding with the physical and numerical growth of the department.

Chapter 4

1956 - 1987

No successor to Mr. Venn had been designated before he retired and no appointment to the post of Laboratory Superintendent was announced after he left. This was somewhat unsettling for me for, although I didn't rate my own chances very highly as I was only about halfway up the Technician grades and with a couple of years to go before I could hope for Senior Technician grade, let alone Chief Technician, I expected someone to occupy that top position. I heard vague rumours that one or two senior men had been asked if they would like to take it on but had declined, being happily situated in the work they were doing. I suspect a policy I had heard Dr. Thompson once describe as "masterly inactivity" was being followed and, provided that the department continued to function as before, no decisions would be made - yet!

Initially, only two minor extra duties fell to me; those of looking after the petty cash account and of collecting and distributing wages on a Thursday afternoon. In those days every member of the laboratory staff was paid weekly in cash. I continued

to manage the lecture demonstrations and to maintain, with Alan Birt, the photographic service to the department. Gradually, other duties came my way, in particular, dealings with other departments and outside bodies who wished to use our premises and facilities. This involved formal correspondence to which I could sign my name only but with no official title. Letters came to me addressed to "The Caretaker", or "The Theatre Manager", even "The Technician-in-Charge", which last honour I could not honestly claim. I described my problems to Professor Pryce saying that I felt I was, mathematically, a point, having position but no magnitude. He accepted my worries and called upon Professor Powell who was serving on the Laboratory Assistants Committee. After the committee meeting in March, 1957, Professor Powell said to me, "Look! Would you be happy with the title of Laboratory Steward? It seems to be the most suitable thing we can call you". I said that would be perfectly acceptable and, in April, 1957, a letter from Mr. Butterfield, the Registrar, accorded me the title of Laboratory Steward in the Department of Physics. In February, 1958, I was promoted to Senior Technician. The title of Laboratory Superintendent soon appeared against my name in the telephone directory, and people accepted this, but it wasn't until somewhere around 1970 that Professor Chambers told me I could regard it as official. He said he didn't know how it had been overlooked for so long.

The current grading system began with the Junior Technicians who could expect to become Technicians 'B' in their early twenties. The Technician scale was a long one running through the grades of Technician 'B' and Technician 'A' with a possible pause, even a halt, at the top of the 'B' scale where there was an 'efficiency bar'. Qualifications and experience were taken into account throughout but it was felt, perhaps wrongly, that the bar was a useful device for holding the slightly less worthy aspirants for a year or so to allow others to benefit from the available allotment of funds for promotion. There would normally be a pause at the top of the Technician 'A' scale as entry to the Senior and Chief scales was governed by the total number of technician posts within a Faculty, the top two grades containing a fixed percentage of the whole.

Thus, in 1958 I began mounting the Senior Technician ladder; my name and title of Steward appeared in the internal telephone directory and life went on. Michael Smith, Staff Tutor in Physics to the Department of Extra-Mural Studies had been on the scene for a couple of years by then and was using the resources of the Physics department for many of his evening classes. Michael was what I termed a practical lecturer - he made much use of demonstrations and it was my pleasure to assist him on many occasions. Some of his 'pupils' were regular patrons and would even attend the same course in consecutive years, so the interest shown was a credit to him. It was not unusual for someone to ask if we would be showing such-and-such a demonstration because they had liked it last year! I have good reason to remember in particular one of his lectures in November, 1956. My wife, Eleanor, was in Southmead Hospital having been delivered of Mark, our firstborn, and I received a telephone message at lunchtime to say she could come home that day. Michael came in just as I was about to arrange a taxi to collect them to say he wanted a certain demonstration for that evening. I explained my predicament saying I wasn't sure what time I could be back. Immediately, he offered to drive me to Southmead and take us all to my home, if that would help. This he did and, on our way back, driving through

Henleaze, we passed Jean, his wife, out shopping with one of their offspring in a pram. Mildly surprised, she waved, he waved back and then she noticed the woman in the back of his car holding a baby. In the few seconds it took us to pass her I was able to observe her startled expression, then we were gone. Eleanor and Mark were settled at home and I returned to the lab with Michael to set his demonstrations. He had to explain matters to his wife when he returned home in the evening and I was then able to go home and drool over the new arrival.

As is mentioned elsewhere, the scales and career structure had been established around 1949/50 and were common to most Universities. The main bone of contention lay in salary levels. Universities seem always to pay less than industrial concerns for similar services and habitually ignore outside increases until pressed to take notice by their employees. Long drawn out negotiations take place which, even when agreement is reached, are rarely satisfactory since industry will have moved on a stage and the Universities, once again, lag behind. On one occasion the matter was referred to arbitration with a result that surprised many, not least the University Authorities throughout the country. Parity with industry was among the considerations and, in consequence, a general rise in salaries of around 27% was awarded. Other changes over the years reduced the working week so as to require one Saturday in two, later to abolish Saturday morning work entirely. For a university this was not easy to achieve since the teaching programme included lectures up until one o'clock on a Saturday. When Saturday lecturing was dropped about six Physics lectures had to be re-scheduled into an already intensive week.

There had always been a distinction between the academic and non-academic staffs. Each had its own world but these overlapped in many ways and there was not a severe 'them and us' situation in the early post-war days. An incident soon after the alternate Saturday working system began was to make me aware that a distinction certainly did exist and was becoming noticeable.

It happened on a weekend when I was enjoying my free Saturday that the person who should have been manning the stores failed to turn up for work. On the Monday morning I was called to account for this but, not having been aware of the situation, I had no answer. I was told to see that it shouldn't occur again as, "a member of the academic staff was unable to get something from the stores!" My inward and very private comment was, "Big deal!", but, the responsibility, apparently, lay with me although I had no recognised seniority at that time.

Because of the way in which the Physics department operated, with technicians forming part of a given research group, relationships within groups were not seriously influenced by such differences. A loyalty to a small team was maintained but, on the overall scale, morale was affected and the 'them and us' syndrome made itself felt. Looking back over the years has caused me to regard the difference to be likened to a ditch flowing through time. For much of this it has been a narrow ditch such that one could step over without strain. On occasions it has widened so that a determined leap was required to test the ground on the other side, a leap that could be made in either direction. Under major conditions of disagreement, such as arose when the Common Grading Scheme was introduced, this ditch, fed by tributaries of dissatisfaction, swelled to a wide pool, the depth of whose waters even were unknown. The results

have been cumulative and morale has dropped, affecting, most noticeably, the social side of the department. People would not mix.

The introduction of the Common Grading Scheme, with the 'Blue Book' as its bible, was, in my personal opinion, an initial disaster. Only a few people were satisfied with their new grades, appeals against given grades were many and took months, even years, to be resolved. Promotion prospects almost vanished and ability and skills seemed to count for very little. I saw colleagues whose talents I rated at least on a par with my own given lower grades because they had fewer technicians in their departments. Grading policy was known to vary between individual universities and this was a further irritant. Stubbornly, the scheme was adhered to, and I remember talking about the problems once with Professor Ziman when he said, "Well, we're stuck with it now". I challenged this statement saying that if he had set a postgrad on a line of research and, after a short time, this was found to be unprofitable and time-wasting, would he tell the man to continue nevertheless, or would he pull him back and set him off on a better road? There seemed to be no answer and grading and promotions remain a grave problem.

It must be recorded that Professor Ziman's response on one occasion of disagreement and dispute served to raise technician morale, briefly, at a time when it was very low indeed within the department. Our departmental ASTMS representatives called a meeting of Physics technicians to discuss the difficulty, as they saw it, of making our own academic staff aware of our financial problems. I was asked, as Chief Technician, to approach Professor Ziman and explain how we felt. His response was to arrange a meeting between the technical staff and the academic staff, whom he commanded to attend, so that the matter could be put before them. This took place and I was able to indicate, using un-named examples, by what percentage there was a shortfall between the incomes of people in various grades and their basic expenditure. Holidays, hobbies and other interests were kept outside the considerations and I, for one, was surprised at how many of my colleagues were working at extra jobs in the evenings and at weekends to help with their home expenses, many of them at jobs I thought unsuited to their abilities. At the end of the meeting we were pleased and a greater sympathy and understanding of the plight of many was achieved. This meeting had done more good than merely to influence our own academic colleagues; it was taken up and reported by the Institute of Physics.

However, let us not linger on the blacker aspects of life; there were many occasions, small and large, which have provided a fillip of extra interest and diversion over the years. It was during a small tea party on the lawn in 1952, the reason for which has escaped me, that Professor Mott and Dr. Potter were noticed to be standing, one at each side of an outward angle of Royal Fort House. Jack Rider, then one of the postgrads in the Metals Group, said to me, "Quick! Take a photograph of those two!" I did my candid camera work and made Jack an enlargement. He claimed they looked just like a bookie and his runner and the picture appeared on the main notice board captioned, "Place your bets with Mott and Pott; they will win you quite a lot!"

In 1962 the Electricity Authority decided to bring the University and much of Bristol into line with most of the country and the mains electricity voltage was raised

from 210 volts to 240 volts, single phase, and from 365 volts to 415 volts, 3-phase. This meant that almost all our equipment which had no supply adjustment itself had to be modified or replaced. The lift motor had to be taken away to be rewound, and it was a relatively new motor. Until a couple of years before this the University lifts were supplied with 500 volts DC from the old tramways power station which had continued to supply DC to its customers long after the last tram had run. Gradually, other consumers modernised their systems until the University was one of the few remaining users, and the old power station was to close. We were without a lift for about a week while the new motor and control gear was installed. Those of us on the lower floors did our best to appear sympathetic towards those on the upper floors, but it was hard to keep up such false behaviour.

Mr. David Gibbs evolved a lecture of general interest on "The Physics of Musical Instruments". This contained a wealth of demonstrations illustrating properties of a wide range of musical instruments and we took this to many locations in the West Country, from Cheltenham down to Redruth in Cornwall. One extended tour took us, for I was his assistant in these ventures, to Exeter, then to Torquay and finishing at Plymouth. A spin-off for me, apart from the general experience, was an appreciation of the value of assistance from the technician on the spot. I was accustomed to visiting lecturers to the department thanking us for looking after them but often felt they might have been making a song over nothing. On this trip I was on the other side of the fence. At Exeter our host, himself a senior lecturer, helped with the portage of our equipment; after a while he sought out a technician who set up a projector, then departed. At the start of the lecture he was brought back and sat by the projector, to my mind, in a trance. Certainly Mr. Gibbs' call for the first slide produced no action and I found myself signalling to him from the stage to wake up. Almost the same thing happened at Torquay but, this time, the technician was, seemingly, dragged in by the collar to sit by a projector, the purpose of which was a mystery to him. By the time we reached Plymouth I had given up all hope of useful assistance being forthcoming and was agreeably surprised that we were met at the door of the Technical College by their Chief Technician, made welcome and helped in with the equipment. He introduced us to a colleague named, if I remember correctly, and I think I do, Mr. Popplestone. "Pop, " he said, "will look after your needs". We had only one little problem, our mains plug didn't fit their socket. This "Pop" put right in a few minutes and he also projected our few slides without a hitch. As we were clearing up after the lecture I found myself thanking him effusively for his assistance, realising as I did so that this was what the visiting lecturers had been doing to me - and why!

During a visit to Bristol by HMS "Hecate", a Royal Navy survey vessel, a message was received that a couple of her officers wished to call to take a gravity reading. The Laboratory contained a nominated gravity marker in the national survey system and the actual measuring point was then in the large basement room which had originally held Dr. Jackson's low temperature apparatus. It had been used in recent years as a processing room for the Cosmic Ray group's thick emulsions and housed also a silver reclamation plant. It had become a Cinderella of a room since no care had been taken of it and the equipment seemed to have been abandoned. On several occasions, when escorting visitors, I have been conscious of the poor state of decoration in various

places but this was to be the only time when I felt real shame regarding the appalling conditions.

Two officers, a Commander and a Lieutenant-Commander, arrived at the department with their gravity meter and I showed them down to the hell-hole. Their discreetly raised eyebrows heightened my embarrassment and I could only comment, "I'm sorry, Gentlemen. This might not be ship-shape but I'm afraid it is Bristol fashion". They were able to take their readings without any trouble but the location needed to be more conveniently situated in the future and the official gravity point is now in the Ground Floor room in the South-east corner of the building, and at the bottom of the drop-shaft.

Dogs have featured on a couple of occasions to provide unexpected diversions. When Dan Scully was Head Porter he lived in the house adjoining Rupert's Gate which opens on to the lane between the Mathematics building and the Childrens' Hospital. He had a large dog, a Labrador, I believe, which would often roam the grounds. One Saturday lunchtime Bob Fletcher had the bonnet of his car raised and was bending over making some adjustment to the engine. Professor Pryce emerged from the building to be greeted with the sight of Bob bending over his car while Dan's dog was demonstrating to Bob his procreative ambitions. A delightful tableau which we could only appreciate second-hand when Bob indignantly related his experience to us on the Monday morning. Maurice Rundle, of course, suggested he ought, at least, offer Professor Pryce choice of the litter.

Some years later, I entered the building from Tyndall Avenue to find the main hallway deserted and with the porter, Bill Meason, and his associates in the lodge with their faces pressed against the window. I hadn't noticed a large Alsatian dog which was wandering distractedly about the hall. It was very docile and came to me quite happily so, as it had no collar, I had to telephone to Redland Police Station and ask for a dog handler to come and remove it. While we were waiting I gave it some water, then it began to sniff hopefully at the door frames so I decided to walk it outside. I fashioned a leash from a length of rope, about twenty feet long as I didn't want to cut the rope, and we set off to walk round the outside of the building. The dog enjoyed this and was rather lively. We were crossing the green in front of Royal Fort House, the dog twenty feet ahead while I adopted the pose of an anchor man in a losing tug-of-war team, when the Vice-Chancellor, Sir Alec Merrison, appeared on his way to Senate House. I fully expected him to say something like, "Tindall! Just what the devil do you think you're playing at?" But no, he smiled, said "Good morning, Kevin" and went his way. He saw nothing unusual in my strange behaviour, which worried me.

1977 saw the Golden Jubilee of the H.H.Wills Physics Laboratory. Professor Thompson co-ordinated all the arrangements which culminated in a day of celebration on July 11th. As was fitting, the events were centred in the original building with reminiscent talks given in the main lecture theatre by Professor Sir Nevill Mott; Professor Maurice Pryce; Professor Sir Charles Frank; Professor Peter Fowler; Professor Andrew Keller, and Professor John Ziman. Sir Nevill Mott traced the development of the department with amusing sidelights, paying tribute to the tremendous contributions of Professor Tyndall. Professor Pryce stressed that he had

come to take over a going concern and he contrasted the difference between the philosophies of Oxford and Bristol, particularly where personified by Sir Philip Morris's attitude and enthusiasm. One point he made concerned the importance of having a happy workshop saying that research workers had to depend so much on workshop services. I listened carefully, hoping some reference would be made to the rest of the technical support staff, but we weren't mentioned.

Before introducing Sir Charles Frank, Professor Ziman referred to the late Professor Powell who had, naturally, received much mention by the previous speakers in their retrospective story of the department. Professor Powell had, in 1963, paid tribute to Professor Arthur Tyndall in a short address to a meeting of the South West Institute of Physics and an excerpt from the recording of this event was played to the audience.

Sir Charles traced the later development of the research programmes in the department describing its growth to the present day, and Professor Peter Fowler spoke of the advances in Particle Physics and the experiments with high altitude balloons.

After an interval for tea, which was provided by the Royal Fort Wives, the speeches continued with the theme, "Looking Forward". Professor Keller spoke on the future of Polymer Research within the laboratory stressing the impossibility of accurate prediction in a science, but he outlined several possible lines of research. Professor Ziman remarked that success depends on good environment, both inside and outside the department, and he hoped that we should look ahead to providing scope for the best people in the next fifty years, not only among the academic and research staff, but also in the calibre of technical support so that all could play a significant part in the future, stressing egalitarianism rather than bureaucracy.

Sir Alec Merrison, in his closing address, thanked everyone who had contributed in any way and hoped that a similar celebration might take place, not in a further fifty years but, perhaps, on the occasion of the Laboratory's Diamond Jubilee. There are two possible periods qualifying as Diamond Jubilees; sixty years, in which case it should have been celebrated in 1987 - and it wasn't, or seventy-five years which will enable some to look forward to the year 2002! The celebration was further marked by a BBC radio item on July 20th, 1977, entitled "The Balloon Goes Up - 50 years at the Royal Fort".

Many events took place in the next ten years including two or three 'Open Days' when lectures and displays were put on to convince the public that we were real people. The most popular public lecture of my experience was given as a Paul Esser Memorial Lecture by Dr. David Bellamy. The theatre, with a known maximum capacity of 340 places, including extra chairs, must have had 400 crammed in before we could shut the doors against an estimated 200 who could not be admitted.

In 1986 The British Association held its annual meeting in Bristol and the University was its venue. The organisation that went into this was enormous; every major department was involved. I had been involved, in a very junior capacity, in the arrangements for the previous meeting at Bristol in 1955 so I had some inkling of the effort that would be required. The major events to take place in the Physics

department were being sponsored and master-minded by Philips, the Electrical and Electronic Company. During the run-up to the meeting a party of senior executives and their staffs visited the department to finalise arrangements. After a preliminary view of the locations they held a company meeting in Senate House which they requested I should attend as the representative of the University as far as their Physics use would be concerned. I was there as an observer and to answer to queries and requests for services. This meeting was an eye-opener for me; the business was conducted swiftly and as each item was concluded someone was deputed, instructed would be a better word, to "see to it!" I found myself saying "Yes" equally briskly, even to pledging the Bursar's department to supplying a hefty power line to the marquee to be erected on the lawn. The meeting wanted an answer, and wanted it now. Although the business method might not be acceptable within University committees, by crikey, it would speed things up!

A very great bonus resulted from the BA meeting; The upholstery in the old main theatre was in a sorry state of repair and this was replaced and certain decorating carried out to restore the theatre to a state of glory. This gave me great pleasure to see as I have always held a certain affection towards this fine room and I was tempted to cry, "Nunc Dimittis!", but not very loudly in case someone up there was listening and I didn't want to go just yet. The old Senior Theatre, G.12, had been re-seated a year or so previously, but only after I had persuaded Bruce Matthews, who had said he could afford only to re-upholster one row, to come over and decide which row he would prefer. After inspection, he said, glumly, "I suppose we'll have to do the lot".

The week of events which began on September 1st was a period of very hectic activity and I was proud of my lads and the way in which they coped. I have a copy of a book "Bristol and its Adjoining Counties" which was published to mark the BA meeting of 1955. The only memento of the 1986 meeting is a copy of a circular from Dr. Bob Evans thanking everyone concerned and threatening, "If, in 30 years time, the BAAS returns to Bristol, we will wheel out Kevin Tindall to organise matters". How nice!

As the Spring term started in January, 1987, I assumed it would be all downhill travel to my retirement in the coming July. I was wrong: there was plenty to keep me busy including well-wishers who would greet me, "Ha, ha, Kevin, it won't be long before they drag you off, screaming!" Then they would become grave of aspect and advise me, "Whatever you do, don't let yourself get bored!" Much as I knew I'd miss the place, I was quite resigned and content with the future and I knew I'd never get bored. Nor have I.

The great event of the year, for me, was highly personal, when I was awarded the Honorary Degree of Master of Science. By no means was I the first to be so honoured nor, I hope, will I be the last. I had attended several congregations to witness colleagues and friends receive their degrees and was, at last, able to understand a little of their joy, pride and immense pleasure it occasioned.

One last duty I reserved for myself in the July was that of coping with the secondary arrangements for a conference to mark forty years of Particle Physics at the

Fort. Many of the delegates were people I had met during the early years and it was really more of a re-union than a conference.

I left my keys with Derek Flower and departed on July 31st after a most enjoyable farewell party. Eleanor, who had been a part-time tracer for the last eleven years, resigned and left with me. She said she didn't fancy trudging in daily while I lolled about in happy retirement at home. Contact with the department has been maintained; I attend the Christmas Parties and retirement parties of my younger colleagues, and in 1990 was invited to operate electricity demonstrations during a two-day event to attract more young women into Physics.

This account has been, so far, as chronological as I can make it. To include more within its shell would not be practical and succeeding chapters deal with other topics and considerations under their own headings.

Chapter 5

Heads of the Physics Department 1946 - 1987

All the Heads of Department have been men eminent in their particular fields charged with the administration of a large and important Laboratory. In this latter respect some have, inevitably, been regarded as more successful than others and their popularity has been varied. While such sentiments often filtered down to the laboratory staff they came from gossip and were mostly expressed by some academic colleagues connected more closely with higher policies and decisions. Individuals among us might, occasionally, have had cause for personal resentment but I believe these were very few. Conflicts there certainly were but these occurred in later years, mainly with regard to salaries and grading structure, and these were important enough to be addressed not only to the Professor but to the University Administration as a whole. Such matters will be mentioned elsewhere. At times I had to 'take arms against a sea of troubles' on behalf of a few of my colleagues but never did animosity arise in these dealings.

In my particular situation I was responsible directly to the head of the department and owed, and accorded him, respect and loyalty. There is a dictum in the Services, "Salute the uniform, not the man". At no time had I ever to consider a distinction. If this appears to influence the following account then so be it. I make no apology.

Soon after I entered the service of the University in 1946 I was taken to meet Professor A.M. Tyndall, the Director of the Laboratory. He welcomed me most cordially to the world of Physics, spoke to me about my future prospects and expressed a curiosity concerning the similarity of our respective names. I knew little about my antecedents, other than my grandparents, but my maternal grandmother had always claimed some vague connection with William Tyndale who had translated the New Testament, the Pentateuch and the Book of Jonah into English, and who had been burnt at the stake as a heretic in 1536. If this were true, and I put no store upon it, then the coincidence whereby both sire and distaff past names should have the same root was shaded by a gap of some four hundred years. Later on Professor

Tyndall and I did compare notes but the faint hope that I might have turned out to be his uncle came to naught.

Apart from this personal aspect I had very little contact with him before he retired as administrative matters were not then my concern. I do remember that when I proposed to become an undergraduate he greeted me one day with, "I hear you're going to become one of us!" I have mentioned elsewhere his tolerance and sympathetic understanding when Mr. Gibbs and I "lost" the first few recording minutes of his farewell lecture to the student Physical Society.

After I began working with Mr. Venn I saw more of him for he would often drop in to Venn's room for a chat during his many visits to the laboratory. I was able to perform several photographic services for him, even going to his house to photograph his grand-children.

Although my knowledge of him is, necessarily, mostly second-hand I remember him as a very able and kindly man. I was told that, probably at a Christmas party, he and Venn gave a short demonstration lecture but with their normal roles reversed; Venn gave the lecture and Tyndall was his excitable assistant. Mr. Venn, of course, was the straight man and I wish that I could have seen them.

Soon after the new lecture theatre in Phase II of the extension, then named the Arthur Tyndall Lecture Theatre, was opened there was established a biennial Arthur Tyndall Memorial Lecture. I decided that the inaugural lecture should receive special treatment and I managed to borrow some pot plants and shrubs from the gardeners to decorate the foyer. Furthermore, I persuaded the Bursar to allow the portrait of Professor Tyndall to be borrowed from the Wills Memorial Building to hang also in the foyer. This was not easy but the effort was well worth while. I didn't want to scar the foyer wall with hooks as the portrait was only on loan so George Hitchings and I devised a suspension method by which the picture was apparently hung from the ceiling tiles. In fact, the weight was taken by the ceiling structure above the tiles. We fitted a small spotlight to illuminate it. All this received gratifying acclaim and I wrote to the Bursar suggesting, nay, pleading, that the portrait be allowed to remain hinting (based upon some secret information I had obtained) that the space it had vacated would probably be useful for a future portrait of some other worthy. My secret information had led me to understand that this problem did exist and that, dear reader, is how the portrait gallery in the foyer to G.42, now the Cecil Powell Lecture Theatre, began.

On Professor Tyndall's retirement in 1948 Professor Nevill Mott became the head of the department. From my situation, from 1951 onwards, he was at first just a figure I would see sometimes in the corridor who would respond politely to a "Good morning, Prof" without seeming to identify who had spoken. As he was not an experimental physicist I had no occasion, later, to arrange any theatre equipment for him and although he, like Professor Tyndall, would drop into Mr. Venn's room for a chat, I don't think he noticed me there nor did he think I had any particular function. This doesn't mean that he was completely out of touch with reality, far from it, he was probably operating on a higher plane.

Professor Mott had a certain reputation for absentmindedness. Probably this was deserved but so many were the stories supposedly illustrating this behaviour which circulated among the postgraduates of the day that only a very few could have had any basis in fact. I suspect he suffered this way as did the Rev. A.W. Spooner from all the apocryphal instances of a form of metathesis which have been attributed to him.

I can recall three occasions when his reactions gave weight to the opinion of him held by the lab. staff; that he was a very great man, a most gentle and kindly person, but he didn't really know about us. Mrs. Langdon, his secretary, told me of the first two and Maurice Rundle related the third.

We had a male cleaner and occasional porter named Bob Kibble. Bob sometimes delighted us with his malapropisms and slightly eccentric behaviour. He will surely figure elsewhere in these annals. One Thursday, having collected his wages, he was disturbed to notice a certain deduction made by the wages office. Bob's attitude was, when in doubt, go to the top. Accordingly, he presented himself to Mrs. Langdon saying he had to see the Professor urgently and, on being announced, marched up to the desk and said, "Professor Mott? I'm a pound short in my money". A startled Professor Mott looked up, somewhat puzzled, and said, "Oh dear. Do I know you?" Mrs. Langdon came to the rescue and directed Bob back to Mr. Venn.

In the early 50's Prof. required some slides to take to an overseas conference. As air luggage weight was then quite a consideration I went to see him to ask if he would prefer slides or a film strip. As different lectures would call for selected pictures he said he would like slides. With one batch I had cause to go down again to ask if fig.nos. or captions were to be included. On my third visit I delivered the finished slides and wished him a pleasant trip. I was walking along the corridor when Mrs. Langdon called me back and said, "You'll love this. He's just asked me 'Who is that nice young man?'"

For the staff Children's Party one year Maurice was to be Father Christmas. Myrtle, from the library, had produced a Father Christmas outfit and gave it to Maurice to try on. It was a good fit, apart from the hood and the beard, both of which were of generous measure. Peering under the lip of the hood and through the mass of cotton wool Maurice, being what he was, said, "Myrtle, have you ever been kissed by a man with a beard?" She uttered a cry of horror and fled from the room. Maurice followed her out with the hood down over his eyes and the beard frothing about his face, paused at the top of the stairs and called out, "Haven't you got a nice kiss for your old Daddy Claus?" He lifted the hood from his eyes and found himself face to face with Professor Mott. Prof. smiled upon him, said, "My! My! Father Christmas!" and continued on his way leaving a deflated Rundle clinging to the railings. Ken held over Maurice for some time the threat that he would tell Professor Mott who it was who had offered to kiss him on the stairs.

In retrospect I believe that I became better acquainted with Professor Mott after he left us in 1954. He was a moderately frequent visitor for conferences when I would, naturally, meet with him to discover his theatre needs. On one occasion when he was due to visit I received a message from his secretary the burden of which was that the

film he would bring should afterwards be sent somewhere else and, on no account, should he be allowed to return with it. The gist of this command reached me also via two other channels so when I met him I told him I'd been charged with retaining the film after the showing and that he should not take it away with him. He gave a wry chuckle and remarked, "I see that my reputation for absentmindedness has preceded me even here!" I merely smiled with him and forbore suggesting that it was here it had its genesis.

Much later he was to be the guest speaker at an Institute of Physics evening meeting in the department. I stayed for the meeting and learned that none of the current officers of the Institute who were to receive him had met him previously. I offered and was deputed to greet him as he arrived and to perform the necessary introductions. This I was delighted to do and was quite gratified that he recognised me as he entered the building. This small service I was able to repeat for the Institute under similar circumstances on the occasion of a visit by Sir Bernard Lovell. Age has some advantages!

Professor Mott left us in 1954 to go to Cambridge and his place was taken by Professor Maurice Pryce. From what I can recall the Chairs of the heads of the department seemed to oscillate, almost, between that endowed by Henry Overton Wills and that endowed by Melville Wills. If they did then it was truly of 'academic interest only' to the technical staff; we were more concerned with the attitude of the head of the department, not with his specific title.

Maurice Pryce was quite different from his predecessor in that he was, to us, more of a presence. He made himself known to us and, although regarded as probably a hard man, was a fair man and one to whom we could "talk straight". He took an active part in the lecture programme and I believe he was a good lecturer. He came out of the Main Theatre after one lecture looking rather harassed and I inquired, "Have you had a rough time, Prof?" He told me he had been lecturing to the 1st MB and said, "It's damn difficult, I've stopped thinking at that level". I reflected a moment and said, "I can understand that. I should find it very hard, for example, to teach a child to read". This exchange was nothing in itself but such incidents help one to appreciate another's problems and, added together, make a valuable contribution towards easier relationships. As far as I can remember he blotted his copybook with us on only one occasion and that was due to an unfortunate remark made, not seriously, but unwisely.

The report came to us immediately after his introductory talk to the new intake of Physics students in the Main Theatre. He gave the usual description of the functioning of the department, the lecture arrangements and the obligations on practical laboratory work. He introduced the staff present and, when he came to introduce Dr. Thompson, is reported to have said, "Beneath that rough exterior there beats a heart of stone". The reaction of my colleagues and myself was of shock and is summed up in Maurice Rundle's comment, "That was bloody unfair!" I think we realised that he had meant to leaven his more serious remarks with a little humour but damage was done. Mark Antony, in his eulogy over the body of Julius Caesar, said, "The evil that men do lives after them, the good...etc".

Cricket matches were popular and frequent during his time and he participated well. His house backed on to the sports field at Coombe Dingle and one match finished up with a mini garden-party at his home. We had no complaint with the support he gave us in our ventures which included, of course, the Christmas parties. By 1962 I had become quite familiar and confident with theatre demonstration work and Ken and I discussed the possibility of presenting a few of them for the enjoyment of the other technical staff. The idea found favour with us and we decided to arrange a Saturday afternoon when the technicians and their families could come to an 'Entertainment in Physics' in the Main Theatre followed by tea and cakes, laid on by Ken, in the teaching laboratory. This was to take place during, I think, the Easter vacation. We went ahead and Terry Gorman and I selected some of the more spectacular demonstrations. At the beginning of that week it dawned on me that I had omitted to inform the head of the department what was proposed. Forthwith I sought audience which, it must be recorded, was never a problem with any head of the department, and explained our proposal. Professor Pryce heard me out and said, "Good! And you'd like me to introduce it?" This favour had not occurred to me but I was delighted. Although willing, he was to be away that day but Mrs. Pryce and their son would like to attend and could I fit them in? We were pleased to see them and the afternoon was a great success. Prof asked me to welcome the guests in his name and to be sure that the demonstrations were presented in their own right and not as conjuring tricks, a view with which I was happy to concur.

Maurice Pryce left in 1964 to go to the University of Southern California. During his last years with us the planning for the Physics extensions was under way and I had been asked to give some thought to the requirements for the new lecture theatres, among other considerations. This enabled me to be of some service to him when, a year or so after he left, he wrote to me concerning the proposals for new theatres in Southern California and asked for suggestions. I was flattered and happy to oblige, writing almost a thesis on projection arrangements and, most important, communication lines and links between the group of theatres. I hoped it would be useful but I never heard how many, if any, of the suggestions I made were acted upon.

Apart from the hiccup mentioned earlier Professor Pryce was popular with us and we regarded him as a good Head.

For the next five years from 1964 to 1969 Professor Cecil Powell was the head of the department. He maintained his throne in his office on the fourth floor for a short time before coming down to occupy the Director's office and this made him slightly remote in our eyes. His group up in the heights had always seemed to us to be in a rather different world with its own internal structure and management and with only vague connections with the rest of the department. This attitude gave me some annoyance, particularly in later years when I held the title of Laboratory Superintendent. As such I felt that I should be kept aware of new appointments to the technical staff and on more than one occasion I was embarrassed by a telephone call from the Finance Office asking for details about a Mr. Somebody. I would have to say I'd never heard of him and would be told he'd joined the staff a few days ago to work in that group. When I went upstairs to challenge this behaviour I would be told, "Oh! We meant to come and tell you, but it doesn't matter, he's here now". I would explain, quite forcibly, that while they could choose their own appointees, common

procedure, let alone common courtesy, meant that I should be kept informed. For a while, after each incident, they would be meticulous, "Lest we rouse your wrath!", but it never lasted.

Cecil Powell, too, was a popular Head and, as mentioned elsewhere, was a good supporter of the social life and a keen cricketer having, in his youth, been considered for Kent. Even so, there were occasions when the feeling among us was that those above ought to be more familiar with the activities of those below. Periodically there were bursts of enthusiasm aimed at improving or re-vitalising some of the lecture demonstrations. This was not a bad thing at all; some of the demonstrations, while showing admirably the intended points, were archaic in appearance and I had rebuilt many to overcome the criticisms from the students. The slide library, too, was receiving attention but I wasn't able to dream up pictures and diagrams without some indication of what was needed. Professor Powell came out of the theatre after one lecture to tell me that the slides he wanted didn't exist and couldn't we do something about it? I remember saying, "Look, Prof., tell me what you need and we'll supply them". His own photographer, Ron Gattiker, was loaded down with group work, which Prof knew. He thought for a moment and said, "Look here. Can you make slides?" I seethed at this question but answered quietly, "Yes, Prof., I can". At that period over half my working time in the darkroom was spent in making a considerable quantity of slides and I was disturbed that he wasn't aware of this.

As a popular lecturer he was superb and I had the pleasure of assisting him during a series of evening lectures he gave to a consistently large audience in the Main Theatre. The lectures were sponsored jointly by our own Adult Education department and the WEA. He took them through a complete cross-section of the world of Physics and each lecture saw the theatre bench well covered in demonstration equipment - just as it should be! I performed the demonstrations and he talked them through. It was thoroughly enjoyable and instructive; I think the audience liked it, too!

It was a delight, also, to hear Professor Powell as an invited speaker, be it an after-dinner occasion or whatever. Clear enunciation and diction are virtues found too infrequently these days when dependence on microphones and sound re-inforcement is only too common. I have a recording of a moving tribute he paid in 1963 to the S.W. Institute of Physics following the death of his friend and mentor, Professor A.M. Tyndall.

Cecil Powell was an extremely likable man and a great scientist. The whole department was shocked and saddened by his early death a few weeks into a retirement richly earned. We were proud to have known and called 'friend' a man who was respected and revered throughout the scientific world.

In 1969 Professor Charles Frank became Head of Department and remained so until he retired in 1976. He was no stranger to us and the transition was quite painless, there being, again, no worries that a new broom might carry out some devastating sweeps. He had been in the department since, I believe, 1947 and was a familiar figure often to be seen under a personal cloud of pipe-tobacco smoke. Once I was seeking him and, coming across George Grainger, asked him if he'd seen Prof

Frank. George peered along the corridor and said, "Ah! There's his trail of matches, I think he went that way!"

Professor Frank was a staunch supporter of the Christmas parties, indeed, of any of the department social functions and this support did not diminish when he became Head. He was a formidable speaker at conferences both when delivering a paper and when posing questions during the discussion periods. At one of the early Solid State conferences he rose to speak and handed me a fair stack of slides. These were the large English size, three and a quarter inches square, and I was operating the old arched projector at the front of the theatre. All went well until, at the fourth slide, he called out, "That's not the one I want", so I tried the next. This, too, was not the one he wanted so he came across to the projector and spread them over the table surface and picked one out. This I projected, then he said "Next!" The order of showing no longer existed so I picked one at random - and I was right! This luck couldn't hold so I put all his slides on the lecture bench and he selected them as he went on. At the coffee break a delegate spoke to me saying, "Does your Prof always lecture like that?" "In what way do you mean?" I replied. "Shuffles and re-deals in the middle of the game?" was the answer.

