



LIFE AT THE LIMIT

TRIUMPH AND TRAGEDY IN FORMULA ONE

PROFESSOR SID WATKINS

Foreword by Niki Lauda

LIFE AT THE LIMIT

TRIUMPH AND TRAGEDY IN FORMULA ONE

Foreword by Niki Lauda

SID WATKINS

PAN BOOKS

OceanofPDF.com

To Louis Stanley and Jackie Stewart, who started the struggle, and to the Chief Medical Officers at the Grand Prix circuits, and to Jean-Jacques Isserman and Hugh Scully who have all worked devotedly to achieve the high standards of medical safety worldwide.

OceanofPDF.com

CONTENTS

[Acknowledgements](#)

[Author's Preface](#)

[Foreword by Niki Lauda](#)

[CHAPTER ONE](#)

[SUNDAY, 1 MAY 1994 – IMOLA](#)

[CHAPTER TWO](#)

[MAY–JUNE 1978, LONDON – THE BEGINNINGS](#)

[CHAPTER THREE](#)

[JULY 1978 – EARLY FINDINGS](#)

[CHAPTER FOUR](#)

[10 SEPTEMBER 1978 – MONZA](#)

[CHAPTER FIVE](#)

[WATKINS GLEN, 1978](#)

[CHAPTER SIX](#)

[GRAND PRIX DRIVERS OF THE SEVENTIES](#)

[CHAPTER SEVEN](#)

[JANUARY 1979 – ARGENTINA](#)

CHAPTER EIGHT

APRIL 1979 – LONG BEACH AND JARAMA

CHAPTER NINE

THE TRIPLE PRESIDENT – JEAN-MARIE BALESTRE

CHAPTER TEN

THE MEDICAL COMMISSION OF THE FISA

CHAPTER ELEVEN

1982 – ACCIDENTS AND THE GROUND EFFECT CAR

CHAPTER TWELVE

GRAND PRIX DRIVERS OF THE EIGHTIES 1

CHAPTER THIRTEEN

FRANK WILLIAMS' FOLLY

CHAPTER FOURTEEN

CIRCUITS I LIKE AND FEAR

CHAPTER FIFTEEN

1983–1993 – THE 'GOOD' YEARS

CHAPTER SIXTEEN

GRAND PRIX DRIVERS OF THE NINETIES

CHAPTER SEVENTEEN

28 SEPTEMBER 1990 – JEREZ DE LA FRONTERA

CHAPTER EIGHTEEN

1994 – THE EARLY RACES

CHAPTER NINETEEN

THE PRESIDENT OF FIA AND THE EXPERT ADVISORY GROUP

[APPENDIX I](#)

[The Physiology of Motor Racing – The Limits of Human Performance](#)

[APPENDIX II](#)

[Safety in Grand Prix Racing 1963–1995](#)

[APPENDIX III](#)

[Grand Prix Questionnaires](#)

[Index](#)

[OceanofPDF.com](#)

Acknowledgements

Bernie Ecclestone is responsible for the initiative to improve medical safety launched in 1978. Without his help and solid support much of this story would not have been told. I am grateful to him for asking me to help.

I would like to thank Max Mosley, President of the Fédération Internationale de l'Automobile, and Alan Henry for reading the text and making suggestions and corrections, and Niki Lauda for writing the Foreword. I would also like to thank the President of the FIA for permission to reproduce the documents on pages 207–49.

Apart from my memory, I have relied heavily on three books for verifying events, dates and incidents: Steve Small's *The Guinness Complete Grand Prix Who's Who*, Jacques Deschenaux's *Marlboro Grand Prix Guide (1950–1994)* and Murray Walker's *The Grand Prix Years*.

It has been called to my attention that Graham Hill published a book with a similar title some years ago. Indeed I have read it but the limits now, more than two decades on, are different.

I extend my sincere thanks to Georgina Morley, Editorial Director, and Carey Smith, my editor and 'personal keeper', both of Macmillan, who have succeeded in refining my original efforts to a respectable standard. The responsibility for any remaining errors in the book is my own.

Author's Preface

For many years I have been asked by friends to write down the Formula One anecdotes they have enjoyed my relating over many leisurely dinners, happy evenings and adequate whisky. But in Jerez de la Frontera in October 1994, at my hotel the Saturday evening of the race, I sat on the balcony of my room looking at the countryside and felt impelled to start.

I had been thinking of Martin Donnelly, as it was our first return to that circuit since his accident there in 1990, and of Ayrton Senna's extraordinary response to that tragedy – his deep compassion for Martin, his intelligent and intellectual interest in the details of the medical rescue, and his courage in practice immediately afterwards, despite being a close observer of the event. We had lost Senna a few months earlier at Imola in May 1994 but his presence was and is still with me.

I wrote the first chapter of this book without pause in the next hour. It has barely changed since. The rest of the book, the fun apart, is the story of how many of us have struggled to improve the safety of the circuits and the medical response to accidents in motor racing. Our purpose – which can never be achieved – is to avoid the circumstances which have led to losses, depriving the world of such men as Senna, whose gifts, had he survived, would have won a place in the history of mankind, not just motor racing.

A handwritten signature in black ink that reads "Sid Watkins". A long, thin horizontal line is drawn below the signature, starting from the end of the word "Watkins" and extending to the right.

OceanofPDF.com

Foreword by Niki Lauda

I suppose the truth is that I am as well known for surviving that terrible fiery accident in the 1976 German Grand Prix as I am for winning three World Championships. I do not generally dwell on the events at Nürburgring almost twenty years ago, but it certainly served as a graphic indication of the potential dangers of motorsport's most senior category.

All of those who choose to compete in Formula One – indeed in any category of motor racing – are acutely aware of the hazards involved. Despite the enormous strides made in car construction and circuit safety, accidents can still happen and the memories of the dreadful weekend at Imola in 1994 are still fresh in the minds of the entire motor-racing world.

I remember racing in a time when circuit medical facilities were haphazard in the extreme; you just crossed your fingers and hoped you would not have an accident at certain tracks! However, in the last two decades, this side of the sport has been transformed, and the men who deserve most of the credit for this are Bernie Ecclestone, owner of the Brabham team and President of the Formula One Constructor's Association, and Professor Sid Watkins, the author of this book.

Motor racing should give thanks for the fact that Sid Watkins, one of the world's most eminent neurosurgeons, is also a passionate motor-racing enthusiast. Bernie had the foresight to recruit him to the position of Formula One surgeon in 1978 and, the way I understand it, Sid is the only man to whom Mr Ecclestone defers wholeheartedly and consistently.

Sid Watkins has brought a totally new dimension to the business of medical treatment and security in one of the world's most high profile international sports. Today's Grand Prix stars can rest much more easily in their beds knowing that 'Prof' will be immediately to hand in the event of their needing medical attention at a race track. Anywhere in the world.

ii
Tomb

OceanofPDF.com



CHAPTER ONE

SUNDAY, 1 MAY 1994 – IMOLA

I don't usually suffer from premonitions but it had been a bad weekend, and although I'd been pretty upset after the accident on Saturday in which the Austrian driver, Roland Ratzenberger, was killed during qualifying practice, by the Sunday morning I had settled down. I can't say I was looking forward to the race, but I was certainly looking forward to the end of the weekend.

The previous evening at the hotel in Bologna I had dinner with ex-Grand Prix driver John Watson, an old pal and currently a television presenter for Eurosport. John was obviously disturbed over the events of Friday, when the young, very talented Brazilian Rubens Barrichello escaped serious injury in a 160 m.p.h. crash during practice and now a death on Saturday. I said a few things to him that, in the end, proved prophetic. I expressed the view that perhaps Formula One Grand Prix racing was coming to the end of its life as we, the elders, knew it. I felt that, with the sociological changes widely occurring in the world, expectations had so altered that the old panache of Formula One was close to being no longer acceptable. I think he was a bit surprised to hear my views but later concurred that a watershed had been reached.

On Sunday morning the warm-up went OK. I had not seen or spoken to Ayrton Senna since the afternoon before when I saw him at the medical centre after the fatal accident. But my unease returned at the drivers' briefing, when we had a minute's silence for Roland. I thought this a bad idea for drivers to endure when they were about to face the risks so recently

patently exposed. But I had no part in it or influence over the decision to hold it. In any event, when I looked around the room most of the drivers were taking it well, except for Ayrton who, for the second time in twenty-four hours, was crying. He was doing his best to overcome his grief, but silent tears were running gently down his face and he was licking them away in an effort to conceal his distress. I averted my gaze out of respect for his personal mourning. I did not speak to him after the briefing – unusually, for normally we had a chat.

There were certain discussions at the meeting which must remain confidential, but Ayrton handled himself well throughout the proceedings – as ever the dignified gentleman I had known for years, had admired, respected, and grown to love.

The troubles started on Friday afternoon in qualifying practice. I was sitting in my car at the chicane before the pits, accompanied by Mario Casoni, my usual driver at Imola, and Dr Baccarini, the Italian anaesthetist with whom I'd worked for some years. We heard the loud thump of a big accident behind us, turned to look and saw the underside of a Formula One almost vertical by the barrier and the debris fencing, at the end of the first turn into the chicane. Mario immediately headed for the accident, while Roland Bruynseraede, the permanent Race Director, could be heard exclaiming 'Red flag!' over the radio. We crossed the track, weaving through Formula One cars which were still circulating, and reached the crash.

As we approached, the marshals intervened, rapidly flipping the wrecked vehicle right way up, in too rapid a way which provoked the thought that if the driver had a neck injury this manoeuvre would not have helped it. I knelt by the driver and heard his laboured and obstructed breathing. It was Rubens Barrichello. Dr Baccarini held his helmet while I cut the chin-strap with my shears. We removed it to find him unconscious. He was bleeding freely from a laceration near the nose but the problem was airflow. This is always a nightmare, for after three or four minutes without oxygen the brain cells start to die. I thrust a plastic airway between his clenched teeth and rotated it so he had an airflow. We put on a stiff cervical collar to protect his neck and by then the extrication team had arrived.

At every circuit we have at least two teams of doctors and marshals trained to extricate a driver using a spinal splint on all those suspected of having a back injury. In the unconscious driver, it is impossible to know

whether the spine has been fractured so this is the routine with all unconscious drivers. This procedure, the result of an initiative from the FIA (Fédération Internationale de l'Automobile), the ruling body for motor sport, and Dr Jean-Jacques Isserman, the permanent medical delegate in Paris, has become mandatory world wide for all FIA championship events. The extrication team began to fit the splint (a so-called KED), to Barrichello while Dr Baccarini and I guarded his airway and neck. I suppose a period of two or three minutes had elapsed before the young driver struggled to regain consciousness, becoming confused and irrational. Relief flooded through the rescuers' minds.

It took a few more minutes to remove Rubens with some semblance of decorum, but when we got him out he seemed awake and intact and went off by ambulance to the medical centre. There the on-site medical facilities are such that he was immediately X-rayed, scanned and examined by Dr Franco Servadei, an excellent neurosurgeon. By the time the helicopter took off to take Rubens to hospital we were all fairly confident that he was going to be all right. Spirits were high, congratulations to the medical team were welcomed. The system had worked and the result was joyful. The next morning Rubens had sufficiently recovered to leave the hospital.

Saturday afternoon was a different story. We were into another qualifying practice then suddenly the red flags were out. Mario took off at great speed, past the pit exit through Tamburello; as we approached the kink before Tosa there was debris littering the circuit. At the apex of Tosa was a wrecked Simtek car. The doctor stationed on foot at Tosa was at the scene of the accident within twelve seconds and the nearest medical intervention car with Dr Lega was there in twenty-five.

I arrived to find the doctors already at work – helmet off, airway in place – but the driver was still in the cockpit. I quickly glanced at the driver's pupils. The situation was grave. It was necessary to extricate him instantly, which we did. Intravenous infusion, intubation, ventilation, and cardiopulmonary resuscitation were performed. The ambulance arrived seven minutes later, and shortly afterwards Roland Ratzenberger was in the sophisticated Intensive Care Unit at the medical centre. It was soon clear that no more could be done at the circuit and the larger of our helicopters

was called to take Roland and the resuscitation team to the Maggiore Hospital in Bologna.