For a period of time Professor Frank was chairman of the Joint Committee for Technical Staff Training. At one meeting some problem or other concerning the training policy relating to certain youngsters became very involved. Arguments and points were being put forward by Eddie Seavill and myself, among others, and the fog was thickening rather than clearing. Prof sat there quietly puffing his pipe until he cut in to the chatter with, "Do you mean?" and restated the case in the proverbial nutshell. The solution became obvious and I marvelled at his perception. This talent I was to appreciate on several occasions during his tenure as head of the department.

Although he was a theoretical physicist he was not slow to use practical methods to illustrate a point he wished to make. Around 1955, when I was working for Mr. Venn, I had a rare urge to tidy up a corridor. Behind a radiator was a piece of corrugated iron sheet with a length of wood fixed across it. Triumphantly, I carried it up to Mr. Venn saying, "Look at what I've found!" "For God's sake", he exclaimed, "Put it back! That's Dr. Frank's research apparatus!" So, back it had to go, behind the same radiator.

Among the office chairs surviving from bygone days were two very comfortable desk-chairs with height adjustment and a spring-balanced tilt. They had castors on a four-legged base. One belonged to the office of the head of department; I had the other. Several times while Professor Frank was Head his secretary would telephone to say "He's broken his chair again". She told me it was his practice to scoot his chair about between his desk and his bookshelves. The castors weren't up to these frequent journeys and would fail. With a fine sense of priorities I would surrender my chair to his use while I had the broken one repaired, meanwhile using a much inferior model until it came back mended. It would stay with me until next time a swap was needed. I don't remember if it was Mrs. Langdon or Miss French who came to tell me once that the chair was alright but a pane of glass was cracked in his bookcase. It appeared that Prof had been dictating and rocking to and fro in his chair while he spoke. On one of his fro's the spring had taken command before he could 'to' and he had been

flipped out on to the floor, cracking the glass in his tumble. My enquiry, "Is he hurt at all?" must have had a hollow ring as it emerged among my disrespectful laughter. Speaking with Sir Charles in December 1990, a long time after the incident, I mentioned it but he said he couldn't remember it at all.

He played cricket for his side at what must have been the last such cricket match at Coombe Dingle when advancing years were beginning to take their toll of many of the participants. Prof didn't need one but many of the batsmen required the assistance of friends to do their running for them on the occasions when they actually hit the ball. By then the formal sporting attire of 'cricket whites' was no longer held to be important, most of us having expanded beyond the yield limits of the garments, and he marched on to the field in dark trousers with his braces in bold contrast to his white(?) shirt. From the pavilion seating came a cry from Mrs. Frank, "Charles! Why are you wearing your braces?" He turned and called back with unanswerable logic, "If I don't, my trousers will fall down!", then proceeded to take his stand at the wicket.

When he retired, in 1976, the department organised a valedictory skittles match at the Joint Social Club at which presentations were made. Mrs. Frank had said that she would like something made in the lab which could have day-to-day use so that she should have a constant reminder of us all. Glassware suggested itself as fulfilling this requirement and Tony Osman made a tall spaghetti jar which he displayed for our approval. It aroused much admiration but the only member of staff who didn't recognise its purpose was Vincent Rubino, a native-born Italian!

In 1977 Professor and Mrs. Frank became Sir Charles and Lady Frank. Their close association with the department has been maintained since their retirement and, shortly after this event I was asked by Lady Frank to look into the possibility of obtaining a suitable long seat, to be placed under the portrait of Professor Tyndall in the foyer of G.42, that they wished to present to the department. Such seats are not normal stock items of furniture so the request became a project. First, I had to produce design sketches of suitable seats, bearing in mind the chosen location. These, when approved by Lady Frank, I took to a furniture manufacturer at Warmley, with whom the University had dealt for some years. Their quotation was accepted and an order placed. The proposed delivery date came and went and I telephoned to ask about progress. There was very sad news; the man who was to have made the piece had suffered an accident with a bandsaw and had severed some fingers. Craftsmen were hard to replace and the manager with whom I spoke said he thought I had been told of their difficulties and that they couldn't see their way to completing our order. He regretted this but suggested I should forget them and place the order elsewhere. We were almost back where we started. On the recommendation of Mrs. Gibbs, in the Supplies Office, another manufacturer was found and the work went ahead. The manager expressed misgivings about the colour chosen for the upholstery, a dark blue which Lady Frank had specified as being Professor Tyndall's favourite. However, he had to admit that it looked very well when the seat was delivered and placed in position. A suitable brass plate was engraved in the Physics workshop to attach to the seat to commemorate the gift and a presentation ceremony was duly held. Lady Frank insisted that my contribution to the project should also be commemorated but I demurred as the seat was their gift. We compromised in that the reverse (hidden) side of the plate states, "Design and trouble-shooting by K.F. Tindall". One day, in the

distant future, this might be discovered and the finder will, doubtless, ask, "Who the devil was he?"

The seat has withstood the ravages of student passage far better than I dared hope. Above it now hang three portraits, those of Professor Tyndall, Professor Sir Nevill Mott and Professor Sir Charles Frank.

The appointments of Professor Powell and Professor Frank had been assumed and seemed to follow naturally. In 1976 this was not so and there was some speculation as to whom it might be. We were aware of several possible aspirants and we discussed them briefly among ourselves. When asked whom I might favour I replied, "Che sera, sera". Whatever the choice, I expected to be able to get on with him and was prepared to wait patiently for the news. This was brought to me one afternoon when Professor Ziman came into the new preparation room behind G.42 where I was working on something on the bench. His visit was unusual but he just said, "Hello, Kevin, are you busy?" I stopped, of course, and asked what I could do for him. Somewhat diffidently, he said, "I thought I ought to tell you that I'm the new Head of Department". I offered words of congratulation and I was rather pleased that he had taken the trouble to seek me out to tell me. It hadn't happened that way before. I had long forgiven him for a remark which had infuriated me once, but that was a long time ago.

Mr. Wedgwood Benn, the politician, had been invited to address the Student Physical Society in the old Main Theatre one evening at 5 p.m. He was to give a talk in the Folk House later and George Hitchings had been asked to take a machine down there and project for him. He was to use these slides in the earlier talk and we were ready in the projection box. He declined my offer to take his slides saying he had brought his own machine and would use it from the front. Propping it on blocks he aimed it, at a steep angle, at the large, tilted corner screen. I returned to the projection box from where I could see and hear the talk. His first slide gave no trouble but, when he operated the auto-change, the slide magazine slid backwards because of the steep rake. After the third time, when the magazine fell out of the back of the projector, I could stand the ridiculous performance no longer and went down to the front of the theatre. (George and Stewart told me I rushed from the box gibbering. This could be true.) While he was collecting his slides from the floor and re-loading the magazine I brought a projector stand from the corner and set the machine for level projection on to the central screen. As I finished I was able to whisper to him that, when he went to the Folk House, he'd be advised to hand his slides to the projectionist. He agreed and then I heard Professor Ziman, admittedly in a placatory tone, say, "Don't worry, Tony. This sort of thing often happens!" That filled my cup completely and I went back to the projection box where, I was told, I gibbered at great length.

As I said before, that was a long time ago, now it was 1976 and Professor Ziman was to have a fixed tenure of five years. Although stories reached us that all was not joy and harmony among the upper strata we had little to complain about regarding our relationships with him. The only sour note I can recall was occasioned by the decision, on the retirement of Fred Bannister, the workshop chief, in 1977, to appoint a new chief from outside the department. The decision was received badly by those in

post in the workshop and Derek Flower, from the mechanical workshop in the School of Chemistry, had a hard furrow to plough as the successful applicant. He succeeded in his job and, ten years later, was appointed my successor to the post of Department Superintendent.

Around 1979/80 there was much unrest among the technical staff concerning salaries and the tardiness of the University's response. A more detailed account is given elsewhere, the upshot was that Professor Ziman commanded that the academic staff should attend a joint meeting with the technical staff at which our problems could be aired. This was a very positive gesture which should not be forgotten. Associated with this was a lunchtime demonstration outside Senate House which stretched to include an hour of the afternoon stint. The Personnel office decreed that the names of those taking part should be divulged. I couldn't say for sure the names of all those attending and didn't think it fair to submit a part-list, nor had I any inclination so to do. When one of the secretaries telephoned to chide me over not submitting names I resented this and said that I took my instructions only from my head of department. If he ordered me to supply names I would obey. This exchange I reported to Professor Ziman who said "For one hour? Forget it!" I made sure news of this support was circulated among my colleagues and they were pleased. In general, he had made us aware in several ways that he was sympathetic to our situation and this gave a small boost to morale which was sadly low at the time.

Professor Ziman relinquished his directorship in 1981 when his five-year term expired but I believe he retained the Henry Overton Wills Chair until he left us in 1982.

In 1976, the same year in which Professor Ziman took the reins, Professor John Enderby came to Bristol as a Professor of Physics. His enthusiasm was obvious and we reckoned he was a 'live wire'. His reaction to a small service I was able to render caused me to ask Mr. Michael Smith, then our Administrator, to explain that facet of the department to him. Soon after his arrival Prof Enderby had bought some furniture packs from a store in Bedminster and asked me if the University had transport that could be hired to collect it and take it to his new home. The Bursar's transport was extremely busy and would not be available for some days, meanwhile Prof was short of furniture. My car was a Ford 'Cortina' hatch-back with a deep luggage space so I offered to go with him to collect his goods. We completed the task in a couple of hours but I had the impression that he felt he was being especially favoured. Dreading that he might have thought he was under some obligation to me I related my fears to Michael Smith so that he could explain that this sort of thing was quite usual within the department and no obligation was implied.

Although I had gathered that his move from Leicester, where he had been head of the Physics department, had allowed him to relinquish such administrative duties, we were not surprised when, in 1981, he was persuaded to become Director of the Laboratory. As I write (January 1991) he still holds this title.

Soon after his accession a grand shuffle was ordained to re-arrange accommodation on the Third Floor. This not only entailed pressed gangs to move people and their furniture, filing cabinets and oddments, it also called for fast action from the Clerk of

Works and his staffs for needed decoration, electrical work, etc., and for the 'immediate' provision of extra items of clerical furniture. Prof Enderby summoned us, volunteers and conscripts, to a planning meeting to sort out any problems. He called the chosen day of action 'D Day' and produced a determined plan to lead up to this with definite tasks to be completed in a schedule that was to begin on, say, D minus 10. I can't remember the actual numbers of days but this was the pattern he set. Days D minus 10 through to D minus 1 all called for jobs to be finished in time for The Great Move on D Day. Certain trimmings might call for extensions to D plus x days. This detailed planning with the individual responsibilities defined, delivered in a manner worthy of a military commander before a critical engagement, rocked everyone back on their heels. Panic induced cries of "Impossible!" were heard, (some people were going to have to work!), but a calmer analysis showed that most of it was perfectly workable. Of course, I felt my lot was the hardest; I had to arrange a frightening timetable with the Clerk of Works for the basic requirements. To give him full credit Bert Backwell, the current Clerk of Works, co-operated magnificently. Admittedly, on my visit to appraise him of the needs, he threw his arms up in the air and wandered distractedly about his office crying out "You don't know what you're asking me to do! Who's going to pay? Where am I going to find the men? Who's going to pay? How can I get the material in time? Who's going to pay?" I told him, "Bert, this has come from the top. Professor Enderby has decreed it. It is for the good of all". "Not for me!" he exclaimed. However, we got down to it and decided on priorities which he agreed to attempt but refused, wisely, to commit himself absolutely to the target dates. By D Day he had achieved about eighty percent; the remaining twenty percent dragged out over a long time but I was wise enough to settle for what he had done and to counsel patience over the rest. D Day probably saw more people making purposeful moves about the Third Floor than that region had experienced in years. The job was done.

As part of these overall requirements Prof had asked me to provide some vertical filing systems for his secretary, Mrs. Felicity Hanley. The furniture budget was niggardly and I was able only to obtain one of two requested. In order to acquire a second unit it was necessary to actuate a rather complicated arrangement, commonly known as 'horse trading', having learned of one unit possibly becoming surplus to another department's needs. My machinations were proceeding steadily, but slowly, towards my objective when Prof met me and said he hoped I hadn't forgotten Felicity's cabinet. I started to explain that I had a cunning plan in operation when he cut in with, "So what else is new?" and went off, laughing merrily. A fine expression of faith and trust but, before long, the unit was installed.

Professor Enderby I always regarded as a mobile professor in that whenever I wanted to see him it was necessary first to go to his office where I would be told he was likely to be in such-and-such a place. On going there I would find he had moved on and I would have to follow a trail until I found him. This I had to accept as a fact of life, particularly after I once grumbled about it to one of my colleagues. He offered no sympathy, saying, "You can bloody talk! What do you think it's like when we go looking for you?".

During the period while Professor Enderby was away at ILL Professor Chambers was Acting Director. He had come to the department in 1958 as a Senior Lecturer,

became a Reader in 1961, Dean from 1973-76 and a Pro-Vice Chancellor between 1978-81. He and his Low Temperature (later Cryogenics) Group were thus well established in the department. During The Great Student Sit-in he had produced a news-sheet to provide concise information on the situation and it was from such beginnings that the Information Office and the University Newsletter became established.

When, as it were, he became Regent his situation gave rise to an initial feeling of wariness among some of the technicians. Happily, these fears soon disappeared but they had been engendered by what had been reported to me at the time of an earlier impatient and unsympathetic reaction of his towards a deputation of technical representatives concerning a dispute over salaries and grading. I never had the full story but I was glad to note that feelings became quite evenly balanced during his tenure of office. He was a very busy man and was heavily engaged on major University committees. For a man who had been an extremely active research scientist this was probably a burden.

Professor Enderby did not return to Bristol to resume the Directorship until a few months after I retired. Although I have enjoyed meeting him on many visits I have made since then my memories of the Physics Department, as far as this account goes, finished in July, 1987.

During the whole of the period covered, from 1946 to 1987, the day to day administration of the department has been carried out by a noble succession of Assistant Directors and Lecturers/Administrators. They have had some thankless tasks and little glory but their contributions have been great and extremely necessary. Professor Tyndall was ably assisted by Dr., later Professor, Piper, whose wit and humour are legendary; by Dr., later Professor, Thompson who figures extensively in this chronicle, and who brought in Mr. Michael Smith as the building and its people and demands increased; by Professor Chambers and, currently, by Dr. Derek Parsons. Professor Piper was before my time of office but it was my pleasure to work with the other gentlemen to whom I could turn for advice and with whom I enjoyed most cordial relations. From them I appreciated the true meaning of co-operation, with emphasis on the 'co'.

Chapter 6

Some Very Close Colleagues

In 1951, having, as it were, returned to the fold, it was not as a stranger that I entered among my technician colleagues and I inquired if there were any activities in which I might be interested. Ken Goble said they were shortly to perform a play called "The Vicar's Drawing Room". "In fact", he said, "You're in it. I want you to play Ethel, the maid". "Oh, ah, well, yes" I replied, "when is it to happen?". "Next Wednesday" he answered, "But don't worry, I'll give you a script".

This play was to be the Physics contribution to a concert arranged by the Employees' Association to be given in the Education Hut, standing then at the far end of Royal Fort Garden.

The plot for "The Vicar's Drawing Room" was based on the wartime ethos of 'everyone doing his or her bit' and all the characters were female but, in the best traditions of pantomime, were all played by men. These 'ladies', supposedly village wives, had each adopted a craft or trade and were meeting for a working tea party at the Vicarage. Ken Goble, the Vicar's wife, was repairing shoes; Maurice Rundle, wearing obvious and enormous bloomers beneath his skirt, was knitting; Victor MacGregor was practising carpentry and Bert Collins had brought his cow (played by Denis Jones and Harry Young) for milking. All these activities were carried on to an accompaniment of village gossip.

My role called for me to enter on a given cue and ask if tea was required and to re-enter on a later cue to serve it. The following stunt was suggested by Eleanor.

Denis Jones worked in the glass-shop and he was persuaded to saw a china mug in half, vertically. We fitted a perspex window to seal one half and tacked the mug together again with wax.

With the script pinned up backstage I tried to follow the lines and catch my cue. Suddenly, there it was! I hobbled on stage in ill-fitting high heeled shoes only to be told, "Not now, Ethel!" I hobbled off again and consulted my script. Something odd here! There was the cue word again! Back on I went to hear "Not NOW, Ethel!" I hissed to Ken "It was the bloody cue!" He whispered something quite rude to me to which I could only reply, in a high falsetto, "Call me when you're ready, Mum", and totter off, muttering quietly, to sit backstage wondering where I'd gone wrong.

Meanwhile, back in the drawing room, controlled mayhem was taking place. Vic MacGregor had sawn through a dining room chair; Ken Goble had nailed a boot to the table; Bert Collins had used the cow's tail as a pump handle to lower a rubber-glove udder filled with milk; Maurice Rundle dropped his wool and crawled under the table to retrieve it, hitching his skirt on something to reveal his magnificent pink bloomers with a large, black patch. On this patch Ken promptly struck a match and lit his pipe. Came a call, "Ethel! Where's our tea?" At last, it was my entrance. I entered with the tea tray and offered cups all round. "Just half a cup for me, Ethel", said Ken and the stunt with the mug worked beautifully. I took a small axe from the tray and struck the cup a light blow in the right spot, the mug split in two and I filled the doctored half with tea. The audience loved it. It appeared, however, that when we cleaned up the perspex window with soap solution we had omitted to swill it afterwards. Ken took a good swig and immediately blew it out over Maurice. This was not planned but Maurice rose to the occasion by raising and opening the shabby umbrella that was part of his costume. This gave me great joy and offset my indignation when I discovered that they had given me an original script, but had since re-written it twice and hadn't thought to tell me.

I suppose this experience blooded me for, in the years that followed, I was to derive great pleasure and immense enjoyment at being involved in many, many happenings with these and other characters.

Ken, Maurice and Stan deserve a whole book to themselves but this would be a surfeit to strain credibility. A few examples must be mentioned.

During the early 1950's the UBEA (University of Bristol Employees Association) ran monthly Saturday Night dances at the Merchant Venturers Technical College in Unity Street as a social venture and to raise funds. The man who provided and sold the interval refreshments never showed a profit, always claiming he "just broke even, lads". Maurice and I were deputed to attend the next dance as observers. We went, we saw, we confronted! Matters culminated with Maurice and the man face to face, of even height, wagging fingers at one another and arguing fiercely. The argument ended with a gem from Maurice which I have treasured to this day. They were eyeball to eyeball and Maurice said, "Look, you're a small man, and I hate small men: their heads and their arses are too close together!".

Ken and Stan were friends as railway colleagues long before they came to work at the laboratory. This didn't prevent Stan from being the victim, from time to time, of Ken's wicked sense of fun.

The teaching labs. then used lots of 2 volt accumulators which required regular charging. Stan maintained a battery charging system using a rheostat from a suitable tapping on the main laboratory battery and any member of staff whose car battery was low would arrive early enough to park next to the old main door and below Stan's second floor window. These were the halcyon days of easy parking! Stan would lower a cable with alligator clips on the end to be attached to the battery. At the end of the day the car owner would pull out the fuse in Stan's lab, disconnect his car, and leave the wires dangling.

One evening, as Ken made his way to the cycle shed, he noticed these wires and attached the two clips to an iron wall ventilator grill. Stan looked out a few minutes later, saw no car so he switched off and hauled in the wire. The two clips remained attached to the ventilator. The next morning he came down to see Ken to tell him some silly bugger had put his clips on the ventilator, they'd pulled off the wire and now he'd lost his clips. Ken commiserated with him and said you couldn't tell what some people would do.

A few days later Samaritan Stan charged another car battery in situ. Ken went to shut a window in the lab. below Stan's and saw the charging wire being hauled up. He grabbed the wire, pulled the ends up quickly, snipped off the two clips, then listened carefully to the angry sounds from above. Stan came racing down, full of indignation, to relate this latest outrage. Again he received sympathetic attention and it was a very long time before the truth came out. Meanwhile supplicants for this charging service received such a list of do's and don't's from Stan that they began to wonder if it was ever worth it.

Happily, it was Stan's turn to laugh when Ken and Maurice, having agreed to charge someone's battery, returned it to him with the polarity reversed and a potential of about 1 volt. The owner was not happy and the battery had to be flushed out, fresh electrolyte put in and the battery charged correctly. At the Christmas Party a few weeks later this episode was commemorated, among a series of satirical advertisements, as 'The Rungobe Battery Service. Batteries charged either way round!'

It happened that, during an International Solid State Conference one year, extensive re-wiring was taking place. A wall-mounted fuse box had been removed from the first floor corridor and a switch box on the room side of the wall had also been removed. This left a large hole with only the steel reinforcing grid remaining. The Satanic Twins, Ken and Maurice, were working in the room when, coinciding with the conference coffee break, Ken left the room to fetch some tools.

Hearing what he took to be Ken's returning footsteps, Maurice pressed his face against the grill and called out into the corridor, "Help! Help! Let me out! Let me out!". He had a glimpse of a startled stranger before the poor man turned and fled. Ken returned to find Maurice perched miserably on a lab. stool, looking very worried. Knowing his man, Ken asked "What the devil have you done now?". Hearing his confession, Ken said "You'd better go and ask Kev if he knows who it is". Maurice found me and gave me his tale of woe. I suggested we picked up coffee cups and wandered among the delegates. He pointed out his unintended victim and I sidled over to read his name badge. It was too good to be true! The man came from a country behind the iron curtain! With unholy glee I reported this to Maurice, asking what sort of impression would this delegate take home? There's nothing like rubbing in a little salt!

Maurice Rundle believed firmly that Fate was always against him. He based this conclusion on the many occasions when circumstances so arranged themselves that he became the victim of consequences arising from some quite innocent action of his, performed with no thought of deceit or evil in his mind. One such occasion occurred in my presence and I can vouch for the circumstances and the almost unbelievable set of coincidences which followed.

Maurice breezed into my room one afternoon and said, "Do you know the number for Canynge Hall, I want to ring Norman Beese?" "Help yourself" I replied, "It's 35828". In those days there were two telephone systems, GPO via a manual exchange and Standard Telephones with automatic dialling for internal calls. Thus there were two instruments in my room, both with dials, although the dial on the GPO telephone was inoperative. Maurice picked up the internal telephone and, to my mild surprise, dialled 35828. My instinct was to cry out, "Wrong 'phone!" but an inner voice held me back and I then observed with close interest. I realised that the internal, three-digit, system would only respond to the first three numbers and I wondered who would be the puzzled recipient of the call. Someone answered and Maurice said, "Can I speak to Mr. Beese, please". Then a look of amazed horror showed on his face. With a mumbled apology he replaced the receiver, turned to me and said, "What number did you give me?" I assured him the number was correct and asked what happened. He replied, "A voice answered and said, 'Harris' so I asked to speak to Mr.

Beese and the voice said 'No, you can't! If you want to speak to my technicians, you ring the lab!' Who was it?" My hilarious reaction to all this depressed him further; he thought I had set him up for it. With a little difficulty, I explained the mix-up with the telephones and asked him to repeat the name of the person who answered. "Harris", he retorted, so we had a quick search through the internal directory and found that 358 was the number for Professor Harris of the Department of Zoology.

The first coincidence involved the use of the wrong telephone and Professor Harris' number being called. The second coincidence arose since there was a technician in the Zoology Department named Cecil Bees! Professor Harris' reaction was justified under the circumstances. Poor Maurice was quite demoralised, even more so when I said, "Are you sure you didn't say who you were?" After a couple of askings he wasn't sure, but he was worried and he remained worried for a long time. Ken had to be told and would threaten Maurice for weeks that he would see that Professor Harris came to learn who had been making "silly phone calls".

Immediately after Maurice and I had sorted out what had happened I suggested he should try for Norman Beese again, this time using the right telephone, but his nerve had gone. I think he wrote him a note eventually.

Stan Edwards was appointed in April, 1950. He had been a railway signalman and made the transition to the heady world of Physics very ably. He was probably the most sober minded of what came to be called the 'gang of four' consisting of him, Ken Goble, Maurice Rundle and myself. I suspect this term was not applied until after it had become public in China but it seemed to be suitable since we were the people most closely concerned with the theatres and teaching laboratories, and we were a team.

Stan was a most conscientious chap, a first-class colleague, an extremely good carpenter and an excellent First Aid man. He was a Serving Officer in the St. John Ambulance Brigade and dealt with all our minor emergencies. He was enthusiastic and thorough and it was widely rumoured that, if you went to him with a splinter, you ended up with whole-body bandaging. Of course, this was absolutely untrue but, "A prophet is not without honour...etc." (Matthew 13, 57). If Stan had evening Ambulance duties he would come to work that day in his uniform, black, with silver buttons and insignia. Maurice would look in on me to report, "Hauptmann von Edwards, of ze Geshtapo, iss on ze premises, Sieg Heil!"

My personal gratitude to Stan came to a peak the day he offered to take over projection duties for the Galenicals Society. This student medical society was having a series of weekly meetings dealing with clinical aspects of medicine. Their pictures of diseases, deformities and operations were highly detailed and, to my delicate feelings, extremely gruesome. It is a fact that any projector kit I used for their meetings contained a bottle of strong smelling-salts to which I had to resort frequently. The last such lecture at which I projected a film described, verbally and pictorially, an operation on a hand. Long before the end I was breathing neat ammonia, dimly aware of what was going on, and clawed my way out to the fresh air as soon as the lights went up. I was, however, still on my feet and was comforted

slightly by the sight of four medical students laid out in the hallway being attended to by their stronger brethren.

The next morning I was moaning away, bewailing my unhappy lot, and receiving little sympathy. Up spake Stan, "That sort of thing doesn't bother me, would you like me to look after their meetings?" It was as if angel choirs had burst into songs of glory! I agreed with great enthusiasm and promised to have him beatified. There was, of course, a pay-off. On the mornings after subsequent Galenicals meetings Stan would come to tell me how much he had enjoyed it, and then tell me why, until I would cry out, "Enough! Enough! Please go away!" I dared not say how ill I felt lest I should end up on a stretcher!

The Southern Universities Joint Board conducted examinations then known as School Leaving Certificate and Higher School Leaving Certificate. The Higher School course required a practical examination in Physics and this was prepared and held in the Physics Department. Some weeks before the event officials would come to discuss the arrangements with Mr. Venn who appointed Stan Edwards as Examination Manager. Special apparatus would be needed, items in greater number than we kept for our own courses, and the workshop resources would be mobilised to manufacture equipment. The rest of our little team would be put at Stan's disposal, "Sold into slavery" as Ken and Maurice put it, for he really worked us hard. Stan, in the guise of Simon Legree, took to addressing us as "Mister". "Have you finished those plug-boards, Mister?" and, "Come on, Mister, you've had long enough for tea!" and so on and on and on. We took it all in good part, we were a team, and there was work to be done, so we didn't resent too much Stan's few weeks of power. I once saw Maurice trying to elicit sympathy from the fourth-floor girls by offering to show them the marks on his shoulders from Stan's lash, but to no avail. It was greatly to Stan's credit, and to Mr. Venn's trust in him, that the examinations were conducted to the satisfaction of the Board with the minimum of hiccups, mostly due to candidate problems, not to the organisation. These examinations continued for some years and, although the title changed to 'A Level', to us they were always 'Higher Schools'. Our mobilisation and enlistment also continued as before, as did our suffering!

Mention has been made of Stan's woodworking skills. There survive many examples in the Stage I laboratory in the experiment sets for the practical sessions. The lighting control box which sat for years on the bench in the old large theatre, now the Arthur Tyndall Lecture Theatre, Stan made for me when we converted the switches to relay control. Most of us have benefited from his skill and advice with our own projects. No mean cricketer, he played regularly for the lab. staff eleven at Coombe Dingle in the days when we were all younger and thought we were fit.

Luxury foods were still in short supply in 1953 when Ken Goble married Vera. Her aunt in Canada knew this and sent over fruit and filling to help towards a wedding cake if someone could be found to do the baking. Stan and Ken were friends of long standing so Stan volunteered his and his wife's services and provided a very fine cake, baked by Margaret and iced by them both. This was the first of a series of quite excellent cakes to be provided by their joint efforts for all manner of occasions including a Jubilee cake in the shape of the Physics building and a final offering at Stan's retirement celebration.

Among his many talents was that of impersonating animal noises. Many a small child accompanying its parents on a visit to the department was urged to go and see "Uncle Stan" and ask him to be a lion. We would lurk outside the door to his lab. and marvel at his variety. A small group of us, including Stan, were on our way to the refectory one lunchtime and passed a child sitting up in a pram outside the door to the Museum Lecture Theatre. As we went by Stan was moved to utter a few gentle barks to amuse the child. It was not amused and began to cry, whereupon Stan tried to pacify the little one just as its mother shot out of the door to see what was wrong. This was an occasion when a man needs the support of his friends, so we left him to it and went in to the refectory. He joined us a few minutes later, looking rather puzzled, and saying he couldn't understand it, the child's mother hadn't been at all appreciative of his intention to amuse and had told him off!

Stan retired, officially, in July, 1979, but continued on a part-time basis until the December to help Jerry Hart, his replacement, through his first term as steward. Professor Ziman gave a valedictory speech and, in his response, Stan recalled some of the events here listed.

There were many occasions when Ken and Maurice performed at parties and concerts, sometimes as a well-matched pair, sometimes with the active co-operation of others. Among these very memorable performances were party pieces such as the Scout Band, the Girl Guide Band, miming to Spike Jones records and, on one occasion, Ken and Maurice mimed to a Nelson Eddy/Jeanette MacDonald record. Needless to say, they managed to get the vocal parts switched about half-way through!

Maurice and I 'performed' "The Green Eye of The Little Yellow God" with complications resulting in my chest bearing scars for some time after having a raw egg broken on it to emphasise the line, "An ugly knife lay buried in the heart of Mad Carew".

What became almost legendary was the famous Wall Paperers sketch performed by the two worthies at a UBEA concert given in the Drama Studio when it was housed in rooms to the side of the Great Hall. In this sketch, which was performed without words, they set out to hang some wall-paper, assembling a pasting board and a pair of steps to assist them. They pasted each other, lost the end of the paper and pasted the table, pasted the steps and, finally, one length of paper. In mounting the steps to hang it, Maurice trod, of course, on the sheet and managed only to fit up a ragged piece about six inches deep. Ken proved, as anticipated, to be the most useless assistant anyone could dread having around. The turn was a riot! I was compère for the show and sneaked out front-of-house to watch. At the end I was sobbing helplessly with mirth - and I knew them! I learned later that, among the audience, there were several other uncontrollable fluid emissions, but no-one was in a state to worry about it.

It was at this concert that we nearly heard Bob Kibble recite the Stanley Holloway monologue, "The Battle of Hastings", ('on 'is 'orse, with 'is 'awk in 'is 'and). Bob had been trying to learn this for the previous three weeks and had been prone to pounce on Ken and myself if he espied us so that we should hear his lines. He still didn't know

them when he went on stage so I had to stand behind the curtain to prompt him. The audience thought this was intentional and kept applauding so he couldn't hear my prompts. Thinking I had deserted him, he began prodding the curtain with his stick, found the gap, and dealt me a severe blow amidst which left me breathless. That was the end of effective prompting so he continued, making it up as he went, but it was hardly a success.

Bob was a large, strong man, an ex-Guardsman and a most conscientious worker, but apt to carry out instructions before they were fully given. The University Orchestra used to rehearse in the large theatre and store its drums and music stands in a room behind the theatre, now Room 1.10, but then known as the Band Room. It was Bob's duty to set out and return these instruments, mostly large kettledrums, whenever needed.

I came upon him one morning, semi-collapsed, on a stool in the hall. "Ah've beggared meself again, Kevin" he told me. It appeared that he'd had a telephone call from the lorry driver to say he would be up for the drums in ten minutes. Before the driver could say more, Bob replaced the telephone, raced up the back stairs and brought all the kettledrums down as fast as he could. The lorry driver arrived and said, "Right, Bob. Where's these two little oil-drums, then?" So poor Bob had to carry all the kettledrums back up the stairs again.

A great respecter of rank and position, he came on duty one evening with a very smart peaked cap. As a cleaner and occasional evening porter he didn't rate a University uniform and had bought the cap himself 'for special occasions'. This evening was such an occasion, a meeting of the Royal Commonwealth Association being attended by civic dignitaries and the Duke of Beaufort. "When Duke comes out of the theatre I can give him a smart salute" Bob told me, and showed me a few practice salutes there and then. In the event, the Duke left by a door other than that at which Bob stood on guard. I was told later that Bob had given smart salutes, and called out "Goodnight, your Grace!" to two startled strangers and the Lord Mayor's chauffeur!

One evening trip took us on a country drive through parts of Somerset and on to Cheddar where a buffet supper, cabaret and dancing completed the evening. Ken had arranged to call for Maurice and take him to the pick-up point for the coach. When he arrived Maurice was not quite ready, being busy somewhere down stairs, so Ken whispered to Maurice's mother, "Bess, I'm just going to nip upstairs a moment, we might have a bit of fun".

He had the germ of an idea in his mind and sneaked into Maurice's room to see if there was anything suitable for his wicked plan. There, in their pristine glory, were Maurice's new shoes; happily these weren't the shoes Maurice planned to wear so Ken took them, smuggled them out to his car and, eventually, smuggled them on to the coach where he handed them to me saying, "Keep these hidden until we reach Cheddar". Somewhat mystified, I asked, "What's going on?" "I'll tell you later, just don't let Maurice see them".

When the trip was under way Ken came back to me and told me what he'd done. "When we're at Cheddar", he said, "We'll be holding a raffle during the dancing and we're going to fix things so that Maurice wins a prize" "Where do the shoes come into it?" I asked him. "They're his shoes" he told me, "I nicked them from his room and he's going to win them in the raffle. You can sell him a raffle ticket and keep the counterfoil so he'll think he's won". It all sounded a bit unlikely to me but it was worth a try so matters were arranged accordingly.

The official raffle was held with proper prizes and genuine winners. After the last prize was won we just continued the draw, making sure that the retained counterfoil was selected. His number was called and Maurice, all happy smiles, came forward to collect his winnings. He unwrapped the parcel and gazed in surprise on the contents. We waited for an expected explosive reaction, but none came. He examined the shoes carefully and exclaimed, "Stuff me! How nice! I bought a pair like this only yesterday, now I've got two lots!" Ken and I were more than delighted, we were stunned! This was far better than we could have hoped for so, after a short while, we set about explaining it all to our friend. He didn't want to believe us and it wasn't until he returned home to discover his new shoes were missing that he had to admit to having been tricked most fiendishly.

Stories involving Ken Goble abound in this account but there must be added to these what amounts to an appreciation of the varied talents he displayed towards the social life of the department and of his technical colleagues throughout the University.

An active supporter of the Employees' Association, he was much to the fore in arranging evening events and the annual outing. In the early days three or four coaches would be needed for the outing; today it is unlikely that one coach could be filled. One particular outing, memorable for all the wrong reasons, was to Porthcawl by rail. Travel arrangements were fine, but Porthcawl on a windy, rainy day is not to be recommended for a family day out. The determination of those who went that they should enjoy themselves in spite of everything had to be seen to be believed. The funfair was heavily patronised, although most of it was in the open, many attempting the water slide in the pouring rain and shrieking in the approved manner when they got splashed. The rest of us got just as wet merely watching.

An outing to Swanage saw him organising sports, for adults as well as children, on the fields above Studland.