It was then that Senna appeared at the door of the centre. He had been to the scene of the accident in a course car that he had commandeered (for which he was later chastised) and, having questioned the marshals about the accident, went to the medical centre area, where he had been debarred (properly) from entering. But he had jumped over the fence at the rear to get to the door of the unit. I took him round to the circuit side of the area and answered his questions with complete honesty. As we talked, Charlie Moody, the team manager of Simtek, arrived. I then had to tell him the bad news that Ratzenberger was beyond medical help. It was tough for me to deal with two such devastated people at the same time, and remain cool and unemotional.

Ayrton was beside himself: he had not been close to death at a circuit before. The last tragedy we'd had at a race meeting in Formula One had been in Montreal in 1982 when Ricardo Paletti was killed at the start of the race, before Senna's career had reached Grand Prix level. Although he was totally aware of and accepted the dangers, we'd had a long run without fatality. So many accidents in the past twelve years, so many serious injuries, but nobody irrevocably lost. It was both cruel and horrible for us all that tragedy had happened again. Ayrton broke down and cried on my shoulder. After all, why shouldn't he. We had been close friends for many years, we'd fished together, we'd stayed with each other's families – he was a part of my family – we had talked and worried together over many things common to us both in racing and in life.

I respected Ayrton Senna enormously from the first day I had close contact with him, at Kyalami in South Africa in 1984. He had brought a difficult car, which was probably not competitive, to a place in the second race of his first season. Afterwards he was brought to the medical centre suffering from serious and agonizing cramp in his neck and shoulders. He did not understand the nature of his problem and was creating a fuss until I told him in a few short, sharp words that his condition was not mortal, it was simply a problem of physical chemistry. The rational look returned to his eyes and, thereafter, he behaved impeccably. Although I know in later years his language and behaviour at times were not perfect, he was at heart a gentleman.

In 1984, at the end of his season with Toleman, he was offered a contract with Lotus. Unfortunately, at the same time he developed Bell's palsy, an affliction of the nerve of the facial muscles, probably due to a virus. One side of his face became totally paralysed: he was unable to close his eye and his mouth was drawn to one side. He came to see me on my ward in the London Hospital and I put him on steroids to try to protect the swelling in the nerve to preserve the possibility of its recovery. He started the treatment and went back to Brazil, where he was advised to stop taking the medication. His condition worsened, he rang me up and went back on the steroids.

He soon came back to London and turned up again in my office on a day when I hold a motley outpatient clinic. It was a busy time and he was told to be seated in the waiting area with the other patients. My secretary, Lynne Hencher, then went to call my next appointment, Mrs Patel, a dear elderly lady with spinal paralysis who was in a wheelchair. When Mrs Patel's name was called in the waiting area, Senna stood up and said, 'May I wheel the chair for you?' which he then did. Entering my office with Mrs Patel, he grinned, said 'Good morning, Professor,' turned and went back to the waiting area.

Some years later he came to Loretto, Jimmy Clark's old school, in response to a letter from Matthew, my elder stepson, who was a pupil there. He addressed the school for forty minutes, took questions, from the youngest eight-year-old 'nippers' to the oldest sixth formers, about many sensitive issues – his religion, his dedication to motor sport, his relationship with other drivers, particularly Alain Prost and Nigel Mansell, and his hopes for his future, namely family, marriage, children, and some degree of tranquillity. Afterwards, during a reception in the Deputy Headmaster's home, he had a deep conversation with the Bishop of Truro who had been in the audience and was at Loretto to conduct Sunday morning service the following day in the school chapel. After the reception the Deputy Headmaster's wife, Mrs Durran, had prepared a small dinner over which Ayrton said grace. Later that night he returned to Portugal, leaving the students and staff pondering over this extraordinary man and reassessing their ideas about racing drivers. On Sunday the Bishop of Truro began his sermon with the confession that he had been spiritually and verbally outclassed as a preacher by Ayrton Senna.

I have so many memories of his kindness and generosity to many causes, including his financial support for a charity to provide medical services for the children of the River People of the Amazon to which he had agreed instantly after I brought this need to his attention. In fact, we had planned to go together at the end of the 1994 Grand Prix season to see the project in action.

Now his head was on my shoulder and my arm was around him. I felt that I had to tell him what I thought. 'Ayrton, why don't you withdraw from racing tomorrow? I don't think you should do it. In fact, why don't you give it up altogether? What else do you need to do? You have been World Champion three times, you are obviously the quickest driver. Give it up and let's go fishing.' He was silent. I went on, 'I don't think the risk is worth continuing – pack it in.' He gave me a very steady look and, now calm, he said, 'Sid, there are certain things over which we have no control. I cannot quit, I have to go on.' Those were the last words he ever said to me.

The pre-race procedure was beginning. I drove around the circuit close to 1.00 p.m.; the medical intervention cars were in place, the doctors with the ambulances, the medical centre ready for action, the centre's staff alert, expectant and, as usual, apprehensive. It was a beautiful day, the circuit well prepared, spick and span. Roland Bruynseraede did his formal inspection and the stewards theirs; all was set.

The cars started the parade lap, Senna on pole. In my car Mario Casoni was all geared up, Dr Baccarini had his IV infusions ready, the cervical collar, and the paraphernalia of resuscitation in the saloon and boot. Dr Domenico Salcito, Deputy Chief Medical Officer for Imola, sat next to Dr Baccarini. Radio control silence was operative. The procession of Formula One cars went past us, the Imola fire cars were at each side and a little behind my car. The race cars resumed their places on the grid, the green flag waved at the back. The red light, four to seven seconds, then the green and we were off. Suddenly yellow flags were waving everywhere. There had been a collision at the start, when Pedro Lamy's Lotus ran into the back of J. J. Lehto's Benetton.

Casoni flashed through the debris; there were crashed racing cars on each side as we trailed the remaining pack. The drivers in the wrecked vehicles appeared uninjured, so on we shot. There had been enough trouble at the

starting line for us to expect red flags to stop the race and to make a formal restart. But as we thundered through Tosa, Acque Minerali, and the Rivazza corners, it was clear that the race was continuing. We finished our lap uneventfully, and as we reached our position in the chicane the leading Formula One cars were completing their second lap. There was still debris in the starting area, and out came the pace car to lead the procession of remaining cars at a slower speed to provide the marshals with safety and time to clear the circuit. I didn't know until later that, during the starting impact, wheels had gone over the fencing into the crowd on the stand side of the circuit, injuring nine spectators. In any event the paced laps continued, five, I think, until the circuit was clear.

The pace car came off. During the next lap the Formula One cars were released to race. Senna was at the front, closely followed by Schumacher. These two went off like lightning on their next lap. My premonition crystallized. I turned to Casoni. 'There's going to be a fucking awful accident any minute.' The rest of the cars disappeared from view at the end of the pit straight into Tamburello.

The next moment the red flags were out again. Casoni took off and as we approached Tamburello somehow I knew it was Senna. He was slumped in the Williams car and the doctor from the first intervention car was with him, holding his helmeted head. For the third time that weekend there was a frantic effort to cut the chin-strap and get the helmet off. We supported Ayrton's neck and removed the helmet. His eyes were closed and he was deeply unconscious. I got an airway into his mouth, rotated it and we had effective airflow.

He looked serene. I raised his eyelids and it was clear from his pupils that he had a massive brain injury. We lifted him from the cockpit and laid him on the ground. As we did he sighed and, though I am totally agnostic, I felt his soul departed at that moment.

More help arrived and Dr Pezzi, one of the trackside medical team, got on with intubating Senna. We got several IV infusions into the inert form and although I could feel his pulse, I knew from seeing the extent of his injury that he could not survive. We called the helicopter to the scene. Dr Giovanni Gordini, the Intensive Care anaesthetist from Maggiore Hospital who was in charge of the medical centre, arrived. In his care Ayrton was taken to Maggiore in the helicopter.

There was no point in my going; there was nothing more to be done that would influence the situation. I collected Senna's helmet. His gloves, which I had removed, and my own were lost. I went to the medical centre to see the staff and to drop off Ayrton's helmet for safe keeping. Dr Servadei was on the phone to Maggiore, providing information for the hospital staff. I reconstituted my medical kit, received the news that the race would be restarted shortly and went back to Casoni and the car.

The restart was eventless, but the next two hours for me were terrible. As we swept past through Tamburello, the scene of Ayrton's crash, there was a large area of white powder scattered to absorb the spilled oil from the car, marking the place where I now believed I had lost my dearly loved friend.

The race was again marred by an accident in the pit lane when, after a pit stop, Italy's Michele Alboreto lost a wheel from his Minardi, injuring several mechanics. After the race Casoni drove me to the medical centre. Peter Collins of Lotus was there. He was worried about two of his mechanics who had been injured. I checked them out and reassured him. Then I changed, leaving all my medical and racing kit scattered in the centre. Dr Servadei had the helicopter warmed up and we jumped in and were off right away to Maggiore. I asked about Senna's helmet before I left and was told that the Italian police had confiscated it. They still have it as I write nearly two years later.

Everything had been well managed at Maggiore Hospital. A brain scan had been done, which confirmed there was no hope. The X-ray pictures of the damage to the skull and brain told the whole story. Ayrton's brother Leonardo and his manager Julian Jakobi were there waiting anxiously together. Dr Servadei, Dr Gordini and I told them that the situation was hopeless. Gerhard Berger soon turned up and so did Pedro Lamy, followed by Mr Antonio Braga, a much loved friend and confidant of Senna's. Despite all efforts, the monitors of blood pressure, respiration and heart action indicated that the end was near. I spoke to Ayrton's brother-in-law in Brazil, and with the family who I knew were about to leave to come to Bologna. They accepted the tragic news with dignity, and took my advice to remain in Brazil.

There was nothing left for me to do. I got a lift back to my hotel. The TV was playing and replaying the whole nightmare weekend. Formula One had indeed reached a watershed.

OceanofPDF.com



CHAPTER TWO

MAY–JUNE 1978, LONDON – THE BEGINNINGS

It all started with a telephone call one morning. I heard the breezy tones of Dean Delamont, boss of the Royal Automobile Club Motor Racing Department, ask if I would see a Mr Ecclestone who wanted to discuss some medical problems. I did, of course, know of Bernie Ecclestone, as the owner of the Brabham Formula One team and as President of the Formula One Constructors' Association (FOCA), but I had never met him. I cheerfully agreed and left it that Dean would arrange for him to contact me directly to set up a time and date. Sure enough, a few minutes later Bernie was on the line: When could I see him?

'How about this evening at 7 p.m. in my office at the London Hospital?'

'Fine.' I was impressed by his precision and the few words needed to fix things.

Exactly at 7 p.m. a knock came on my door and Mr Ecclestone walked in. I recall the first thing that struck me about him was his aura; immaculately tailored, he obviously had a big personality and it oozed out of him. Here was somebody. He made the points he wished to discuss with great clarity, and the immediate matter was disposed of rapidly. He then turned the conversation to motor racing. He said that he knew I'd been around the motor racing scene a long time. He went on to discuss a number of problems related to medical safety at the circuits – there had been an accident the previous weekend in Spain in which Carlos Reutemann had to go to the hospital – and wondered if I would be prepared to help.

It was clear that Bernie Ecclestone had done his research.

I had been appointed Professor of Neurosurgery at the old London Hospital in the East End of London in 1970 – the neurosurgical unit there is one of the oldest and most prestigious departments in the world. Prior to working there I had been Professor of Neurosurgery in upstate New York at Syracuse, close to Watkins Glen, the well-known race track for the American Grand Prix. From there I had joined the RAC Motor Racing Medical Panel, helping with safety at British races when I came back to the UK in 1970.