Cricket matches, concerts and garden fetes were all testimony to his efforts. Not alone; he had the knack of gathering about him a team of volunteers to assist with the detailed planning and operation. I believe that his was the inspiration which led to a series of most successful Founders' Day Fêtes held at Coombe Dingle.

Ken was a great man to have as a fellow committee member, particularly on the UBEA committee on which I served with him for several years. His wry humour could blunt the edge of any acrimony that developed. I must have followed him as representative on the Refectory Sub-committee where I discovered how much his contributions had meant.

From 1951 until he retired in 1979 I was happy to be working with him, and with the rest of the slightly crazy team which we comprised. Lest an impression be gained that life was all play and no work let me assure the reader that, numerous though the occasions of levity might seem, such occasions did not occur every day: far from it. The various events described cover a span of almost thirty years and we certainly gave earnest and proper attention to "the trivial round, the common task". We tried, conscientiously, to "fill the unforgiving minute with sixty seconds' worth of distance run" and we prided ourselves that we were reasonably successful. Very, very rarely were any of our escapades planned; they just happened. It was simply our good fortune that, from a small 'seed' incident, an almost natural development would follow. Sometimes we were inspired to give a little nudge; more often, once the seed was sown it became self propagating and would bloom into something memorable. Most large departments can boast of one or more individuals to whom things just happened, but I feel that the Physics Department was well blest in containing, for so many years, more than its fair share.

Chapter 7

Sydney Harold Venn, M.A.

As described earlier, I first met Mr. Venn in 1940 but he had been the Laboratory Steward since 1919 when the Physics Department was housed in buildings in University Road, later to become the home of the Department of Geography. Before the First World War Mr. Venn had been a laboratory assistant at Clifton College. As a Territorial he served with the Royal Engineers during the conflict and returned to Clifton College after the Armistice whence he was recruited by Professor Tyndall and appointed Steward in the Autumn of 1919 to satisfy the need for increased technical assistance in the post-war development of the department.

Of those remaining in the laboratory today (1990) only Marianne Pearce, Keith James, Harry Young and his wife, Thelma, will have personal knowledge of him. To most of us, now retired, he will always be remembered formally as 'Mr. Venn', informally as 'Jan'. This sobriquet was bestowed by Maurice Rundle from his Naval service when all men from the West country were so dubbed. We would not have dared to address him as such; it was always 'Mr. Venn'. Some of his peers from other departments with the privilege of seniority and long acquaintance would call him 'Harold' but, such was the respect he drew from his staff that the proper mode of address was maintained.

By no means did this make him unapproachable, nor was he a martinet. Certainly, any task attempted had to be carried out earnestly and his standards were high. Apart from the more mundane aspects of his duties as head technician his greatest achievements were in the vast field of lecture demonstrations: there he was an acknowledged master. Electrostatics was an important part of the Intermediate Course and was covered in the early stages of a new session. Demonstrations of the varied phenomena were many. Unfortunately, October and November are not remarkable for crisp, dry weather and the normal humid conditions, exacerbated by a theatre full of steamy students, could mean that no charged body could retain its charge for very long. I knew this, to my despair, but it was fascinating to watch Mr. Venn, with a small bowl-fire radiator, a carefully dried rubbing cloth and infinite patience, charm the most recalcitrant apparatus into obedience. He it was who always assisted Professor Tyndall in his popular lectures, not only locally but also at the Royal Institution and other venues, indeed, there was no-one else to do it! When he started in 1919 the laboratory staff, including himself, totalled three; by 1939 there were ten, even those were to be reduced by war service. Post-war expansion brought the numbers to thirty-three in 1947-48, to fifty-four by 1952. Numbers had increased dramatically with the appointment of a host of girls as microscope observers in the Cosmic Ray Group and a peak was reached a few years later when around sixty-six technical staff were employed in the Physics Department.

Mr. Venn had been one of the founders of the BILT (Bristol Institute of Laboratory Technology) concerned with the education and training of young technicians. He was an ardent supporter of the Employees' Association and a great lover of sport, cricket being his favourite game. He was no mean performer both behind the wicket and in

front with bat in hand. His late cut was a joy to behold and, even in his sixties, he kept wicket during an inter-departmental match at Coombe Dingle. "It's the buggers coming down wide on the leg side I have difficulty in getting across to" he remarked casually to all and sundry.

A summer fête was organised, largely by Ken Goble, in about 1955 and was held in the Royal Fort grounds. One of the side-shows was to be a rifle range with half a dozen borrowed air-guns and a good supply of pellets. During the early preparations the guns were test fired on the small range and Mr. Venn came on the scene, his eyes lit up and he requested a few trial shots. He became so keen that we couldn't get him away from the place until he had used up all the pellets and we had to go out and buy a new supply before the fête could take place!

As a little haven of peace from the excitement in the grounds he set up a few suitable static demonstrations in the lecture theatre which folk could wander round and enjoy. One of these was 'the phantom bouquet', an optical demonstration with a large concave mirror which produced a deceptively clear image of a bunch of flowers, but attempts to touch the flowers meant one's hand passed right through them. I took Eleanor, my wife, into the theatre and Mr. Venn showed off his prize demonstration. She was quite fascinated and told me afterwards that the best thing about the fête had been "Mr. Venn's geranium". From that day, and the same demonstration has been shown on countless occasions, it was ever referred to as "Mr. Venn's geranium". It meant I had to explain why to several generations of theatre assistants who had never heard of Mr. Venn, but the name stuck.

Normally he was a man of placid disposition with a quiet sense of humour but there were two occasions when I witnessed, but happily was not the recipient of, a remarkable wrath. The first incident occurred one Thursday afternoon when the wage packets were being issued in his room. On his desk he had a very large glass ashtray, almost an heirloom, certainly precious to him. David Lee, a junior technician who, in his early years with us, we regarded as an accident looking for somewhere to happen, came to collect his wages carrying a Dewar flask containing some liquid air. He said, afterwards, that he had noticed little clusters of tobacco ash in the ashtray and had wondered how they would be disturbed if he poured liquid air on them. Under Mr. Venn's astonished gaze he did just that; the clusters of ash dispersed themselves with little puffs and jumps and the beautiful glass ashtray split into two pieces with a frightening crack. Mr. Venn was magnificent in his rage. David Lee was awful in his abject fear and grovelling apologies, and he managed to avoid Mr. Venn for a whole week - until next pay-day when his need for his subsistence forced his re-appearance, still grovelling and still mouthing useless apologies. David left shortly afterwards to perform his National Service in which he did well, returning two years later having been a Corporal Instructor in RAF Radar. His reputation had remained unchanged but he hadn't; he had calmed down considerably and became accepted as a likeable and worthy colleague.

The second occasion was equally unfortunate for the, slightly, unlucky person on whom the wrath descended. The Cosmic Ray Group occupied the fourth floor and installed large processing tanks for the treatment of the thick, silver-heavy, emulsions used in their experiments. These were in a room above the library and spillages and

leaks sometimes occurred. One rather serious leak sent strong fixing solution of sodium thiosulphate cascading into the library through the ceiling. It was, literally, a case of all hands to the pumps to protect the books. Those of us engaged in the cleaning-up were not happy, Mr. Venn least of all. This acid solution had crept down one of the lighting flexes and had filled the spherical lampshade. With some of us steadying the steps, he detached the lampshade and then carried it very carefully to a sink. He was observed by one of the Cosmic Ray postgrads who was thoughtless enough to call out, "Going in for goldfish, Mr. Venn?" We held our breath; Mr. Venn addressed himself to this unfortunate lad, consigning him, all his colleagues and the whole group to eternal damnation. The poor fellow slunk away, written on his expression was a resolve to be very, very careful about such remarks in the future, and Mr. Venn proceeded with his task having, unknowingly, earned our unstinted admiration - yet again!

During the war, tea, along with most foodstuffs, was under ration. Industrial establishments, and we counted as one of such, were allowed a special ration. Mr. Venn organised this and would buy, under permit, a seven-pound bag of tea from Carwardine's shop in Whiteladies Gate. This he would weigh out into quarter-pound amounts in reclaimed jam jars for sale to the tea schools. Even when rationing ended this practice was continued, out of habit and convenience, for some time. It fell to my care after he retired and I carried on for a couple of years but managing to buy the tea, still in bulk, but ready wrapped in quarter-pound packets. With the increase in numbers of both technician and postgraduate users it became rather cumbersome and greater varieties of tea had become available so I called a halt.

One instance of Mr. Venn's care for the welfare of the department, and one which surprised us as it showed an entrepreneurial trait which we'd not suspected, occurred on the occasion of the Coronation of Her Majesty Queen Elizabeth II. Few people possessed television sets in 1952 so Mr. Venn approached Professor Mott, then Head of Department, to seek permission to hire a projection television set for the great day, to have it set up in the large theatre and to recoup the cost by selling tickets. He hoped to cover the expenses but was ready to stand a modest financial loss. He need not have worried, the theatre was packed and his expenses were covered with a fair amount over. This he donated to, I believe, the Children's Hospital, our close neighbour.

In the early days Saturday mornings were part of the working week and the last lecture would begin at twelve noon. The Employees Association ran an annual outing on a Saturday, usually in July, for which concessionary leave was granted to those participating. This practice was of long standing and had been ratified some time in the distant past. A copy of the letter giving this permission was one of very few documents which Mr. Venn kept clipped together on a hook in his room. One day the Registrar, Mr. Butterfield, telephoned Mr. Venn to seek some clarification of the intention of the letter, explaining that he knew of such a document but had no copy to hand. Mr. Venn said, "Just one moment, Mr. Butterfield, I'll read it to you". Reaching over to the clip, he soon found the letter and read it out. Then, after the usual compliments, he replaced the telephone, turned to me with a happy smile and told me that the Registrar had praised his most efficient filing system and wished that his own could be as effective. Some years later, when I had assumed Mr. Venn's duties, Mr.

Butterfield mentioned this efficiency of Mr. Venn's system and advised me, kindly, to follow his practice. I hadn't the heart to tell him the story as I had witnessed it.

The general respect and affection accorded Mr. Venn did not exempt him completely from certain irreverences and mischief from his underlings. One memorable possession of his was a modest container of tacky wax, a most useful commodity, very handy for holding small screws on to the tips of screwdrivers when performing an awkward assembly, among other uses. No matter how often we dipped into this wax it didn't seem to lessen and Ken Goble suggested that, since its consistency was similar to ear wax that was how Mr. Venn kept it topped up. Long after Mr. Venn retired Ken would come to me and say, "Can you let me have a bit of Jan's ear wax, Kev?" He broadcast his theory quite widely so Mr. Venn was well aware of his impudence but simply ignored it.

Denis White joined the laboratory staff as a Junior Assistant in 1943 and, from about 1946 until he left in 1953, was Mr. Venn's assistant in the theatres and in the photographic darkroom. Like most youngsters, Denis was prone to gentle mischief. One of Mr. Venn's skills included the repair of galvanometers, a task requiring fine-soldering work, concentration and patience. He had made, from thick copper wire rolled to a coil with the 'bit' end protruding, a double ended soldering tool. When replacing a galvanometer suspension wire he would settle himself at his bench, the work laid out before him, a binocular magnifier fitting over his head, and his soldering iron resting on a stand which positioned the working end over a small flame. All this was placed so that he could reach out for what he wanted without turning his gaze from the task. It was Denis' fiendish delight to creep up quietly and reverse the soldering iron so that the cold end became the one in the flame and the hot end available for Mr. Venn to grasp. Sudden oaths would betray the success of this mean trick, Mr. Venn complaining that he couldn't understand how he kept putting the damn thing down the wrong way round. I don't think he ever discovered what was being done to him; at least, when Denis left in 1953 he was still alive and well, so perhaps he didn't find out.

With the changes in titles and grading which came about in 1950 Mr. Venn's title of Laboratory Steward became Laboratory Superintendent, as, of course, did the titles of his peers throughout the University. His birthday was in November which meant that he retired in the following July in the year 1956 having given thirty-seven years of devoted service to the University of Bristol. As the time approached Alice Terry began writing to as many of the past students, graduates and post-graduates, as she could and the response was great. Greetings and good wishes were received from all over the world, so widely was he known and remembered. At his farewell party none of us expected this to be the last we would see of him. For some years he continued to come to the Christmas parties and also to join in with us on many of the outings and visits we made to various firms.

I was certainly pleased to see him when he called; usually I had a couple of queries for him to answer about procedure and about certain demonstrations. Mr. Venn had been on very good terms with the Physics teachers at several Bristol schools, in particular those at Badminton School, Colston's Girls School and Redland High School. These ladies had, naturally, proper names but he always referred to them as

'she', irrespective of which they were. It caused me a little confusion at times which I learned to live with when he would call in to ask to borrow some theatre equipment saying, "She wants me to take it over and show it. I'll bring it back in a couple of days". I didn't like to keep asking which 'she' he meant, nor to which school he referred, but the stuff always came back with "She said, thank you very much. It was a great help".

In 1964, eight years after he retired, the University awarded him an Honorary Master of Arts Degree. It was most richly deserved and Professor Gifford, Professor of Modern English Literature, was appointed Orator. He came to the department seeking background information on Mr. Venn and he fell among friends. Maurice, Stan, Ken and I were delighted to supply him with a fund of stories, most of which were true and many of which he included, to our delight, in his Oration. We were able to attend the ceremony and it gave us very great pleasure to see him so honoured.

While writing this appreciation of Mr. Venn I became puzzled as to why, although he retired in 1956, it was not until 1964 that he was honoured. I spoke with several people who had known Mr. Venn and who might have had some knowledge of the circumstances. After speaking with Mr. Evan Wright and Sir Alfred Pugsley I have concluded that it was the award of an Honorary Degree of Master of Arts to Mr. Richards, ex-Clerk of Works, at the formal re-opening of the Great Hall in 1963 which initiated a policy of so rewarding certain members of the non-academic staff for long and meritorious service. I have not found any instance of a similar award prior to 1963 and subsequent awards were not automatically given.

Chapter 8

My Lads

When Mr. Venn departed it seemed to be taken for granted that I should continue to look after the lecture theatres and cope with the general photographic needs of the department. In all this I was assisted by young Alan Birt whom I 'inherited' from Mr. Venn. He was the first of several able assistants who were to work with me, mainly in the lecture theatres, but also in the many and varied little jobs of maintenance and fabrication throughout the building. Alan was a likeable lad and fitted in well with Ken, Maurice and Stan who continued to form, with me, a team of like-minded individuals who could work together with success and harmony. His parents moved to the South East of the country but Alan chose to remain in Bristol, living on his own. On his wages at the time this was not easy for him and we had grave suspicions that he was not eating as much as a healthy lad should. Mrs. Terry took him under her wing to a certain extent and spoke with a friend who was a member of the clergy at St. Mary Redcliffe Church. This surely helped him and, eventually, Alan left us to go to St. Paul's College in Cheltenham to train as a teacher. He visited us on many occasions, particularly when he sought help with some of his science project work. After he qualified and had carried out his teaching practice he joined the Royal Air Force as an Education Officer. Once, while he was stationed in Scotland, he telephoned me at work to ask if I had any information on wind-chill factor. I knew little about this and suggested he should speak to the nearest Royal Navy station since

they would deal with this in survival courses. Alan chuckled happily, saying, "Yes, there is a place near here and I lent them a boat recently when they broke theirs. I can screw them for the information!" It's not what you know, but who you know!

While with me Alan had become a competent photographic assistant and had kept up his interest while at college. I was not surprised to hear from him a few years later that he held the rank of Squadron Leader and was joint Second-in-Command of the Inter Services School of Photography at RAF Cosford. He invited me to visit the station where I spent an extremely interesting day. As we toured he would introduce me to his fellow officers, who would respond cordially, then Alan would say, "This is the chap who started me off in photography". This opened many doors and I was shown the equipment and processes with detailed explanations.

Terry Gorman was appointed when Alan left and, at about the same time, Geoff Freke was appointed as photographer, around 1959/60. The theatre work, plus the extra general duties which fell slowly but surely to my lot, were beginning to make it difficult for me to continue carrying out the increasing amount of photographic service required. I asked for assistance and Geoff, who had been a photographer in the RAF, joined the team.

Terry had quite a 'feel' for demonstration equipment and, between us, we built several new items and re-vitalised others. To Terry must go the credit for the demonstration using a brass tube, pierced longitudinally with small holes, both ends sealed but one with a small loudspeaker fitted, which, when the tube is supplied with gas and lit above the small holes, shows standing waves variable with the frequency fed to the loudspeaker. It is known, classically, as "Rubin's Tube". When the Bristol Exploratory was being set up I supplied a slightly larger model to them which is part of their exhibition.

Terry left me in 1962 to work as a school technician at Bower Ashton, later becoming Chief Technician to the Department of Architecture and, on that department's demise, he went to the Engineering School.

Geoff Freke left in 1961 to become photographer at the Nuclear Power station at Berkeley, Gloucestershire.

In his place was appointed George Keene, who is still in post. George had been a technician in the Veterinary School in Park Row so was no newcomer to the University. One of the applicants for the job was Gordon Kelsey who later came to set up, and head with great distinction, the Arts Faculty Photographic Unit. At his interview with us it became obvious to me that his qualifications and wide expertise would not be used to the full by our special requirements. In other words, I believed he would not have any job satisfaction in post with the Physics department and might well move on after a relatively short time with us. This would not be good for us, nor would it be good for him. While showing him round the department and the darkrooms I made these points to him as honestly as I could, and as gently as I could, telling him, "This job is not really for you; the scope is much too small and your greater skills will not be exercised". Gordon withdrew his application and I was delighted (and somewhat relieved) when I met him following his appointment, not

very long after this, to the Arts Faculty. I believe to this day that I advised him wisely.

George Keene's photographic skills, though not as wide as Gordon Kelsey's, enabled him to cope with our needs immediately and by dint of application and from attending photographic courses at Gloucester he has become a most able photographer and, indeed, a good friend to all members of the department. A competent projectionist, he has practised this art also in many instances and locations within and without the University. He makes a valuable contribution to the Training Scheme in educating the youngsters in the elements of photographic work.

In 1962 a teacher, whom I knew, from Kingsdown School came in to see me to ask if we had a vacancy for 'a bright young lad who wanted to do scientific work'. His name was Stewart Field and he was very much a young lad, quiet, extremely shy, but he became a most worthy assistant, teaching himself the skills he desired. The little workshop area which was part of my room was his joy and he asked if he could work in the evenings to develop his interests. The story of his tuition by Dr. Burch is related elsewhere; from this he went from strength to strength as a most careful and cunning instrument maker. He had a flair for solving little design difficulties in experimental apparatus and his talents were called upon by, among other groups, the Cryogenics Group. When their technician left them they were without regular technical assistance and Dr. Guban asked me if Stewart might be interested in transferring from theatres to Low Temperature work. At that time there were four of us in the theatres section, myself, Stewart, Mike Gabb and George Hitchings. Our overall range of activities extended far beyond straightforward theatre work and we had no difficulty in keeping very busy. Nevertheless, I admitted to myself that my immediate staff numbers were high when compared, loosely, with similar situations elsewhere in the University, although direct comparisons were not possible. Stewart, George and Mike had been rated Grade 3 under the new scheme and the current chances of their advancement were almost zero. Assuming a move would be to Stewart's advantage, I agreed to put the proposition to him. First, I asked Don Guban about Stewart's regrading. He said they were prepared to take him as a Grade 4. "Not good enough" I told him. Had Stewart stayed with me on the teaching side Grade 4 would have been his next step. The new scheme gave research technicians progress from Grade 3 to Grade 5. Grade 4 was not a rung of that particular ladder. Interpretation of this dual ladder system was not constant but I argued in favour of Grade 5. In the end we reached a compromise. It was then September so I agreed that Stewart could go to the group with an immediate promotion to Grade 4 but that this should be reviewed in time for a possible (to my mind, certain) promotion to Grade 5, the proper grade for the post, in the following February. Then I broke the news to Stewart; he didn't want to go, saying he was quite happy where he was and that he was doing jobs for that group anyway. I persuaded him to give it a try, on approval, as it were, saying I'd have him back if things didn't work out. In the February they were glad to make him a Grade 5. A comment I was given by, I think, Dr. Parsons was that they hadn't realised what technical assistance could mean until Stewart worked for them. I told the remaining two lads that I didn't intend to seek a replacement for Stewart and that I hoped that, as three of us would be doing the work previously shared by four, this might be to their ultimate benefit. 'Ultimate' was the

right word; it was a long time before advancement could come and, when it did come, it was due to different circumstances.

George Hitchings came to the Physics Department in October 1965. He had been employed by STC who maintained our internal telephone system. George had become dissatisfied with his lot and, having had many contacts with the department in his job and having got on well with those he met, he asked if we had any vacancies. The Polymer group needed another technician and he was employed. George's talents lay in the field of electrical and electronic work and he was not happy with the Polymers. There was also a strong personality clash between him and Terry Owen, the senior technician in that group. With the establishment of two lecture theatres at each end of the building it was going to be necessary to have both preparation rooms manned. He transferred to the theatre section at about the same time that Mike Gabb joined us, hence the section numbered four people until Stewart moved. George and I primarily looked after the new theatres while Stewart and Mike attended to the old theatres. George's assistance I valued greatly. We could work well together and he was a most versatile man. The new lift needed much attention and, unlike the old lift, the machinery for which was in the basement, had its motor and controls at the top of the building. When it failed George would race up the stairs with a most enviable vigour and put it right. After he left us I refused to face those stairs and we called in the engineers. The new lift had no location indicators at any floor level. If one was in the lift it told one where one was but from outside one couldn't tell if it was coming or going. The existing indicators were a joint production between George, Stan Edwards and myself, with the installation being carried out by George during a spell when I was in hospital. It cost £120 against an estimate from the lift firm of £1100! As mentioned elsewhere, he and I also fitted the pelmet over the wall-boards in G.42 to hold curtains and chart hoists. He used to take my name in vain when dealing with unruly students but I think his best effort was when telling off a small group for their untidiness in the lecture theatre, "You must understand that, in the evenings, this room is used by grown-ups!"

His contribution to the department was very great and he was most disappointed and disheartened when regrading left him with only a Grade 3 recognition. He was worth more but I was powerless to help him and I regretted it very much when, in November 1974, he resigned and went to work for Blick International on Public Address and Communications systems. After a couple of years he changed to another firm, M.D.H., which dealt with hospital related clean rooms and clinical filtration. He now runs his own business in this line with many contracts in the South and the South-West and, I am pleased to learn, is doing very nicely with a full order book.

Mike Gabb joined us in 1968, working first in the teaching labs before moving to the theatres. He remained with me as a good, all round technician until 1977 when, on the retirement of Spencer Havard, Mike took the post of technician to the MSc course laboratories. His great love was, initially, the motor car and he was an Aston Martin aficionado. He also drove an old Bristol on which he lavished much love and care. I used to find bits of cars tucked away in odd cupboards where he thought I'd be unlikely to discover them - but I did! All my 'lads' have been blessed with a sense of mischief and Mike was no exception. At the start of one of his First Year lectures Dr. Parsons asked Mike to set up a certain demonstration on a theatre trolley and to wheel

it in when it was ready. Mike asked if this wouldn't distract the students? Derek Parsons replied that anything that would wake that lot up would be a benefit. They woke up right enough when the doors were opened and the trolley appeared, pushed in by a character wearing a full-head monkey mask!

When the Christmas parties were in their heyday Mike was an excellent stage manager and proscenium constructor. In latter years his interests focussed on hot-air balloons and he helped with the flights of the Bristol University balloon, eventually acquiring his pilot's licence. Mike resigned in November 1987 to undertake flying balloons commercially from a farm property near Alcester with Sally, his wife. How, or if, he managed to remove all his car bits from their various hiding places in the department I don't suppose I'll ever know.

Bill Gaylord, a Canadian of varied talents and experience who had also served in the US Marine Corps, joined me in January, 1978. In November, 1979, Nick Swatton came along as a theatre and general assistant and he, too, is currently in post with Derek Flower. There appears to have been a gap in lecture theatre assistants for a few months before Bill Gaylord came. I cannot account for this now but, somehow, we must have weathered this possible hiatus. It was certainly a period during which the calls upon the demonstration equipment were at an all-time low.

Bill brought with him a certain amount of transatlantic know-how and a great deal of American attitudes typified by their "WALK" and "DON'T WALK" instructions to pedestrians. He was a great one for putting up admonitory notices and taking much pleasure in making sure I would meet with "Please Do Not Smoke" signs wherever our paths should cross. I ignored these; this was before the vile habit of smoking had become the subject of such intense feeling. No-one dared to suggest a ban to Sir Charles Frank so I sailed, as it were, in his lee. I revenged myself on Bill by taking opportunities of telling him stories and jokes which were essentially English and which did not translate freely in the American idiom. With blatant expressions of pity my English colleagues would explain them to him. Bill Gaylord did not, I think, like students very much. They were too undisciplined for his ex-naval outlook and, on one occasion, he tried to institute a one-way system for entry to, and egress from, lecture theatre 1.11. Naturally enough, the students resented this and, in truth, so did I and I made him take the directing notices down forthwith. In July, 1981, Bill sold up in Bristol and returned to his original home in Vancouver where he has set up in business as a commercial and industrial equipment repairer, offering a wide range of technical services with the slogan, "Keep'em Up and Running". He was always able successfully to tackle similar repairs with us and, on a visit to England a couple of years ago, he and Judy and their son, Michael, spent an afternoon with me. I gathered his business was flourishing and he was enjoying Vancouver immensely.

Nick Swatton was interviewed in mid-November, 1979, and the letter appointing him was posted late on Friday afternoon. He was due to give one week's notice to his employer and, realising the letter might not reach him early enough on the Monday for this to occur in the current week, I decided to telephone him at home on the Saturday morning to say the letter was on its way. His mother answered the telephone and I asked if Nick was available. Before I could go on to say who I was, Mrs. Swatton, assuming me to be one of his cronies, spoke to the effect that I could

suppose he was available, there was this apparition in a dressing gown fumbling its uncertain way down the stairs and I should remember it was only eleven o'clock so not to expect him to be fully conscious. I broke in to say that I found all this most revealing and a puzzled voice asked who I was? "My name", I replied, "is Kevin Tindall". There was a moment's silence then, "Oh, my God! What have I done?" and I heard, with evil joy, the excuses of a distraught Mum and her protestations and claims of her son's outstanding virtues. I had just time to say I didn't believe that, either, before Nick took hold of the telephone and I could deliver my message. Re-living the incident kept me cheerful for the whole weekend and, as I heard later, so it did also for Mrs. Swatton.

These were the regular, full-time, assistants who suffered me over all those years. Theatre work formed one of the modules for Trainee Technicians and a succession of these youngsters have passed through the system, guided by my 'lads', since the scheme began. Long may this flourish!

Chapter 9

Lecture Theatre Matters

In September 1980 I delivered a paper at the Institute of Science Technology Conference at Portsmouth Polytechnic. The subject I chose was "The Technician in the Lecture Theatre". I had noticed that, at previous conferences, technicians had presented many papers concerning specialised techniques which they practised in research fields but the teaching element seemed totally neglected. I felt it was time to lift a stone or two and expose the life and times of such people. The following account is a digest of my paper.

Mr. President, Ladies and Gentlemen:

In keeping with the practise of preachers of my experience I wish to open with a quotation from the Good Book - the Bye-laws of the Institute of Science Technology. I quote Number 26; Definitions: (a):- "Words which only import the masculine gender shall include the feminine gender".

The theatre technician is a person of reasonably wide general knowledge and experience in the particular subject being taught, rather than a highly skilled specialist in research techniques. He must be able to accept the routine of day to day lecture programmes, from time to time broken by bursts of activity when demonstration lectures are performed. His work can usually be divided into two parts; term-time daily work, and after hours evening meetings and vacation conferences.

In term-time he will probably have a fair idea of the calls to be made upon his services and equipment and will hold a good stock of chalks, board rubbers, projector lamps, OHP pens and transparencies, etc., etc. He will probably become a 'maggpie' in that he will be loth to throw away anything that might come in useful. Basic routine work is simple, requiring a little dedication. This means seeing that rooms

are ready for use, the lights work, the boards are clean and any visual aids needed are in place.

However, careful attention as described above does not always mean that one remains on top. On one occasion, having checked that the theatre was ready and that the chalk box held a good supply, I was assured by the lecturer (later an Oxford professor) that he had all he needed and I left the theatre. Almost immediately he buzzed for attention. When I went in he said "There's no chalk!" I showed him the chalk box and he protested "There's no full sticks!" One does not ever argue with a lecturer in front of his class. I brought him more chalk and handed him a full stick. He said "Thank you very much", broke it in two and began to write on the board. He had no idea why the class gave him a round of applause.

Demonstrations during lectures used to be a regular feature and kept us fairly busy, not only with the preparation and operation, but also on maintaining current stocks and refurbishing apparatus, frequently constructing new equipment. This is where the magpie syndrome occurs. The newly made apparatus is stored, even though the lecturer whose quirk it was to do things that way might say that he'd probably not want it again. He will, or somebody else will, want it the day after it is dismantled. Unfortunately the tendency has been for fewer and fewer demonstrations and far more chalk and talk. This is a great pity on two counts. Firstly, the interest in that aspect of the work must suffer, and the fact that much of the demonstration apparatus doesn't see the light of day means that younger assistants never see it used and assume that it is old stuff of little importance. I fear greatly whenever my colleagues announce that they are 'tidying up a cupboard' and I insist on seeing what they propose to throw away, often salvaging treasured relics of the good old days.

When demonstrations are prepared it makes very good sense to rehearse them with the lecturer concerned. It might sound presumptuous to assume that lecturers are not capable of performing the demonstrations, indeed, in most instances they put them over with admirable flair, but it is a case of 'know your lecturer'. A demonstration that fails destroys the emphasis it was meant to convey, in some cases can ruin the lecture and cause a great loss of prestige, 'face', if you prefer, for the lecturer. Whose responsibility is this? I suggest that a sensible lecturer will rehearse his demonstration with the technician and will lecture to it while the technician operates the equipment. If the apparatus does not behave, and there will be occasions, then the lecturer should be able to talk through while the technician puts things right. It is his job to do this without fluster and requires the technician to be able to forget his surroundings and concentrate. I won't pretend this is easy but I do hold that the lecturer has more to lose with his students in the case of a spoiled demonstration than does the technician. It is a case of recognising priorities.

The technician is reasonably competent in the use and care of the audio and visual aids in his charge. He should be a projectionist par excellence as this might well constitute a much used skill. If he specialises at all it is likely to be in this field. Audio-visual embraces, of course, tape recorders, sound re-inforcement and closed-circuit television as well as slide, film and overhead projectors, not forgetting our old friend the epidiascope. Nowadays the diasopic function of such equipment is rare since the large format slides are not often seen except with visiting American speakers, and the recent breeds of episcopes do their part of the job admirably. A

Visual Aids Technician, as such, is a specialist in his own field and is a person apart from the theatre technician, although one might well be part of a theatre team.

What I have classed as term-time activities may often include popular Sixth Form lectures for schools. Almost without exception these involve many demonstrations which the speaker will bring with him, frequently bringing his own support team. He may well have provided the technician with a list of requirements to be supplied locally and will certainly need some assistance in setting up his equipment. It is also probable that his lecture is well timed and well rehearsed and it can be a delight to assist him and witness a good lecture professionally delivered. Not all arrive with a support team and I am reminded of the first time Dr. Shaw, of Nottingham, came to the department to lecture to Sixth Formers on "Explosives". He came, unsupported, but with many cases of demonstrations including an old muzzle loading shotgun of noble dimensions. My colleagues and I were to assist him. He explained that he would perform all the demonstrations himself and required us only to stand by with fire extinguishers at a certain point in his lecture. This all seemed straightforward and I settled myself by the slide projector which, in order to leave the board area clear, was at the front of the theatre near the bench and pointing at the corner screen. There were about four hundred school children in the audience and what Dr. Shaw had omitted to tell me was that explosions would take place during his lecture without warning, but would be related to what he was saying. It was the most hair-raising experience of my life! The first explosion occurred in the first minute of his talk and about three feet from where I was sitting. I was told afterwards that I levitated in a sitting position about nine inches. I believe it!

From then on I became more and more shell-shocked until the time came to man the fire extinguishers. This occurred when he soaked a mass of cotton wool, the size of a football, in liquid oxygen. He donned a fireman's asbestos head cover, ignited the cotton wool and shouted "FIRE!". At this stage it seemed quite natural to rush forward with the fire extinguishers and deal with it. His final trick, and I use the word deliberately, was to shoot a wax candle from his muzzle loader across the theatre and through four thicknesses of stout plywood. He had given an excellent lecture and was a first-class showman.

On a much earlier occasion, when detergents were just coming into use, a schools' lecture was given, sponsored by the Royal Institute of Chemistry. To illustrate the effectiveness of detergents as de-greasing agents the lecturer had borrowed a duck from Bristol Zoo. He had it swimming placidly in a large glass tank, placidly, that is, until he added a few drops of detergent to the water and the duck sank. The roar sent up by the children turned the duck's obvious surprise into blind panic and it managed to scramble out of the tank and set off, quacking angrily, across the lecture theatre floor. "Catch it!" screamed the lecturer and three technicians hurled themselves fearlessly at the astonished bird. They missed! Eventually one grabbed it and, forgivably, turned proudly to the audience to display it. The audience was loving this, the more so when the duck shot upwards, out of his grasp, like a piece of wet soap. One man had the sense to throw his lab. coat over it and order was restored. Final honours, nevertheless, went to the duck. The lecturer knew he couldn't return a non-buoyant duck to the zoo and asked the technicians to rinse the detergent from the duck's feathers. They took it to the large sink in the preparation room, three of them took it, two to control it and one to wash it. The duck quietened down under the water

and seemed fascinated by the fast running tap. Suddenly it stuck its beak right up the tap nozzle and, in no time at all, three technicians were soaked to the skin.

Term-time work may well include examinations conducted in the lecture theatres. Technicians might be involved in the setting out of answer papers, possibly assisting in issuing question papers and seeing that candidates and invigilators are settled, but will not be responsible for the conduct of the examination. This is the duty of the academic staff, as is the collecting in of finished scripts. To be on call during examinations is reasonable as the invigilator (usually only one, firstly because the duty is unpopular and, secondly because the authorities are reluctant to pay fees to two invigilators if they can get away with paying only one) may not leave the room unattended. In moments of minor crises, a student feeling ill or needing to visit the toilet, he will use the call buzzer and the technician will respond. The only real difference between our behaviour during examinations and at other times is induced by compassion for the students in their time of stress. We treat them more kindly before they enter the examination room.

Now to consider the other aspect of the theatre technician's job; that of dealing with evening and out of term events. This is not obligatory on any technician although the information given to applicants at interview tells them that meetings will take place in the evenings and that it is hoped that they will be willing to attend to their fair share. They are also told that they will receive extra payment for such services. Preference is given, unashamedly, to those who are willing to co-operate. This reveals one requirement of the job; a certain availability of a person's spare time. Nevertheless, it is grossly unfair, particularly if the theatre technician is the one person in the job, to expect him to devote every minute of his spare time to performing evening duties. If he is a member of a team he will probably do his share quite happily and the only form of obligation imposed is that of honouring a commitment he has accepted. If he is unable to do this he is expected to find a substitute. The question now is, who controls the booking of the theatres? In many cases with which I am familiar it is the administrative secretary to the department who accepts bookings, mostly, but not always, after reference to the theatre staff. This can be dangerous as a meeting might be thrust upon one at very short notice and, to put it mildly, can be inconvenient. Few things are more upsetting than to find one is expected to work on an evening which is already planned for a family or social occasion. Such a system is untidy. The secretary might not be able to obtain an immediate answer from the technician and the applicant for the particular meeting is told "I'll have to let you know". This is not businesslike, it leaves the applicant unsatisfied and it is time wasting for the secretary as she must either write or telephone to the person concerned later on.