I had trained originally at the Radcliffe Infirmary, Oxford, under the famous Joe Pennybacker, an American from Tennessee who had qualified as a doctor in Edinburgh. Joe himself had been trained in neurosurgery at the London Hospital by Hugh Cairns in the 1930s before Cairns and Pennybacker had moved to Oxford in 1938 to open the Nuffield Surgical unit. In a curious way, the family had gone full circle.

At Oxford I had had a wide experience of dealing with major head injuries and multiple trauma in the Accident Service. The proximity of the Radcliffe Infirmary to Silverstone had enabled and encouraged me to indulge my interest in Grand Prix racing – having worked in my father's garage from the age of eight, I loved messing about with cars. So I had the medical experience and the knowledge of the sport. Naturally I was willing.

‘OK,’ he said. ‘I’ll talk to everybody and phone you tomorrow.’

As this interview was coming to an end, Professor David Ritchie, a friend and surgical colleague, appeared in my office. We had a meeting that night at the Athenaeum Club, and he’d come around to collect me. Bernie kindly offered us a lift – a hair-raising episode. We set off in an Alfa at massive speed down the Whitechapel Road in London’s East End, and through the City. Bernie skilfully jagged in and out of the traffic, finding gaps where none existed, while calmly talking about the problems of Formula One and the world in general. We had a few near-misses about which he made no comment, and to my surprise he deposited us at the Athenaeum – intact.

The next day he phoned as promised and suggested that I turn up for the tyre testing at Brands Hatch the following week. He said he had discussed my new role as Grand Prix surgeon with everybody, and everybody had agreed but they all wanted to look at the flesh. Accordingly, I appeared at Brands, and sure enough the scene had been set. After a few words with Niki Lauda who led a group of Formula One aces – Mario Andretti, James

Hunt, Carlos Reutemann, and one or two others – it looked as if we were ready to get on with the project of ensuring proper medical care for Formula One worldwide. I made one proviso: I wanted to discuss the proposal with Dean Delamont who, as the representative of the RAC internationally, was a necessary and powerful ally to have if one hoped to achieve success not only in the UK, but also in other parts of the world. It was Dean who had initially inveigled me into motor racing in Britain, and then in the United States when I was working at Syracuse during the Sixties.

As I had been pals with Dean Delamont since 1961, by the time Bernie asked me to come aboard I had had a fair amount of Formula One exposure in Britain, France, Monaco, Belgium, Germany and Italy. During my years in the USA, from 1962 to 1970, I'd worked regularly at the US Grand Prix at Watkins Glen and for major races of all types there. I'd taken a team of surgical specialists with me so we could give a good, sound, surgical opinion even in the relative backwoods of Montour Falls. I suppose it was this new approach that led Dean to recruit me with a team of specialists for the British Formula One races in the Seventies and to my meeting with Bernie in 1978.

The RAC surgical team in those days was not always welcome, and I remember being told at Silverstone in 1973 that for major events like the British Grand Prix we would rarely be needed but should come to the Club events where driver inexperience led to more accidents. It was while this conversation was going on during the race meeting that a massive accident in a saloon car race brought David Brodie and four other badly injured drivers to the 'Stanley Passion Wagon'. Louis Stanley, closely involved in the BRM Formula One team, had a passion for safety, and had developed in the late 1960s together with the Grand Prix drivers – particularly Jackie Stewart – a mobile hospital in a large transporter wagon to go to all the European Grand Prix races. Unfortunately many circuits boycotted its use.

Later that day, Jody Scheckter distinguished himself by creating an accident at Woodcote when leading in the first lap which involved about twenty cars and led to Dean Delamont black-flagging the race. Fortunately, only one driver, Andrea de Adamich, was injured, fracture-dislocating his foot, which we dealt with in the wagon. After this practical demonstration of what could happen during a non-Club racing weekend, I heard no more comment about that particular point of driver expertise.

However, the suspicion with which medical and safety matters were regarded in the racing world taught me to tread carefully. So I went along to Dean Delamont's domain on the circuit and had a word with him, and he promised to secure the support of the RAC. I had now been a member of the medical panel of the RAC for eight years, and for the past five had run the Stanley Passion Wagon at the British Grand Prix with a team of specialists. I went back to Bernie and indicated assent. 'All right,' he said. 'See you at the Swedish Grand Prix. Leave everything to me. I'll set up the arrangements.'

That was the beginning of what has now become established as a long, healthy and firm relationship which has accomplished a great deal for motor sport. My earlier impressions of Bernie remain unchanged. He is still a man of few words. I suppose this is because he has a complete overall grasp of anything and everything that is going on in Formula One, which gives him the ability to anticipate a problem and its logical solution almost before it occurs. In the early days when I rang him about something I wanted to do, he would often start the conversation saying, 'I know what you want to talk about, and I agree.' To make sure, I would then go on to outline the problem, and he would listen patiently, till I had finished. Then he would say, 'I've already agreed,' and that would be the end of it. He is always there ahead of you. No matter where I have seen him performing, whether in a political forum at the FISA, at a circuit, or in everyday life, he seizes a commanding position and with unerring instinct speaks at the correct time, explaining succinctly what it is he hopes to accomplish, and then finds the answer without any bullshit.

He is also immensely quick witted and extremely funny. I remember returning from a race and arriving at Heathrow Airport with him at a period when taxi drivers had considerable geographical difficulty about deciding whether or not they wished to take you where you wanted to go. A monetary discussion was usually necessary before agreement could be reached. Bernie and I stood waiting for a black cab, and when one eventually pulled up, he quickly flung open the door, said, 'Get in'. We sat down before the cabbie had a chance to look us over and ask where we wanted to go. After a moment the aggrieved looking cabbie made his inquiry, 'Where to?'

'Anywhere you like,' replied Bernie.

The cabbie was visibly put out by this and demanded again, 'Where do you want to go?'

'Well, I don't really care . . . what about Victoria?'

'Victoria where?' shouted the cabbie.

'Where the poof-poofs are,' responded Bernie mildly. 'The ones with wheels!' This silenced our chauffeur thereafter.

His great perception and sensitivity enable him to react to any problem and turn it to his advantage or to the advantage of whatever he is supporting. On the surface he is the hard, ruthless and powerful impresario; beneath the exterior, he is a very gentle person. Whenever anybody is in trouble – a driver, a mechanic, someone who works for him in the factory or in the office – he is immediately on the phone to find out if there's anything he can do, and to get the necessary help. That is something I suppose most of the world doesn't know about, nor would he want it to. In fact, when I told him I was writing this book he said, 'If you say anything decent about me, I'll sue you.'

In 1979, for example, the young German driver Jochen Mass had an accident in testing at Silverstone late one afternoon, and ended up in the Northampton Hospital. Bernie found me on a golf course within a couple of hours of the accident and a few hours later I was in Northampton trying to sort out the problem. He has been the same with all the accidents and other crises that have occurred around the Formula One scene: wanting to know what the difficulties are, discussing them with apparent dispassion, then telephoning the person involved, or relatives and friends, to provide what he can in the way of support.

In the period before and in the early years after the FISA Medical Commission was formed in 1981, his help in the many difficult circumstances was vital and he always gave it. I imagine he knew what the odds were of losing any contest that he got into (and he was bound to be the favourite to win) but he never hesitated to come out of his corner at the appropriate moment, and has astonished many people over the world by his firm stance.

Following my agreement with Bernie, in June 1978 I was preparing to go to Anderstorp in my new role. I needed surgical and resuscitation equipment; Bernie provided it without question. I met Robert Langford, the Formula One Safety Delegate, for gin and tonics to get some background information. Robert is a great chap and was completely dedicated to his

task. In those days he always walked the circuit every morning testing the Armco safety fencing doggedly and, frequently, with intuition, finding a weak spot. Robert went through a lot of shoes this way. Over the next couple of years we also went through a lot of whisky.

The Wednesday, 14 June, before the Swedish Grand Prix, I turned up at Gatwick – no ticket, no hotel reservation, no nonsense. I was told to find Herbie Blash, Bernie's right hand man at Brabham, at the terminal. Herbie, whom I'd never met, in turn was told to look for me. He found me, and off we went. On arrival in Sweden John Watson, one of the Brabham Formula One driver (the other was Niki Lauda), had been detailed off to take me to the circuit. We drove away very sedately. John was extremely polite and he took great care to avoid frightening me with his driving!

Anderstorp, although fairly isolated, was a nice place and the Chief Medical Officer, Dr Wallman-Carlson, was charming and efficient. The medical set-up was pretty good, with a reasonably close and excellent hospital at Varnamo. Things at the circuit were a bit odd, however. A small, specially designed and equipped caravan was the medical centre and there was a large hut with portable equipment to house excess casualties! In addition, there was no helicopter for the first practice day. Dr Wallman-Carlson was not too pleased about this, but had been told, 'practice was not dangerous compared to the race' (a view not supported by the statistics), and that a 'copter would be available for the next day and actually present for race day, Saturday. Arrangements around the circuit with fast intervention medical cars and ambulances were good. I felt pretty comfortable with it all, and was sorry the next year that we did not go back; nor did we ever as a result of the Monza accident later in September 1978, which resulted in the death of the great Swedish hero, Ronnie Peterson.

But there was a good deal of fun that weekend about Bernie's fan car, which actually won the race with Niki driving it. The fan car had appeared at the Brands tyre testing where Bernie concealed the new technology by the simple expedient of putting a bin lid over the rear end of the car each time it came into the pits. Before the race Mario Andretti complained to Niki that the fan was throwing up a lot of dirt and shit in his face when he was following closely. Niki's wit was as cool as ever – 'If you don't like it you should overtake or fuck off' – or words to that effect! Shortly thereafter the fan car was withdrawn, but the fan principle to create more down-force

still remains dear to the heart of the brilliant designer, Gordon Murray, and appears again in the current McLaren F1 road car.

I watched the events from the bottom of Race Control, the medical centre being alongside. James Hunt, ever the gentleman, saluted each time he drove into the pits!

OceanofPDF.com



CHAPTER THREE

JULY 1978 – EARLY FINDINGS

Robert Langford and I struggled with a lot of baggage out of Marseilles Airport into the bright sunshine and a rented car. The extra medical equipment that I'd ordered with Bernie's approval had arrived at my office in London and was on its way to live in the Brabham transporter – just in case it was needed. The streets of Marseilles were crowded with traffic and people, and it was a relief when we got out of town and on to the road to Le Castellet.

I had never been to the Paul Ricard circuit before and I was impressed with the size of the facilities, paddock and pit complex. The medical centre was at the pit exit end of the paddock and was small but well equipped. In overall charge of the medical organization was Dr Jean-Jacques Isserman, the President of the Medical Commission of the French Fédération du Sport Automobile. It was our first meeting and we hit it off well. Since then we have worked together for the last sixteen years during which, once the FISA Medical Commission was established, he has become an integral and most important influence. The actual operational running of the medical service was in the hands of a Chief Medical Officer, Dr Rheinhold Krantzler and his colleague, Dr Alan Guerder, but Jean-Jacques was clearly the mastermind. I was pleased to be shown a typed protocol of how the medical service worked, together with a plan in case of a major accident. The Paul Ricard circuit has a service road within and just outside the barriers delineating the actual racing tarmac; this arrangement provides medical and ambulance access to all areas on the circuit and greatly simplifies rescue

procedures. There was plenty of medical and nursing support with helicopter evacuation provided to the major Marseilles hospitals and Burns Unit. It all looked pretty good to me.

Over the next few days Jean-Jacques and I had some good conversations about the problems we perceived world wide. Standards of medical response were highly variable and virtually uncontrolled by the governing body. The medical centres, their equipment, staff, training, competence and attitudes were frequently inadequate. I told him that Bernie had asked me to help Formula One on a worldwide basis. He was very surprised about this and shook his head, doubting that it was possible; he thought it was too much for one person to try to do.

Robert and I went off to our hotel down the coast past the island of Bandol – where I understood the stars stayed – which could be reached only on a small ferry. Our hotel was a simple little place, but comfortable, and it was the first time we were at the same lodgings. Before dinner we cracked into some Scotch, and I found that Robert had a delightful and irreverent sense of humour. As the evening blossomed I realized I had found a highly intelligent and sophisticated ally and friend.

On the Saturday night Robert suggested that we visited the island where the high-livers were staying so we set off to catch the ferry. As we were waiting on the landing stage we ran into Jackie Stewart who was coming ashore. I had met him before when he was still driving Formula One. Indeed, once at Silverstone for the British Grand Prix he had brought his personal resuscitation doctor with him. This had embarrassed the authorities there, and I remember smoothing the troubled waters about the role and status of Jackie's doctor. Jackie Stewart had just heard that I had been recruited by Bernie and was very charming and encouraging about what he thought I might achieve. He offered his help and support in any way at any time I needed it. He has given it many times over the years.

Amongst the drivers Jackie had been *the* originator of the crusade for safety and he described to me his experiences at Spa in 1968 when he'd had an accident from which he'd been rescued by Graham Hill. His account of lying injured on the floor of the medical centre surrounded by cigarette ends and empty cans was a vivid reminder of how things had been. Together with Louis Stanley, and through the Grand Prix Drivers' Association they had striven to improve matters, but Jackie thought that there was still a lot to be done. One of their ventures had been the building and equipping of the

GPDA mobile hospital transporter, the 'Stanley Passion Wagon'. Although it went through two phases, Mark I and Mark II, this project seemed to have foundered internationally and ultimately disappeared. We agreed to stay in touch, and then Robert and I ran for the ferry.

The island was interesting and the hotel restaurant excellent, and at an adjoining table were Bernie, Niki Lauda and John Watson. We left the island on the last ferry after a happy and encouraging evening.

The rest of the weekend was without event. There were no accidents or incidents in practice or during the race. On the Sunday night we got to Marseilles Airport in time for a gin and tonic before the flight. Our next date was Brands Hatch, the British Grand Prix – 16 July.

I knew Brands well; in fact it was the first circuit at which I had worked back in 1961 at a kart race to which Dean Delamont had invited me. I had also been there as a member of the surgical team in 1974 and also 1976 when James Hunt won the race after a restart, but was subsequently disqualified amidst great controversy because he had failed to complete a full lap after the first start accident at Paddock Bend. I had arranged the usual back up of receiving hospitals and my own staff for the 1978 race and I got on well with the then Chief Medical Officer.

The principal problem medically at Brands was the size and the position of the medical centre. It was situated underneath the main grandstand, without direct access to the circuit. The rooms were small and ill-equipped, occupied when I first went there by two ambulancemen who were having a celebratory beer. I don't know what they were celebrating, but they were pretty uncomfortable when I asked them to show me the oxygen supply and to switch it on as they couldn't find the necessary spanner key!

A casualty from the circuit had to be brought via the circuit to the paddock and then under a tunnel to reach the outside of the track. An ambulance then had to drive from this point behind the public stands, where the tunnel exit was, along a road lined on each side by concession stands which were usually packed at a major event by a throng of excited race fans.

We survived the weekend despite all this, and I advised Bernie we should not go there again until a proper medical centre was built. Bernie went along with this and told me to write a letter to Basil Tye, Chairman of the International CSI Safety Committee of the FIA, explaining my view. This I did, and by the time we returned in 1980 a grand new centre had been built

out on the circuit, with excellent access to the Grand Prix and Club circuit and with an adjoining helicopter landing area. Naturally when I visited the centre I was told how much I had cost the circuit by being so demanding. My reply was that I didn't care as I was sure it was less than that spent on entertainment suites and parties.

The year 1978, however, still held surprises for when we got to Hockenheim at the end of July there was, to my utter astonishment, no permanent medical centre! In addition, I had the flu and the weather was beastly hot. Robert and I were housed downtown in a small, noisy and non-air-conditioned hotel. To avoid heat stroke the windows of my bedroom needed to stay open, immediately admitting the swarms of indigent mosquitoes and the drunken noise of the revellers in the bars and in the street. It all conspired to put me in a pretty bad mood, but more of this later.

The tremendously positive side of the weekend, however, was meeting Herbert Linge and his ONS (Oberste Nationale Sportkommission) rescue and medical teams for circuit response. Robert Langford had spoken very highly of the ONS system of fast Porsche intervention cars which were excellently equipped and staffed with race drivers, who were paramedic-trained, and resuscitation doctors, who were trained fire-fighters. There were three such Porsches to cover the circuit with sophisticated radio communication between each other and a controller in Race Control to coordinate response. There were four station-wagon ambulances with doctors and in addition two emergency trucks with doctors out on the circuit.

I was very happy with this arrangement, but pretty unhappy in most other respects. In Sweden I had been surprised to find a caravan as the medical centre, but here at a sophisticated circuit with so many permanent and excellent buildings including a hotel the medical centre was a converted bus! It was a single-decker provided and equipped by a volunteer organization and, being mobile, was used for other sporting events elsewhere as required. It was well equipped with the usual resuscitation, ventilation, and defibrillation facilities, and it was air conditioned and connected to mains power. Ideally, there would have been anaesthetists and surgeons on hand but here there were only two doctors to staff it, neither of whom was an anaesthetist. The medical crew camped, slept and cooked alongside the bus which was parked out in the paddock.

Dr Bernd Adami, a gastrointestinal specialist, was the Chief Medical Officer. He and his team were upset and bitter at the lack of help and consideration from the circuit and the club, particularly in providing sufficient passes for the medical team. Thus, on the first practice day there were only four doctors and one medical student. On the second practice day there were nine, and on race day there were ten. But in order to achieve this I had to insist on getting extra passes. Evacuation by helicopter was by the Autobahn helicopter response and Dr Adami told me that delays of up to forty-five minutes could occur if the helicopters were busy elsewhere. Adami had had to man one of the ambulances himself because of the shortage of doctors during practice. But on race day the final insult was perpetrated by his being refused admission to Race Control. He was told that there would be sufficient liaison between the medical team and Race Control and myself through Mr Langford. During the dispute, Dr Adami was roundly chastised and insulted by a lady who also dispensed hospitality as well as abuse. This was just before the actual preparations on the grid, and it was at this stage that I enlisted Bernie Ecclestone's aid. His response was that unless Race Control agreed with my proposal he would get the drivers out of the already assembled Formula One cars on the grid and we would all go home. The shocked authorities replied, 'If you do that, what are we going to do with this huge crowd of German people waiting to watch the race?' Bernie responded that they could all perform a certain act in somewhat impolite terms. He then turned to me and said, 'I'll go down and stand in front of the grid. If things are OK, put your thumb up. If not, I'll get the drivers out of the cars.' There was no resistance or even discussion after that, and the parade lap started on time. As a result Dr Adami and I observed the race from Race Control; but at the end of the event Bernd and his whole team said it was unlikely that they would agree to come to Hockenheim ever again. And they never did.

In 1979 the situation was totally changed, and there was a new medical centre splendidly equipped with a full medical staff including anaesthetists and general, thoracic, orthopaedic and plastic surgeons with helicopter availability for all practices and the race. Herbert Linge and his team of Porsches were there, and Herbert drove Dr Eike Martin (Niki Lauda's doctor) and myself during the practices and for the first lap of the race in the ONS doctor's car.

Since then Hockenheim has gone from strength to strength on the medical centre side, and in the Eighties a brand new and spacious centre was built at the end of the pit lane with a helicopter pad alongside. In subsequent years the ONS helped us in other countries: in Italy, Holland, Austria, Spain, Portugal, Hungary, and at Spa in Belgium.

I have always got on very well with Herbert Linge and with his staff. One of the great stories told by Herbert Linge is about the making of a motor-racing movie called *Le Mans* in which Steve McQueen starred. Linge was employed on a per diem cash dollar basis to drive in his Porsche down the Mulsanne Straight at Le Mans to be overtaken by McQueen at the end towards the sinking sun. McQueen told Herbert that he was a crack driver and that Linge did not need to lift off – McQueen could beat him. After an unsuccessful week of failure on McQueen's part, the film's director instructed Linge to let Steve pass. Herbert acceded and went home a lot richer.

I've been driven on many first laps by Herbert, Peter Lux and Jurgen Ditzinger with impressive efficiency and in radio contact with their controller, Uvi Frumolt. I was therefore pleased and delighted when I was made an Honorary member of the ONS and presented with their insignias. Dr Wolfgang Gruh commanded the medical team from 1979 through the Eighties and was in charge that fateful day in August 1982 when Didier Pironi had his huge accident in the wet. Dr Reichert is now the Chief Medical Officer, and with the splendid organization of the medical team, the ONS, and the wonderful hospitals of Heidelberg, Mannheim and Ludwigshafen in support, I'm always happy and relaxed in the atmosphere at Hockenheim.



CHAPTER FOUR

10 SEPTEMBER 1978 – MONZA

It always seems a long day at Monza on race day, partly because one has to go so early to get into the circuit before the hordes of ‘tifosi’ arrive and partly because the race doesn’t usually start till 3.00 p.m. I had been to Monza before in 1963 when Jimmy Clark had won – still in the aftermath of the Von Trips controversy when he was accused of causing the accident in which Von Trips was killed in 1961. Monza didn’t seem to have changed much in the fifteen years. I always find the atmosphere there melancholic as well as, of course, frenetic. There seems to be a pall hanging over the circuit, particularly early in the morning when the mist lingers among the trees of Monza Park. It reminds me of Flanders, I suppose because of the lives lost there – more than fifty deaths in fifty years up to 1978 – a grim statistic.

It had been impossible to get much information about the circuit facilities before I arrived; as usual in those days my enquiries were treated with silence; no response was the order of the day. Nevertheless, on arrival I was received gracefully by a surgeon who was in command of the medical centre which was situated at the back of the paddock. It was small and very basic in form but the vital equipment was there, and run by six doctors who were variously trained in anaesthesia and traumatology. There were seven ambulances around the circuit, two of which were mobile Intensive Care Units staffed by doctors, the rest by nurses. Fast cars with doctors were stationed at the pit exit, at the bridge before the second chicane, and at Variante Ascari. The helicopter pad with a large evacuation helicopter was

situated alongside the medical centre right across an internal pathway. The receiving hospital was Ospedale Maggiore at Niguardia, which is a polyclinic and trauma centre roughly a ten-minute flight away. As was usual in these early days I was stationed near to Race Control so that I could get information about events during practice and the race. The physical separation of the medical centre from Race Control meant that I had to get through the paddock to reach the centre, a walk of about three or four minutes. Ronnie Peterson had had a bad weekend with a series of misfortunes to his car but I had talked to both Peterson and Mario Andretti in the Lotus motor home just before the race and they were in a jovial, leg-pulling mood.

Within seconds of the start it was clear a big accident had occurred, followed rapidly by fire, and just before the entrance to the chicane the circuit was in chaos. It turned out that ten of the twenty-four cars were involved. What had happened was described by *Motor Sport* (October 1978) as follows:

Patrese was on the right-hand side of the pack trying to overtake Hunt, as they funnelled into the road circuit, and the Arrows hit the McLaren, which bounced across the road into Peterson's Lotus which in turn was spun across the road into the right-hand guard-rail and was struck by Brambilla's Surtees that was trying to avoid the mêlée down the right-hand ride.

I set off to reach the scene of the accident but was prevented from getting further up the circuit by police and carabinieri who had formed up across the track. There seemed to be no way through and there was a good deal of shoving and pushing. Nigel Roebuck later reported in *Autosport* that Peter Briggs of Team Surtees had been rewarded with a truncheon blow to the side of the neck when trying to find out about the condition of Vittorio Brambilla, his driver. One of the Italian officials who was with me tried to explain to the carabinieri that we should be allowed to go to the accident but to no avail. Just then James Hunt appeared walking back to the pits and told me that Peterson was injured and that an ambulance and doctor were with him. I turned and set off to the medical centre. I didn't know at that time that it was James who had, in fact, pulled Ronnie out of the car and out of the flames.