I suggest that the senior theatre technician should be the one to say yea or nay to a proposed booking as he should know the daily availability of himself and his colleagues. In my own case I have absolute control over the booking of all lecture theatres and other rooms in the department, subject to any over-riding decision by the head of the department. This applies to all evening meetings and vacation conferences and this authority is a privilege which I guard jealously. Lest you might think I am playing God let me assure you that it entails responsibility also. Firstly, to my colleagues for reasons given above, secondly, to the client that what he is expecting will be provided and, thirdly, to the University that everything is conducted within the parameters laid down by the Registrar, who is the ultimate authority. He it

is who confirms, officially, any arrangements made with the client and it is he who sets the charges made for the use of the premises and its services. He does not bill the client for the services of the technician; this is done directly with the client and is based on the rate fixed by the Registrar and is a projectionist's personal fee.

It is most essential that the technician accepting bookings should keep a diary and keep it meticulously. If double bookings occur they might well be between two societies, each two hundred strong and both expecting the same room at the same time.

It is also essential that the technician knows when to say "No". As decreed by the higher policy in the University certain types of meeting are not acceptable, partly because an apparent sympathy to a controversial cause might bring the establishment into disrepute, partly because the premises do not carry a licence for the public holding of such meetings. He must also be able to say "No" if the requirements of the proposer are beyond what the technician is prepared to provide.

Conferences occur fairly frequently during vacations and are usually somewhat demanding, not difficult, but they require full attention and sometimes require extra equipment at the last minute. A good conference secretary will make sure that the theatre technician is fully briefed in good time. Nevertheless, not all are perfect and the technician does well to open a file as soon as the first approach is made. In this he keeps all correspondence, which should go without saying, and also a diary sheet with notes and dates of all telephone messages and all matters covered on visits, if any, to look over the accommodation.

This is essential, otherwise small, but important details can be overlooked and minor panics arise when one has to rush around to put things right, often when one should be calm, relaxed and ready to start. The most common problem is that of the conference programme not being available until the first session begins. Since this will be the only timetable of events it is important that it be seen by all projectionists in order to let them plan their day and to be in the right place when required.

One occasion which drove home this point occurred some years ago when the theatre staff arrived just before nine o'clock to service a conference assuming it would start, as was customary, at nine-thirty only to find the audience had been sitting patiently, or otherwise, since about eight thirty. The organiser was one of our own professors who hadn't thought to tell us he planned to start at eight forty-five, nor had he provided any timetable of events so we had no idea who would speak, nor for how long. A lesson was learned by both sides.

Some lecturers can generate problems, in particular, when they try to overrun the allotted time and refuse to accept that students have to make their way to other lectures in the nominal ten minute breaks. Out of courtesy, tempered with a touch of self-preservation, first-time lecturers are introduced to the theatre, shown its services and call arrangements and told politely that the lecturing time is fifty minutes, starting from any hour. First offenders are given a limerick:

Outside theatres there's sometimes a queue,
Lectures start on the hour, it is true.

It was always intended
That lectures be ended
Quite promptly, at ten minutes to.

This usually does the trick. Further offences are dealt with as the needs arise. Sometimes one has recourse to the Head of Department or even the Chief Technician!

So, the theatre technician is a person of many qualities; patience, tact and diplomacy, a sense of humour (to help retain his sanity), versatility, ability to get on well with his fellows, endurance, and enjoys reasonably good health.

Is he, or she, a special person? Only in that he, or she, chooses to do this particular job. Otherwise, ladies and gentlemen, the theatre technician is one of us.

*K.F.Tindall
Sept.4th 1980*

Chapter 10

The Student Body

"This would be a fine place to work if it wasn't for the students!"

How many times have I heard this time honoured cry from my colleagues, not only in the Physics department but from several other science departments. It has come to form part of a ritual observed by technicians in moments of stress; the second part of the ritual being a sad admission that the students were, after all, our *raison d'être*.

By the nature of their occupations technicians working in theatres and in teaching laboratories would enjoy closer contact with undergraduates than would their peers in workshops and research laboratories, certainly with regard to first and second year students. Of latter years the third year practical work often meant that students carried out their project work in research groups and the technicians therein would be heard to join in the ritual lament.

A stranger, hearing this utterance, might assume that our relations with the undergraduates were rather brittle. This was not so, and any technician challenged on his remark would probably reply, "They're not that bad, you know. We don't really mean it". In general, our relations with the students were very friendly and some we came to know quite well. There would always be a dividing line; we lived in different worlds and had different interests, different philosophies and different priorities. To us, each fresh intake meant a new crowd of young people to be ministered unto, to be guided in the ways of the laboratory and to be viewed always with just a little apprehension. To them, we were people in white coats who provided sets of apparatus, odd pieces of wire, thermometers, metre sticks etc., but we also represented Authority and spoke with authority, often so as to curb their misplaced exuberance or to remonstrate over their carelessness with the equipment for which we were responsible.

During the early post-war years, when the department was smaller and the student numbers less, it was possible to get to know them fairly well. The whole department was more intimate. The students' mode of dress was more conservative than it is today. It would have been rare to notice a male student without a tie; there were fewer female students but it would also be rare to notice one wearing slacks or trousers rather than a dress, or blouse and skirt combination. This may well have been due to the country's slow recovery from the years of austerity for it was not for several years that the style of student dress would alter, and alter dramatically. Almost without exception, University or Faculty scarves would be sported and our lost-property lockers usually contained half a dozen or so at any time.

A high proportion of the post-war male students were ex-servicemen whose studies had been interrupted by conscription. They had a self-confidence engendered by their experience which contrasted nicely with the brashness exhibited by some of those who had come straight from school. It didn't take long for the freshmen to settle to University life, even before the development of 'Freshers' Squash', sometime known as 'Faffy'.

After the pre-sessional introductions the first duty of the students was to register for the appropriate courses. All undergraduates and postgraduates intending to read Physics would come to the Large Lecture Theatre where a panel of academic members of staff, seated behind the lecture bench, would deal with their enrolment. The clerical operation was always performed by Mrs. Alice Terry who would sit at a small table at the end of the bench. As this table was open-fronted Alice would always remind us, "You won't forget my modesty screen, will you?" Ken used to keep a special piece of stout card to which he always referred, and I report this with shame, as 'Alice's chastity board'.

All the students were assigned, in small groups, as now, to tutors appointed from the academic staff. The tutors' job includes not only the student's individual progress but also matters of welfare, within and without the department. I believe the success of this depends as much on the individual student's willingness to confide as it does upon the sensitivity of the tutor and his ability to deal with matters raised. In the person of the Departmental Secretary, Miss Alice Masters who became Mrs. Alice Terry on her marriage in 1947, there was a confidante to whom many of the students turned. Alice never regarded herself as an 'agony aunt', rather as someone who was interested in the students and who was prepared to listen. By this office she was able to keep her finger on the pulse of the undergraduate life within the department and would, with the utmost discretion, bring to the notice of the Professor those little problems which might, otherwise, grow unnoticed into bigger problems. When Alice retired this most important link was broken and a form of intimate contact was lost.

The effect of this loss was brought home to me one day during the time Professor Pryce was Head of Department. It must have been towards the end of March and, therefore, towards the end of the Spring term when I met a Third Year student, whom I knew, as he was leaving the lecture theatre. He looked glum and I greeted him with, "Cheer up! It can't be that bad!" His response, "We've just wasted another hour", led me to enquire as to what he meant. He told me that the lecturer had been incomprehensible and that this state of affairs had persisted since the beginning of the

session. In effect, the class had gained nothing from the whole course of lectures. I gathered from him as much as I could and said I would see the professor about it immediately, but it was probably too late in the lecturing year for much to be done. I felt, privately, that notice could, at least, be taken of the situation when examination papers were being marked. This lad and his companions would only agree to my doing this if they could remain anonymous. I duly reported all this to Professor Pryce who was, naturally, upset and he asked me why the students had not complained before. I gave the answer they had given me when I asked that question, "We were afraid it might go against us in the examination marking". "What utter rubbish!" exploded from Professor Pryce, "Where on earth did they get that idea?" Where, indeed?, but I believe firmly that, had Alice still been operating as a liaison between long gowns and short gowns, this situation would never have lasted beyond the first three weeks of the session.

For what I hoped would be for the common good I had a little chat with the officers of the Physical Society and urged them to make similar future problems known to us, offering Ken, Maurice, Stan and myself as 'ears'. The great pity of it was, to my mind, that the reason they had given for not complaining had deterred them from discussing it with their tutors. They felt, also, that it would be a little *de trop* to criticise a lecturer to one of his own colleagues. A noble sentiment, but one which they could not really afford.

Another instance gave me reason to wonder how much substance student complaints really had when I answered a bell-call to enter the theatre during one of Dr. Lang's lectures to the First Year. When I went in I found him writing on the board while a great hubbub came from the class. After handing him some coloured chalks he'd wanted I asked him if he was having a break. He told me no, he was lecturing but if they didn't want to listen they didn't have to!

The Student Physical Society was then a very strong body. It operated under a regular constitution and elected its officers and representatives from all student years. Invited speakers would come to address the society on Friday evenings at five o'clock in the Main Theatre and the meetings would be well attended. The formal introductions and the closing votes of thanks would be given with flair by articulate speakers, their performance reflecting well on their earlier education. I note, with regret, that in later years such standards fell. It became rare to hear a speaker introduced in a manner which would serve as an *aperitif* to the main course. Votes of thanks became extremely brief, covering little more than a short "thank you" to the speaker for turning up, as though the 'voter' was eager to get home.

Two Physoc lectures out of the many call for special mention. Professor Buckminster Fuller was visiting Britain and gave a lecture, in the Physics theatre, to Architects and Engineers on his geodetic structures. It was most interesting and Physoc managed to get him to come to lecture to them. It was expected his topic would be as before, indeed, he gave me the same set of slides of which the first was a map of the world. On starting, he called for this but, instead of continuing as before, he talked for an hour on his life and varied experiences, all the while leaving this rather uninteresting slide on the screen. No mention was made of the topic for which he'd been invited.

Once only in my experience did the Physoc have a genuine crank to address them. A certain man from Somerset offered to come and talk. He claimed he could prove the Moon was inhabited and that he could also overcome the force of gravity. The fact that he proposed to bring his assistant, a reputedly voluptuous young lady, might have been an added inducement for Physoc to invite him. He arrived without his young lady and persuaded an innocent student (is there such a creature?) to assist him in his attempt to overcome the force of gravity. He gave the lad a piece of iron to hold, then approached him with something in his hand concealed by a duster. The iron leapt upwards and met his device with a loud clunk, dislodging the duster and revealing a big magnet. Derisive cheers greeted this ridiculous performance and he continued with absurd statements and stories. He 'proved' the Moon was inhabited by claiming that, since one couldn't see any creatures on the side towards us "it stands to reason they're all round the other side!"

The new Students' Union building in Queens Road opened in 1965 and replaced the Victoria Rooms as the centre of undergraduate social life. Whereas the Victoria Rooms had been available to users other than the student body the new Union, necessarily in view of the increase in student numbers, became the prerogative of the undergraduate and postgraduate members of the University. The exception to this was for the use of the swimming pool and swimming tickets could be obtained with ease from the office of the Registrar. Out of Term the building was used for conferences and for dinner parties. Eventually a form of affiliation became available to enable staff with certain interests to take part in functions of appropriate societies. Apart from the swimming pool few of these options were exercised by technical staff, certainly not from the Physics Department. Woodland House remained as the centre for Physical Recreation and the tennis and squash courts have been enjoyed by several technicians.

The opening of the Union was followed within a couple of years by the provision within the Physics Department of the 'Students' Discussion Room', a large basement room in the second phase of the extensions so named to justify its inclusion in the plans. It soon became known by two other names; the Students' Common Room being its semi-official styling, for that was its real function, only to be denied them during periods of University examinations; and, by the cleaning staff and myself, as 'the pig-sty'.

At the beginning of each session I would meet the officers of the Physical Society, now known as 'Physoc', and try to explain, as kindly as possible, their rights and responsibilities associated with the room. They would hear me out, as kindly as possible, and would assure me of their good intentions. These I would always accept but experience soon taught me not to count on success from any of their efforts. A few weeks into the session the senior cleaner would come to see me to complain about the mess in that room. I would point out that mess was their problem, that was why cleaners were employed. We always established a few ground-rules and continued from there. The next shot fired was to tell me that the ladies were allowed only so much time in the room and could not complete the task. This situation used to call to my mind a very old 'Punch' cartoon in which a Rolls-Royce car was being supplied with petrol at a small country garage by an aged mechanic slowly winding

the handle of a manual pump. "Do you mind turning your motor off, Sir? You're overtaking me!"

What the cleaners had to face consisted of three or four empty rubbish bins with what should have been in them strewn all over the room, empty cups having drained on to tables and floor, cigarette butts stubbed on the tables or trampled into the tiles, torn paper and discarded notes, many stuck to the floor by dried coffee. Having inspected the scene I would suggest that the cleaners abandoned the room for a few days and concentrated on other areas to see what happened.

As expected, after two days a deputation from Physoc came to tell me their room hadn't been cleaned. I told them why not and drew a distinction between the natural carelessness of youth and sheer laziness and bloody-mindedness. We discussed the problem. I certainly realised the efforts the sensible, devoted few were making and the difficulties they faced with their unco-operative colleagues. The deputation offered to go down and clean the room themselves but I couldn't have that. They promised greater efforts in future and I persuaded the cleaners to make an all-out assault on the mess with extra time reclaimed from their diverted duties during the previous few days. Mrs. Lucy Wootten was the senior cleaner and Lucy and I understood one another. I expect she kept her Supervisor informed but the little exercise was successful - until next time.

There was set up a Staff/Student Committee to deal with suggestions. I was not ever invited to attend their meetings which I regarded as complaint sessions only; very few sensible suggestions were ever made but these were acted upon. One of these resulted in the rather nice mural decorating the screen room-divider, painted by one of the students; the coffee bar was installed by committee request, a request with which I was in sympathy as I could see it would be of great benefit for conference requirements. I had hoped, however, that it could have been located on the opposite corner of the room to avoid queues stretching back up the stairs causing a hold-up for those wanting the cloakrooms. The availability of water supplies and drains determined its present location.

I was shown the plans and invited to comment. Now, the conditions under which the scheme had been approved specified the use of the coffee bar for beverages, biscuits and wrapped sweets. This was agreed with the students and with the refectory. Soft drinks might be carried such as Coca Cola and the like. It would not be a licensed bar. However, during conferences or staff parties, when an outside licensee might be required to provide alcoholic drinks, it could be so used as students would not be in residence. With this possibility in mind I asked that the bar top be so constructed as to be able, on such occasions, to accept a beer dispensing tap. This evoked an immediate response from the Domestic Bursar reminding me of the conditions of installation, etc., etc. I had to appear in person to explain that I knew what the conditions were, had agreed to them and would abide by them but that I was looking forward to its possible use for non-student requirements. All I wanted was that the bar top be made sufficiently strong, happily it was and all was well. I was pleased eventually to witness its use as I had foreseen.

Before the new Union and the Physics Common Room seduced away our undergraduates the links between them and the technical staff were close and several functions were arranged such as cricket matches, skittles evenings and the annual Physoc Party. This was usually held in the second floor teaching laboratory, courtesy of its Steward, Stan Edwards. There was always a home-made cabaret towards which the technicians were invited, nay, expected to contribute a worthy item. Ken usually produced a script to which we added little bits and we would perform. Great fun it was, too. The Union provided a more natural venue for these activities and our associations with the students were reduced.

In the Spring of 1987 I was delighted to receive a telephone call from Dr. Trevor Preist who was then Head of Physics at the University of Exeter. He had graduated in 1962 and intended to have an twenty-fifth anniversary party at his home to include his particular cronies from his Bristol days. These included Professor Mike Stowell, John Williams, Colin Fisher and a couple of others, all of whom had achieved some eminence in their professions. He thought it would be a nice surprise if Ken, Stan, Maurice and myself could arrive un-announced and join them. Trevor's wife, Ruth, had also been a student at the same time and supported his suggestion. It took a little organising as I was the only one who had not yet retired but we managed it, even bringing Maurice who was not a well man but who wanted not to miss the occasion. Trevor made some excuse to his guests and met us at the motorway service station to guide us to his house. We four donned the familiar white lab.coats and entered upon the party with claims of unfulfilled lab. deposits directed at each guest. The party was a huge success and we four were very happy at having been remembered so kindly. Certainly those early times were halcyon days, we didn't earn much but life was happier.

Chapter 11

The Party Spirit

My first experience of a laboratory Christmas party occurred in December, 1946. Although this was certainly not the first party of this nature to be held in the department I believe it to have been the first such to which the junior laboratory staff were admitted. The topic had been mentioned during a few coffee breaks, but in slightly guarded terms, as I recall. Several weeks had passed since I started work and there had been no sign of any organised tea-club. I mentioned this to John Quarrington saying that I missed my 'cuppa'. He took pity on me and said I'd better join their little club which met each morning in the bottom preparation room outside the Senior Theatre (G.12). It was a small, select club comprising Miss Masters, Mrs. Hapgood, John Priest, John Quarrington, Bill Crompton, Mr. Venn, on rare occasions, and myself. My arrival was greeted with a certain reserve, particularly on the part of Miss Masters, but time, and my careful observation of what I interpreted as protocol, soon allowed me to be accepted into the conversation and to enjoy the departmental gossip.

The coming Christmas party was mentioned, a little cautiously as I was very much a junior member, but, as things turned out, it had been decided by the organisers that all members of the department should attend if they so wished. I was intrigued as to what form a party would take within a scientific department.

As yet I still knew only a few people in the laboratory and I asked John Priest about attending. He was going unaccompanied himself so we agreed to meet in Crockers bar and proceed from there.

The party was a very pleasant affair. We lads tended to huddle together at first, slowly becoming parts of the main proceedings. Coffee and sandwiches made up the refreshments and there was no licensed bar. It was, after all, only 1946 and the promised years of plenty were yet to come. I understood why John had suggested we should meet in a bar before completing our journey.

Father Christmas appeared, of course, and behind his whiskers it was just possible to detect Professor Tyndall. He proceeded to give some appropriate presents to certain individuals whose recent deeds had resulted in some prominence. I can remember only two of these. Miss Littleton, the Librarian, received a large, heavy parcel containing books, all of which were 'overdue'. A French research student, M. Bourion, had recently had a minor accident involving a flash-back from a hydrogen cylinder which meant he attended the party partly swathed in bandages. He received a book on Burns!

From then until 1978 the Physics Christmas Party was a hardy annual and became quite famous within the University. It owed its success to the wholehearted support of the entire department, only losing its momentum, perversely enough, when the department expanded with the advent of the major extensions.

For some twenty years the pattern, once established, became a tradition. In its heydays a friendly publican would be persuaded to obtain for us an occasional licence so that a bar could be operated. Various groups of ladies would organise food which would include turkey, ham, pork, rolls, salads and desserts of all description. The Royal Fort Wives worked very hard to organise the refreshments, as did the female members of staff. In particular, I recall that Dr. Valerie Clapham and Mrs. Mary Herwig gave unstinting service over many years. It was not unknown for the glass-shop to smell most appetising as John Burrow's large annealing furnace was pressed into service to cook, or re-heat, the meat dishes. The professors used to don chefs' hats and carve the joints; other members of staff would fill and hand out the loaded plates and a very good time would be had by all.

The party would begin around half past seven with staff and their guests arriving to meet in the bar area which, for many years, would be in the second room of the Stage I teaching laboratory. Stan Edwards would have cleared the room, as far as was possible, of movable furniture and some of the girls would have disguised its normal function with artful decorations. Just before eight o'clock it would be announced that the cabaret was about to begin in the lecture theatre. This announcement would be ignored, so would the next until, eventually, the bar would close to re-open after the cabaret.

The cabaret used to be the highlight of the whole party with turns and contributions from all sections of the community. The postgraduates could be relied upon for something novel; research groups would occasionally provide something special; various musical members would entertain; individuals would come forward and the technical staff, almost invariably, provided a concerted item guaranteed to bring tears to the eyes and, sometimes, to affect parts further south.

Among the academic staff there were many who contributed to the fun. Sometimes a group of professors would present a sketch of their own. Such records as I have cover only the last few years of these parties and I note that a 'Profs' sketch' featured in three successive years. Other staff provided musical items, comic or semi-serious, among them the name of Dr. Gugan occurs more than once. A great number of contributions came from Mr. David Gibbs who was always willing to play for the carol singing which closed the cabaret, and who entertained us musically with his family on many occasions. To these and many, many more the department owed much for their part in providing good social events to be enjoyed by all.

Among the many, many more must be mentioned some of the stalwarts of the technical staff who performed in a great variety of comedy sketches, frequently written by themselves or grossly parodied from some more serious sources. I refer in particular to "The Highwayman" by Alfred Noyes, and to "The Green Eye of the Little Yellow God" by J. Milton Hayes. Both were so performed that their authors would hardly have recognised the results as being their work; if they had, it is doubtful that they would have admitted to having written them!

Ken Goble, Maurice Rundle, Harry Young, Keith James, Bert Collins, Ken Brine, Jerry Anniss, Stan Edwards, myself and, in the earlier days, Victor MacGregor and Denis Jones all appeared in various guises, sometimes recognisable as themselves playing character parts, sometimes almost unrecognisable as members of a Scout or Guide band, with drums, bugles and countermarching, all within the confines of the lecture theatre. "Can this cockpit hold the vasty fields of France?" quoth Chorus in Henry V. Well, we did our best and the audience's imagination did the rest. I delighted in taking part with my colleagues in the events but, eventually, apathy began to set in and it became more and more difficult to find enough turns to present a reasonably varied cabaret. It seemed that the latter-day postgraduates were unwilling to 'make fools of themselves' for the enjoyment of their fellows. Excuses were offered that they wouldn't know what to do, they had no time, no-one could act, they couldn't sing, they couldn't come up with any ideas, and so it went on. The stalwarts on whom I, as co-ordinator of the cabaret, had always been able to rely had retired and daring replacements did not materialise. So it was, much to my sorrow, that it was decided not to have any more parties of this pattern.

One particular memory stays with me from the Christmas Party of 1972. It had been my habit to have, always, a camera close to hand and I had been able to make numerous 'candid' photographs of my colleagues in moments of interest, the results of which I produced, or published, at later dates to their embarrassment. It was, therefore, only just that I should fall a victim in like manner. One of the sketches in 1972 called for my appearance as a fairy queen. After this performance I was making

my way back to my room to change into normal dress when I was hailed by George Keene. I turned to see him pointing a camera and I adopted a suitable pose. "Don't forget to let me see the results, will you, George?" "Never fear" said George, "You'll have a copy". I forgot all about it until the New Year when I opened a copy of the University Newsletter of January 25th, 1973, to find a picture of myself as 'Fairy Nuff' with Ken Goble credited with the photograph! So was the biter bit!

Not only I, but also Sir Charles and Lady Frank regretted the demise.

My first exposure to involvement in the parties came about in 1947 when I was invited to help and to attend a Christmas Party meeting in the flat of Dr. and Mrs. Frank in Blenheim Road, Westbury Park. They were enthusiastic supporters of the party concept and remained so even after their retirement. I have always been grateful for their encouragement. Indeed, on one occasion in the 1960's so severe an attack of apathy assailed the department that I was unable to gather a team of co-workers, nor were enough people coming forward to provide a cabaret. I voiced my despair to Dr. Thompson who said "Well, why not cancel and see what the reaction is?" This was done. The reaction was an outcry from people who said "We would have come", but they couldn't say this in time for a reasonable estimate of numbers to be given to the caterers. The band, hired to provide music for the late evening dancing, had to be cancelled also. They weren't very happy and claimed contract obligations but eventually settled for compensation.

A very positive reaction came from Mrs. Frank. She telephoned me to say how disgusted she was at the turn of events and that I was not to feel too badly about it. She and Professor Frank would give a party at their house in Coombe Dingle; would I be sure to come and would I circulate her invitations, there being only three days in which to organise it all. This I was happy to do and it was a great success. This was positive action and support!

In the later years the general party area was moved to the new wing where the initial get-together, the food and the dancing all took place in the basement common room, the cabaret being performed in the new lecture theatre. Mike Gabb and George Hitchings performed wonders with stage arrangements, even making a demountable proscenium arch from Handy Angle borrowed from the workshop (and never returned!).

Previously, the parties had used the Stage I laboratories for bar, food and dancing. For the dancing Stan Edwards contrived the removal of all the 'fixed' benches in the middle of the room. He managed to arrange that all electric, gas and water supplies to these benches should be capable of being disconnected and re-connected with comparative ease. How he managed this I felt it prudent not to enquire but it must have meant some pretty devious quid pro quo-ing with the Bursar's staff to achieve the end result. I doubt the Bursar knew about it, either.

Stan was not what is termed a dancing man but he was always happy to make these arrangements and watch the merriment from the side. On one occasion, during a St. Bernard's Waltz, I paused over one of the duct covers for the ritual stamp-stamp of the dance. The duct cover split, gave way and I was suddenly six inches shorter. Stan

leapt into action, heaved me out of the duct, removed the cover, sealed off a small area with upturned lab stools and disappeared, with the broken cover, into his cubby hole. Very soon there came frantic carpentry sounds and, in a remarkably short time, he re-appeared with the cover now securely repaired. He replaced it, cleared his obstructions and said to me, "There, dance your way through that, you clumsy bugger!".

There were many memorable sketches and individual items presented during the parties. Of these one or two are worthy of special mention.

It should be realised that most items were produced and presented by groups or individuals preparing their offerings in relative secrecy so that, while the fact that a contribution would be made might be known to the co-ordinators, the subject and content would not be known until the curtain went up for that particular item. Happily, it never happened that two groups presented similar offerings and this made for additional surprise and interest among the rest of the general cast.

During one earlier party, with the cabaret taking place in the Main Theatre, the lights suddenly went down, a trap in the ceiling opened and a rope ladder came snaking down. There then descended a caving group, led by Dr. John Bates, which made its way around the theatre, aided only by the lamps on the helmets, and commented on the odd 'rock formations' observed in its passage. A full commentary on the progress was provided by the members of this group which, having uttered as a parting shot the words, "Ooh, look! There's a stalagmite that looks just like Professor Mott!", made its way past the astonished professor and disappeared through another trap in the floor of the theatre. The lights then came on again and the cabaret continued.

Dr. Thompson told me one year that he proposed to do a turn at the coming party. "Great!" said I, "What are you going to do?". "Never you mind", he replied, "Just provide me with a small table, a telephone and a bell I can operate with my knee". I relayed this news to my fellow organisers and we speculated as to what he might be up to. "I expect he'll have a smack at the postgrads", reckoned Ken. "No", said Maurice, "He's more likely to thump the Bursar over decorations". How naive we were!

In our innocence (a word which applied more to our belief that life was rosy, rather than to any lack of guilt) we assumed, happily, that our little escapades, our devious tricks, our lack of reverence and our ability as general fiddlers were known only to ourselves and our immediate circle. We had deceived ourselves! From his position at the front of the theatre, before an audience of some one hundred and eighty people, he received calls on his telephone and his answers revealed, to our absolute horror, how much he knew about us and our tricks, and he made great play on this store of knowledge. Backstage comments contained phrases like, "How the devil did he know that?", "By God, he's got your number, hasn't he?", "Who's been talking out of turn?" and many similar exclamations. A rather shaken crew of technicians continued bravely through the rest of the programme but the consensus of opinion was that it had been a damn good turn.

Professor Powell always enjoyed the parties. For a short series we had used short comedy films to pad the cabaret programme when necessary. Prof. was an ardent Charlie Chaplin fan and would urge us, on these occasions, "Get a Chaplin film. It doesn't matter which, but do get one". Sometimes he would offer a monologue, the most famous of which was about a bargee, his wife and his 'orse. To perform this he required a railing on which to lean, a person to address and a glass of beer. On one occasion I was the person to be addressed. Just before we went on stage he turned to me and said, "Oh, I need a glass of beer, can you get me one?". I rushed out to the bar and managed to buy a glass and gave it to him as we went on. Later, talking to Ken, I told him, "I not only had to stand there doing nothing, I had to buy his beer, as well!". Ken replied, "I think he gets all his beer that way. I had to buy him one for a similar turn two years ago".

The last of the traditional full-scale Physics Christmas Parties took place on December 20th 1978. It opened with a flute solo by Beth Aplin, Dr. Peter Aplin's wife, with piano accompaniment by David Gibbs. Then followed Dr. Alwyn Eades who sought, with a colleague, to discover a proper definition of a Physicist. The professors provided an entertainment in which Professor Ziman was a fishmonger and his customers were played by the other professors. The ladies, led by Thelma Young, presented "The Fragrant Garden", a story-sketch of gentle love, with hero, heroine and villain. When first mooted the title was mis-heard as "The Perfumed Garden", which gave rise to some interesting speculation as to its performers and content. Mr. David Gibbs and his sons then gave a recital of light classical music which added a nice professional touch to the programme, then finished off with a rendering of "The Teddy Bears' Picnic". My job in the cabarets had, for years, been that of compère and general filler-in. To fill-in for the last spot on the programme I had a ventriloquist's dummy named Stanley Rungobe who was, supposedly, a candidate to replace Ken, Maurice and Stan who would soon be retiring. He was interviewed on stage. The programme ended with the usual carol singing.

In 1983 a brave attempt was made by Neil Merrett and Nick Swatton to organise a Christmas Party on the old lines. They worked hard trying to arrange a cabaret; a team of caterers was formed and music was to be provided for the after-supper dancing. Posters were displayed, tickets were printed, sellers appointed all to little avail. Two days before the party date only about thirty people had said they would come against a hoped for number of around one hundred and fifty. The old apathy was back. The caterers' job became impossible and the two lads became thoroughly disheartened. They told me they had no alternative but to cancel and I could only agree. Of course, as soon as this was publicised people were saying, "But I would have come", but it just didn't occur to them that planning depended on early knowledge of numbers expected.

I was disappointed for Neil and Nick but only realised how bitter they, and several willing participants, must have felt when what was to have been the last item on the cabaret programme was revealed at the secretaries' and technicians' Christmas lunchtime celebration a few days later. They had prepared this surprise item secretly, hampered in these preparations by my coming upon them in conference and suggesting they should get back to work, not just once, but several times. In desperation they asked Eleanor, who was privy to their purpose, to take me away for a day so that they could finish their evil preparations. Accordingly, we took a day's

leave and I was taken shopping in Bath. I was a little surprised as I thought our Christmas shopping had been completed.

I found out all about it the next day at the Christmas lunch party. I was inveigled out of the room for ten minutes on some excuse or other and returned to find the room partly darkened and everybody seated. Neil met me at the door and proclaimed "Kevin Tindall, This is Your Life!". I then enjoyed, thoroughly, the ordeal they had prepared. Those I had loved and trusted had provided ammunition in the form of personal photographs and stories of incidents in my past. One or two were actually true! All this was presented in the familiar television style by Neil, to the great enjoyment of all, particularly those in the audience off whom I had scored many points in the past. There was no doubt that justice was done, and seen to be done. I had no complaints and treasure the album and tape recording presented to me.

Had the party taken place as planned I have no doubt that this turn of theirs would have made a fitting and memorable climax. I understood, later, that the academic staff, on whose laxity the organisers laid the blame for the cancellation of the departmental party, were barred from attending. Unfortunate, but that was the measure of the prevailing feeling among the technicians. What is more unfortunate is that wounds like this leave scars that never disappear completely.

Parties still continue on a less ambitious but, non the less, enjoyable scale and have been organised by the ladies, secretarial and technical. Long may they continue.

Other parties, too, play their part in the life of the department as, no doubt, they do in most other departments. These include social occasions to welcome new years of postgrads and new staff, to help introduce students, of all years, to the teaching staff, and to bid farewell to those retiring and, sometimes, to long serving staff who leave to go elsewhere.

Chapter 12

Aspects of Technician Training

Well before the H.H.Wills Physical Laboratory was opened it had been recognised within the science and engineering departments, at least, that the young people among the laboratory staff should be encouraged to continue their education.

Facilities for so doing were provided by the Merchant Venturers Technical College, known affectionately as 'The MV' in premises occupying one side of Union Street near the bottom of Park Street. This establishment contained also the University Faculty of Engineering until the opening of Queens Building when the Faculty came up the hill to the new premises. Some of the lecturers in Engineering used to teach also at the evening classes. I can remember being taught mathematics by Mr. Mayhew in 1947 when he would appear wearing a black academic gown, the main purpose of this was, evidently, to protect his clothes from the very dusty chalk of the time. Years later I was to serve under his chairmanship on the Refectory sub-committee.

This system of study was known as 'night school' later to be defined, in somewhat softer terms as 'evening classes'. Studying thus meant that one attended on three nights of the week from 7 p.m. until 9 p.m. with, in some cases, an afternoon class as well. Today such an obligation would be regarded as a hardship but then it was accepted practice. Before 1939 many youngsters left school at the age of fourteen to seek jobs. Those more fortunate, perhaps more determined and ambitious, would be able to attend Secondary or Grammar Schools to study for the School Leaving Certificate, possibly going on to obtain the Higher School Leaving Certificate. These were commonly known as 'School Cert' and 'Higher Schools'.

The most common courses at the MV led to Ordinary National Certificate (ONC) and to the Higher National Certificate (HNC), both of which were worthy achievements recognised and welcomed by possible employers. These certificates could be obtained in several disciplines and would require a minimum of three years of part-time study for ONC and a further minimum of two years for HNC. Studying in this manner demanded great effort and dedication on the part of the student, happening as it did, on top of a five and a half day working week, and made his social life almost non-existent. Despite all this careers were made, outdoor sports flourished, hobbies and interests were maintained and courtships and marriages took place.

At the other end of the scale there were a few craft courses in elementary metalwork and elementary woodwork, attractive to those requiring manual skills and which, naturally, were not so demanding academically.

On joining the laboratory staff in October, 1946, I sought permission to attend a course at the MV. The person who regulated applications and attendances on behalf of the University was Mr. E. Latham, Superintendent in the Department of Zoology. All arrangements were made through him and the University covered the college fees. A great change took place in 1947 with the establishment of the Bristol Institute of Laboratory Technology, the BILT.

The gestation period had occupied several months and conception had occurred as a result of the recognition by senior members of the laboratory staff throughout the University of the necessity to provide, as fully as possible, for the training needs of the increasing number of young laboratory assistants consequent upon the University expansion. An informal meeting of all laboratory staff was held in, I believe, December, 1946, at which the proposals were outlined. Most of the laboratory staff attended and the scheme was agreed to. A title had to be decided upon and much time was spent considering various suggestions. Some were too long, some were too vague until, with a cry born of patient endurance, Mr. Joe Dann, Superintendent of the Department of Anatomy, called out, "Mr. Chairman! Why don't we end this beating about the bush and call ourselves 'The Bristol Institute of Laboratory Technology'? Then we can all go home!" This was greeted with applause and a roar of approval and so it came about. An Inaugural General Meeting was arranged and held in the Geology Department Lecture Theatre at 5p.m. on the evening of Wednesday, January 1st, 1947.

Strong support for the scheme had been shown by the Academic staff and Professor Skene was invited to act as a neutral Chairman at this meeting. Mr. E. Latham was asked to act as temporary Clerk to record the proceedings. After Professor Skene took the Chair and opened the meeting a formal objection was raised by Mr. H. Freke, Superintendent of the Department of Geography, as he felt that the meeting should be in the hands of a member of the Laboratory Staff. At his own suggestion Professor Skene retired from the room while the matter was discussed when it was proposed by Mr. Venn, seconded by Mr. Priest, that Professor Skene be asked to act as Chairman. This was approved by a vote of 66 for, 3 against, and he was invited to continue.