I arrived at the medical centre at the same time as the ambulance with Peterson. There was a huge crowd of 'tifosi' outside the security rails of the centre and spilling over the access roads. Ronnie was quite conscious and rational, but both his legs were badly smashed, and he had some superficial

burns on the shoulder and chest. We got several intravenous infusions up into the arm veins and his blood pressure was surprisingly normal. The medical team were busy splinting the leg fractures, many of which appeared to be technically compound. There were a lot of people in the medical centre by now, including a person who was trying to take photographs through my legs. I rewarded him with a kick, following which he desisted but not before he attempted to get me by the short and curlies. The scene settled down, and Ronnie was talking sensibly. He was very anxious that I should come to the hospital as soon as I could and that I promised. In fact he said, 'Please don't leave me, Prof.'

We took him on the stretcher across the walkway to the waiting helicopter. There was a great murmur from the crowd as we crossed the walkway and a struggle when the 'tifosi' tried to touch the injured Peterson, as if he were some holy relic. Dr Rafael Grazales-Robles had come to the medical centre to help, though he was nominally the personal doctor of Emerson Fittipaldi. I asked if he could go to Niguardia with Ronnie but he felt committed to stay, as I did, at the circuit for the restart. As the copter prepared to leave, Lotus owner and designer Colin Chapman turned up and I told him the score and to which hospital Ronnie had gone.

In the centre there were now other casualties. Vittorio Brambilla had had a severe head injury – it was presumed from a wheel hitting him. He was unconscious with a left-sided paralysis of his limbs but otherwise no other injuries, the vital signs of pulse and respiration being quite stable. Hans Stuck, the Shadow-Cosworth driver, was there with a severe headache, having briefly been knocked out and recovered. His concussion was clearly slight but I told him he should not drive in the restart. The cars of Pironi of the Tyrrell team and Brett Lunger of McLaren were badly damaged so they did not restart and thus nineteen cars were lined up for the second attempt. As the restart was being organized, the news from the hospital was satisfactory. Peterson arrived in stable condition and was being X-rayed.

No sooner had the cars started on the parade lap, when, almost unbelievably, Jody Scheckter had gone off in a big way in his Wolf-Cosworth and smashed the Armco barrier at the second Lesmo corner. Robert Langford shot off to inspect the damage, and it became clear the crash barrier had to be replaced. A long delay then ensued during which the massive crowd became very restless and started to chant and shout in unison for the restart to take place. The atmosphere by now was getting

pretty ugly. It must have been nearly two hours later as the light was beginning to fade, when the race started in a shortened version of forty laps. The crowd were in a highly volatile and emotional state and as the race ended it was getting dark.

Towards the end of the race we heard from the hospital that a threat had developed to the blood supply of Ronnie's leg, and it was thought necessary to try to deal with this crisis by replacing the fractured bones and securing them in the correct position with internal or external pins and nails. By now Ronnie's manager Staffan Svenby was with him, and Staffan later told me that Ronnie had been rational, calm and composed when the decision to operate had been taken.

After the race I went across to the Lotus home. By now it was pitch dark. There were still many people in the circuit and paddock – an uncontrolled crowd – as there was no security policing once the race had ended. I found Mario Andretti and Colin Chapman and brought them up to date with the news. We decided to go straight to the hospital by car, in convoy, to see the situation. The helicopter had departed when the race ended, before visibility got too bad, so there was no choice but to struggle through the crowds and through the traffic jams which characterize Monza after a Grand Prix. Mario drove his car, and I followed in mine. Our attempt to escape from Monza took a long time. Firstly, the crowds resented our cars trying to use the access road to leave and we were repeatedly forced to stop, whereupon the 'tifosi' would start to rock the cars threatening to overturn them. Secondly, whenever we stopped Mario was recognized and was accorded a hero's reception which brought further delays. Eventually we got out to the main road. Mario knew a short cut across some fields, using a rough track to get us to the motorway, but on reaching it he turned the wrong way. We had to turn round and head back towards Milan down the Autostrada which was heavy with traffic. Suffice it to say, the obstructions were such that I was able to keep up with Andretti's Rolls-Royce in my Fiat Panda rented car.

We finally got to the hospital. Clogging the entrance, there was a large crowd, including journalists and photographers. We forced our way through a barrage of questions, and once inside were met by some of the medical staff. They told us that Ronnie was still in the operating theatre, where he had been for some hours. I was invited to change and join the operating team. All seemed to be going well, and the surgeons were working on the

last fractures to be immobilized. I talked to the anaesthetist and Ronnie's vital signs were all fine. The blood transfusion with the correct blood group was in progress. Looking at the X-rays I counted about twenty-seven fractures in both legs and feet. The surgeon in charge indicated that he thought all was going to plan and that they would be finished shortly. Thereafter, Ronnie was to be transferred to the Intensive Care Unit where Brambilla had already taken up residence.

I went with the young neurosurgeon to check on Brambilla who was also quite stable, and not showing any signs of brain swelling or intracranial bleeding. I returned to the group quite satisfied that everything was under control. Mario and Colin were waiting for me in an ante-room and Staffan got on the telephone to Ronnie's wife, Barbro, who was in Monaco. I reassured her; as at that stage I felt confident he would recover. Plans were made for her to come to Milan the next morning.

By now it was about midnight. Staffan and I had checked out of our hotels that Sunday morning, so Staffan found a hotel for us, not far from the hospital. We checked in, in good spirits considering everything that had happened. Mario and Colin were returning to the Villa d'Este at Como.

About four in the morning Staffan woke me by telephone to say that the hospital had called to tell us that things had taken a bad turn for Ronnie. On the way to the hospital he told me that during the night somebody claiming to be a doctor had telephoned Barbro to tell her that he thought the Italian doctors were killing her husband. We were never able to get to the bottom of who this person was, but it was suspected that the miscreant had impersonated medical staff in order to get into the hospital.

On arrival at the Intensive Care Unit the neurosurgeon met me and said that Ronnie had developed breathing difficulties and was now being ventilated on a machine to try to keep up his blood oxygen levels. A chest X-ray showed that he had developed multiple emboli (small obstructions due to blood clots or fat globules) in his lungs. His kidney function had also declined, and urinary output had deteriorated. He was unconscious, and neurological examination showed that he had signs of severe brain damage. Using an ophthalmoscope and looking into his eyes I identified fat globules obstructing the small arteries in the retinas of both eyes. The outlook was pretty hopeless and the neurosurgeon agreed to my suggestion that we should get an electroencephalogram – an electrical recording of brain

function – to get objective evidence of brain function in addition to our neurological observations.

Staffan and I thought we had better get hold of Colin Chapman and Bernie Ecclestone to let them know of the gravity of the situation. We telephoned Colin who immediately left Como to drive to Milan. Bernie also arrived shortly afterwards and was very anxious to know the situation. By then in fact the clinical situation was worse and the neurologists who had come in to do the brain electrical recordings reported that the trace showed no activity and indicated brain death. Mrs Peterson was still en route and had not yet arrived so I was not able to speak to her directly.

There was a great deal of consternation by now because of all the difficulties that arise, particularly in Italy, when there is a death resulting from motor racing.

I left the hospital with one of the Lotus team members to head for the airport. There was a large hysterical crowd outside the hospital. The news had spread rapidly, and most of the teams had heard on the grapevine so the atmosphere at the airport was very depressing. It is always the same after a tragedy in the Formula One circus, when it goes home having lost a brilliant driver and a popular and respected man. There is not a lot of discussion, but there is a feeling of helpless grief among everybody.

The papers in Britain were full of the tragedy for several days, and there was a great deal of pressure to ban Monza as a Formula One circuit for the future. A few days later I heard from the neurosurgeon at Niguardia that the autopsy confirmed fat embolism as the cause of Ronnie's deterioration and death; fat globules were evident in the lungs, kidneys and brain.

It seemed to me that the start and the response of the rescue team to the accident had been a shambles. Various estimates of the delay in getting Ronnie out of the car and the arrival of the ambulance range from eleven to eighteen minutes. Subsequently, Bernie came to the conclusion that my authority had to be extended to supervising the rescue arrangements on the circuit, instead of merely being the surgical adviser to Formula One. It was clear that this would necessitate my taking a very active role at the race tracks, and this subsequently provoked a great deal of resistance and controversy. One of the problems at Monza was that from the moment of the accident there was no information, and once the circuit was sealed off by the police there was no access. Despite the speed of Formula One cars there was obviously a need for a following car with medical support on the

first lap. Bernie, Niki, and Jackie Stewart all agreed that this was what we should try to do. There were howls of protest and a great deal of sabotage of our future efforts to achieve this in the next few months, despite there being another massive accident immediately after the start in the first corner in Argentina in January 1979.

OceanofPDF.com



CHAPTER FIVE

WATKINS GLEN, 1978

Watkins Glen is situated in a beautiful part of New York State and the track is in the hilly bush above a village called Montour Falls. The views of the countryside from the circuit are spectacular and in the autumn, at the time of the Grand Prix there, the colours of the foliage are wonderful. That's about it; the facilities were primitive. The most famous part of the circuit is known as the Bog because of its propensity, when it rains, to become a mud bath, where the drunken racegoing crowd indulge in car burning and arson of all kinds.

The medical centre at the pit exit was a building in which I had worked during my stint in the USA in the Sixties. It hadn't changed and the first priority had always been, on opening the centre up, to sweep out the accumulated dead flies which were inches deep. There was a small hospital at Montour Falls but the nearest major medical centre was at Syracuse at the State University Hospital and Medical College where I had been a Professor of Neurosurgery for seven years. It was from that hospital that I used to take a surgical team to Watkins Glen during the Sixties. My old friend, Peter Byles, was a Professor of Anaesthesia there so I recruited him, with Bernie's agreement, to be with me there and at subsequent races in the USA and Canada.

I had met the Chief Medical Officer of the circuit, John Herrman, earlier in the 1970s. He had recently replaced the original Chief Medical Officer, Dr Francis Ward, a very nice and competent general surgeon, with whom I had worked from 1962 to 1970. In fact I'd operated on Dr Ward in the late

Sixties when he had compression of the spinal cord in the neck from arthritis. Subsequently, sadly, Francis had developed motor neurone disease and, although tetraplegic in a wheelchair and on a portable ventilator with a tracheotomy, he had continued to turn up to the Grands Prix to keep an eye on things!

As we were old acquaintances, generally there was no difficulty in getting the medical set-up in a good condition. Dr Herrman was an extraordinary chap who always presented himself for duty in the full regalia of a State Trooper's uniform, including the peaked Canadian Mountie type hat and a high-velocity rifle. When I asked him what the latter was for, he drawled mildly, 'It's a weapon for law enforcement.' His other idiosyncrasy was that he wanted to follow the first lap in his helicopter so he could land right on the spot if there was an accident. I said I thought it would be better to have a following medical car, to which he didn't object at all. I pointed out to him that in case of fire he shouldn't come too close with the 'copter and fan the flames. I also suggested that when he was in flight he should stay high enough to avoid throwing dust and debris in the pathway of the Formula One cars. All these negotiations were concluded happily, and a suitable vehicle and driver were found for Peter Byles and myself.

In the aftermath of Monza, two weeks earlier, there was really no opposition to my suggestion that a medical presence should follow closely the race cars on the first lap. As Peter and myself had American medical qualifications there was no medico-legal problem with our licences. However, we didn't have any racing kit. This wasn't too important for the practices but I thought we should be properly kitted out with helmets and overalls for the actual race. Bill Simpson, the race kit manufacturer, came to our rescue with a loan of helmets, and later gave us a helmet each and proper overalls in time for the Long Beach race the following spring. Our Formula One driver friends helped us with racing overalls: Jody lent me a set and, as Peter Byles was a tall chap, James Hunt came up with a pair for him. Peter really enjoyed this – once he was in the gear, with 'James Hunt' written across the front of his chest, he had a whale of a time giving autographs and cuddles and kisses to the inexperienced American ladies who were ogling him, mistaking him for the real thing.

We had a few tries between the formal practice sessions to see if we could get the medical car around quickly enough. The only problem with the car was there was no back seat or seat belts for Peter, so he had to

spreadeagle himself across the shelf in the back with bits of medical equipment lying around him. The best position for bracing himself turned out to be a posture which didn't allow him to see where he was going. I did promise to let him know if I could see we were going to have an accident so that he could hang on really tightly. Nevertheless, he toughed it out and we found we could just get round. I felt we had to have another option, and we picked two spots where one could get a car off the track on to an internal road, so we could get back to the pit exit if necessary, without doing the whole lap. The start at Watkins Glen was downhill into a tight right-hander, into a loop and then another right-hander up a bit of a hill. This part of the circuit had had a chicane put in to slow the exit speeds from the bottom loop, just below the spot where François Cevert had his fatal accident during a practice session for the American Grand Prix in 1973.

I don't remember the name of our driver, but I began to worry a little about him just prior to the race. He was overweight, in fact obese, and he started to sweat a lot. This, associated with a good deal of yawning and sighing, suggested to me that a certain anxiety state was developing within him. It is natural to be nervous at the start of a race. The worry about major accidents and injuries and, in those days, the high risk of fire, is not a prescription to steady the nerves. But if the anxiety gets excessive my concern is that instead of enhancing performance, it can interfere with it. One has to remember the driver has a highly responsible and high profile role. If all goes well this doesn't matter, but to screw up, spin or collide with the rear markers or later to be so slow as to ruin the pace of the front runners by being caught up before finishing the lap would be a disaster. All this in front of a huge multimillion TV audience (much of it live) is a daunting prospect. In addition, although the Formula One cars are so much faster than ours was, sometimes on a hill or a bend in the circuit and always in a wet start one is blind, and a Formula One car crashed, spinning into or sideways in one's path can always occur and provides a serious hazard. All these possibilities have been advanced to oppose the concept of a medical team following for the whole of the first lap. On the other hand, such an arrangement allows response to an accident even well out on the circuit in the shortest possible time – one to two minutes – and this provides, in my view, sufficient justification to take the risks of a medical chase car.

Anyway round came the cars on the parade lap, they took the start and, with us at the back, we arrived into the loop. There was a bit of a queue for

them to get through the chicane, but as we reached the chicane something went wrong. We hit the kerb and got a launch. I don't know how high we flew, but it was a decent height and the flight was long enough for me to remark to the driver when he shouted 'We're in the air!', that we were bound to come down eventually. This we did with a huge thud but, fortunately, on all four wheels. Poor old Byles, lying straddled in the back took a fair shaking. Neither the car nor the driver seemed to be fit to finish a whole fast lap. We had lost time anyway so I called it quits, and we nipped off the circuit at the top of the straight and made our way on the internal road back to the pit exit. Fortunately there were no more worrying events in the race.

The following week we went to Montreal, where the Grand Prix was being held for the first time. I had few worries about going there because the Montreal hospitals are great, excellent, medical centres, and once again I knew some of the staff at the Royal Victoria, Montreal Neurological, McGill, and Notre Dame Hospitals. At the circuit there was a Chief Medical Officer, Dr Guy Prevel, whom I did not know, but Professor Hugh Scully, the most experienced motor-racing doctor in Canada, was integral to the organization. I had known Hugh, who is a cardiac surgeon from Toronto, for some years. As the Chief Medical Officer he had been responsible for the Mosport circuit when I used to visit the Formula One races there in the preceding years. Despite all this experience, or perhaps because of it, the authorities were not too pleased at seeing Byles and myself, and there was fierce and successful opposition to us following the first lap. But in subsequent years we had no further trouble and, with Jacques Bouchard and Ronald Denis in charge, the medical team has been excellent.

However, in reviewing the 1978 season after the last race certain clear features had evolved for the Governing Body and FOCA to attend to. With the support of Bernie, Basil Tye of the CSI Safety Committee, the Formula One Commission, and some of the drivers, a comprehensive strategy was evolved to provide scrutiny, standard procedures and accountability for the 1979 season. Bernie agreed that I should have a highly competent anaesthetist with me whenever necessary at the races; as it turned out Peter Byles did the three North American races in 1979 and Niki recruited Dr Eike Martin, a German anaesthetist, to do the European races. In South Africa the Chief Medical Officer at Kyalami, Dr John Pringle, excellent as an organizer and as an anaesthetist, did the job.

Robert Langford and I evolved a medical and safety questionnaire to be sent to the circuits ahead of time to provide data about the circuit facilities, medical centre, medical staff, designated hospitals, helicopter ability, and assurances *in writing* from the hospitals to the circuit that they were aware of and ready to supply medical support during the practices and the race as necessary. We also requested consent for the FOCA surgeon and anaesthetist to follow the first lap in a fast car equipped with radio and driven by a competent, recognized race driver who knew the circuit! During practices and the race the FOCA medical personnel were to be stationed in the same fast car with the driver and radio connections, close to the Race Control tower and ready to respond.

Pressure was exerted to build decent medical centres where we knew these did not exist. These included Brands Hatch, Sweden, Austria and Germany, where experience in 1978 had shown that either no building existed or that they were patently inadequate. At dinner in Austria in August 1978 Gerald Lascelles, President of the British Racing Drivers' Club, owners of Silverstone, had agreed to try to get a new medical centre built for 1979. The authorities at Silverstone concurred and were polite and decent enough to send the plans for my comments. The bulk of it had been done by July 1979, just in time for the British Grand Prix, but of the ten recommendations I made, it took another fifteen years to get the final and tenth request fulfilled, namely that the medical centre should be surrounded by a high wire fence for security, and the helicopter landing access should be immediately adjacent within the security fence. By 1994 it was in place, but made of wood rather than wire! It was put up just at the time that new plans were being hatched to replace the old building which has served so well for fifteen years with a larger and more exotic building – now the largest medical centre in the world.

For the 1979 season a stipulation was made for helicopters to be available at all circuits for all practices, the warm-up and for the race. Also, by arrangement with Bernie we were to have at my discretion stand-by air ambulance Lear-jets, so we could easily evacuate any casualty to a preferred surgical centre or hospital, or to the driver's home country.

I had done nine Grands Prix as FOCA doctor in 1978 and had learned how much need there was for development, and also how hard it was to get through the opposition. I was more hopeful for 1979, having evolved the strategies outlined above. But I was to learn more about the continuum of

human calumny at the next race in January in Argentina, and later in 1979 at Long Beach, Jarama, Zolder, Monaco, and Dijon.

OceanofPDF.com



CHAPTER SIX

GRAND PRIX DRIVERS OF THE SEVENTIES

When I first went to the Grand Prix meetings in 1978 the talent around was remarkable. Looking through the lap times for the second practice session at the Swedish race at Anderstorp in June, the list of drivers went: Andretti, Scheckter, Peterson, Jabouille, Reutemann, Depailler, Villeneuve, Hunt, Patrese, Alan Jones, Lafitte, Fittipaldi, Watson, Tambay, and Regazzoni in the first fifteen – with Pironi, Rosberg, Mass, and Ickx all lower down. I didn't get to know all of them very well but I was on good terms with all of them, save Pironi with whom I could never get on.

Mario Andretti

I had admired Andretti since his initial meteoric performance in 1968 with the Lotus at Watkins Glen and subsequently his win at the Indy 500 in 1969. Tough, uncomplaining and polite despite a healthy vocabulary, in public he appeared very smooth and sophisticated and he has rightly been called a great ambassador for the sport. His phenomenal season with Lotus in 1978 was marred by Monza, but despite losing the race there, on a time penalty, to Niki Lauda and the awful outcome of Peterson's accident his behaviour was impeccable. After three further seasons with more car retirements than finishes, he virtually quit Formula One. His reappearance at Monza in 1982 for Ferrari, to replace the injured Pironi, was remarkable. Despite a short absence from racing he put the car on pole, much to the delight of the Italian crowd who gave him a rapturous reception. When I

last saw him at Donnington in 1993, he was completely unchanged; the laconic, laid back and composed attitude was the same as ever.

Jody Scheckter

I suppose, of all the drivers, save Senna, I was closest to Jody Scheckter. I knew him much more intimately than most of the other drivers and I was very fond of him. Temperamental, argumentative, sulky at times, he had an overriding commitment to safety and was tremendously helpful to me when he was President of the Grand Prix Drivers' Association. His aggressive stance on safety led to a great deal of flak for him, and there was much derision for his demand for more tyre barriers and new chicanes. He was outspoken but at the same time had a charming touch of innocence and a shy sense of humour. He too, like Senna, was frequently on the phone to try to help out if somebody had been injured or was ill. He was fairly well behaved in a road car and I remember his rueful complaints that he had been 'outdriven by a lunatic' when Jorge Schvarcz, a neurosurgical friend of mine, outstripped him on our way from the circuit in Buenos Aires to inspect a private hospital, the Clinic del Sol, that I had organized as a back up. He and Villeneuve got on very well and he was devastated when we lost Gilles at Zolder in Belgium in 1982.

One of his foibles was to call me 'My Proffessor', which he always misspelled. Between the Argentinian and the São Paulo race in 1980 we had a few days' holiday at the Intercontinental at Rio. While walking barefoot on the beach I stepped on a discarded syringe with needle still attached that was lying concealed in the sand. I had to invite Jody to pull out the syringe, the needle of which had totally penetrated my foot. I felt all right (apart from apprehension at what I might have contracted), but I thought Jody was going to pass out during this manoeuvre. When I got back to the UK I had a big shot of gamma-globulins to combat any nasty viruses. He was a very loving and considerate son to his parents and after his triumph with Ferrari in 1979, becoming World Champion, he had a poor season in 1980 and I was glad when (I think on my advice), he retired.

Carlos Reutemann

I always found Carlos Reutemann an enigma and hard to get to know. He always seemed remote, self-contained and assured though, if things weren't going well, he was the epitome of gloom. After he retired I found that he

had hidden depths and his composed exterior concealed an inner spirit that could revel in an outrageous prank.

Short of an accomplished driver at Kyalami in 1985 to drive the first lap, I happened to come across Carlos and invited him to drive. To my surprise he agreed, provided he could test the two special cars that had been prepared for this purpose by a well known manufacturer. We organized this practice through Derek Ongaro, the FISA safety delegate, and off we went with John Pringle, the Chief Medical Officer, in the back. Going through the S-curves at old Kyalami Carlos had the car flat out and proceeding in a direction that could not be influenced by finger spinning the steering wheel fully in either direction. Carlos pronounced the car 'shit' and enquired why Bernie couldn't afford a better following car. On returning to the pit lane the car leaked every possible fluid it contained from all possible exits. Carlos said, 'It's no good. Let's try the other.'

A similar performance ensued with similar comments, but at the end of his test the car still appeared intact. 'OK,' he said. 'I'll turn up before the parade lap.' This he did but the wretched car would not restart. Time was running out as the race cars were circulating in the fifteen minutes before assembling on the grid. At this point lateral thinking became necessary, so we charged into the car park just by the paddock and ran down the lines of cars there, searching for a car with the keys left in the ignition. Sure enough, we found a nice family saloon with four doors. Carlos jumped in and drove it up on to the apron. John and I transferred all the medical kit and we were ready to go.

There was only one problem: time had run out and we could not make it round the circuit to get to the back of the grid before the parade lap started. Carlos jazzed the car up on to the tarmac and reversed up the side of the grid as it cleared for the green flag to be waved. We got to our position full of glee and waited for the Formula One cars to come round to take the start. Flat out into the first corner, down the hill and around Sunset – of course we were being far outstripped and had no hope of completing a lap. At the bottom of the hill before the S-curves we stopped and watched the field go up the hill round Leeuwkop and into the pit straight. All went through safely so we cut across an internal road and got back to our race station at the beginning of the pit lane.

The race went off without trouble. At the end we emptied the kit and carefully replaced the car in its spot, giving thanks to an unknown and

unacknowledged owner whose proud possession would never be the same again. During all these adventures I saw Carlos smile a few times and actually heard him laugh when we pinched the car. Hidden depths, I thought to myself, as I'd never seen him register fun before.