In his introductory remarks Professor Skene reviewed the history of the proposals for the establishment of the Institute saying that certain Academic members of the University together with a few Technical employees thought that it was "high time to put forward a scheme by which suitable training in laboratory arts, with examinations and awards, should be commenced, and that this was welcomed by the Heads of all Departments".

The business of the meeting included the adoption of the proposed Constitution, with minor amendments, and the election of officers. Mr. Venn was elected President, Mr. E.S. Roberts became the Honorary Secretary and the office of Treasurer was taken by Mr. E. Latham. The Executive Committee consisted of Mr. J. Dann, Anatomy; Mr. H. Joiner, Botany; Mr. P. Alden, Zoology; Mr. G. Bryant, Geology; Mr. W. Scott, Physiology; Mr. S. Yorke, Chemistry; Mr. H. Freke, Geography; Mr. F. Bannister, Physics; Mr. H. Darke, Engineering (MVTC); Mr. K. Phillips, Pharmacology. Thanks were expressed to Professor Skene and the meeting closed at 6.10 p.m.

The records show that committee and planning meetings took place frequently over the next few months in order to organise a range of courses in the arts and skills required to provide competent laboratory support. The first courses to be arranged were for the teaching of glass-working skills and the tutors were John Burrow from the Physics Department and Stanley Yorke from the School of Chemistry. These were followed by courses in photography tutored by Ron Gattiker, again from the Physics Department, and in Laboratory Electronics tutored, I believe, by Ron Ricketts of the School of Chemistry. More were to follow dealing with matters peculiar to a given discipline and each course was the responsibility of one or more tutors. A very fine co-operation took place with tutors being drawn from both Academic and Laboratory staffs, with no remuneration sought for their work. Classes were held in the evenings and during vacations. Membership of the BILT called for a modest subscription. Participation in the courses was not obligatory although the Probationers and younger assistants were encouraged very earnestly to take advantage of the opportunities offered.

At one stage great consideration was given to creating a full syllabus with the object of achieving national recognition of the qualifications aimed for in the Bristol scheme. Some extremely hard work and effort was put in to this by many senior people in the University. I cannot remember them all but do recall the work of Mr. Cunliffe in producing a most comprehensive syllabus. There were many who cared as he did and it was not their fault that the concept did not succeed. From what I can

remember, it would have been running parallel to an expanding structure of City and Guilds courses and might have been seen as an unnecessary duplication.

There was much enthusiasm all round for the initial scheme and the classes were well supported. Eventually examinations and tests were held and certificates of progress were awarded. While these gave comfort and pride to the recipients the value of these certificates was limited as the standards set were Bristol standards, not necessarily recognised outside the University, although word was spreading among other universities that Bristol was operating such a scheme and comparisons could be made with their schemes, where they existed.

The BILT continued to flourish, expanding its activities to include visits to places of technical interest. Some memorable occasions included visits to Kodak Laboratories; Richard, Thomas and Baldwin Steel Works at Ebbw Vale and even a trip down a Mendip coal mine.

Because it was a recognised organisation of Laboratory Staff it was accepted by the University as a body able to conduct wage negotiations on behalf of not only its own registered members but for all members of the Laboratory staffs. This function it performed until late 1953 having achieved salary revisions and re-gradings from around 1950. All these agreements had been reached with the Officers of Bristol University and were on a local rather than a national scale. Many members felt that the BILT did not carry enough weight to conduct negotiations aimed at reaching parity with the scales of other establishments and authorities and that such negotiations should be performed by a national Union, the Association of Scientific Workers. The BILT Executive Committee, and Bristol University authorities, resisted this suggestion on the grounds that local negotiation was preferable. The result was that a large number of members resigned from the BILT in April, 1953. Eventually, of course, the Union did become responsible for salary and wage negotiations and the function of the BILT was reduced to organising internal courses, works visits and evening showing of technical films.

It struggled along in this manner until 1961 when the decline in membership caused it simply to fade away. Interest had been lost and it could not recover its initial momentum.

The BILT had been formed to promote the training and education of young laboratory staff and this service, happily, was little affected by its demise. In 1947 the University had set up a committee known as the Joint Standing Committee for Laboratory Staff Training which consisted of an Academic Chairman, four members of the Academic staff and four members from the Laboratory staff representing the BILT. By 1958 this committee was well established and continued to function as before. There were still four representatives from each side, academic and technical, but now the technical members were appointed by the AScW which had absorbed the concern for technician training.

Having become an undergraduate in 1948 and then gone to work in London in December, 1949, returning to Bristol in July, 1951, I was away during the important developing years of the BILT and the SJCLST. I re-joined the BILT and, on

transferring to work with Mr. Venn, became involved, by association with him, in the training schemes for the juniors. I was called upon to assist him in the workings of the Joint Committee and so continued when he retired in 1956. Until my retirement in 1987 I remained a member of that committee, its title changing only to replace the word 'Laboratory' with 'Technical'.

The first Chairman in my experience was Professor Ottaway who served for several years. We came to know one another other than across a committee table and, on occasion, he would invite me down to his office in the Veterinary School to discuss with him sundry matters that had arisen. One which had given us cause for concern was the failure rate among the young technicians studying for ONC. It was necessary that three subjects be studied concurrently; Mathematics, Chemistry and Physics or Biology. All three chosen had to be passed for a year to be completed. A pattern had emerged which showed that, among the fallen, Chemists tended to fail and detest Physics, Physicists to fail and detest Chemistry. Biologists, as I recall, seemed more likely to survive. Passes in only two of the subjects meant the whole year had to be repeated as, more acceptably, did more serious failure. I put it to Professor Ottaway that this system was unsatisfactory since the student's enthusiasm fell considerably during a repeat year and many of them yearned for a less academic course. Under the existing pattern there was no alternative offered by the college. Certain craft courses were on offer at other technical schools and colleges in the Bristol area so some juniors began to attend at Soundwell, Filton and South Bristol.

In 1964 there were changes in the education system which introduced the 'G' course and the 'G*' course. Both these were intended as diagnostic courses to determine the suitability of further education courses for young people. That could also be worded 'to determine the suitability of young people for further education courses'. Although examinations were held in these general subjects the results were not meant to indicate a pass or a failure but to supply evidence on which decisions could be made. However, the youngsters tended to regard examination results as before.

Dr. Willavoys, Head of Science at the Technical College, and a staunch adherent to the National Certificate cause, retired and Dr. Trevor Green was appointed. The local branch of the Institute of Physics held a meeting in the Physics Department to consider the training of technicians in universities, schools and in industry. Hugh Levers, of the Dental School, and I, attended as representatives of the Institute of Science Technology. Dr. Thompson was Chairman for the meeting and had hinted earlier to me that we should attend as we might find it interesting. Indeed we did! At an appropriate point in the discussion we raised the subject of a wider range of courses being provided to suit the needs of technicians for whom the National Certificate syllabuses were not catering. We were prepared to expand the point by pressing for greater provision of City and Guilds Institute courses, some of which were run in conjunction with the IST. Before we could do so Dr. Thompson, from the Chair, said, "I think you should have a talk with Dr. Green who is sitting not far from you. He has plans that will interest you". At the end of the meeting Hugh and I sought out and met Dr. Green. He described his plans for future courses and we were greatly encouraged. City and Guilds courses became available and the success rate with University technical staff increased satisfactorily.

It might be of interest to make note of a conclusion arrived at concerning the inability of many youngsters, considered to be bright, to cope with the first year of ONC. Their complaints to the committee in defence of their failure rate often charged the college with poor teaching. Against this we had to set the success rate of many of their peers but, nevertheless, notice had to be taken and discreet enquiries made. What I believed to be a factor in the matter, and I offered the suggestion to Professor Ottaway, was that many of our youngsters had been accustomed only to middle-school teaching when information was, more or less, pumped into them. Without the leavening effect of sixth-form learning experiences, whereby information was made available for them to explore and absorb, they were unused to the college style of lectures covering only the broad outlines of a subject with the pupil being expected to expand on this by home reading. Whatever the reason, the increase in suitable City and Guild courses provided a partial but welcome solution.

A further improvement in conditions had come about with the establishment of the Joint Committee in that day-release classes became available and the greater part of a training course would be undertaken during the daytime with, in some cases, not more than one evening per week requiring attendance. Where certain courses required attendance on two or more evenings a concessionary half day would be granted, ostensibly to give time for homework.

Adult technicians wishing to attend certain courses were also catered for. Those seeking higher qualifications could be granted day-release and, normally, the costs would be met from departmental funds. Fees for successful examinations would be reimbursed. A very popular course, eventually, dealt with photography and led to an Institute of British Photographers qualification. Bristol did not offer such a course, surprising in such a large city. An elementary course was held at Filton but people wishing to study for higher qualifications had to go to Gloucester College of Art, Salisbury College of Art or to Cardiff. Once, at a Filton College Open Evening, I asked why this should be so. I was told that the authorities in London recognised the need for centres to cater for photography and had looked on a map at the zone to be covered and stuck a pin roughly in the middle. This landed near Gloucester so there it was established and taught to Intermediate IBP standard. Those wishing to progress had to travel to Salisbury or even to Paddington. As travelling expenses could be claimed applicants for the senior courses had to make a very good case for their continuation beyond Intermediate standard. Winter could make travelling and attendance difficult.

The overall administration of the Joint Committee was covered by the Registrar's Office, in the person of Mr. Moon, until the establishment of the Personnel Office when the administration became part of its duties. Patrick Cole was 'our man on the spot' in the early days; as I write, and for many years past, Brian Jenkins has held the reins.

Technical Education Council (TEC) qualifications were to follow some years later, around the early 1970's. Their proposals looked very attractive and I was interested to attend a meeting to hear about them at the Institute of Physics in Belgrave Square, London. My initial understanding of the plan was that individual subjects would be

studied to a required standard and then logged. A select number of subjects so achieved would permit the award of a certificate. The analogy presented was that of a succession of building bricks being assembled until the resulting structure was sufficient to be classified. This, to me, seemed to provide a solution to the old problem of a repeated year, but I was disappointed to find later that the grouping of subjects to form a qualifying block could still call, in some cases, for a repeated study of a subject in which one had already achieved a pass. To adapt the original analogy, one builds a wall with individual bricks; one does not usually cement two or three together before setting them in place.

Apart from outside training at the colleges much attention began to be given to 'on-the-job training' at a more intense level than that which used to be referred to as 'watching old Fred'.

In 1960 the age gradient of technical staff in the Physics department began to appear top-heavy; there were few young technicians and those taken on as Juniors seemed not to remain very long, nor were there many of them. Dr. Thompson discussed this with me at length; the result of our deliberations was a scheme to employ and train a small number of youngsters, four, I believe who would attend suitable college courses and would be appointed to the department, but not to specific groups, as junior technicians on the establishment. They were to circulate, almost as super-numeraries, between chosen locations, spending three months in each place. After fifteen months each would be allocated to a specific group, amicably agreed between the group and the youngster concerned. The scheme received the blessing of the University, applicants were interviewed and four lads were taken on in January 1961. The areas of experience included the teaching labs and theatres, the mechanical workshop, the glass-shop and two research groups and each lad spent three months in each location. It was to be some years before applications from girls were to be usual. This exercise was a 'one-off' and produced a glassworker, a workshop technician and a research technician. I believe one lad left soon after this training period to take a scientific post elsewhere but that was not a bad thing at all. At least we'd been successful in producing a useful technician and they'd had the same right to move to other employment as had any other employee. One of the three, Dick Iles, is still in the department, Bob Morgan, who became a glassworker, went to Warwick some years later and Dick Chappell took a degree and has been teaching since at a local school. From time to time he brings a class to the Schools' Lectures.

Fifteen years was to elapse before a similar scheme, but on a much broader and thorough pattern, was to emerge and this will be described later.

It was long felt that what we usually recognised as "on the job" training was not providing a wide enough range of skills to make a complete technician in a reasonable space of time. The first moves to improve this situation were made by offering, during the long vacation, a series of short techniques courses covering aspects of electron microscopy, glassworking, photography, workshop skills, visual aids and projection, electrical and electronic skills. Primarily intended for Junior Technicians, these courses became very popular with other technicians seeking to broaden their experience or to learn the rudiments of a new skill. Some courses had to be doubled to accommodate the numbers and these continued for many years. In the main these

courses were given by technicians for technicians. Support for the scheme from the academic staff was strong and several lecturers helped to operate certain courses.

College courses on day-release were continuing and the average figures for the last few years up to 1976 show that almost twenty per cent of technicians were attending some form of continued education. In 1972/73 87 juniors and 38 adult technicians took part; in 1973/74 56 juniors and 52 adults attended college courses. Figures for 1978/79 account for 10 Trainees (note a new title!) and 55 adults.

The reduced numbers of youngsters and the altered ratio of attendance happened when a halt was called to recruitment because of teething troubles associated with the introduction of the Common Grading Scheme and this remained while problems relating to promotions and career prospects were being resolved. A new look was needed and in 1976 a pilot scheme for Trainee Technicians was instituted. Entry qualifications were, as before with Juniors, four 'O' level passes, or equivalent, in appropriate subjects. The preferred age would be 16 years, although entrants would be considered up to 18 years of age.

Three were appointed, one male and two female, starting in September, 1976, to allow entry also to college courses. These appointments were not departmental but were on a Faculty basis and the entrants were to spend one year in each of two major departments chosen from Chemistry, Physics and Biological Sciences. A third year would be spent in a specialised field related to the Trainee's interests and potential. The Training Supervisors agreed among themselves as to what skills and experience should be presented where, and they alone were to be responsible for the Trainees' time. The emphasis was very much on training as opposed to 'dogsbody' jobs as progress would be monitored very carefully with an eye to avoiding square peg in round hole situations. Each Trainee was to keep a log which would be inspected from time to time.

On appointment as a Trainee, and subject to the usual probation period, each was assured that a permanent post in the technician structure would be found at the end of the three years of training. Efforts would be made to suit the individual's wishes with those of a particular department. By the early 1980's it was no longer possible to make such a promise of assured employment but great efforts were made to try to retain those who showed good promise.

It is interesting to record that when the scheme was first proposed in the Training Committee some doubts were raised as to whether such a thing was feasible and whether it could succeed. I was very pleased to be able to quote chapter and verse regarding the success of the smaller scheme put in to operation by the Physics department in 1961.

Initial selection interviews were carried out annually by the Personnel Office and the short-listed candidates would be interviewed further by my supervisor colleagues in the Faculty and myself. The calibre of the final candidates whom we saw was high and we were grateful to the Personnel people for their selection. We saw them individually and separately and we compared choices after all had been interviewed.

The reactions of the technical staff with whom they were placed for periods of two to three months over the two first years were most gratifying. The job was carried out with enthusiasm and constructive comments were passed back to the Training Supervisors. Some of the girl trainees started their training in the Chemistry School workshop, to the initial delight of the men therein, and earned great respect by their achievements and thus struck a possible blow for the Women's Liberation Movement. Certain research workers, even group leaders, had to come to terms with the local supervisor's ruling, "No, Dr. So-and-so, you may not borrow young Whatsisname for a couple of days to clean your glassware, nor to tidy your lab. If he comes to you, it will be for eight or nine weeks, please, to learn what it's all about. His turn to clean or tidy will come then".

Adult technicians continued to avail themselves of certain courses of study, some have become Open University students, have been assisted in this by Bristol University, albeit with some reservations when the scheme started, and several have obtained their Degrees.

Isolated courses on certain techniques frequently arise to which technicians may be sent, fully sponsored, to attend. Some are one-day courses, others run for a working week and might necessitate living away for that time. Two which spring to mind have dealt with Argon Arc Welding and High Vacuum Techniques.

Back in 1964 and in view of the coming expansion in theatre and laboratory work I applied successfully to the University to be sent for a week to Leybold's factory in Cologne. This firm operated several courses during the summer to familiarise teachers with the whole range of Leybold teaching apparatus and they ran one English week. I arrived at the Cologne/Bonn airport on a Sunday evening without a word of German. I became so ashamed that most of the locals could speak English to me that I learned a few important phrases as quickly as I could and, with perseverance, I was amazed how confident I became (though still highly illiterate) by the end of the week. The whole class was accommodated in a small hotel near the centre of the city and my first meeting with my classmates occurred at breakfast on Monday morning. I was greeted by a lady whom I knew who was the Physics teacher at Colston's Girls School in Bristol. All my companions were teachers and I was concerned lest I would not be able to keep up in the lectures. I need not have worried; the classes were very strongly slanted towards the practical uses of the apparatus and I found I was the one with the advantage. It turned out to be a most interesting and instructive week, not only from the scientific value and the visits to the instrument factory, also from the insight into the local social life. A number of Leybold demonstration sets now occupy the preparation room cupboards as a result of my experiences with the equipment.

Laboratory experience was not confined to young people and technicians only from the University staff. Frequently, in the schools' summer term, we would be asked to accept pupils from the local schools for one week on "work experience". A highly condensed version of the training syllabus saw them circulating a department in half-day units to gain an insight into the activities. It was most pleasing to see my colleagues accepting these youngsters immediately into our daily life, treating them as

equals and enjoying their company at lunch and coffee breaks. Some displayed an alarming expertise in card games!

At the request of Bristol Polytechnic the University also played host in a similar manner to groups of Commonwealth technicians attending special courses at the college. These folk came to us for a two-week visit and a programme would be evolved to cater for their expressed interests. Discussions with them showed us the many and varied difficulties each faced. Many were restricted by politics, most were hampered in their work by delivery problems with apparatus ordered from Europe. Most of these people enjoyed their work and were fairly enthusiastic. A few, a very few, came from countries where the word 'Mañana' had, as the Irishman said, no equivalent which expressed the same degree of urgency! While chatting with a Nigerian technician I mentioned that a friend of mine was somewhere in that region of Africa. The Nigerian knew the place and said, "He is a near neighbour of mine, it's only about 600 miles from where I live".

It is only right that I should end this chapter with reference to the last course a technician is likely to attend during his time of service. This is run nowadays by the Department of Extra-Mural Studies (or whatever its fashionable title is today) and is on the theme "How to Survive Retirement". Good advice is offered regarding health, pastimes and financial matters and the course is available to all members of the University facing retirement.

Chapter 13

Photography and Photographers

Immediately on joining Mr. Venn in 1953 I commenced my duties as the departmental photographer. The Cosmic Ray group, as it was then known, had its own specialist photographer, Ron Gattiker, who was fully occupied with their particular needs. All other work, except that which was part of a research project by post-grads, fell within my province. For example, X-Ray spectroscopy, photomicrography and optical spectroscopy were lines of research in which the initial photographic processing would be done within the groups. I could be called upon for printing pictures to be included in reports and papers and for making photo-mosaics of micrographs. The basic requirements of slide making and diagram reproduction remained and, of course, increased in volume with the expansion of research and its use of photographic techniques. The original equipment devised and assembled by Mr. Venn had been quite adequate for the previous requirements and now included a few devices, such as a film-strip printing apparatus, provided by Denis White. All this I inherited and set to work, backed up by my own cameras. Soon, though, I was forced to rebuild the enlarger and the copying camera to enable me to work faster and cope with the increasing demand. Ron Gattiker gave me much help and advice but there was then no course available offering technical photographic expertise. The

West of England College of Art operated a photographic course run by Mr. Desmond Tripp, a Bristol photographer with a very successful studio in Whiteladies Road. I attended this course for one afternoon a week over two years and, although the bias was very much towards commercial and advertising photography, I found it extremely rewarding as to lighting and developing and printing techniques. One of my test photographs resulted in a creditable picture of a trilby hat and a pair of leather gloves. That the scientific scope of the course was limited was shown when Desmond Tripp was asked by the College to produce a film-strip for another class to use. Our course had no such equipment and he persuaded me to make the strip as a class demonstration one week. He sat back with my classmates as I got on with it. Did I get a fee? Not a penny!

Photographs of experimental apparatus were often required for reports and to support theses. My camera, although a Soho Reflex quarter-plate camera, had no body movements to correct tilt or converging verticals. I still had one of my earlier cameras, a triple-extension half-plate stand camera, a most unwieldy beast but one which I had found a great advantage in many ways when I had begun to take photography seriously during the War.

I found that setting off somewhere on my bicycle, laden with this camera and only four negatives (the maximum number I could load at a time), and suffering also from the unit cost and great scarcity of such large plates, helped wonderfully to concentrate the mind on the job in hand so as not to waste money, opportunity nor effort.

Attached to the workshop and the teaching labs jointly was a most useful mechanic named Jack Allen. Jack spent his time in a small workshop, now a research lab, opposite the main workshop on the Ground Floor corridor. He rebuilt this camera for me and provided rack and pinion slide movements to give up-and-down, tilt-and-turn, and lateral adjustments to the lens panel and the plate holder. He also converted it to take quarter-plates which were cheaper and more convenient. With this I could roam the building photographing apparatus in situ and maintain reasonable perspective. My practice, for sound reasons I won't go into, was to stop the lens right down to f.64 and to expose a slow plate for about thirty seconds by uncapping the lens. A flair for showmanship led me to obtain an old bowler hat from a jumble sale, to hold it over the lens while the cover of the plateholder was withdrawn, then to remove the hat with a flourish, count thirty, and replace it. My clients would observe this in silence, but it pleased me.

There was nothing remarkable in our photographic achievements that was any different from that of my colleagues in other departments, only the methods might vary between individuals, but two incidents remain in my memory.

In 1955, as part of his glacier research, Dr. Nye joined an expedition to Austerdalsbreen, which flows out of Josterbreen ice-cap, in Norway. During his stay he set a camera on firm ground overlooking the glacier and took photographs at, I believe, about twelve-hour intervals, the viewpoint remaining constant. On his return to Bristol we processed his films and printed the negatives so that register points were maintained. This sequence of prints was then made into a 16mm film by exposing two or three frames on each print. This was a little tedious and the work was carried

out by Dr. Nye and Alan Birt. The result was a most impressive time-lapse film sequence of glacier flow. Although Alan had grumbled at the time it took to complete the filming he admitted later that he was pleased to have been associated with the project.

Professor Frank came to the darkroom one day to introduce Dr. Lang as a visitor to the department who was to stay for a few months. He told me Dr. Lang had a negative from which he wanted an enlarged print and Dr. Lang handed me the negative. I examined it to assess what exposure and paper grade it might need. The subject was an etched crystal surface showing grain boundaries. Apart from a little shading to even up the print it appeared a straightforward job and I said I would make his enlargement that morning. Instead of leaving the negative with me he said he'd let me have it the next day. I asked him to bring it early as I had a batch of slides to make for someone going abroad. He brought it about mid-morning the next day, but it was not what he'd led me to believe. To understand the new problem a little technical explanation is necessary.

There was a printing method sometimes used for architectural subjects and occasionally for a very special portrait effect. One makes a well balanced negative, usually on glass, of the particular subject and then, again with a glass-based emulsion, one makes a contact print developed to the same tonal range as the negative. If these are placed face to face in perfect alignment one has a sandwich of photographic material uniformly dense, even opaque. A slight displacement between the two allows density boundaries to show and, used as a negative, can produce a distinctive print, almost a line sketch. It is a lengthy printing process and it looks like bas-relief, but it isn't that. True bas-relief, produced photographically, involves a slow physical build-up of the developed image itself. Such a near-opaque sandwich negative was what Dr. Lang brought me.

Long exposures at low light levels are affected by what photographers know as 'Reciprocity Law Failure'. Bunsen and Roscoe's Law of Reciprocal Exposures states that the product of a photochemical reaction is proportional to the total energy involved, i.e., the product of intensity and time, and is independent of the absolute value of either factor separately. In practice, the Law is generally true with exposure times between one second and one hundredth of a second. Beyond these limits the Law is definitely not linear. Determining the correct exposure demands an inspired guess and a series of test exposures. I began with a two minute test which was useless, no image appeared at all. I started to get a trace of an image after a twenty minute exposure and after successive tests, all for increasingly long exposures, arrived at an exposure time of fifty minutes. After this the final print had to be made; another fifty minute exposure. Altogether it had taken most of the day to produce one print which, had it been made from the negative as it was first shown to me, should have taken me no more than five to ten minutes, allowing for shading. There were still the slides to make which I had promised and which task took me well into the evening to complete. While the long exposures were being made the darkroom was effectively neutralised. I delivered the print to Dr. Lang, dared him to find any fault with it, and said, "Don't you ever try a trick like that on me again!" I have never forgiven him for this.

A man who was very particular about the quality and standard of his photographic work was Dr. J.W.Mitchell. Since his research was into the structure and mechanism of the photographic emulsion this was not surprising. He had a reputation for being a hard man, certainly he was very strict with his postgraduate students and demanded 100% effort from them. I learned to reach his exacting standards with regard to slide making and to accept his occasional criticism, "No, no. That hasn't sufficient contrast" without resentment. I respected him, slightly from afar, and on one occasion, when he was preparing material for a conference in America, I found myself making slides for him up until 10.30 one night. I was quite happy doing this as I knew that he would be in the laboratory until about 3 a.m. preparing material for me to finish the next day. His manner in his dealings with me earned my full co-operation.

In 1954 photographic pressure was relieved when Miss Jean Robinson joined the Polymer Group as a photographic technician. Jean was a jolly lass and a hard worker but, even in those days, perhaps more so in those days, darkroom space was at a premium. A rarely used toilet at the back of the building was made usable as a darkroom and she occupied this until it had to be demolished for the new construction work. She moved then to a little used toilet at the other end of the Ground Floor, outside lecture theatre G.12. This had, as a relic from its war-time use, a bath which occupied half the floor space. A table top was fitted upon it and it served for a time as a bench. It was only when the new building was ready that we could answer her plea, "Can't you find me somewhere that isn't a lavatory?". Until Jean left in 1973, and Don Reed took her place, she had been one of the stalwarts of the Christmas party and other social events. Her friend of long standing came to help Stan Edwards in the First Year teaching laboratory. This was Thelma Sweet who married Harry Young, then in the workshop. Thelma has been the steward to the Third Year laboratory since the move to the new wing.

Also in 1954 Ron Gattiker left Bristol to join Kodak Ltd., spending some years in Salisbury, Rhodesia, as it was, before returning to work in the Kodak Laboratories at Harrow. Bill Harbor, from the workshop, decided to turn his photographic hobby into his profession and transferred to the Cosmic Ray group to continue Ron Gattiker's work. Bill retired in 1986.

Several new darkrooms were built within the new extensions. The Second and Third Year teaching laboratories each had one to answer student needs; the MSc laboratory had an associated darkroom; the room on the Mezzanine floor originally intended for Tony Philpott was used by the Electron Microscopists until it was re-designed to accommodate an electron microscope; a room on the Fourth Floor was planned as a darkroom but became, instead, an office and is the only office in the building with a floor drain to guard against flooding. George Keene and I moved to a new darkroom on the First Floor (I was still exercising an interest in photographic work in 1966) and the older darkrooms were disposed among research groups. The need for better space resulted in George Keene's moving to a purpose built unit within what had been the old stores which allowed him studio space as well as a more versatile darkroom area.

During this era I have seen large negatives give way to small negatives, a change made acceptable by the improvements in emulsion manufacture resulting in fast fine-

grain material; a change from glass plates to sheet film; another change, which I regretted, when 35mm transparencies replaced two inch square glass lantern slide material, since this reduced the projectable image area by 33% and forced the image into a rectangle, if not reduced further by masking. Added to these changes have been improved printing materials and rapid processing techniques, improvements in colour transparency films and a great expansion into colour work in general.

Before the arrival of the first generation of photocopiers the reproducing of documents was a fairly laborious process. Ignoring the time-honoured way of copying parts, or the whole, by hand which could introduce errors of omission or punctuation which could lead to mis-interpretation and confusion, there were two preferred methods, both involving photography. The first method was that of Reflex Copying in which a sheet of specially sensitized paper was placed, face down, on to the original document or book page, held flat with a glass cover sheet, and exposed to a strong light from above. The sheet was subjected to wet development processing and dried, resulting in a negative with white lettering on a black background, but with a mirror-image of the original. Legible copies were then made by placing the negative, face down, on a second sensitized sheet, face up, keeping them pressed together with glass and exposing again to light from above. Each print so made needed wet processing as for the negative. In material terms the cost was low but the time involved was considerable.

One great advantage of a copying system was its benefit to the University libraries. Hitherto, requests for book loans from other scientific libraries had meant that relevant volumes were sent, by parcel post, for perusal. Postal charges were rising and the host library would be without its books for the duration of the loan. Apart from the time the process took there were other disadvantages. The copying and development process required a semi-dark room. The material was, necessarily, light sensitive and it meant that suitable trays of development fluids had to be available, and washing and drying facilities were needed. It did not demand great skill but patience and thoroughness were essential. Whilst a sheet diagram was easy to keep flat, and would give a sharp reproduction, problems arose with copying from bulky bound volumes as the fierce curvature into the spine of the book inhibited even contact and exposure. A swifter method involved camera work using 35mm microfilm to photograph directly the information requested. Processing was faster and the roll of negatives could be printed fairly quickly. For a single sheet request a photographic plate exposed in a copying camera was used.

The first desk-top copier in the department was a Kodak 'Verifax' machine, still a wet process, but a complete system with its own light source and a graded cover plate to even out the illumination. A matrix negative so produced would yield an average of eight legible copies before a new matrix would be required.

The first dry copier system was the Xerox process. This used carbon powder, a strong electrostatic field and heat fixing for the positive image. Because of its application of electrostatic principles it served as a practical topic in lectures on electrostatics. I was present at one of Dr. Jack Mitchell's lectures to the Third Year Honours students when he, having recently visited America and witnessed the process, quoted this instance. I remember, at the conclusion of his explanation, his

informing the class that the scheme had a very promising future and he advised them that the Xerox Company represented a very sound financial investment. I wish now that (a) I'd had some capital and, (b) that I had taken his advice. Soon after this an exhibition of reprographic systems was held in the Grosvenor Hotel, near Temple Meads, which I visited. There the Xerox system was being demonstrated; the machine was enormous and the engineer operating it was answering questions about its copying speed, cost per copy and hire rates. At a quiet moment I asked, somewhat timidly, what the potential was on the charged wire. He became transformed! This was, apparently, the first technical question he had been asked and he welcomed it. For the next twenty minutes I was given a detailed account of the workings, panels were removed to show me the intricacies within, all this accompanied by an enthusiastic explanation which left me reeling. Meanwhile, several commercial visitors paused, listened for a minute or so, then passed on, shaking their heads. I was wont, later, to advise my colleagues, "Ask the right question; you'll be amazed at the results!"

Our first direct copier was a Xerox desk-top machine. As a forerunner to the later larger, and faster, copiers it was quite successful, with one slight disadvantage; it produced copies about 10% smaller than the original. This didn't really matter with written work but it meant that full-size diagrams were not reproduced full-size.

The performance and possibilities of today's copiers are well known but the development of the reprographic art took place within my experience. In a full history one would have to include all duplicating systems from carbon paper, through the old jelly copiers, the Gestetner system, even the John Bull printing set (one of which I kept in my desk for making repeat entries in the official diary!), to the off-set litho printers. A litho system was installed and operated by Maurice Rundle who became very proficient and would produce sets of examination questions, laboratory information sheets and file-bound copies of special reports. This work he coped with in parallel with running the 1st MB teaching laboratory-cum-lecture room. He was most conscientious in these duties and worked well beyond the statutory weekly hours to complete his tasks on time. It would have been ridiculous for him to have taken time-in-lieu, indeed, he didn't want it, and I was pleased to see him receive ex-gratia payments. On his retirement in 1983 all this work was taken over by Miss Marianne Pearce who now occupies the room which had been Mr. Venn's and, for my early years, mine.

It was not only the Physics Department that required copywork. Almost all University departments had the same needs as my contemporaries would, doubtless, vouch. The Inter-Library Loan scheme operated with all the libraries in the University. Having, then, no technical staff the Arts Library was at some disadvantage and would request assistance, cap in hand, from departments better blest.

As the number of requests and the consequent volume of work increased it became necessary to look for a more suitable solution. The matter was of sufficient importance for the Vice-Chancellor, Sir Philip Morris, to be concerned. After some negotiations a young technician in the Department of Zoology, Tony Philpott, who had some photographic expertise, was seconded to the Main Library for this work. It

was arranged that he should be based with the Medical Photographic Unit situated in the Bristol Royal Infirmary, the unit being part of the University. He was to fulfil the copying requirements of the Library and, when not so employed, to assist the medical photographers. The scheme didn't work. The Assistant Librarian, Mr. Joe Lightbown, found difficulty in getting the necessary work carried out and enquiries revealed that the original proposals were being reversed; Tony was not being given the books to copy when they arrived, instead, he was only able to photograph them after working for the medical photographer, often not receiving them for several days. This unsatisfactory situation was referred back to the Vice-Chancellor who approached Dr. Thompson to ask if the Physics Department could take Tony Philpott under its wing and ensure that the work could be carried out as proposed, again with the department benefiting from Tony's services when no copying was required. Apart from library copywork he was to make 35mm slides for the Arts Faculty.

Dr. Thompson asked me to accommodate Tony Philpott and to supervise his photography. Mr. Lightbown would send books needing to be copied to me for Tony's attention. Tony came to us, we found him a suitable darkroom, books and slide requests arrived and he commenced operations. As ordained, I monitored his performance for a couple of weeks until it became obvious to me that he was quite capable of working well without my interference and I arranged with Mr. Lightbown that such work as was needed should be sent directly to Tony. He certainly wasn't ignored, I met with him regularly, he took coffee breaks with us and was accepted as one of us, carrying out a good number of photographic commissions for the Physics Department. Such was this acceptance that he was still with us when Phase II of the extensions was commenced. A small darkroom on the new Mezzanine Floor was designed internally by me to cope with his particular copying needs. As things turned out he never used it. Just before the finished Mezzanine Floor was handed over Tony left us to join the Department of Geography where he now provides a most comprehensive photographic service. Like many others he came to us as a young lad and left as a valued colleague and friend.

A few months after Tony first came under my care I was pleased to be invited by Dr. Thompson to share a commendation given him by Sir Philip Morris on the very successful outcome of the arrangements.

Chapter 14

Projectors

Slide projectors were well established and familiar pieces of equipment, having been in common use since the late nineteenth century, but only in the larger formats. The regular English slide size was 82.5mm by 82.5mm but it was necessary to have projectors able to accept American slides, 82.5mm by 100mm, and Continental slides of 85mm by 100mm. The now popular 35mm slides (50mm by 50mm outside dimensions) were appearing slowly, but their usage was accelerated by their comparative lightness. The air traveller's weight allowance in those days was small and saving a kilogram here and there was much to be desired. A typical batch of the larger slides, sufficient for a good conference paper, would weigh about 1500gms.

The same quantity on the smaller size would weigh only 500gms. If they were card mounted, rather than between glass, the weight dropped to around 100gms.

The projectors themselves were physically large; light sources were either carbon-arc or special lamps of up to 1000 watts. Few had any forced cooling so the lamp housings would become too hot to touch and slides left on the screen too long made their safe exchange a chancy business.

The Physics Department had three projectors. All were epidiascopes and were capable of projecting slides quite brightly and, in the 'epi' mode, of projecting pictures or book diagrams quite dimly.

In the main lecture theatre was a Zeiss arc-fed epidiascope of noble proportions. It sat at the front of the theatre aimed at a screen mounted across the corner. It received power via cable connections to terminals in a small floor-trap which supplied 115 volts D.C. directly from the main battery. It required constant attention while in use as the clockwork mechanism for advancing the burning carbons had been discarded sometime in the late 1920's owing to the distracting ticking and clacking noises it made. Consequently, the operator had to strike the arc manually and maintain a quiet flame for the whole of a session of slides. If neglected, this machine hissed angrily until adjusted. To protect slides from the intense heat of the arc the light passed through a glass-ended tank which would hold two litres of distilled water. That this was effective I once discovered at the end of a long morning conference session. I saw steam rising from the tank vent.