James Hunt

James Hunt was the complete opposite. He was always into fun, whether it was seizing the PA system from a flight attendant during a flight and giving his version of the welcoming address on behalf of the captain in broken English to the astonished passengers or appearing among the luggage, seated on the carousel at the baggage pick-up at the airport. I have vivid memories of James on Sunday nights, when we were departing from distant airports to come home, lugging two black bin bags around, one with full cans of beer and the other with the empties. He always called me 'Doc' in his best public school tones, and after he'd been retired some years we became closer friends. He developed a penchant for salmon fishing, a profound weakness of mine, and for some years he came up to Scotland to fish the Tweed with me. He often brought his two sons, Tommy and Freddie. He was a devoted father, getting up early to cook their breakfasts and reading them bedtime stories. His death was a great shock to all my family, for he seemed so fit and well and full of life.

Gilles Villeneuve

The most daredevil of this group of drivers was the Canadian Grand Prix ace, Gilles Villeneuve. When we first met he expressed the hope that he would never need me professionally. I remembered his words that day at Zolder in 1982 when I went to his tragic accident in the final few moments of qualifying practice. I once had the misfortune to meet him in the lobby of the hotel at São Paulo when he offered me a lift to Interlagos. Madame Villeneuve was with him so when we got to his rented car I moved to sit in the rear, but Madame insisted that I sat in the front. Gilles in a road car was frightening, and when I turned to speak to his wife she was not visible as she had taken to the floor. She indicated that this was normal for her and I soon found out why.

Villeneuve believed in the 'gap theory' – i.e., that there was always a space into which he could move when faced with a high-speed collision. He ignored all red lights, gently bounced off parked cars or lamp posts, talking

all the time and never pausing or hesitating in the traffic. On getting to the circuit he asked if I wanted a lift back later! On the Sunday night of that weekend he asked me if I would mind driving his rented car to the airport to dump it for him. I got into the battered remnants, found the vehicle to be now clutchless, so I left the keys at the hotel reception and took a cab. His helicopter drill, I was told by Trevor Rowe, then Secretary of the Grand Prix Drivers' Association, was much the same – frequently taking off with the fuel gauge at zero, and flying in and out of power cables and pylons with cool aplomb.

After a big first lap accident in 1980 at the Ste Devote corner in Monaco in which Daly, Jarrier and Giacomelli were involved, my car, driven by Jacky Ickx, was held up. In consequence, as we exited the swimming pool section of the circuit, the leaders and pack arrived on their second lap. Ickx stopped our car, and the Formula One cars streamed past, giving us a respectable berth – all except Villeneuve. He just skimmed past on the shortest possible line, yielding neither a centimetre nor a milli-second of time.

Niki Lauda

Prominent among my supporters to get things improved in Grand Prix medical response was Niki Lauda. We have remained good friends to this day without a lot of contact in recent years till the Grand Prix Drivers' Association was resuscitated in 1994 following Senna's tragic accident at Imola. Niki is coolly intelligent and wily, with a cynical sharp wit. He is very direct and candid and at times can be guilty of extremely colourful English usage.

In the early days he would try to get his car first to the pit exit at the Friday morning practice. If I put my thumb up he would drive out on to the circuit, if I put it down he would stop his car to block the exit and get out to find out what my problem was about starting the practice (it would normally be because I was anxious about the inadequate medical set-up). I drove with him in a road car on only one occasion, to the circuit at Jarama from Madrid on race day. He was very well behaved, the antithesis of Gilles.

To everybody's surprise he unexpectedly retired from the Brabham team in Montreal in 1979 saying he was fed up with driving round circuits like an idiot. After his three years of retirement when he came back to join

McLaren in 1982 he seemed much more polished than when he was with Brabham – I thought perhaps he'd been sent to a charm school. He was also on a fitness kick and on dietary control in the hands of Willie Dunlop, the rehabilitation expert. Much fun was made of his diced carrot and vegetable meals, but one race day, very early in the morning, I caught him in the hotel coffee shop tucking into bacon and eggs, sausages and all the trimmings. When I chastised him for breaking his diet his reply was characteristic: 'Do you want me to die hungry?'

On one occasion he agreed to be the victim in a simulated accident at the end of untimed practice in Austria for the medical team to rehearse an extrication. When I asked him afterwards how it was, he grinned evilly and said, 'I think they broke every fucking bone in my body.'

Clay Regazzoni

For quiet courage in the most severe adversity I commend Clay Regazzoni. He was always supremely fit, smart and alert. When he had his awful accident in 1980 at the US Grand Prix in Long Beach problems of radio communication, among others, prevented me from getting to the scene. Phil Hill, the great American driver, always drove me at this circuit and that in itself was a delight, as his car handling and speed were wonderful. I was also accompanied by Peter Byles, an old friend and a skilled anaesthetist, and the three of us waited at the medical centre on the bay side but Race Control did not release us to go to the scene. Eventually, after Clay was removed from the car and was taken to the hospital, I left the centre on the back of a police motorbike to get to the road where a prowler car was waiting to take me on to St Mary's Hospital.

Clay was quite conscious and composed but paralysed from the waist down with a spinal fracture compressing his spinal cord and with a broken leg. It was necessary to operate on his spine immediately to take the pressure off the spinal cord. Gene Stern, one of the great American neurosurgeons and an old pal, came down from Los Angeles to Long Beach to consult with the local neurosurgeon who was, as it turned out, one of Stern's protégés. When I told Clay the score he very calmly and bravely said, 'OK Doc,' and that was that.

The following morning, after a long operation, there were signs of some recovery in sensation and a few weeks later, when I went to see Clay at the Paraplegik Centrum at Basle where he was under the care of Dr Zächz,

Chefartz, there were further signs of recovery. However, the final outcome has kept him in a wheelchair, but he has made a tremendous contribution by encouraging and training disabled drivers to participate in motor sport.

Much to my amusement, when Clay's leg fracture was later operated on in Switzerland, I was accused by the Italian press of leaving engine oil in the fracture site. When the fracture haematoma fluid was released by the surgical incision (at this stage of its resolution the fluid is usually brown-yellowish in colour) it was reported to 'the tifosi' as oil!

Vittorio Brambilla

I cannot leave the subject of drivers of the Seventies without tribute to my friend Vittorio Brambilla, who has driven me at Monza to follow the first lap for many years. Vittorio is a big fellow in structure if not in height, and after he retired from Formula One was drafted to look after me. His handshake is crushing, and he enjoys seeing the unfortunate recipient wince as it takes effect while introducing himself: 'I am called the gorilla of Monza.' He grins and follows up the hand crush with a deft rabbit punch to the back of one's neck. Having got the formalities over at the beginning of each practice session, he would then enjoy the social scene as his friends passed our car, which was parked at the pit exit and at the main entrance from the paddock into the pit lane. If a particular favourite appeared he would get out of the car and fondly go through his crunch and punch routine.

He had a nasty head injury in the multiple shunt in Monza in 1978 which resulted in Peterson's death. Vittorio made a good recovery and came back to Formula One a year later. His career after that was brief but cheerful, and his response to my enquiry whenever he had a crash was, 'OK, OK, Doc,' delivered with a big smile.

He won one Grand Prix in 1975 in Austria in the rain when the race was stopped, and the story goes he was so pleased as he took the chequered flag he threw both arms into the air and promptly crashed. In fact the race had been incorrectly stopped, with the chequered flag shown in error for the red flag.

When he first turned up to drive me at Monza in 1981 I asked him tentatively if he felt fully recovered from his 1978 head injury. 'Oh yes,' he said, 'I'm OK, Doc,' then added archly, 'But I've had another brain injury since then, at Kyalami in a sports car!'

As we got set up to follow the race, and before we went round the circuit to get on the back of the grid, he became serious for a minute. 'Professor,' he asked, 'how close do you want me to stay with the Formula One cars in the race?' The vehicle we had was a V8 Alfa so I didn't take this threat too seriously. 'Vittorio,' I replied, 'I don't mind, but I don't want you in the lead at the end of the first lap.' He roared with appreciation and winded me with a slap on the back.

He was a joy to drive with as he was quite fearless and really enjoyed giving the car all it could take. He was always hugely pleased with his performance going through the Ascari curve, and would turn and give me a big grin and a nod. We had the odd slide and spin in the wet which he happily shrugged off.

On one occasion after we got through the first chicane with a couple of big thuds, a most menacing banging started under the driveshaft cover. We looked at each other significantly but he bashed on unconcerned. Putting my hand on the driveshaft cover I could feel the vibration and by leaning on it with both hands could dampen it a great deal. We finished the lap in this fashion, hoping for the best.

At Monza during the last lap, and before the hordes of 'tifosi' invaded, we usually got ready to move the car into a security compound. The moment it was in and as the flag dropped, Vittorio used to jump on to his motorbike and speed off at a great rate. One year we left it too late and had to abandon the car and run for security. There wasn't much left of the car at the end, but that's the way it is at Monza – when the chequered flag drops it is every man for himself.

John Watson

I include John here although, of course, he went on racing well into the Eighties because the bulk of his racing was done in the Seventies. He is one of my favourite people with his combination of humour and mildly zany but gentlemanly personality. Bernie once said of him he is such a gentleman that if he saw a following car in his mirror he would move over to let it pass. It is true he is a gentleman but I have seen him put in some blistering drives at Grand Prix races in Zolder after Villeneuve's accident in 1982, in Detroit in 1982, and Long Beach in 1983, all of which he won. He won the British Grand Prix in 1981, and after his first Grand Prix victory in Austria in 1976 his previously bearded visage was shaved naked, as the result, so it

was rumoured, of a bet with Roger Penske, a fellow racing driver. Dennis Jenkinson, the long revered littérateur of Formula One, had also wagered that if John Watson ever won a Grand Prix he would shave his famous beard, so the razors were out after that event.

Though very courageous, he was sensibly cautious and I remember going to haul him out of a crash at Tarzan, the first big corner at Zandvoort when, despite all invitations, he would not get out of the cockpit till I got there. He had some back pain and requested reassurance that he had not done his back a serious injury. I obligingly undid his overalls, reached into the car and examined his spine with the ancient technique of palpation. All was well and after a rest in the medical centre he happily returned to duties.

He and Bernie have an affectionate and humorous relationship. When we first went to Montreal to the Isle Notre Dame circuit John went out and tried it. On returning to the pits he was asked by Bernie what it was like. Grinning like a schoolboy John said, 'It's great fun.' 'Fun,' complained Bernie, 'fun? You're paid a great fortune to be out there risking your life – you're not supposed to be having fun!'

Wattie is always a great pleasure to chat to or to dine with and exchange a few scandalous stories. At one stage some years ago we used to frequent an Indian restaurant in the Whitechapel Road near the London Hospital. The last time we dined together was at Imola in 1994 on the Saturday night of that dreadful weekend. He is kind enough to support my fund-raising golf event after the British Grand Prix each year and it was a pleasure to have two winners of the British Grand Prix there in 1994 – Damon Hill being the other.



CHAPTER SEVEN

JANUARY 1979 – ARGENTINA

Buenos Aires is a wonderful city. The old architecture and the magnificent boulevards are reminiscent of the great cities of Europe and strolling in the streets one could almost believe that one was in Rome or Madrid. We all liked the atmosphere, and as the city is very cosmopolitan and has a decent English newspaper, it was one of the few places in the world in which I felt that I could happily live. After all, it had a branch of Harrods! The exhausting aspect of life there was the fact that what we would regard as evening activities started very late indeed. For example when Dr Prada, who was the Secretary of Health for the Municipality, invited me to dinner and asked me to meet him in the lobby of the Sheraton at 10.00 p.m., he actually collected me just before midnight. We dined about 1.00 a.m. at a restaurant some miles from the hotel where the *specialité de la maison* was partially clotted blood in sausage skins. The usual nocturnal activities finished about 3.00 or 4.00 a.m., so to get to the circuit by 7.00 a.m. meant that the nights were pretty short. As a result, most of the indigenous people were somewhat slow and sleepy in the mornings, but they recovered after their siestas to get fired up for the nights.