In the small theatre was an Aldis epidiascope, in many ways a more versatile instrument although the illumination was less, a mere 500 watt projector lamp, but which still became very hot. This machine had a gap between the slide holder and the projection lens into which items could be inserted and their silhouettes projected. It also had a second lamp housing which clipped below the episcopes window.

The seminar room on the third floor, incidentally, the only room on the third floor belonging to the Physics Department, held a Ross epidiascope, again with a 500 watt lamp, but not as versatile as the Aldis.

The rest of the third floor was then occupied by the Mathematics Department; even the Maria Mercer and Exley Library was a shared facility. When the mathematicians moved to the new Queens Building the Exley part of the library moved with them and the Maria Mercer Library expanded down the corridor to its present size.

There were two film projectors in the department after the war; both were obtained as war-surplus material at the probable cost, in those days, of 6d per pound weight! One was a GB-N standard 35mm film projector installed in a projection booth behind the large theatre and which replaced a previous model. I have no experience of the earlier machine but the GB-N I operated for some years. The original operators were Jack Mahoney, Electrical Foreman, and Len Price, a carpenter. Len had been in the Army as a projectionist with the Crown Film Unit and Jack brought his electrical skills to keep it running. It was an awkward machine to drive, the positions of the projection ports made it difficult to see the screen and adjust the focus at the same

time and films would arrive unspooled, as was the standard cinema practice, and needed winding on to our spools for loading. Film lengths used to be quoted as a number of reels, each reel representing ten minutes show-time. Our spools held two 'reels', equal to 2000 feet of film, and ran for twenty minutes. After each spool the projector had to be reloaded which meant a two minute break each twenty minutes during a performance. I grew to hate it and welcomed the arrival of a similar machine which was sited in the large Engineering Lecture Theatre in Queens Building, under the care of my colleague, Ron Foot. Came the happy day when Ron said he'd been offered a second machine being disposed of by an advertising film maker in Bristol and would I go with him to see it? The projector was in good condition and at a reasonable price so I urged him to snap it up while he could. He did, and I was delighted for I could now divert all requests for 35mm projection to him for, with two parallel machines, he could achieve continuous projection.

The other film projector was an Amprosound 16mm unit originally built for the American Army. It needed some modification to enable it to operate properly with British electricity. In America the A.C. mains is generated at 60 cycles per second; in Britain at 50 cycles so the motor drive pulley had to be altered. This was done before I came to operate and when it was in Denis White's charge. It gave very good service for some years before it began to wear out and was replaced in the early 1960's with an up to date machine, a Bell & Howell 630D.

Student film societies were our most frequent customers and to cope with the demand for continuous showing a second machine and operator would be brought in. The Geography Department had similar equipment and their projector and ours would be set up on the back row of the theatre and run as a tandem pair. It was through this work that I first met A.G.W.Moon who was then a technician and administrative assistant to the Professor of Geography. He and his colleagues, Harold Freke, the Geography Superintendent, and Graham Hutt, a technician, would take it in turn to operate on these occasions.

With the expansion of the Physics Department it became necessary to equip the new lecture theatres and a pair of Filmosound 16mm projectors were purchased. With a suitable link unit it was now possible for one man to operate both machines for uninterrupted showing of a feature film. A full-length film usually came on three spools ready for loading, each spool running for up to forty minutes. The new projection room behind the new large theatre made life a lot easier.

One change I had been able to bring about in the old large theatre had been to have the two projection ports replaced by a wide window. This meant that all projectors could be operated from the projection room, away from the audience, and was of immense benefit during conferences. I had also installed, with the help, at different times, of Terry Gorman, Stewart Field and Mike Gabb, a multipoint relay system to control the auditorium lights. For nearly thirty years the theatre lights could be controlled either from the bench or from the back row, but not from both places at the same time. Our system was extendible and allows the lights to be controlled from the bench (at three points), from the back row and from three locations in the projection room. A similar facility was installed in the small theatre. When the new theatres were being designed such a system was included for the large theatre (G.42).

Slide projection always looks easy. So it should; if it looks difficult something is wrong and, what is worse, the audience is distracted. One advantage of a projection room location is that panics can be endured in moderate privacy. Today, with the modern magazine-loaded, semi-automatic projectors, the important parts of the job comprise the setting of the machine to point at, and fill, the screen with a correctly focussed image and making absolutely sure that the magazine is loaded properly, with all its slides inserted correctly. There are eight ways in which a square slide can be fitted into a square receiver. Only one way is correct. Just as the camel is believed to know the hundredth name of God so is the projectionist supposed to know the right way to load a slide. After this is done it is a matter of pressing a button to change the slides. Often this is done by the speaker himself, remotely, which has the advantage of eliminating the call of "Next slide, please"

The modern international method of marking a slide calls for one spot to be placed at the bottom left-hand corner of the slide mount when the slide is viewed as it is to appear on the screen. Before this method was established there were at least three conventions of spots, or white strips, and speakers used whichever appealed to them. This meant that every batch had to be examined to determine the orientation.

Before the magazine system came along each slide had to be loaded individually, projected, and changed. Nearly all projectors had a transverse slide carrier with one slide on screen and one ready to be slid across. The one just shown would be replaced by the next in sequence while the 'ready' slide was being displayed. When the change cue came one pushed the slide carrier across and repeated the process until finished. Care had to be taken that the last slide wasn't overlooked and left in the projector.

This performance meant that the operator had to stay alert and that any mistakes, such as a slide in upside down, had to be corrected quickly and calmly. Sometimes the lamp would burn out and it could be agony to remove since it would be very hot indeed!

In my thirty-five or so years experience as a projectionist I must have projected countless hundreds of slides of all sizes and types, mostly without anything memorable occurring. However, three occasions dominate my memory.

At one Galenicals meeting the speaker was a Home Office pathologist, Dr. Francis Camps, who came to describe his work. The more morbid the subjects of the Galenicals' lectures, the more entertaining their speakers tended to be. Dr. Camps was no exception and this was one of the occasions when, as projectionist, I was able to develop a rapport with the speaker, anticipating his request for "Next slide, please", so as to be ready and perform a neat change of picture. He was talking, at one stage, about the Christie murders where body after body was discovered behind false panelling in a cupboard. His flow of words was such that I was in tune with his thoughts and matched his commentary with slide changes without any need for the customary cue call. After the first couple in this particular series he nodded approval at me and we continued like that right through his description, which would have been spoiled if his flow had been interrupted. At the end of the account the audience

applauded our teamwork and he and I met there and then, in the middle of his lecture, and solemnly shook hands.

Professor Piper and Mr. Gibbs were both involved in Civil Defence as Scientific Intelligence Officers. Some of the training sessions were held as simulation exercises and a script was prepared to demonstrate procedure using special message forms bearing the continuity information. I had made for Professor Piper several filmstrips of some forty frames of the message form contents so that these could be projected to a class while the exercise was being enacted.

One day he told me that such an exercise was to be mounted in the Drill Hall in Whiteladies Road for the benefit of senior officers of the Forces and would I please take a projector to the Drill Hall on a certain Saturday afternoon. We had then risen to an Aldis 1000 watt 35mm slide projector and, as the exercise was codenamed "Four Horsemen" I deemed it appropriate to borrow a copy of Dürer's engraving from the main library to make into a slide for a frontispiece.

I arrived at the Drill Hall to find they had erected a large screen to the side of the 'stage', but the hall had no blackout. I warned the organiser that this might be a problem and agreed to overrun the lamp as far as I dared. The audience came in, consisting of very senior officers, loaded with gold braid and red staff tabs. The most junior appeared to be a colonel and they sat on tiered seating arranged behind where I had the projector. After the introductions I switched on the machine and showed my Dürer slide. Low mutterings of "Oh, I say, jolly good!" came from the audience and the play began. The first few messages-cum-slides depicted increasing levels of Alert, then a messenger came running in, waving his message form and shouting, "Nuclear incident over Birmingham!". I changed to the appropriate slide and then it happened!. The lamp blew! It didn't just expire with a phut, it exploded with a loud BANG! and glass splinters shot upwards out of the top of the lamp-house. With one hand I pulled the connector from the rear of the projector, with the other I covered my head against the descending glass. I then looked round apologetically to the audience and there wasn't a man to be seen! Every one of Britain's finest fighting men, as represented by those present, had taken cover immediately! They climbed back to their seats, looking a little sheepish and very dusty, and the organiser came over to say, "I suppose that's it, is it?". I said, "Give me five minutes and we'll see". Luckily, no fuses had blown and I dug the remains of the lamp base out of the projector and put in a spare lamp so we were able to continue, but with the lamp decidedly not being overrun.

In the late 1960's an international Orthopaedic Conference was held in the Main Lecture Theatre. Among those billed to speak was a Travelling Fellow. This term intrigued me and I was almost expecting a strolling player, or a mummer, to appear. When he eventually arrived he turned out to be a perfectly normal Canadian surgeon, normal, that is, until he handed me a box of 35mm slides and said, "There're ninety-two slides there, and I've got eight minutes. See what you can do!" Stewart Field was with me in the projection box, he stood behind me and caught the slides as I pulled them from the carrier and tossed them in the air, the change slide buzzer was almost a steady buzz and I have no idea to this day what the subject of the man's machine-gun delivery was all about. But, we finished as he did and the audience roared its

applause. Whether they followed his talk I do not know. This man came to collect his slides immediately afterwards and said, "That was damn marvellous. The Yanks can't touch you!" The ultimate Accolade! It was not a performance I would ever seek to repeat and it could not have been achieved using a modern magazine projector.

Slidesmanship, as I like to call it, took me all over the University over the years and I made many friends in other departments, mostly among the academic staff for whom I would be working. For several years I used to go to Wills Hall on a Sunday evening during Summer Schools to show films for the entertainment of the adult students. When the Senior Common Room moved to Senate House a film club was formed and I projected films on Monday evenings, managing to persuade the Bursar to lay a permanent loudspeaker cable to avoid the danger of long wires stretching out through the audience. The growing popularity of television took its toll of audience numbers and such shows gradually ceased, not only in the SCR, but in Halls as well. The Student Film Society (Bristol Student Films) kept going until about 1988, then it, too, felt obliged to give up.

This had been a very lively society in its time, not only presenting films, classical and commercial, but had also produced several shorts. In 1956 it held showings fortnightly, soon to become weekly, then continued with showings on Tuesdays and Thursdays in term until its demise. When the new Union was opened they left the Physics Department to hold all showings in the Winston Theatre. This didn't work out as the Union management could not offer them the same night every week and they would also have had to stand down in favour of stage productions, so they came back.

Incidentally, the Union opened for business a week or so before the resident electrician-cum-projectionist took up his appointment and I had the distinction of projecting the first film to be shown in the new Winston Theatre.

In the 1950's and, indeed, through to the early 1960's there were few experienced projectionists. Of those some were attending evening classes at the local technical colleges and thus had limited free time. The demands for our services were increasing and it was not uncommon for us to act, mutually, as locums in one another's departments. A scale of fees was determined by the Registrar and was quoted on the back of the Room Booking forms. These were not wage related but were flat fees and were thus more attractive to the junior technicians than to the seniors. As I moved up the scales I often wondered why I bothered but, as with many aspects of University life, I enjoyed the work. It was time-consuming but not arduous and, as mentioned previously, it took me all over the place and exposed me to wider experiences.

In 1953 the fee was set at five shillings (25p) per hour with a minimum payment of ten shillings (50p), but if the duties commenced immediately on the finish of the daily stint then the first two hours brought in only seven shillings and sixpence (37.5p). These rates were increased by the same percentage as salary scales rose on reviews. This produced some very odd figures for the hourly rate for projection duties. I remember quoting the current rate to a man who had called to discuss with me details regarding an evening lecture he was arranging. His reaction was, "£1.98 an hour?"

What clown thought up a cock-eyed figure like that?" I told him it was probably the same clown who thought up all the other cock-eyed figures. Whoever he was, he was still at it in 1987, never giving a thought to rounding the sum off, preferably upwards, to give it at least some semblance of a professional figure.

When the extension to the Physics Department was being planned consideration had to be given to the projection facilities in the new theatres. I studied catalogues and visited a couple of Visual Aid exhibitions armed with the appropriate dimensions of the theatres to find equipment suitable. It was still essential to allow for big slide projection as many speakers were using their old British sized slides and, of course, we could expect a good few American visitors with even larger formats. With the trend towards 35mm slides machines to cope with the larger ones were going out of production. The only one I found to fit our bill was a Leitz 4BL, an excellent piece of equipment though with a slightly tedious system of slide changing which necessitated loading each slide into a wooden carrier and inserting this through the projector. This apart, it would give the required performance and it cost £130, a reasonable amount, even in 1964. This machine was specified for the estimates.

Two years later, when the time came for purchasing, I found that this projector had been discontinued and replaced by an improved model. The new unit had two projection lenses to allow its use under different projection conditions and now cost £330. For what we wanted it would be similar to using a Daimler saloon as a town run-about so I began to look elsewhere. There was no commercial alternative but a suitable projection lens of 16 inches focal length was available from Johnson's, who marketed a range of optical equipment. Stewart Field and I decided to buy this lens and build a projector to suit. The lens and its mount cost £70 and we managed the rest within our original budget figure. The design was tailored to allow the projector to sit at one side of the open projection booth at the back of the new small theatre, leaving the rest of the platform area free for other machines.

35mm slides were projected with Aldis projectors or Leitz 'Prado' projectors, all of which were of the push-pull pattern requiring the slides to be put in one at a time. Mr. Jack Greenland, of Messrs. Salanson, continued to woo me with a view to selling me a Kodak Carousel projector but I resisted for some years. The reason for my stubborn refusal lay with my firm belief, and one which I hold even today, that a slicker performance is possible from a competent operator using a push-pull machine than from an automatic slide-changing projector. Another valid point was that most of our lecturers would use only a few slides during course lectures and it was simpler for them to put the slides in as required. Frequently a lecturer would enter the theatre with a small batch of slides and would, perhaps, show only two taken from among them. Had they been loaded into a magazine the order of showing would need to be decided and stuck to unless he was prepared to flash through the set until he found the particular slide he wanted. I don't mind admitting now that I held, privately, to the opinion that one or two lecturers couldn't be trusted with any piece of equipment more complicated than a door-knob and I certainly didn't want to let them loose on one of my expensive machines. I once observed a certain professor who, on finding the picture appearing on the screen upside-down, picked up the projector and inverted it bodily! His slide disappeared into the mechanism where the gears made short work of mangling it, and serve him right!

In the fullness of time it became important that carousel-type projectors should be available, particularly for conference work. Many visiting speakers would arrive with their slides already loaded in magazines and people seemed conditioned to the relatively long delay as the machine removed one slide to replace it with the next. The use of two machines with a suitable link system can now give an almost instantaneous slide change.

Probably the finest examples of slide projection these days are to be found in the highly sophisticated presentations where twenty or more projectors face the same screen and the picture programme is controlled by a computer system and a recorded commentary. Unfortunately, this is hardly appropriate in a Physics lecture theatre.

At one time the possibility of producing tape/slide presentations was considered. The main advantages of this practice are that the commentary can be honed to perfection, the slides chosen to match this commentary, the time taken for each performance is known to a few seconds and the content stays unchanged, unless altered deliberately. I bought a small Philips tape/slide synchroniser through which the tape passed during its passage through a spool-to-spool recorder. It worked very well but there was little application for it. The original idea had been to have it as a static display which students could operate but suitable subjects did not present themselves. The device was not wasted; it was used during summer technician-training sessions as a teaching aid.

The proposals that produced the attempt were worthy but the scheme could have had only a fleeting popularity, would have been but a hiccup in the progress of teaching methods, as it has been superseded by the far greater possibilities of video cameras and recorders.

CCTV, or Closed Circuit Television, came into service with us in, I believe, 1966. A black and white system with four monitors and two simple cameras was bought from Philips Electronics. It was transportable and was first used in the Main Lecture Theatre in a series of lectures to Stage I students in which the class took part as close observers, indeed, as participants in the afternoon's experiment on the lecture bench. Details and measurements were presented via the monitors for their deliberations and conclusions. All the theatre technical staff, for a period there were four of us, nominally two to each pair of theatres at both ends of the building, could be involved in the lecture presentation, some on cameras and some helping at the bench. The techniques worked up and employed were more on the camera side than the projection, though occasionally a monitor would flicker and require a good wallop on the side.

This system lasted us for over ten years until it became impossible to obtain spare parts. It had become obsolete and was replaced by colour monitors which doubled as television receivers, to our delight, but we retained the black-and-white cameras. When colour camera work was needed we would borrow from wealthier users.

Although Overhead Projectors had become available soon after the war they didn't appeal, initially, to the Physics lecturing staff who preferred to illustrate their lectures

and develop formulae on the chalkboards. It had always been the traditional method of teaching and I wondered, sometimes, if the fact that, with these new teaching aids, they would be facing their audience the whole time was a little frightening. The first OHP I bought was accepted rather grudgingly but eventually every theatre and teaching room was to have one. The potential of this new aid was seldom exploited, most people being content simply to use it to project single sheets of information on to the screen, very rarely to make use of overlay methods to illustrate a step-by-step development of a theme.

One great benefit arose from the increasing use of OHP's; the amount of chalk dust diminished in direct proportion as they reduced the amount of use given to the chalkboards.

The earlier epidiascopes performed dual functions; they could project slides or book pages and plates. The area to be projected was rarely greater than about 150mm square, not enough to embrace a whole book page. Around 1965 a new breed of projector arrived, the episcopes, which performed only the one function but could accept an A4 sheet and project this on to a screen with acceptable brightness. These proved to be useful visual aids, if somewhat expensive to run. The light sources were 1000 watt tungsten filament lamps costing about £15 each. Probably the more recent models will use the less expensive halogen lamps.

Chapter 15

Dr. C.R.Burch

Probably the most remarkable man that I ever met was Dr. C.R.Burch, FRS.

It took me a little time to identify all the members of the department when I joined and he was pointed out to me as 'an amazing man'. I soon learned that he was held in great respect, spoken of almost in awe. It must have been about 1952 when I first spoke with him and this small experience showed me why he was so regarded.

He was then developing his hot-blast gas torch, aided by Fred Bannister who was his technician. He had set up the experimental model in the lecture theatre during vacation time, and was demonstrating it, informally, to various people who drifted in to see it. I had been to see Mr. Venn for something or other and he suggested it might interest me to look in. I did so to find him halfway through describing the torch to Denis White. I realised, with some surprise, that he was explaining the performance to Denis in photographic terms purely because he knew Denis was a photographer. I had arrived to miss the early stage of description so, when he had finished with Denis, I posed a question. Dr. Burch looked at me steadily and I thought, "Oh Lord, he's going to tell me he's just explained it once and I should have been listening". I was misjudging him badly. It turned out that he was identifying who I was and what I did.

At that time it was mainly electronics and he proceeded to describe the construction of the torch in electrical and electronic terms, drawing on the analogy of a stabilised power supply to explain, very clearly, what was happening.

I was to meet him more intimately when I became the photographer and would carry out varied photographic requirements. He had a reputation as a mild eccentric and there were occasions when I could believe this. I made several short films for him, including a colour film of the hot-blast torch in its finished version. At the end of shooting the action sequences I had few feet of film left on the spool and I suggested that he should burn out, by mirror writing, in a thin sheet of iron, the words "The End" while I filmed this from the opposite side of the metal sheet. Far from pooh-poohing the idea he chuckled with glee and said "What a good idea!", so we did it and the film still exists, or should do, in the University archives where I sent all my C.R. Burch relics of slides and films just before I retired.

Geoff Freke and Terry Gorman were both members of my little theatre staff later on, Geoff as photographer and Terry as my assistant, when we made other films of his aspherising machine.

I remember saying to Mr. Venn one day, "Dr. Burch wants me to go to his house on Friday morning to film his device for separating tin-slime. Will this be O.K.?" Mr. Venn agreed, telling me not to hang about as we were busy. On the Friday I collected my portable lights and the cine camera and arrived at Dr. Burch's house just after ten o'clock and was taken up to his attic workshop. Over by the end wall was a large lathe which looked familiar. When I mentioned this Dr. Burch told me that it was one which had been disposed of by the Physics department when more up-to-date machinery was being acquired. Harry Tressider had told him that it was being scrapped so Dr. Burch went to see Professor Tyndall with a view to obtaining it. Prof listened to his plea and said "How much will you pay us?" "Five Pounds?" replied Dr. Burch. Professor Tyndall thought for a moment then said, "Make it ten; you'll pinch five pounds worth of bits to get it going!" My comment immediately was "Good Lord; that was a bit unkind, wasn't it?" "Oh, yes" replied Dr. Burch "But very true indeed!"

The rest of the attic seemed occupied by an enormous table strewn with nuts, bolts, screws and odd pieces of metal. Experienced gadgeteers will find nothing unusual in such a state of affairs, everything one might want can be found - if one cares to look. In one corner, by the door, was the device I was to film, a wonderful construction of pillars, pulleys, springs and cord belts which caused oscillatory motion to a spiral trough down which the tin-slime, mixed with water, flowed to be separated by centrifugal force as it reached the end. The different densities of mineral were received in little tin pots below. One of the springs which actuated the return of one of the eccentric arms had started its existence as a sleeve band for a gentleman's shirt.

As part of a talk I gave to the Student Physical Society in 1986 I showed this piece of film. As expected, it drew roars of laughter but allowed me to explain, "You may well laugh at it but you must also realise that this was genuine experimental work and, if you examine the device and its operation, you will find it is a beautiful example of

kinematic construction. It was also instrumental in prolonging the economic life of some of Cornwall's tin mines". The point was made.

However, time was marching on and I was still waiting to start the camera at a quarter to three in the afternoon while Dr. Burch, who could become totally oblivious to the passing of the hours, was making further adjustments to the apparatus. I suggested meekly that perhaps I should go away for half an hour to get some food. He said, surprised, "Why? What time is it?". He called down to Mrs. Burch who provided some sandwiches and, eventually, we shot the film. I arrived back at the laboratory just in time to go home, having failed to satisfy Mr. Venn with my explanation. He, Mr. Venn, had cheered up by next morning and merely said, "Let that be a lesson to you!"

It was Christmas Eve, probably 1956, at about half past three in the afternoon. I had finished all outstanding photographic commitments by lunchtime and had spent the early afternoon clearing up the darkroom, emptying all the solutions and leaving the benches and equipment ready for a fresh start after the Christmas break. As I locked the darkroom outer door a gentle voice at my shoulder said, "Ah, Mr. Tindall". I turned to find Dr. Burch standing there who went on to explain that he had forgotten to send a Christmas card to one of his Cornish mining friends and did I think I could produce a suitable print from the negative he was holding. I pointed out the impossibility of his friend's receiving the card until the holiday was over, to which Dr. Burch explained that he would word it with New Year greetings. Anyone else would have been sent packing with my best Christmas wishes ringing in his ears but this was, after all, Dr. Burch. Therefore I opened the darkroom, prepared some modest quantities of solution and, forty minutes later, I handed him the finished print, as per his instructions. He thanked me and said he hoped he hadn't made me late for going home. Officially, he hadn't, but we seemed to be the only two people left in the building.

What were often regarded as eccentricities on the part of Dr. Burch nearly always had logical reasoning behind them. He must have been in his early sixties when, on approaching the stairhead from the third floor corridor, I was astonished to see him running, flat out, up the stairs to arrive on the landing where he paused and stood clutching the hand rail, panting heavily. I rushed over saying, "Good grief, Dr. Burch, what on earth are you doing? Are you alright?". He got his breath back and reassured me explaining that his doctor had told him it would be good, occasionally, to stretch his physical abilities as far as he could. Following this advice he had run up from the ground floor and said that, on a good day, he could manage to reach the top floor. This was the first time I had witnessed this exercise but I was told by others that he did this sort of thing frequently.

When Terry Gorman left to work elsewhere a young lad named Stewart Field came to join me fresh from school. He showed early signs of manual skills and good imagination and I was agreeable to his coming in to the preparation-room-cum workshop in the evenings and at weekends when he liked to potter. One morning I came in and saw a beautifully made model of a bollard, such as one might find on a quayside. It was only a couple of centimetres high but nicely turned with a neat square base. I asked Stewart if he had made it and, rather diffidently, he admitted so.

When, out of curiosity, I inquired which lathe he had used he confessed to having shaped it by hand with a file, the work being held in the pillar drill. Now, such a method involves hard work and slow progress so I said he really must practise on a lathe. Stewart explained that all the lathes were busy during the day and were not available at night. There was only one man to whom I could turn. I went to see Dr. Burch and explained the situation and asked him if he would spare an hour sometime to instruct Stewart in the basics of lathe work. His reply was, "Send him to me now". I returned to the prep. room and said, "Stewart, pop down and see Dr. Burch, take your little bollard to show him. He has agreed to tutor you for an hour or so. Pay great attention, won't you?". He was gone for two days! He came back a little starry eyed but with permission to use the small lathe in Dr. Burch's workroom. Naturally I sought Dr. Burch to thank him for spending so much time with Stewart, omitting the fact that I was left with the work of both of us, and his comment was, "I was pleased to help him; he is lad of promise".

Although a very thorough and serious scientist Dr. Burch was not without a good sense of fun. I was, mildly, one of his victims. His room was in the corner of the building, on the ground floor and next to the old front door. It was sub-divided into three sections to include a workshop, a darkened central area and a window-lit laboratory and office. His aspherising machine for figuring mirrors, together with its associated interferometer, was extremely susceptible to building vibration. To eliminate this problem a large hole was excavated in the central room, down past the foundations to bedrock. Into this, and bedded on sand, was lowered a large concrete block weighing four and a half tons. On this was mounted the aspherising machine. While this work was being carried out Geoff Freke and I were asked to photograph the hole and the block. We took photographs with reference scales to show the sizes and Geoff said he had one frame left. I said, "Come on, Geoff, I'll stand by the block and we can call the picture 'The Smallest Man in the Works'. Now guess which print Dr. Burch chose to illustrate his paper entitled "Aspheric Reflecting Microscopes and their Future" which was published in the Journal of the Royal Microscopical Society, Vol.80, of October 1961. No prizes offered for a correct solution.

The extreme sensitivity of his equipment was brought home to me on one occasion when I was attempting to take some photographs of his interferometer in his laboratory. With great care Dr. Burch was making fine adjustments to stabilise the image of the wave fronts on the surface of a concave mirror. Each time he succeeded, and we were ready to photograph, the door would open to admit a visitor and the stability would be ruined. Dr. Burch, at times of stress, was prone to utter earthy comments and, after a few interruptions, said to me, "Kevin, the next person to open that door will be told to bugger off!" A few moments later the door was opened and he looked up with an oath to see Professor Mott, the Head of the Department. I thought this might stymie his reaction but, not a bit! He said, "Ah, Mott! I have just told Kevin that the next person to open that door will be told to bugger off, so will you please bugger off?" "Oh! Very well", replied Professor Mott, and he backed out, closing the door behind him very gently. Dr. Burch returned to his adjustments quite satisfied but I had to concentrate hard on what I was doing.

One attribute of Dr. Burch's which certainly earned him our respect was that of invariably acknowledging the technical assistance he received, mentioning the

technicians by name. I was very proud to notice my name at the end of some of his papers. This attribute appeared to be unique to him. Very, very rarely did any of the other academic staff make such acknowledgement even though the amount of support work given by technicians was often very important, not earth-shattering by any means, but frequently involving great devotion and application.

One particular instance springs to mind. A series of aluminium hemispheres was needed to build spherical chambers for a cosmic ray experiment. Using the pulsed MIG technique sheets of aluminium 2.4 by 1.2 metres and 4.75 mm thick were welded in pairs by an outside company. The sheets were to be annealed after welding and spun into 1 m radius hemispheres. All six attempts at spinning failed because the welds cracked.

Two technicians, Ken Brine and Richard Head, set about the problem and were successful in making secure welds using thin copper backing tape and argon purging. The sheets were annealed and all six hemispheres spun with complete success by Windward Company of Birmingham. Ken and Richard were disgusted that little notice was taken of their achievement and told me so. I suggested they wrote their own account and submitted it to an appropriate journal. They thought they'd like to do this but weren't sure how to set about it. I thought immediately of Dr. Burch and went to see him and explained the situation. He was interested in what the lads had done and the outcome was that he not only helped them to put together an account but found someone to act as referee. The article was eventually published in the Welding Institute Journal where it aroused interest among the readers resulting in several enquiries being directed to Ken and Richard.

When Dr. Burch retired little changed. He still came in to carry out a little research and to write papers. When he died it was realised that we would not see his like again.

Chapter 16

Security Matters

Before the days of student lockers in the department there were no places within the building which students and, in particular, the Student Physical Society could call their own. There were cloakrooms and these were used fully for their intended purpose and coats, scarves and headgear could be left therein with confidence. Standards of honesty and respect for the property of others declined as the years passed by in proportion to the increase in student numbers. By 1970 the problem was so great that it became rare for coats to be left unguarded and a Security Officer was appointed to try to combat the situation.

Ex-Superintendent Mark Bleasdale became the first incumbent and Peter Eyles moved from the Registrar's Office as his assistant. They became familiar figures as they went about their duties, known, behind their backs, of course, as Batman and Robin.

Soon after his appointment Mark Bleasdale, having spent some time in learning the ground and meeting people in the various departments, had to deal with a spate of cloakroom thefts. Our cloakroom was one of the hot spots. Mark came in to see me and said "Kevin, have you got a large white lab-coat I can borrow? If I walk about as I am everybody is going to recognise me as a policeman". Now, this was very true; he had only recently retired from the Police Force and still retained his rather majestic gait. I lent him the largest coat I could find, he donned it and set off down the corridor as I watched from my doorway. I couldn't help chuckling to myself and when I came to know him a little better I told him why. Even with the 'disguise' and his attempt at nonchalant progress he looked just like a policeman in a white coat. Our working relationship was, I believe, very amicable, even when a little spot of bother involving two of my technician colleagues called for his investigating powers. What it was need not concern us in this narrative. Suffice it say that both had acted in a spirit of well-meaning helpfulness and were truly innocent of any crime. A formal interview was set up and my colleagues had asked me to be with them in the function of 'Prisoner's Friend' as the term is used in the Services. It was my first experience of a police-type interrogation and I found it somewhat overwhelming. The questioning was deep and persistent and I felt I was there as more than just an observer and, therefore, had no hesitation in insisting it should stop when one of my colleagues, a lady, showed signs of distress. The questioning was being conducted in a gentle manner, there is no suggestion whatever of any bullying having taken place, but such a situation meant tensions were mounting. Calm was restored and they continued. At the end a concluding report had to be drafted to close the matter officially. It was read over and the technicians were asked to sign it. Out of relief at the termination of their ordeal they were about to do so when I stopped them. The wording was such that a strong measure of guilt could have been inferred and might well have counted against them in their careers. Saying that the wording was not acceptable I suggested a modification that, without altering any facts, put a kinder light on the implications. Happily, Mark Bleasdale agreed to this and the incident was then closed. My colleagues were, justifiably, frightened by what had taken place and would certainly be more wary in future.

I worried, unnecessarily as it turned out, that I might have damaged the friendly professional relationship I wanted to maintain with the Security Office by putting my oar in so forcibly. Mark assured me afterwards that the outcome had been quite satisfactory and that black marks would not be registered against my colleagues. Both remained with us for some few years before leaving, quite independently, to take up other employments.

Incidentally, my first contact with Mark Bleasdale had been but a fleeting one and occurred a few months before his appointment. It was during the Great Student Sit-in of Senate House when the occupation lasted for over a week, caused upset and nuisance, resulted in internal damage, invasion of records and files, disruption of normal Senate House services and, since we were just across the road, visited a few headaches upon me and my staff.

On the first morning of the sit-in I arrived at the department just before nine o'clock to see the crowd of students around the front of the Senate House. It was only when I entered the laboratory that I began to appreciate the implications for there, awaiting

me, were the Finance Officer, Mr. Albany Smith, and the Deputy Finance Officer, Mr. T.B. Smith, seeking sanctuary. They were only the advance guard; assistance was also needed by the Bursar and the Registrar all with most of their staffs.

My right-hand man at that time was George Hitchings and, between us, we managed to provide space and odd furniture to enable the basic needs of the University to be fulfilled as well as possible under the circumstances. One most essential requirement was that people should receive their wages or salaries, so we fixed up the Finance Office first.

The Deputy Bursar in those days was Mr. A.G. Jones. Among his duties was that of 'Telephone Overlord' and he would wax exceeding wrath if he found that anyone had tampered with the internal telephone system. After he first issued his dictum upon this subject I kept very quiet about the various previous alterations I had carried out to further the comfort and efficiency of the department.

George Hitchings, before he came to work in the Physics Department, had been on the staff of Standard Telephones and had installed and maintained most of the internal telephones. He had been invaluable to me when semi-official (i.e. requested changes by our masters but which were not felt important enough to be made official) alterations or extensions were needed. The influx of so many visitors meant that telephone links had to be supplied and so Mr. Jones lifted his ban to enable this work to be done. Both Standard Telephones and GPO, as it then was, rose to the challenge and, between us all, links were made.

Lectures in the department had to continue as usual despite our personnel overload as very, very few Science or Engineering students were involved in the sit-in.

Another sacrosanct facility in the building was also invaded with the reluctant sanction of the Domestic Bursar. When the new building was built a small kitchen was included containing a sink and a large unit for bulk production of tea or coffee. This room was under the control of the Refectory Manager and was not a Physics Department facility. It was used only by refectory staff for conference work or other special occasions. Senate House also possessed such facilities from which tea and coffee were dispensed to the various offices. With the sit-in these facilities were denied them but our invaders became just as thirsty with us as they did in their own building. By dint of cunning improvisation we were able to supply beverages for the first day after which the refectory resources were able to cope.

Naturally, the situation attracted reporters from the press and from television and many of these had their own nuisance value when they came across the road looking for telephones so as to call in their copy. There were two public telephones, one at each end of the building, but they shunned the further one lest they should be too far away from possible developments.

Since a stalemate seemed to have occurred developments were negligible but, in the fullness of time, it ended and the cost had to be counted. As far as I could tell, the major benefit was the fitting of decent locks throughout Senate House and the achievement of one or two of the students' "just demands".

While this situation was in force a friend of mine, an elderly Franciscan priest, asked me what it was that the students wanted. I explained as best I could and he said, "Such a pity! People of great intelligence but so little wisdom".

Before the Security Office came into being any crimes or misdemeanours within a department were dealt with internally, if this was possible. For serious matters the Registrar would be informed and the incident would usually be reported to the police. An incident in the mid 60's which gave rise to some bizarre offshoots will bear relation.

A rash of petty theft broke out in that raincoats began to disappear from the Mens' Cloakroom on the ground floor. The police were informed and a detective came to investigate. There was very little the police could do without any description of a suspected person, particularly as most University buildings were quite open and any form of restriction on entrance during the day was out of the question. It wasn't practical to expect the police to supply a constable to keep the cloakroom under observation so, with the blessing of the detective, we attempted the task ourselves.

Dr. Thompson approved the plan of action which meant hanging a 'target' coat in the cloakroom where we could observe it from one of the ventilator ducts. The coat belonged to Terry Gorman who lent it on the understanding that if it was stolen it would be replaced. Observers, drawn from the theatre and teaching lab. staffs, took one hour tours of duty throughout the next four days. Communication was via a field telephone linked to the Porter's lodge, thence by an internal telephone call to the teaching laboratory.

People came and went and the coat hung there, apparently un-noticed by all. The observer's job became rather tedious until Ken Goble devised a way to combat this boredom. A frequent visitor to the department was a man, known as Bill, from the Clerk of Works' department. He used to deal with blocked drain pots and any other messy job that cropped up. Despite his calling he was a cheerful man, given much to saucy badinage. While on duty one morning Ken observed Bill enter the cloakroom and shut himself in one of the cubicles. Ken rang through to speak to Maurice saying, "Quick, Maurice! Bill's just gone into trap two. Nip into trap three and give him a bum shandy!". "Right!" said Maurice and proceeded to carry out this instruction by standing on the seat of trap three, reaching over quietly and depressing the flush for trap two. Then he ran like the wind for there came from trap two first, a bellow of rage, secondly, a string of oaths and fierce promises of what would be done to the perpetrator who, it was then revealed, must have descended from a long line of bachelors, and thirdly, Bill himself moving with some discomfort and clutching the seat of his overalls. Alas, he had not entered the enclosure for the purpose for which it was intended but to pass a quiet ten minutes enjoying his newspaper and a cigarette.

The observers, from then on, pursued their task with added interest and it must be recorded, although it is difficult to believe, that Bill was caught thus on two further occasions. He would enter the cloakroom with great caution and check each cubicle before secluding himself, but to no avail. It is only fair to him to state that his reactions became highly tuned and it was a near thing for the duty plunger to leave the

scene before he was seen. Bill was convinced we were, if I may use the phrase, at the bottom of it, but he couldn't pin the blame on any individual. A post-graduate came up to me one morning and, in all seriousness, asked me if I knew there was a funny little man dancing up and down in the hallway, clutching his rear quite frantically and shouting unpleasant threats.

No attempt on the coat was made during our period of observation so we closed down the operation and returned the coat to Terry. A few weeks later Dr. Thompson mentioned that a drain pot was blocked and asked me to call in the chap who dealt with them, "You know, that little chap, whats-his-name". Thoughtlessly I replied, "You mean Bill Wetarse, er, I mean little Bill". Dr. Thompson looked at me solemnly for a moment then said, "There must be a good reason for a man to earn a name like that?" So I explained and he seemed much pleased. What I didn't include in my explanation, and what remained a secret shared by only a few of our intimates, was that the last victim of the practice was not little Bill! Ken was the duty observer during the last hour of the last shift and all was quiet until he saw someone enter whom he considered a likely prospect. He passed the message to Maurice saying, briefly, "Trap two! Quick!" Maurice reacted with commendable speed, peeped over the barrier after depressing the flush, then reacted with phenomenal speed in leaving the scene to escape the wrath which would follow the screams of rage. He reached the sanctuary of the laboratory to collapse, white of face, and to report that Ken, whom he now realised must be illegitimate, had called him down to give a bum-shandy to Dr. Kay! Ken held over Maurice for several months the threat that he would reveal the truth to Dr. Kay, "I'm sure he'd like to know, so just remember that, won't you?"

An incident occurred in, I think, 1975 which was not publicised at the time for very good reasons. Public warnings had been issued concerning a renewed spate of terrorist parcel bombs and people were advised to treat with great suspicion any badly wrapped and ill-addressed parcels which might be delivered to public buildings. I was apprehensive, but not too surprised, when Bill, our porter, called me to see a parcel which had just arrived in his lodge. It answered the description of the suspect parcels absolutely, it could have been the prototype about which the warnings were issued. There were Standing Instructions about the procedure to adopt which included leaving it alone and informing Group 4 Security. Reasoning that (a), it was in a public area and (b) that it had withstood postal handling so far, I picked it up and carried it, very gingerly, to Room G.45, locked the door and then locked all doors which gave access to that area. This was out of term so the adjoining lecture theatres were not in use; Room G.45 was under a flat roof and was shielded from the road by the verandah corridor. The effect of any blast was, therefore, greatly reduced. I could not, with public safety in mind, have put it outside the building. I telephoned Group 4 Security with the information that we had a suspect parcel and, within a minute, they telephoned me to check that the message wasn't a hoax. They told me the Bomb Squad was on its way and to keep everyone clear of the area. A police constable arrived first and we set up a nominal barrier on the corner approach to the corridor. Before the Bomb Squad arrived two members of staff showed intense interest. The first was Professor Frank to whom I had sent a message as soon as I took action. He telephoned to the porter's lodge to ask if he should come and have a look at the parcel. I persuaded him, almost pleaded with him, to leave it all to the police, which he agreed, somewhat disappointedly, to do. I think my main fear was how I would

answer to Mrs. Frank if she had asked, "Kevin, why did you let Charles near that bomb?"

The other would-be investigator was Professor Lang who wanted to pass the barrier and have a look. He was so insistent that the policeman came over and I said it was fine with me if he wanted to make an arrest - I would be a witness in his favour.

The Bomb Squad and Special Branch officers arrived and I gave them my story. They went into G.45 and, very cautiously, slit the parcel open. One of them came out to ask me if I'd care to look inside to see if I could identify the contents. What I could see looked like white covered flex and we certainly didn't use that sort of wire. They decided to remove the parcel in what they called an armoured wagon. It was a pick-up truck with sandbags and steel plates and I was glad to see them drive off. I then gave Professor Frank an up-to-date report and we awaited developments. With the parcel in a small containment area I had not pressed the panic button to evacuate the building. In retrospect I probably should have done so but the police preferred to handle the matter as quietly as possible. Their later examination revealed that what I had thought was flex was nylon cord. The parcel contained recovered debris from one of our own balloon flights which had come to earth in a farmer's field and he claimed the advertised reward. The contents of the parcel included two timing clocks and two used detonators whose purpose had been to cut the cords between the balloon and its parachute. Until this was explained the police were, naturally, very suspicious of the contents. It had been a false alarm but, as I explained to Professor Frank, under future similar circumstances I would have no option but to act as I had in this case.

Key security is an ever present headache in most large establishments and is certainly so in University departments. My colleagues elsewhere will have their views on the matter but the following outlines my own experiences.

Until the late 1950's entrance to the Physics department after normal working hours could be obtained by holders of a standard Yale key of the type used in the average house. The main weakness of this system was that copies could be obtained from ironmongers offering such a service. That these were unofficial didn't affect their performance and a stage had been reached when no-one could be sure how many keys existed, lost or active. Non-keyholders were expected to ring the door bell and hope that someone in the building would hear and respond. Once, when I had occasion to come into the building one evening, I rang the bell and the door was opened by Professor Tyndall. When he heard I was coming in to do some extra work with Mr. Gibbs he said I should ask Mr. Venn for a key. Venn was rather reluctant to issue me with one as they were normally reserved for senior people, not for lab. assistants.

However, the time came when it became important to pay more attention to building security and a sample Yale Security lock was submitted for approval. Dr. Thompson and I examined it and, apart from the key being about a quarter of an inch longer than usual, it seemed very like the previous locks. It was claimed that extra keys could be obtained only from the manufacturers with an official University order. Dr. Thompson said, "I wonder if that is so? Would you care to pop down to Warlow's, ask him to make a copy and see what he says". Accordingly, I popped down.

Warlow was a locksmith of what is usually described as "the old school". His shop was in Colston Street opposite the bottom of St. Michael's Hill and was somewhat gloomy inside. There was a small counter just inside the door and Mr. Warlow would emerge from the dim interior and say, "Good morning, what can I do for you?" It might, on occasion, be, "Good afternoon", but it was a ritual greeting. He was certainly a first-class locksmith and his work jacket glistened with a patina acquired by years of oiling and filing at his bench. One might say that it reflected his labours. I told him I wanted to know if he could make me a copy of the key. He peered over his glasses and asked me to wait while he went into the back room. I passed a couple of minutes studying the ancient posters and advertisements crying the virtues of the new padlocks being demonstrated by gentlemen in Edwardian dress with rather sad looking moustaches until his return. He emerged from the gloom, regarded me in a worried manner, and said, "I know you, don't I?" I agreed and said I had called several times with key requirements from the University. "I thought so", he went on, "only when anyone asks me to copy a key like this I'm supposed to call the police". Somewhat anxiously, I explained my purpose in asking if a key could be cut, not that I actually wanted one, I just had to sound out the possibility, and he could check this with Dr. Thompson in the Physics Department, and would he please do this before summoning the Law. Happily for me, he accepted my nervous explanation and I returned, hot foot, to report my mis-adventure to Dr. Thompson. He just said, "Ah, that's fine. Copies won't be too easy, then!" "Is that all you can say?" I replied, "Do you realise I was nearly arrested doing your bidding, and they might have come up here asking all about me?" He smiled, a most evil smile, and said he'd thought Warlow might feel like that and if there had been questions, he would probably have denied all knowledge of me! Game, set and match to him, dammit!

The new locks were fitted and keys were issued on the new-for-old basis. I was surprised to find so many people, mostly from the Cosmic Ray Group, returning keys numbered differently from those with which they were originally issued. They tended to share them around quite freely but it was their turn to be surprised when I would only return deposits to the named key holders and a frantic swapping went on until a form of order was restored.

This business of lock renewal occurred twice more with replacement Yale equipment and the story was repeated. The usual reason for replacement was the recognised limit when more keys were known to be lost or missing than were on the active list. It is believed that the missing keys could be anywhere in the world in parts from which various visiting scientists may have come. Monies from deposits on keys were banked with the Finance Office, only a working float being held by me. Deposits on keys known to be lost beyond recovery were passed into departmental funds from time to time.

When the new extensions came into use the locks were changed again, this time for Abloy locks with cylindrical keys. After a good few years these, too, were replaced for the same reason, more missing than in service.

Each time a lock change occurred certain priority users were supplied with new keys immediately. These priorities went to the Bursar, for the maintenance

departments; to Security, for patrolmen, porters and for the 'archive' copy in the main safe; and to the BBC who used one of the turrets for relay transmissions. In order to get the key to the right people, and to reclaim the old key, I have often gone to the studios in Whiteladies Road on a Sunday morning to ensure that the engineers can get to their equipment for outside broadcast work. A panic call from the BBC one Christmas Eve was caused by a statement by the Safety Officer, Norman Pearce, that the building would be closed over the holiday and no-one would be admitted. Apparently there was to be a very important outside broadcast to be handled on Christmas Day. I rang Norman to explain the situation and said the BBC had a key, officially, and would this 'ban' apply to our own people who might come in to see to long running experiments? All was well in the event although I'd had to promise the BBC that I would make myself available in case of difficulties. There were none; at least, none to invoke my presence.

There were, of course, keys to each room in the department but only a few offices with sensitive material made much use of them. All those for the old wing, and there were a good many surviving, had to be re-numbered to allow a numerical sequence with the rooms on each floor in the new extensions. The old locks were manufactured by Gibbons and were sturdy, well engineered units. The new locks were Union products, lighter, but quite efficient. It had been necessary to confirm with the Union Locks representative that the new key numbering was acceptable. Mostly, the keys bore the number of the room which they fitted, which was logical. Sub-master and service keys were to be marked appropriately. This was a tedious session with the architect, Mr. Luxton, the key representative and myself. Most of it was straightforward until we came to the projection suite behind the new large theatre. With very little heart-searching I suggested the two small storerooms be labelled PR 1 and PR 2, but we also had a little private toilet which I had asked for, argued about, but finally obtained to the chagrin of Jack Lane, who had wanted one in the new Medical Theatre but hadn't succeeded in achieving. "How shall we label this?" asked the rep. "Label it B, O, G," I said. He wrote it on his list, then he looked at what he'd written, turned to Eddie Luxton and exclaimed, "B, O, G! That spells bog!" Eddie was as weary as I and replied, "It's quite logical; it is a bog". Thus it became and remains so today. I felt a bit brighter after that.

Locker keys for the use of students presented the same problems, as the saying is, "in spades!" In the spirit of economy I bought in a load of key blanks and cut replacements myself. A time consuming task but one with which I often whiled away the hours while projecting films. I was proud that I left the system fully operative with active keys accounted for when I handed over to Derek Flower on my retirement.

Chapter 17

The Maintenance Men

Among the most hard-working and important persons in a University, the Clerk of Works rates highly. His responsibilities embrace all forms of maintenance, additions and modifications to buildings and the services and fittings within them.

The first that I knew was Mr. Richards. He had already given long service to the University by the time we met and I came greatly to respect his ability, his 'feel' for the buildings, his thoroughness and his fine attention to detail. He was known always to carry a small piece of mirror with him on his rounds with which to inspect behind radiators to see if his painters had done a proper job. Out once on an errand, I came across him on the pavement opposite the University tower looking through binoculars at the work of painters, high on scaffolding, refurbishing the shields that commemorate the Founders of the University. I greeted him with some curiosity and he explained that, at his age, he wasn't going to clamber up all those ladders and, suspecting that the painters knew this, he didn't intend that the work should be skimped. He told me that binocular inspection was a popular method with many surveyors and inspectors.

His staff and teams of carpenters, painters and plumbers stood in awe of him but always spoke of him with respect, claiming that he might be a bit of a hard so-and-so to work for but he knew his job and was a fair man. I venture that such a verdict is one which many to whom it might be directed would consider satisfying.

I remember once putting an order, via the Bursar, to the workshops for a pair of loudspeaker boxes which were to be fixed to the wall of the Main Lecture Theatre. After a reasonable time had elapsed, and there was no sign of the boxes, I telephoned the carpenters' shop to ask if they were ready. The carpenter concerned told me he'd made them once but, "The boss told me to start again". I was puzzled until I learned that Mr. Richards had seen the finished boxes and asked where they were to go. On hearing that they were for the lecture theatre he had said, "You can't put wood like that in the Physics Lecture Theatre! Do them again, in teak!" And so they were done. This would have been in the mid nineteen-fifties when money wasn't so tight and proper attention could be paid to the finished appearance of a job.

Richards was a great supporter of the UBEA (University of Bristol Employees' Association) and many a little project benefited from his help.

On occasion we sought his advice about jobs we were trying to do within the building and he would listen to our slightly vague requests and say, "Just what is it you're trying to do, my son?" We youngsters were always "my son" to him but he always managed to give constructive advice. Once, when I telephoned him to enquire about some wood for shelving I'd been asked to make, he questioned me deeply about the fixings I was proposing to use then said he thought it would be better (i.e., safer) if one of his lads came and did the job. I felt a bit hurt by this but had to bow to his decision.

His successor was Mr. Boardman who was the incumbent when the restoration of the bomb-damaged Great Hall was undertaken. Because Mr. Richards had cared for the Great Hall for so many years before the war he was invited back from retirement to work with Boardman overseeing the work of restoration. During this period, under the aegis of the Deputy Bursar, Mr. A.G. Jones, I used to visit the site to photograph the progress. As work went on I came to know several of the masons and carpenters. Many of these men had been recruited out of retirement for their skills; indeed, many had worked on the original construction, some as apprentices, some as qualified

craftsmen. One mason had built the spiral staircase in the Physics building which gives access to the roof-flat from the fourth floor. I worked out that when he was doing this I would have been two years old! Another, a carpenter and joiner, was working on one of the lanterns depending from the great hammer beams. Pointing to the next lantern along, he told me he had helped construct it nearly fifty years previously.

Although Richards and Boardman were supposed to be working together on the project, I had a strong feeling that all was not harmony between them. There was an understanding that I would supply a selection of prints for those on the site whom I had photographed, chiefly for their interest but also as a quid pro quo for their tolerating my weekly, or twice-weekly, appearance to clamber around the scaffolding. At some spot during my travels around the work Mr. Richards would emerge, secretly, and say, "Here, Kevin, you won't forget to let me have some pictures, will you? Only, address them to me, personally. If he gets hold of them I shan't ever see them". I would reply, "Right you are, Mr. Richards, I'll not forget". As I left the site Mr. Boardman would shoot out of his hut, look around furtively and say "Here, Kevin, you won't forget to let me have some pictures, will you? Only, address them to me, personally. If he gets hold of them I shan't ever see them". I would reply, "Right you are, Mr. Boardman, I'll not forget". This became a regular occurrence and I would look out for their suddenly materialising before me. On occasions when one of them might be off the site I quite missed him.

The Great Hall was formally re-opened on December 6th, 1963, with due pomp and ceremony. Among the Honorary Graduands was Mr. Richards whose long service to the University was rewarded with the Degree of Master of Arts, *Honoris Causa*.

I remember becoming quite indignant with Mr. Boardman a few years later when work began on the first phase of extensions to the Physics Department. Demolition had started on the, almost triangular, end rooms of the building at ground level. These included what had been a small storeroom in the days of the old workshop and two cloakroom/toilets. Ken Goble came to me and asked if I'd seen what was happening to the doors of these rooms. We went to see and found them about to be smashed by a bulldozer. These doors, in common with most other doors in the building, were of teak and worth almost £100 each, even in 1964. Ken and I reckoned they ought to be saved. I telephoned Mr. Boardman to tell him the situation, asking if he wanted to send his lads to salvage them. His reply was that they were in the hands of the contractor and, "nothing to do with me, Brother". "I'll call you back" I said, and dashed off to see the site agent, Peter Griffin, with whom I had already established relations. I asked Peter what would become of the doors and he told me they would be scrapped. "Can I have them?" I asked, "they ought to be kept, if only for replacements". "Help yourself" he said, "only be quick; that bit of building has to be down by this evening. I called Mr. Boardman again to say we would salvage them and would he collect them and store them? "Nothing to do with me, Brother, " was his reply, and nothing I could say would persuade him otherwise. Slightly fuming, Ken and I unscrewed the hinges and removed the doors, four of them, and stowed them in the basement near to the lift motor. Although they remained there for several years, Ken and I reckoned we had acted correctly in saving them.

A good time later, Mr. Boardman having retired and been replaced by Mr. Backwell, a need arose for a couple of new doorways to be cut in the curtain wall along one corridor. Bert Backwell was talking the job through with me and said he would have to put lightweight panel doors in to keep the costs down. I told him that wouldn't do at all, remembering Mr. Richards' stern views on quality. Bert said he just couldn't afford teak doors at about a hundred and fifty pounds each. "Could you afford teak architraves if I supplied the doors?" I asked him. "Where are you going to steal two teak doors?" he asked. "Come with me, all shall be revealed!" I told him, and took him down to see the benefits of our salvage those years before. As a result, the standard of doors in the old part of the building was maintained.

With every Clerk of Works I had reached an understanding that if I stressed that a request for service was urgent, then that is what I would mean. I promised them all that this call for priority would not be abused; most requests would be accompanied by an agreed timescale. On very few occasions had I cause to cry "URGENT", and on each occasion the response had been magnificent. I think this was appreciated for quite a number of my requests for jobs were answered more rapidly than I'd dared hope.

Bert Backwell was always helpful, in particular when George Hitchings and I wanted to put up curtains in the new large lecture theatre, G.42, to conceal the somewhat unattractive chalkboards during non-scientific meetings. The original intention, agreed between Dr. Thompson and myself when the theatre was being planned, was for curtains across the boards which would be withdrawn into tall wardrobe-like, cupboards either side of the chalkboards. These would be classed as furnishings and were not in the initial contract for the erection of the theatre. Money for furnishing came from a separate pocket and the wardrobes would have to be considered after the theatre was in service.

When the time came to consider these wardrobe cupboards I was appalled to learn that the provisional estimate of cost would be about £500 each! George and I sat down with pencils and paper and evolved a scheme to install a deep pelmet right across the fifty-foot width of the chalkboard wall which could hold, not only a curtain rail so that the curtains could be withdrawn well clear of the chalkboards and their resulting dust, but could support also a couple of chart hoists, items not previously included in the board unit. We designed the pelmet to be about fifteen inches from front to back, with a twelve-inch deep fascia and to be attached to special brackets fixed to the wall with Rawlbolts. A detailed plan was submitted to Dr. Thompson with the assurance that we could, and would, assemble and install it ourselves. He gave the scheme his blessing and we set to. Advice on suitable timber to use was given by Bert Backwell who said he would be able to supply the cut sizes we needed. He suggested blockboard for the horizontal, concealed, ledge and inch thick Afrormosia for the facing to match in with the theatre woodwork. Fred Bannister, in the Physics workshop, supplied the necessary brackets to our design and, within the budget we had set, we were able to buy a scaffold system usable in all the theatres. This last item proved to be a great boon on many occasions and in many locations.

When all the timber and the brackets were supplied George and I began the installation. The work took us just two days to complete and the results were highly satisfactory. At the time, indeed, on several similar occasions, George and I voiced our opinion that we were extremely fortunate, in the Physics Department, that our masters would allow us to initiate and carry out projects of such nature. One or two of my colleagues in other departments had said that their Profs. would never countenance such action but would insist that the Bursar should be responsible.

Bert Backwell eventually retired and Mr. Don Kendall was appointed. Don was still there when I retired and I enjoyed friendly relations with him and with his staff. Our problems in the building, more frequent in the new parts than in the old, were always attended to promptly, with the exception of painting and decorating. This was quite understandable since, by the time Don arrived, the University was suffering stringent financial cuts. However, all was not lost. Priority was given to "public areas" and areas where safety might be a consideration. Other places had to take their turn in a queue, the length of which was governed by costs rather than by the availability of painters. It was ploy of mine to become aware of what decorating was being carried out in neighbouring buildings, to watch the weather until it became probable that outside work would have to stop, then to telephone the Clerk of Works and say that, if he were to have a spare painter in the next week or so, I had a 'little job of painting' that wouldn't take long to complete. My success rate was fairly good and some offshoot of Parkinson's Law ensured that the inside work would take just as long as the weather held in my favour.

Large buildings require constant maintenance and the various sections of the Bursar's Department existed to service our needs. It was inevitable that we should come to know the craftsmen and to come to know some of them very well indeed. After all, this was of mutual benefit to all sides; we were able to do small favours for them within the laboratory and, in return, they were ready with technical tips, "tricks of the trade", and were often able to obtain goods for us at trade prices, a privilege enjoyed also by the academic staff and, without doubt, by colleagues in many other departments.

Those with whom we had the closest associations were among the electricians, the carpenters and painters, the plumbers and the heating engineers, and we called them friends.

The man we came to know probably the best of all was Bill Herwig of the Electrical Section. My first meeting with Bill took place soon after I returned to Bristol in 1951.

Extensive re-wiring of the electrical mains was taking place; I believe the old two-pin system was being replaced with an earthed three-pin installation. This was really an intermediate step later to be replaced with the 13-amp ring-main system now in common use throughout the country. Until the 1950's power outlets were two-pin using un-polarised two-pin plugs and no earth safety connection. Many pieces of equipment were 'chassis live', that is to say that the metal frame of the device would act as a common connection in the circuitry. Depending on how the plug was inserted this frame could be either at earth potential or 210 volts (in those days) above earth

and capable of giving a dangerous electric shock if touched. The new system had a robust third pin which carried the earth connection and also made sure the plug could be inserted only one way. It still didn't avoid one complication for, as with the old two-pin system, there were three sizes of outlets and plugs. Heavy load equipment, such as fires and kettles, required the largest, 15-amp, outlets; medium load devices, such as soldering irons, domestic irons, toasters and the like were used from 5-amp outlets, smaller in size, and table-lamps, standard-lamps, radios, etc., were supplied by smaller still 2-amp outlets. Adaptors to allow small plugs to be used in large sockets appeared in profusion. Each socket outlet was supposed to be protected by its own fuse in the distribution box. This meant extensive wiring runs and the danger that a small load device developing a fault when connected, via an adaptor, to a 15-amp socket could become quite lethal before the fuse took any notice of it. As previously, this system employed round pin plugs and sockets.

The laboratory was in a state of upheaval during the re-wiring: cables trailed down the walls in new trunking to meet the fuseboxes; socket outlets were being fitted in profusion around the rooms and the floor ducts were uncovered to allow the wires to be laid. During this time Bill was much in evidence, to my eye, rather a burly man. He had been in the RAF and had spent some time out East; later, I was to enjoy some of his tales.

He laid a few tools on the bench near to my work while he stooped to pull a cable through the duct. I glanced at them and thought a pair of pliers looked rather familiar so I examined them more closely. Stamped around the pivot were my initials and I recognised them as pliers I had mislaid in 1949. "Hey!", I cried, "these are mine, they've got my initials on them!" Bill arose to come and look at them and I feared there might be a harsh discussion, but, no. He looked at the initials and said, "If they're yours, old chap, you'd better have them back. I don't know where they came from, I must have picked them up somewhere or other". I still have them among my tools.

He and Maurice had attended the same school but at different times so rapport developed. He, too, was an ardent supporter of the Employees' Association and he and I were consecutive Chairmen of the Association in the early years.

The electricians tended to be responsible for certain buildings because of their acquired familiarity with particular conditions and requirements of those buildings, although their work could take them anywhere within the campus. The Physics Department was one which Bill took under his wing and he became a familiar figure. I think he began to realise that he was accepted as a Physics colleague when he suffered from Ken Goble's evil sense of mischief. He had been re-wiring the clock system, installed around 1926-7, and had managed, with some difficulty, to feed a cable through a devious path to emerge from the ceiling on the Third Floor ready to connect to the clock. Feeling, naturally, exhausted by his labours he joined us for a cup of tea in the room on that floor which later housed a duplicator but then did double duty as a tea-room and cleaners' room. He regaled us with his tale of woe and we sympathised, as was our kindly habit, while Ken popped out and snipped off the tail of cable, leaving about two inches dangling below the ceiling. He took this very well apart from delivering a brisk but inaccurate review of our probable genealogy.

Eleanor and I benefited from his kindly assistance on several occasions. Once, as we were returning from a coach outing we stopped in a small town square. Eleanor had expressed a strong wish for a ham sandwich before we left the coach. She and I searched all around the square for an eating house but none was open. Eleanor, who was then in what was termed "an interesting condition" expecting our firstborn, began to give up hope and we returned to the coach. Suddenly, making his way along the coach aisle, came Bill bearing a magnificent ham sandwich. "There you are, my dear" he said, "You need this. You've got two to feed now!" Bless him!

Central heating was yet to become common and most houses, including ours, relied on coal fires and on hot-water bottles for bed comfort. Those who can remember that far back will recall that hot-water bottles warmed only a small zone, usually around one's feet. If hot enough to warm more they became untouchable. Electric blankets were becoming available but pessimists (and stoics) were condemning them as dangerous and effete. Being effete didn't bother us, as consenting adults we could be effete in the privacy of our own home if we so desired, but safety had to be considered. We asked Bill's advice and the result was he offered to get us one through the trade. It proved to be a tremendous boon and we took to uttering a short prayer, "God Bless Herwig", before we went to sleep. With good Christian economy we abbreviated this to "GBH". Eventually, we told him of this practice and I really believe the good man was embarrassed!

During the finishing stages of the building of the workshop block in 1956 I was present when Bill, taking a look at the contractor's electrical work, fell into conversation with one of the painters. This man was painting a door, the door between the main workshop and the corridor, as I recall, and the topic of rates of pay arose. All crafts look easy until one tries to copy and the painter's almost leisurely application produced great indignation from Bill when he learned that a contract painter earned a penny an hour more than he, a senior electrician in the University, received. In wrath he informed this man that painting wasn't a trade, it was a disease!

Mary, Bill's wife, joined the team of observers in the Cosmic Ray Group and the bonds with the Physics Department strengthened. They became total after a certain incident which he claimed to have marked his life.

It is necessary here to describe a peculiar facet of our corporate existence recognised by us as a fact of life.

Whenever we attempted anything which we would regard, paradoxically, as innocently illegal, we could be assured that, somewhere in the proceedings, Dr. Thompson would appear. The occasions on which this occurred are far too numerous to be listed but there were very few technicians indeed who could claim it hadn't happened to them. These appearances of his would arouse in the victims instant feelings of guilt and confusion. These feelings could also arise if he appeared while we were carrying out our lawful duties, resulting in a frantic review of our activities before we realised we were, for once, quite in the clear. Naturally, we would take pains to ensure that any deviant behaviour could be so unobserved, but usually without success.

One summer's day Stan, who was having some trouble with his Lambretta scooter, decided to bring it into the lab. so he could work on it that evening. We reckoned lunchtime would provide a good opportunity to bring it into the building and we prepared accordingly, borrowing a large plank to lay up the steps and on which to push the scooter. Three of us were pushing and pulling, the scooter was heavy to move uphill, when suddenly it became easier, topped the slope and we turned to thank the unknown helper. Of course it was! We chorused a thank you, a difficult thing to say with one's jaw hanging open, and he went his way with a happy smile.

We believed this talent of his was a gift and that he had honed its performance to perfection. It became known to us as being 'Tompo'd. It was common for a miserable looking colleague to say, "I just popped out to the corner shop and guess who I met as I was coming back". We would reply, "Ha ha! You've been Tompo'd!" It was always funny when it happened to someone else.

I was at home suffering a severe cold one Thursday which happened to be a Polling Day. I felt I could walk the few hundred yards to carry out my civic duty and went to vote. In the voting hall I heard a voice say, "Why, hello, Kevin". It was Mrs. Thompson! I reported this incident when I returned to work and Maurice said, "You won't be safe anywhere now, he's probably trained the whole family!"

I am sure Dr. Thompson knew exactly what he was doing and that he took great joy in the effects he achieved. A suitable occasion arose, probably at his retirement in 1975, when I felt I could raise the question. He heard me out and replied, "I deny everything, you're making it up." I didn't believe him and I don't think he expected me to.

So it was that Bill Herwig, returning from working at one of the halls of residence, decided to break his journey in Cotham and have his hair cut. He sat at the back of the salon, waiting his turn, and realised he was being observed through the mirror by a customer under the scissors. As recognition dawned the customer dipped his head slightly in salute and Bill lowered his jaw in acknowledgement.

He returned shortly afterwards to the department, wearing the typical look of gloom which told all, and said, "Guess what. I nipped in for a haircut and got Tompo'd, and I don't even belong to the Physics Department". "You do now" we told him. "Welcome aboard, you're now one of us!"

Within the newly opened Queens Building there was provided an out-station of the University Refectory which served a respectable lunch. It was intended for staff use and gave us a little haven free from the overwhelming number of students using the main refectory. It developed a regular clientele, mainly technical and secretarial staff, and our crowd included Eddie Seavill, Geology Superintendent; his assistant, Maurice White; Bob Fletcher, who left the Physics Department later to join the Dental School, and Bill Herwig. This was a merry band whose habit, on the occasional crash resulting from some pans or crockery being dropped in the kitchen, was to rise as one man and give a triumphant cheer, then to resume our meal as before. The other users

became accustomed to this behaviour and learned to ignore it, but it gave us a simple pleasure. What is it that is said about little minds?

One day, as we were walking through the garden to lunch, we agreed not to react if such an event were to occur, but not to tell Eddie Seavill of our decision. Nothing happened for a few days then, suddenly, there was an almighty crash from the kitchen. Pavlov would have been proud of us! We all started to rise, remembered, and sat still; all except Eddie. Like a lone champion he stood, gave a resounding "Hooray!", realised his predicament and sat down in confusion, muttering, "Ooh, you rotten buggers, you rotten, rotten buggers!" Well he might; his performance had been greeted with amazed stares from the other diners, including ourselves, of course.

On another occasion the sweet course consisted of a rather stodgy pudding liberally laced with sultanas and the like. Most of us found this, though quite tasty, rather heavy and gave up. Bill, a stalwart trencherman, liked it and said he could do with more so those who had barely touched their puddings heaped them on to his plate. He was pleased and began to tuck-in with great gusto. Out came my pocket camera and a picture resulted which we published with the caption "You've never had it so good!", a comment then topical, courtesy of Harold MacMillan. It was a great success and I had to make many copies which would appear on suitable occasions in the most unlikely places. A large print, much admired by those present, confronted Bill when he attended an Old Redcliffians Rugby Club dinner. Miss Woodcock, the catering manageress, on seeing one of the prints, asked questions as to how Mr. Herwig was given such a large helping.

Our path to lunch frequently took us through the museum of the Department of Geology. There, one day, we came upon Harold Freke, Superintendent of the Department of Geography, who was working on a plastic contour model of the Severn Estuary which was propped on an easel. The Geologists had such a model, fully coloured, and the Geographers wanted one of their own. A fully coloured model was fairly expensive and the Geographers, balanced on the fine line between economy and parsimony, decided to buy an uncoloured model and have Harold, an expert cartographer, colour this to match the original. It took him several days and, when we appeared, he had painted, approximately, the top quarter. We were moved to offer him artistic criticism and helpful suggestions until his aggressive motions with a loaded paintbrush forced us to leave him. A day or so later we passed that way again. He had made fair progress and the work was more than half completed but he was absent. Advantage had to be taken of this heaven-sent opportunity and we added, in light pencil on the un-painted portions, a few details we felt he might care to include. Among many was a sketch of a half-submerged galleon a little south of Lundy captioned, "Har Freke sank here", and a fine arrow pointed to Brean Hill, which had been so coloured in contour bands as to resemble a giant boil, with the legend, "Warning! Don't pick!" He obviously didn't appreciate our efforts since, next time we passed, he had overpainted our contributions. A pity; we were only responding to the MGM motto, "Ars gratia artis".

Chapter 18

The Physics Extensions

Construction work on the extensions to the Physics Department commenced early in 1964. The site engineer was a Peter Griffin whom, after a shaky start, I came to know very well. There was an introductory meeting in Dr. Thompson's office, which I attended, at which the plan of campaign was outlined and problems about construction noise and its possible interference with lectures and examinations were discussed. This having been settled Peter Griffin said he wanted the works to be totally out of bounds to members of the department. I said, "Don't include me in that ban, if you please, I want to know every stick and stone that goes into it". Grudgingly, I felt, he agreed. It didn't take long for us to come to trust one another. The first event of general interest was the arrival and erection of the tower crane. The base was laid, the first section of the central tower put in place, then the jib arm and counterweight assembled about this. As new sections were added the jib unit raised itself until the final height was achieved. This happened without noticeable mishap; not so the crane erected later in similar manner when Phase II was begun in July 1966. After about the second central section of tower was added something gave way and the jib arm slid down the tower, neatly coming to rest on top of an unfortunately parked car thus enabling it to pass under an extremely low bridge!

To save coffee and tea-making time Peter installed a drinks dispensing machine for the workmen. It didn't take them long to discover that the circular 'knock-outs' from electrical conduit boxes were good coin substitutes for a cup of coffee!

Sets of plans had, of course, been supplied by the architect and were sometimes revised. I was still spending a lot of time on after-hours meetings and activities so I couldn't complain when, on going home one evening, I said to Eleanor, "Guess what! The new plans have provided a room we hadn't expected!" "That's nice for you", she commented, "Now you'll have somewhere for your bed!" The room which appeared was B.15 and I thought it might serve a turn as a small store for furniture oddments. This was not to be: surprise!, surprise! it was colonised by Professor Lang and absorbed into his empire.

Work proceeded at a steady rate, indeed, the Second Floor, intended for the new MSc course, was finished first of all and was ready for occupation in August, 1965, six months ahead of schedule. The other floors followed and were ready by Christmas 1965. There were minor snags with Lecture Theatre G.44, both to do with the electrical sub-contractor. When the first wiring plans were submitted I asked if two floor-inset power points could be provided, one at each end of the front row of seats, to supply local slide projectors. This was agreed and they were written in. When the under floor conduit tubes were being laid, work that was being hastened because the floor's final cement screed was being laid as the tubes were installed, I noticed these extra locations weren't being catered for. When I challenged the electrician he said they weren't on his plans. Nor were they; his plans were out of date. By the time I had sorted this out with the architect it was too late, the screed

was down. This meant that an extra socket had to be installed by Bill Herwig, our University electrician, almost before the paint was dry.

The lighting for that theatre consisted of banks of tungsten lamps in the ceiling. These could only be replaced by erecting stepladders among the seating rows. It became practical to wait until six lamps had failed before replacing a batch. Before examinations or important public meetings they would be replaced however few had failed. The central two rows of lights were fitted with a dimmer, a large Variac housed in the space below the theatre. Incidentally, the name for this space, originating in the times of the Roman amphitheatres, is a 'fornicarium'. The gentle reader may work out for him/herself why this should be so.

Prior to the handing over of this theatre the electrician said there was something funny about the lights. They seemed very bright and lasted only a few hours. I still hated him for not putting in my extra points and suggested he should measure the voltage they were receiving. He thought this would be a waste of time but, to prove I was talking through my hat, he would do so. He did, and it was lovely to see his consternation when his meter registered 280 volts instead of the expected 240 volts. Variacs are very familiar devices in physics being simply variable auto-transformers but usually overwound to allow an output, if desired, slightly higher than the input. The installed Variac, a nice large one and motor driven to boot, was also built this way. The cure was to fit a mechanical stop to the rotor arm to limit its rotation and to restrict its output to 240 volts. Having rubbed his nose in it I felt more kindly disposed towards him.

The installation of a heavy NMR machine caused me some worries as it weighed three and a half tons and was destined to sit in a research room on the Fourth Floor. I thought it would be easier to install at ground level but the floor loading would not allow this. A firm specialising in heavy lifting managed to hoist it in stages up the lift shaft. Even when installed and resting on load spreaders it was suspected of inducing a slight sag in the structure. After a few years it was removed by the same firm of heavy lifters and travelled to Leeds with Dr. Ian Ward when he took an appointment there. I was glad to see it go.

Furnishing the new rooms and laboratories was an undertaking in itself. Much of the University furniture requirements, particularly for special, perhaps non-catalogue, items was constructed and supplied by Lord Roberts' Workshop which was largely staffed by disabled men. While they were understandably a little slow in manufacture their standard of workmanship was extremely high. Among our special requirements for the laboratories were large apparatus cupboards and benches of various top sizes. The cupboards were designed by Stan Edwards who drew his plans after discussing the needs with Ken, Maurice and myself. Twelve or so were ordered in advance of the building completion date and their size was decided by existing apparatus cupboards. Very fine they were, too, with one drawback; although we could shift them around the old building fairly easily the doorways in the extension were slightly lower and this made moving them a problem. Once we got them to a given room there they would stay. The order to follow for cupboards for Phase II had the design altered slightly so as to remove this difficulty.

The laboratory benches, cupboards and drawer units associated with them were designed by Professor Thompson and the prototypes constructed by Lord Roberts' Workshop. The benches were of constant height and depth, front to back. The rail between the end legs was off centre and so placed as to act as a backstop to drawer and cupboard units which sat underneath the bench frame. When sited to be accessible front and back the students would sit at the side opposite to the cupboards/drawers. The bench frame was slightly deeper on this edge and was pierced to provide pigeon holes intended as space into which to stow notebooks and, which dates the thinking of the time, scarves. It would not be long before a University scarf would become an object of curiosity.

There were four sizes of bench differing only in their length. The distance between the legs on the long side was the governing dimension designed that the legs would embrace either one cupboard, or two drawer units, or one cupboard and one drawer unit in the three smaller benches and with a choice of two cupboards or three drawer units for the largest bench. Large numbers of all these items were needed and a firm of furniture makers near Southampton were contracted to supply copies of the prototypes. These benches were very successful although the occasional postgrad would come to tell me there were two drawers missing, not appreciating the cunning purpose of the pigeon holes.

During the period of construction Professor Thompson spent a year in America and asked me to act as 'link-man' in his absence. It was a most interesting year for me and quite a demanding experience as this was on top of my normal duties. Among the tasks was that of determining furniture needs for every room and of placing the orders. This should have been straightforward; all I had to do was decide the requirements from the room plans and individuals' special needs. Continual interruptions which were part of a normal departmental day were only allowing me a few half-hour sessions on furniture with consequent loss of continuity. I happened to mention this difficulty to Michael Smith, our Administrator, who suggested I should take the paper work and plans and work at home. "I can't do that, can I?" "Why not?" he replied, "We do it with exam marking". So I stayed at home for three days and finished the job. In the previous three weeks I had managed less than a dozen rooms.

The electrical distribution for Phase II nearly got off to a bad start. In Phase I the fuseboards and master switches were sited near the doors at lintel level. In case of fire or other danger one could reach up easily to cut off the supply to that room. A different electrical contractor was appointed for Phase II who began to mount the fuseboards at ceiling level. When told they were to be at lintel level he said he'd thought ceiling height would be wanted "so the kids can't switch off out of mischief". His last installation job had been in a school!

The electrical consultant was very stubborn about providing under-floor conduit tubes to connect the lecture bench in the new large theatre with the projection room to carry microphone and other auxiliary cables. He gave way under pressure and laid some tubes but claimed that microphone cables were in his contract and he would carry them across the roof of the theatre with the lighting runs, and he wouldn't be shifted on this matter. After the theatre was commissioned and we tried to use his cables the hum pick-up was horrendous. George Hitchings and I had to draw the

microphone cables out of his ducting and re-lay them in the underfloor tubes. This cleared the hum and we used only 60% of the reclaimed cable.

The Students' Discussion Room in the basement had a floor area of about 50 ft by 50 ft, bisected by the floor groove for the movable partition. Rather than have a blank floor suggestions were sought for a suitable pattern or style for the tiling. Many of these were quite magnificent but could only be appreciated in toto from a viewpoint about thirty feet above. This ruled them out but Moreton Moore designed a stylized impression of the twin crystal spirals of the Frank/Reed dislocation. At first this, too, seemed to require a higher viewpoint but he and I amended it so that the pattern was duplicated in each half of the room. The core tile of each dislocation source consisted of a representation of the Physoc logo. This is what was laid and it has been pointed out that, whilst many famous men and women are commemorated by plaques attached to buildings, very few have had floors laid in their honour.

As each floor was finished so it was handed over to the University. A little ceremony marked the occasion with a solemn procession through the area comprising the architect, the site engineer, Mr. A.G.Jones who was Deputy Bursar, Mrs. Ellery who assisted him and who dealt with furniture, and myself. We looked for errors and omissions which needed correction, then accepted that area with an agreed value for insurance. The others would depart and I would join my merry band of furniture movers (the usual team of Ken, Maurice, Stan, my lads and any others we had conscripted) who were lurking outside the connecting doors with a caravan of trolleys and furniture dollies laden with benches, desks, cupboards, stools and chairs. The future occupants had to make their own way!

As a tailpiece, Room 1.36 is one of the Stage II teaching laboratories. It was not originally planned as such; it was intended as an overflow to the main stores but the current increase in student numbers pre-empted this possibility. Fred Salter, who had come as the store-keeper in 1947, moved from rather cramped quarters in the old wing to what looked like sumptuous accommodation in the new wing, unfortunately with north-facing windows, with much steel shelving, and a high ceiling which meant it could never be a very warm room. Fred retired in 1978.

I have always thought it was a pity that a double set of doors was never provided for the entrance hall. Such a system would have kept the hallway and the building warmer, notices would not be wafted off the boards and scattered and, in the windy days of winter, gales would not force the closure of the main doors with entry only from those at the sides of the building.

There is a lightning conductor attached to the wall of Phase I which can be seen as one goes through the archway to the small courtyard and was part of Phase I construction. While the scaffolding was in place later for the construction of Phase II I noticed the conductor had been removed. I mentioned this to the architect and asked him where he intended re-siting it. He said it was alright where it was and he certainly didn't intend to re-locate it. It turned out that some unknown thief had spent a profitable time climbing the scaffolding armed with a hacksaw and had made off with over forty metres of expensive copper strip. It's a pity he didn't try it under cover of a thunder storm.

Chapter 19

St. George's Day, April 23rd 1980.

On St. George's Day, 1980, the University was presented with the flag of St. George. There is a little story about the circumstances leading up to this event.

For some few years previously I had been in the habit of telephoning the Security Officer, the Keeper of Flags, on each St. George's Day and complaining that there was no flag flying to mark the occasion. I was told, each time, that the University didn't possess such a flag and, on my repeated insistence that it should have one, that the matter would be looked into. This was still the situation in 1979 when I made my annual telephone call. The suggestion was made, "Would you like us to fly the Union Flag?". "Most certainly not" I replied, "How do you think you would fare in Scotland or in Wales if you made such a suggestion relating to their National Days? You would probably be lynched!". Saying that he was sorry, but that there was nothing he could do about it, the Security Officer said I ought to talk to Albert Greagsby in the Zoology Department. It seemed he, too, had been plaguing the Security office in like manner, and for several years, as had I, with equally frustrating results.

I duly contacted Albert and we exchanged notes on the short history of our efforts. His pleas had been met with the claim that there was no money and the University would not be able to justify such expenditure. We decided, there and then, that the deficiency must be made good and that we would endeavour to provide a flag.

Albert undertook to investigate suppliers, sizes and costs while I was to approach the University authorities and explain our intention. I went to see Michael Parry in the Registrar's office to say that, in view of the fact that they had no St. George flag, we would like to present one, and would the University agree and accept the gift?

Mr Parry said it was a fascinating proposition but he'd have to consult the Vice-Chancellor and did we realise that suitable flags were not cheap? I said that we guessed it would be moderately expensive and had been led to believe that the University would not be willing to spend money in such a manner, hence our offer.

Albert Greagsby obtained some sizes and cost estimates from flag makers and we decided that a fourteen foot flag would be the smallest size we could use. The cost was to be about forty-two pounds. I had mentioned our project to some of my closest colleagues in the Physics department and, after the news had spread around a bit, five of them said they would like to be associated with the gift.

Michael Parry came back to us to say that the Vice-Chancellor, Sir Alec Merrison, found our intention most intriguing and had offered that the University would be prepared, under the circumstances, to meet half the cost. The seven technicians concerned felt that, having resolved to make the gift, they would prefer to carry out the enterprise without any assistance otherwise it would not be wholly theirs. We thanked Sir Alec for his suggestion and explained our feelings, which he accepted.

Since we'd had almost a year for gestation there had been no rush and the flag was bought and delivered in February, 1980, and plans were laid for it to be flown from the tower above the department of Zoology. Details of the little ceremony of actually flying the flag for the first time were worked out so that this could be both memorable and properly dignified. As a member of the Scout Movement I was familiar with the practice of 'Breaking the Flag' in which the flag is furled and held furled by a slip knot on its lower halyard. The flag is hoisted to the truck prior to the ceremony and is then broken on the command by a sharp tug on the flag rope, when it unfurls. With small flags this is no problem as the halyard wraps easily around the furled flag and keeps it snug. With our larger flag this method would not work, despite attempts by myself and other Scouters. Maurice Rundle, an ex-navy man, was equally unsuccessful but suggested I should approach the personnel of the Royal Navy Information Office in Colston Street. "Ask them if they've got a decent bunting tosser", were his words, so I took the flag down to them. The people there were very helpful and approved our intention. They tried every way they could think of to fold this large flag for furling but had to admit defeat. I was told that it wasn't Navy practice actually to break the flag, it would normally be hoisted with a suitable accompaniment on a bo'sun's pipe, and suggested that I should ask the Scouts as they were known to break flags. We had gone full circle!

At about nine thirty on the morning of April 23rd, 1980, the presentation was made and the flag of St.George flew for the first time over a University building. A party consisting of all the donors and senior representatives of the University met at the top of the Arrowsmith Tower and I had the honour of actually making the presentation to the Vice-Chancellor. The event was covered by the BBC West Region television and was reported that evening.

The University, as recipient, was represented by Sir Alec Merrison, Professor Chambers, Mr. Cannon, Mr. Parry, Mr. Allen and Mr. Carleton. The donors were Albert Greagsby, Michael Gabb, George Keene, Maurice Rundle, Tony Osman, Vincent Rubino and myself. The presentation was worded that "the flag shall be flown, from now on, on St.George's Day and on any other suitable occasion".

The Vice-Chancellor accepted the flag, thanked us all, then asked Albert Greagsby to climb to the flagpole turret and hoist the flag.

Of the donors, all except Albert were from the Physics department. It was remarkable to me that we included in our number Vincent Rubino who had been an Italian Army Officer in 1939 and who had spent most of the next six years as a prisoner-of-war in Britain!

The flag still flies proudly and is in the care of Albert Greagsby, who is meticulous in his duty.

Chapter 20

A Bit About Balloons

Of the original observers who came to work in Professor Powell's Cosmic Ray group only three remain in the department. In its heyday the group employed a dozen or more, often referred to as 'Cecil's beauty chorus', and lively young ladies they were. Mrs. Andrews, herself a Bristol graduate, was in charge and looked after them like a mother.

Although the group seemed to be pretty well self-sufficient it drew, frequently, on willing volunteers to help with actual balloon flights. On only three occasions was I ever involved; once, in 1947 when an early flight was to take place from the bomb-site in St. Michael's Hill, now occupied by the Maternity Hospital, and the lifting was to be provided by a cluster of rubber meteorological balloons. One worked overnight to prepare for an early morning lift-off and the rubber balloons were warmed in an oven to make them pliable from their compressed packing. Around midnight a glum Owen Locke came in bearing some overcooked balloons which looked like toast. We hangers-on were sent home to return by eight o'clock next morning. I turned up at eight in time to see the new cluster disappearing in the sky.

My next involvement was in November, 1949 when, as my lab notebook shows, I co-operated with John Priest in making a light-weight transceiver and a variable inductance height indicator, both to be flown with the balloon. Polythene balloons were being made on the Fourth Floor and their payloads were increasing.

The only full-scale flight in which I took part occurred around 1956 and was made from the airship hangars at Cardington. My job was that of second camera-man with Bill Harbor and the launch was perfect. Unfortunately, the balloon came down after only a couple of hours and an RAF helicopter, co-operating with the team, arrived at Cardington ready to retrieve the fallen balloon. This presented a great opportunity to film a retrieval and I tried to cadge a ride. The pilot said to me, "Have you got a blood-chit?" This meant had I insurance cover which would absolve the RAF in case of accidents, but I had no such document so I couldn't fly with them. Max Roberts and I, having done more than a day's work by noon, went to a local cinema and slept through the whole performance.

The three remaining observers are Mrs. Rose Maharaj, who is still with the group; Miss Marianne Pearce, who deals with the department's reprographic needs, and Mrs. Beatrice Ruston who is, officially, a stores assistant but who runs the stores during the necessary absences of Ron Stone, the storekeeper, who is an Avon County Councillor.

Marianne has told me of the informality of the very early flights. During her first week of employment in 1954 Professor Powell said it was a nice day and how about flying a balloon? They set off in a lorry for Whitchurch airfield and the lorry broke down at the bottom of Lulsgate Hill. Picnic atmosphere prevailed and the party continued on foot while the lorry was eventually persuaded to start again.

The balloon loft was always a good place to visit if one wanted odd bits of polythene sheet. Seeing Ken Goble covering some apparatus in the teaching lab, Dr. John Forty asked where he could obtain some. "On the Fourth Floor", said Ken, "Go and see Fat Pat". John made his way up and was greeted by a pleasant, plump lass. "I'm looking for Fat Pat", said John. "My name's Pat", she replied, but I believe he got his polythene.

Chapter 21

Conferences and Exhibitions

Apart from the meetings of the British Association, which involved almost the whole of the University, the most ambitious venture within the department was the Electron Microscope Conference, EMag 76. This was to include contributors from all over the world and working displays of many types and makes of electron microscopes. The quotations from commercial firms for the hire of display materials and cubicles were well beyond the budget of the conference. Dr. Dingley approached me with the idea that we should erect our own display cubicles, fully wired for power, and providing semi-darkened enclosures for the instruments. We did this, buying the speedframe and chipboard sheets, and building cubicles based on a module system of panels eight feet high and four feet wide. Each exhibitor could choose his colour scheme. While the skeleton framework was being assembled the eight by four panels were emulsion painted, mostly by Eleanor, whom I had co-opted. The job took us most of August and involved many technicians at odd times. The main exhibition was held in the big basement common room but, almost at the eleventh hour, it spread to the preparation room where extra, smaller cubicles were installed. Not only did we do the whole job at a fraction of the quoted hire charge, we owned all the material used. After dismantling, some of it was sold at bargain prices to members of staff, some was retained as display boards by the Bursar and, I suspect, some is still hanging around in the department.

While I have to regard it as a magnificent achievement, I would not recommend a repeat performance of such magnitude. It might have been co-incidental, but I spent a few weeks a little later on having a hernia repaired!

One morning Dr. Thompson came to see me to say he had spent the previous day at the Institute of Physics in Belgrave Square. A question had been raised concerning a Diamond Conference to be held in the Department during the coming Easter Vacation. This booking had been entered in my diary some weeks previously but, so far, I had no details. I asked what the question concerned and he explained that, when a conference was designed, it was usual to find a member of staff from the host venue whose interests lay in the particular field and persuade him to be 'the man on the spot' who would attend to all the local arrangements. I agreed that this practice was familiar to me and asked whom he had in mind. "Well", he replied, "that's the question. There is no-one here currently working on diamond crystallography so I suggested that you might care to take the job on". "Thanks very much indeed" I said, "I don't know anything about diamond crystallography, what are they expecting?" "Don't worry about that, " Dr. Thompson assured me, "all they want you to do is to deal with

arrangements for accommodation, local transport, refreshments and the Conference Dinner. The Institute will cope with delegates, registration, speakers and all financial matters. I think you'll enjoy it".

All this must have taken place during a period in which Dr. Andrew Lang was either away from Bristol or, possibly, before he joined the department. I thought it over for a minute, realised this was a new challenge and said "Right! I'll do it".

A rough estimate of the numbers likely to attend was supplied by the Institute of Physics and I booked provisional accommodation in one of the Halls of Residence. Wessex Coaches were contracted to ferry the delegates hither and thither, arrangements for morning coffee and afternoon tea were made with the Refectory to be served in the Physics Department, lunches to be provided in the Refectory and the dinner was booked to be held in the first floor dining room (with bar!) also in the Refectory. Thus was the groundwork laid.

Happily, communications with the Institute were good and exchanges of information were fairly frequent. As the event drew near I learned that no guest speaker had yet been approached to attend the dinner. No, I didn't volunteer to carry out this duty also but agreed to try and find someone local. My first choice was Professor Powell who, although not a crystallographer, was a first-class after-dinner speaker. I explained what was wanted and that I was empowered to issue him the invitation which included, naturally, Mrs. Powell. To my delight he agreed, asking me what sort of people they were and how had I become involved. I did my best to describe the proposed pattern and content of the conference and had to admit that all the participants were yet strangers to me. He was amused at my account of how I became involved.

Arrangements were now well in hand; all that remained was to give the Hall of Residence final numbers for accommodation, to confirm how many coaches would be needed at what times and to tell the Refectory how many to feed. All was completed in good time. Lecture Theatre arrangements were straightforward and no problems were anticipated there.

I met the Conference Chairman and some of the delegates when they arrived at the Hall the evening before the conference to appraise them of the detailed arrangements and the conference went ahead.

It ran for three days and the dinner was to mark the finish. During lunch on the final day the Chairman told me that they knew Professor Powell only by repute and had not met him. I had been invited to the dinner so I said, "Don't worry, I'll meet him at the door and I will introduce him". Came the evening and I did just that. I met Prof. and Mrs. Powell as they arrived, introduced them to the Chairman and rejoined Eleanor, my wife, saying, "That's my last duty, now we can relax".

At dinner we found ourselves seated on the top table, Professor Powell and Mrs. Powell either side of the Chairman and I was sat next to Mrs. Powell. Dinner went well and I was enjoying myself until I caught a signal from the Chairman. I crept behind the seats to find out what he wanted and he whispered, "I think it's about time

for you to introduce our speaker". Panic!! I hadn't expected this! I asked him to give me a minute and crept back to my seat. I didn't want to let him know I had been caught out and needed a brief moment to cobble together something coherent. Mrs. Powell asked me if anything was wrong. "Guess who's got to introduce the Prof!" I told her. " Oh, no" she exclaimed, "you will be kind, won't you?" I assured her that I would, most certainly, be kind. I fear she had memories of Prof. and myself at certain Christmas Parties.

Somehow I managed to introduce the speaker, explaining that I was in the position of a subaltern being asked to say a few words about his commanding officer, but describing briefly what I knew of his immense contributions to science. Then I sat down. Mrs. Powell said, "That was lovely!"

Professor Powell then addressed the diners with his usual flair and was well received. Mrs. Powell must have let the cat out of the bag about his introduction for, as we were leaving, he thanked me with a merry twinkle in his eye.

I think everyone connected with the conference was happy with the way things had gone. I was pleased that all my machinations had been fruitful and I had enjoyed the little job I did for them. It had been an interesting interlude alongside my normal daily duties.

Schools' Lectures occurred regularly each year. The most popular were those sponsored by the Royal Institute of Chemistry, the Institute of Physics and, from 1957 until 1974, those organised by CEWC, the Council for Education in World Citizenship. In nearly all instances these were highly successful, being well prepared, of topical interest and were extremely well presented. There were some, of course, that were not as well received as others but I can recall only one that was a failure and that one was doomed from the start.

I cannot remember the subject, except that it was arranged one Christmas by the Royal Institute of Chemistry. The speaker, one of a team of two, called for his first slide immediately following upon the introductions, the house lights were lowered and on the screen appeared a table of chemical equations with far too much content on the one slide. Even in the projection booth and above the noise of the projector fan I could hear the groan from the audience of fifth- and sixth-form children. Speakers with an enthusiastic delivery could have overcome this disadvantage. These men couldn't and the lecture was a great disappointment. There were no bench demonstrations to enliven the proceedings and, unfortunately, the reputation of the RIC suffered.

The CEWC meetings were run in two sections over one and a half days. They took place in July after the 'A' and 'O' level examinations. In those days the school term continued after the examinations and these meetings served to maintain interest and help to fill the last week or so of the school year.

The pattern consisted of a senior, full day, conference for post-'A' level pupils and a half day meeting to cater for third and fourth year pupils up to 'O' level. A particular country would be selected each year and speakers of generally high calibre would be

invited to talk about the geographical, political, religious and cultural aspects of that country. I had, perforce, to be present at much of the talks and I was quite impressed by the wealth of information given and the interest evinced by the children. Experts on the subject often included representatives from the country's embassies and consulates.

The organisation was London based and a small party from headquarters would come to Bristol to meet with the local representative, Mr. Ross Gilkes, a senior teacher. The General Secretary was a Mr. Terence Lawson and I came to know him and Ross Gilkes very well. The meetings were always held in the main lecture theatre which, certainly for the senior conference, would be filled to capacity with around 380 pupils and teachers. The black-out system for that lecture theatre is still impressive to see in action when all the blinds descend on the operation of a switch similar to the driving control on the old tramcars. During the re-wiring of the theatre and its controls, when new fuse-boxes and blind-selector switches were being fitted, Mr. Harvey, the Electrical Engineer, wanted to replace this magnificent relic with modern push-buttons. I refused to let him alter it on the grounds that it was an essential part of the character of the theatre.

It was Terence Lawson's delight to initiate the proceedings by operating the blind-control switch himself. Their stately, uniform descent always produced a respectful hush among the audience which he exploited by going immediately into his introductions. We would meet on his arrival and, after we had exchanged courtesies, he would always say, "You won't forget to let me drop the blinds, will you?" He admitted it gave him great satisfaction, a certain feeling of power and enabled him to capture the attention of the audience, all at one stroke!

One meeting in particular is worthy of mention. The country chosen was Tibet. Professor Powell had recently visited China and he gave an account of his travels and observations. A further speaker at this conference was to be a Buddhist monk who needed to be met at Temple Meads station. These men are bound by strict obligations; they may not handle money, they may not eat meat, nor may they take any food after noon. Miss Woodcock, in the refectory, was advised and catered suitably. I have the rest of the story from Ross Gilkes.

Having seen the conference started Ross went to the station to collect the visitor. He realised that he should have no difficulty in identifying a man in saffron robes and was prepared to accost him and greet him even though they'd not met before. The train drew in and Ross, having spotted his man, approached him ready to present a welcoming smile and an outstretched hand. To his surprise the monk was approaching him with a welcoming smile and with his hand stretched forward in greeting. "Odd!" thought Ross, "How can he know me?" Ross told me it was like a scene in a spoof western where the adversaries approach, then walk past one another. This was just what happened and Ross turned to see the monk greet and shake hands with someone who, as it turned out, was an ex-RAF friend of the monk, a friend from before he became a Buddhist. The situation was resolved and the visitor was brought to the conference where he took part in a most interesting session. Unfortunately, he insisted on leaving immediately afterwards to go to Bath with the man he had met at the station. This was disappointing since the last session of the day was always a

question forum with all the speakers participating and the interest shown in the Buddhist's contribution gave rise to some very good questions which he wasn't there to answer.

The last such conference was held in 1974. By then attendances were falling, largely due to the changes occurring in education whereby pupils were allowed to leave the schools on completion of their examinations rather than having to mark time until the official end of term. A further reason given was the loss of goodwill caused by the lowering of standards of refreshment and service from the University Refectory. In the early days coffee and tea, with biscuits, were served to the speakers and the organisers during the mid-session breaks and soft drinks were available on the lawn for the children, with refectory staff in attendance. For whatever reasons this practice was changed with an urn of coffee with plastic cups being left available from which the organisers were to help themselves and with bulk supplies of soft drinks, but no attendance, for the children. The responsibility for monitoring the issue automatically devolved upon the accompanying teachers. This drop in standards has been quoted to me as being a contributory factor towards the decision to terminate the conferences, at least, in the West Country.

Tickets for these conferences were nicely printed and were supplied against application from the schools. It was generally held, not only for CEWC but for all instances of schools lectures, that there would be a 5 to 10 per cent fall-out among those applying. In view of this tickets were limited to 400 and schools, on occasion, were rationed so as to keep the attendance within the limit. We used to collect tickets as the audience arrived and, if time permitted, would put them in numerical order to allow the organisers to estimate the attendance factor for each school. While sorting the tickets one afternoon we discovered a forgery. Its number was in the proper sequence and we assumed the original had been lost or damaged but the culprit had produced a very fair copy with pen and ink, certainly good enough to pass a cursory inspection when collected. As Ross said, the effort that went into the forgery spoke well for the doggedness of the boy (for we knew to which school the sequence had gone) but it betrayed also a streak of deviousness since a replacement ticket could have been had for the asking.

Chapter 22

Occasions of Unusual Interest

Following upon the death of the previous Chancellor, Sir Winston Churchill, the Duke of Beaufort was chosen to be his successor. He was a member of a family which had played a part in the founding of the University in the very early days but his appointment was not popular with the radicals among the students. He was not a noted academic and they held that his position in society and his inherited wealth represented privileges which were anathema to them.

It was, perhaps, because this was known that a certain care was taken to ensure that the Installation could take place unmarred by overt disruption. It was expected that there might be objectors, even a protest demonstration, such was the excitable student

mood of the day. I cannot recall just what precautions were taken, this was long before the time of a Security Office, but all went well on the great day and the dignity of the ceremony was not interrupted - but, only just!

The ceremony of Installation was one that I wished to attend out of general interest but the demand for tickets ruled me out. Resigned to having to miss the occasion I was delighted to receive an invitation to join the film team organised by the Department of Drama. They had been asked to make a film record of the proceedings and cast around for extra camera operators. My experiences in this field stood me in good stead, for once, and I went to the Great Hall the day before the ceremony for rehearsals and camera alignment. My post was to be at the side of the stage, hidden from the audience, operating the Arriflex 16mm camera which was aimed to cover the platform party. With all the camera equipment were sound recorders dotted here and there. The rehearsal went well and we left all the gear ready for the next day.

In the morning we arrived early for last minute checks for sound levels and camera angles. As the moment drew near another chap and myself noticed a tape recorder we couldn't identify as being part of the regular equipment and it had upon it a tape, partly run. Our first thoughts were that someone had slipped this in to make a personal, unofficial recording of the event. Then we noticed it was connected to a timing device and, also, it had no microphone. This made us very suspicious so we disconnected it and removed it to a side room for examination. We soon discovered that the timer was set to switch on the tape well into the proceedings and would result in blaring pop-music being produced. Such a happening would certainly have disrupted the ceremony and precious minutes could have elapsed before the source was traced.

The tape recorder was an expensive model and merged quite well with the other equipment about it. Had we not been checking our own cables and connections we would, almost surely, have accepted its presence. We locked it away, reported its discovery, and awaited results.

Clearing up was carried out the next day. Towards the end of the morning a student approached us and, rather sheepishly, inquired if we had seen his tape recorder, describing it briefly but accurately. "If it was the one left on the floor then someone trod on it," we lied. He paled. "I borrowed it from a friend," he gasped, and we rejoiced, wickedly, in his discomfort. After complimenting him on his misplaced ingenuity we returned the recorder to him, intact, assured him he was lucky to get it back and told him to go and mend his ways. I don't suppose he did.

--ooOoo--

On November 15th, 1957, the Physics Department, among others, was honoured by a visit from HRH Prince Philip, Duke of Edinburgh. The occasion passed off very smoothly and a natural interest was shown by everyone at the presence of a Royal Personage.

What I remember best about the occasion was the preliminary visit by sundry officials representing the Palace organisers, security people and officers of the

University, including the Vice-Chancellor, Sir Philip Morris. The object of this exercise was three-fold; firstly, to decide what was to be shown; secondly, to plan the route to be followed and, thirdly, to assess the time to be spent at each point of interest. The essential stops were recorded with, literally, stop-watch precision, even to the journey by lift from the ground floor to the balloon loft on the fourth floor. Here the Duke was to be shown the construction of a high-altitude polythene balloon and would look through a microscope at a typical particle track in a piece of special photographic emulsion.

The balloon loft ran the length of the fourth floor from the join with the tower block to what was then the rear wall of the building. The main roof girders crossed this space just over six feet from the floor and they were unprotected. They had not been considered hazardous until a week or so before the planned visit. In a mood of justifiable exuberance, having apparently achieved a mild scientific break-through, Dr. Jake Waddington went bounding through the loft to share his joy with a colleague. The peak of one of his bounds brought his head into a painful contact with one of the girders, resulting in serious bruising and lacerations. Panic!! Suppose the Duke of Edinburgh were to be hurt in like manner! Not that it was likely that he should bound along as did Dr. Waddington, but the potential hazard had been exposed. The answer was to take several cardboard tubes, cores on which the rolls of polythene were supplied, slit them lengthwise and fit them over the exposed edges of the girders. They were marked with red plastic tape and would serve as a temporary measure. So successful were they that they were still in place in 1987, when I retired, and, for all I know, might be there yet. The safe passage of the Royal Head was assured.

When the reconnaissance party arrived at the microscope position the slide was in place and ready to view. The action of viewing was simulated and timed. It was noted that adjustments would be necessary to the binocular microscope to allow for eye separation and fine-focussing. The latter could not be pre-determined but one of the party addressed a companion with the question, "What is the Duke's inter-ocular distance?" To my amazement this man produced a little notebook and supplied the answer. I thought then, and still do, that this was a beautiful example of meticulous planning.

--ooOoo--

On many great occasions the incidents which become firmly embedded in the memory are often quite trivial and, as in this instance, incidental to the main event. So it was during the visit of HM Queen Elizabeth II to the University on Friday, December 5th, 1958, honouring thus the first ceremony in the celebrations of the University's Jubilee Year. Having taken many photographs of the current restoration of the Great Hall for the University records I was able to obtain a ticket to view the ceremony from one of the galleries. I was able, also, to view the solemn procession the Queen made from the main doors, up the grand staircase to the Great Hall. Her approach to the stairway was heralded by a magnificent fanfare from the first-floor landing provided by trumpeters from Kneller Hall. On completing this fanfare they broke off and ran like fury along the West corridor by the Great Hall to appear again on the stage to herald the Royal Entry. I moved smartly to my appointed place in the upper gallery and was able to observe them, through a half open door on that side of

the Great Hall, trumpets held high, scooting along to reach the stage in time. I thought, "Good grief! They'll be hopelessly out of breath!" Not a bit! They formed up smartly and, on cue, the fanfare sounded out sweet and true. My memories of the ceremony as a whole are dim but I was pleased to be there, not least for the performance of the trumpeters.

--ooOoo--

Many and varied are the outside societies and clubs which hire rooms in University buildings. One such, a private society with certain political interests, hired the new large lecture theatre for a Saturday morning meeting to be addressed by Dr. David Owen, then Her Majesty's Principal Secretary of State for Foreign Affairs, i.e., Foreign Secretary.

I arranged the booking for them with the Registrar, as was usual, and entered the date and time in the diary. I thought no more of it at the time merely thinking to myself that our range was extending and who on earth could we expect next.

Early in the week before the meeting was to take place Mark Bleasdale, our Security Officer, put his head round my door and said, "Oh, Kevin, I've got Chief Superintendent Andy McMahon with me from the Special Branch. Can we have a word about David Owen's visit?" I thought, "Ye Gods! Special Branch, no less!" and asked what I could do for him. Chief Superintendent McMahon was a most affable chap and addressed me immediately as "Kevin", explaining that he and his lads, two officers who looked grim and decidedly un-affable, would like to see where David Owen would enter, where he might go to 'compose himself' and where the meeting would take place. I agreed to 'walk the ground' with them and asked wasn't all this a bit heavy for what I believed would be a straightforward meeting and address? "Not at all", he replied "You'd be surprised how many people there are who'd like to upset things or even have a go at him, indeed, at any senior politician these days".

Accordingly, we examined the route to be taken, where the toilets were, in which room he would initially be received by his hosts, the lecture theatre itself and all available approaches. He asked what the window at the back of the theatre was for and I explained that it was the projection room window and said he could put a couple of observers (I nearly said 'marksmen') up there if he wanted to. He said he would do just that and asked me if I would be in on the Saturday morning. I hadn't intended to be in but the situation looked as if it would hold great promise so I said I would certainly attend.

As was my practice, I made sure that the theatre and allied rooms were made ready on the Friday afternoon, just in case anything prevented my attendance on the Saturday, and went home very mildly excited at the morrow's prospect.

The next morning I arrived fairly early and was asked to justify my presence by two constables before I was able to park my car. "If you're expecting trouble", I told them, "I'll park at the back of the building, out of sight of the road". I did so and entered the building to find two more constables at the front door. They asked me who I was and I replied, grandly, "I am the Superintendent". They saluted me! Most

gratifying, but I was kindhearted enough to explain that I was not a police Superintendent so they asked me if there was a coffee machine in the building. One went off to find it and the other remained at the front door. While he was looking down the road a police car approached from up the road bearing senior uniforms and I tried to draw the constable's attention to this by going "Pssst!" It worked just as the car drew up and an officer with a silver edge to the peak of his cap called out, "Where's your mate?" I thought to myself, "Oh dear, oh dear!" but the constable, saluting with a flourish, answered, "Inside, checking, Sir" and my heart warmed towards him.

Soon more police arrived and the Great Man's car, led by a motorcycle outrider, drew up at the door and he alighted to be greeted by the organisers of the meeting and taken for hospitality in a side room. More policemen arrived, those on duty at the ends of Tyndall Avenue being brought in along with those who had been just outside the building. Dr. Owen's chauffeur, Special Branch himself, was there also and when he reached for something in his pocket his jacket opened sufficiently for me to spot a pistol in a shoulder holster. "What ho!" I thought, "things are looking interesting!" but all remained quiet and peaceful.

I had told Mr. McMahon that I would go up to the projection room when the meeting was under way as I expected he and his two lads would like a cup of tea. When I went there I found fourteen assorted coppers, all hopefully waiting with their tongues hanging out. By scouting extensively I managed to borrow enough cups and beakers to supply everyone and a good time was had by all. The meeting went without a hitch and, as far as I know, those attending were happy. At the end David Owen departed without fuss, if one discounts the motor cycle escort, and the various policemen left in one's and two's to do whatever policemen do in such circumstances. I wouldn't normally have stirred myself to come in for any form of political meeting but I enjoyed the accompanying circus.