When I got to the circuit I found the medical centre to be very well equipped. It was a good size and the resuscitation equipment was excellent. Helicopters had been organized so that one would be available on the Thursday and three for Friday, Saturday and Sunday. A municipal hospital was to be used where there was a helicopter pad a short distance from the building but still requiring an ambulance transfer. On the Thursday it had

been arranged for me to visit the hospital by helicopter, but as the afternoon wore on and the light failed I lost hope that the 'copter was ever going to turn up. Generally speaking there were plenty of ambulances around the circuit and at the centre, in fact twenty in number, but there was a dearth of intervention cars. The medical staff at the centre represented an unusual spectrum of specialists. Apart from the senior who was an anaesthetist and Dr Hugo Bogetti, who was a urologist and general surgeon, there was a haematologist, a dermatologist, a cardiologist and a physician. Dr Prada, the supreme chief, was a nutritionist, but a well-dressed one, as he always turned up in a very smart white tropical suit!

I had a good friend in Buenos Aires, Dr Jorge Schvarcz, a neurosurgeon who had trained for some time in Edinburgh, and I enlisted his aid in getting my act together. Jorge is a rebellious fellow who drives his road car like a lunatic, but he is also very light-hearted and great fun. I thought it wise, as I hadn't seen the municipal hospital, to get a private hospital organized. This we did at the Clinica del Sol where Dr Hernan Bunge, another neurosurgeon, was the director. Bunge and Schvarcz organized orthopaedic, general surgical, plastic and burns, anaesthetic, and radiological cover. As it turned out in the end, we only needed the radiological help.

The weather was very hot, so after each practice day most people sought solace in, or around, the pool at the Sheraton. It was to this location that Bernie arrived one afternoon in his usual dapper attire and expensive footwear, together with briefcase. Mario Andretti, who was in his bathing gear, told Bernie he had been offered a thousand dollars to push him in the pool. Bernie put the briefcase down, said, 'Five hundred dollars each,' and gently projected himself and Andretti into the water.

The sticking point at the circuit was to get hold of a car in which to follow the first lap with Jorge and his anaesthetist as a team. We were repeatedly promised that a car would be provided, but it was only on race day that it appeared. Again there was fierce opposition to our proposal to follow the first lap, and instead we were told that the car would, with driver, be available at the foot of the control tower. Just before the race started this was certainly the case. Immediately after the start at the first corner there was a huge pile-up. Jorge and I rushed down together with Robert Langford to the car which was still there – locked, no driver, and no keys! We ran

down the pit lane and I jumped on the back of a pick-up truck that was going to the scene of the accident.

The principal casualty was Piquet who had hurt his foot; and Niki had gone to his rescue. Much to Niki's amusement the marshals were trying to get Piquet's helmet off without undoing the chin-strap. 'They were trying to pull his bloody head off,' Nicki said to me afterwards. The other fact that had amused Niki was that, as he went to remove Piquet's helmet himself, he stepped on Piquet's outstretched hand. Niki commented, 'This gave him something else to yell about, apart from his foot!'

When we got Piquet into the medical centre he was, in fact, only very slightly injured with a damaged big toe. There were some other minor casualties: Jody Scheckter had sprained his wrist and was very anxious to restart, but he fell foul of Dr Prada and they had a good row, which resulted in a written injunction to debar him from the race. Due to mechanical problems resulting from the pile-up, Pironi did not restart, nor did Tambay, or Merzario. Piquet was left languishing in the medical centre, and we got ready for the restart.

With the help of Bernie and Mr Sierra, from Race Control, it was agreed that we would follow the start in an ambulance through the first corner and then pull off the circuit. As we lined up behind the grid to take the start the ambulance driver started to mutter to himself in an anxious manner. I asked Jorge what the matter was and he explained that the ambulance driver thought he was having a stroke. The explanation for this phenomenon was that as the weather was very hot and with the heat from the exhaust there was a mirage effect. The backs of the cars could not be seen clearly, and appeared to be swimming and blurred in outline because of the convection effects of heat. Jorge hastily reassured our driver that he was OK, and that it was just a problem with vision which he should ignore. As the race cars left, the driver did a valiant job pursuing the rear markers at about twenty-five miles per hour till we got to the end of the pit straight and through the first big right-hander. There were no further problems, and after the race we organized for Nelson to go to the Clinica del Sol where he had both feet X-rayed. Neither showed any fracture.

On the Monday after the race I made my own way to the municipal hospital and introduced myself to the hospital administrator. He was not at all helpful – in fact, he was rather hostile – and wanted to know why I had come. Nevertheless, he agreed to get somebody to show me round, and

seeing the general deplorable state of that institution, the highlight of the tour being an anaesthetist chasing flies in the neurosurgical theatre with a craniotomy operation in progress, I understood why the hospital was not on the scenic route for the helicopter which didn't show on the Thursday. I was very glad that we had organized the Clinica del Sol, just in case.

The only other matter of note about the nocturnal activities mentioned earlier, was Jorge insisting on taking me to a tango night spot in a building near the waterfront which had been used as a military hospital in 1806 when British forces landed at Buenos Aires to invade Argentina – a historical fact quite unknown to me till then. The principal artiste of the show was a man who sang his laments with great soulfulness. He bore an uncanny resemblance to Adolf Hitler, and Jorge kept assuring me that he was indeed Hitler. When the lights went up at the end of the performance, again at about three in the morning, we found Dr Prada having fun and sitting quite unknown to us a few tables away. Prada looked pretty uncomfortable on discovering us there, and Jorge hastened over to tell him that we had been following him all evening!

I enjoyed going back to Argentina in 1980 and 1981, and in those years we had some intervention cars and were able to follow the whole of the first lap. The only exciting incident took place in 1980 when we got towards the end of the circuit where there is a double loop. To save time we took a short cut across the circuit while one of the tail-enders, who had been running slowly towards the end of his first lap, was in one of the loops. As we slipped back on the circuit after our short cut, he suddenly appeared behind us in the rear-view mirrors. Our driver became very excited and called upon 'Holy Mary Mother of God' to help him, as he thought the whole pack had caught us. We raced into the pit lane entrance and the Formula One car followed us. Seeking some escape from this great peril, our driver saw an opening into the paddock and immediately drove into it to find himself in among the parked trucks, much to our surprise and amusement.

I was disappointed when the race for 1982 was cancelled by Bernie at the end of 1981. He apparently knew something that the Foreign Office didn't, for the latter expressed surprise when Argentinian troops invaded the Falklands the following spring. Bernie had already said he didn't want to go to Argentina as he didn't wish to be a hostage.

In 1979 the Brazilian race at Interlagos was the next weekend but one, so I stayed over between the races, and Jorge took me on a day trip to the

Iguazu Falls on the Brazil–Argentina border. Here the James Bond movie *Moonraker* was being made with shots of the Garganta del Diablo – the principal waterfall. I was able to get Roger Moore’s autograph for my son.

In São Paulo Dr Raul Marino, another neurosurgical pal, was on the staff at the Universitos dos Clinicos. He suggested that we had the Syrio–Lebanese private hospital as a back-up. The only place to land the helicopter there was in the adjoining car park. The helicopter was a very large military vehicle and the pilot an intrepid airman. The car park was at the base of some surrounding skyscrapers, and each time he tried to get down between the tall buildings the convection currents, as it was very hot, threw the helicopter up and about. After several hair-raising attempts to dive the ‘copter down, even the ace pilot came to the conclusion that it was too dangerous.

Landing at Universitos dos Clinicos was no problem. Both the hospitals were excellent, and the facilities at the circuit good and included a following car which was provided without demur. The car smelt strongly of aclohol but to my great disappointment it was in the fuel tank!

Jorge came to Brazil for the weekend and one night when he was left to his own devices, as Raul Marino had taken me out to dinner, he decided to spend some time in the bar at the Hilton. He picked up a beautiful blond and became sufficiently infatuated to take her out to dinner to soften her up for a night of romance. Next morning he was exploding with indignation as he related his escapade to me, for when he got her into his hotel bedroom he found out that she was a man. I think Jorge regretted his expenditure more than the lost opportunity, for he kept grumbling that it was a very expensive meal!



CHAPTER EIGHT

APRIL 1979 – LONG BEACH AND JARAMA

It was quite a novelty to be checking in on the *Queen Mary* in April 1979 for the Long Beach race. The ‘old lady’ was berthed alongside the waterfront and was a wonderful hotel with excellent state cabins and very good service. As I stood in the queue to register I became aware of two men who were just ahead of me. I was alerted when I heard one say to the other, ‘There’s a British arse-hole coming to check us out and inspect the organization.’ I imagined they meant me, so I warmed to the task of eavesdropping on their interchanges. The summary of it was they thought they were pretty good, and they resented the intrusion of this arse-hole. I thought it politic to keep quiet as I was to meet them formally later that afternoon. I think they were still blissfully unaware of their *faux pas* when Robert Langford and I went to our meeting with them. Probably they are not aware to this day that their paranoia amused more than it annoyed me. I gave them a fair drubbing about their arrangements, and as reasonable cause to dislike me in the flesh as they had in anticipation. There was a great deal of comment about the difficult medico-legal aspects of any treatment that I might get involved in, but I sidestepped this by saying I was there only to inspect, assist and advise. The fact that Peter Byles and I were also in possession of American (though not Californian) medical licences was a source of continuing preoccupation for them.

The Chief Medical Officer Jeffrey Macdonald was a very engaging character and I think an excellent traumatologist and physician. He was the Director of Emergency Medicine at the Long Beach St Mary’s Hospital and

became a national figure in the USA. He was tried and convicted some years later for murdering his wife and children. Of course, these events were unknown to me at the time; I understood that he had been a distinguished doctor with the Green Berets and had parachute experience as well as having served heroically in Vietnam. In April he was a swinging, handsome and successful specialist and I found his company to be most agreeable.

All the arrangements were agreed and I found to my pleasure that Phil Hill was to drive for me. During practice sessions we sat in a souped-up Toyota Supra Celica at the pit exit on the town side. The medical centre was on the Bayside about halfway down the long straight. Phil and I talked of old times and although I had never met him to chat to before we had lots of old and mutual acquaintances: Jim Clark, Innes Ireland, Jack Brabham, Dan Gurney and many others. Everything went swimmingly till race day when the by now hoary subject of the FOCA medical team following the first lap came up. First we were told it was OK, then it wasn't OK for a variety of reasons, including one that we were not to touch anybody on the circuit until a Californian doctor got there first because of the medico-legal problem. Another was that it was necessary there was a doctor in Dan Sullivan's car which followed the race. Dan was the Chief of Rescue and Emergency for the circuit, and a fine big chap he was too – whom I grew to like a great deal over subsequent years. That car, however, was heavily loaded with 'disincarceration' equipment and had no hope of completing a lap. It went only to the bottom of the starting straight and then got off on the Bayside.

Bernie rose above all this by pronouncing that once the circuit was under the jurisdiction of the international officials and stewards the track's surface was international and not subject to Californian laws. Whether this was true or not I have no idea, but it was a good ploy.

Phil and I talked it over and he was game to follow the pack, whether or not he got any instructions to so do. We waited at the pit exit as the race cars did the parade lap. The start was round the hairpin at the beginning of the long bay straight and in the run-off at the hairpin Dan Sullivan's car, a wrecker and a fire truck stood ready to take the start. As the last Formula One car went past us on the parade lap, Phil drove out of the pit exit and got on the back of it. There was a lot of consternation at the hairpin run-off when they saw us arrive behind the back-markers.

We all looked very professional in the FOCA car as we had the new Simpson helmet and overalls on and Phil was properly kitted out. Even Dan seemed a bit upset as we slipped past them and down the hill to take the start. Phil really got into it and made a brilliant start yelling 'What's with the Formula One shit!' as he got in among the back-markers. Of course, with his reflexes and a quick car he left all the other followers standing and I could see the flashing lights behind us disappearing as we charged down the long straight. There was a bit of a mêlée at the right-hander at the bottom of the bay straight but Phil picked his way through the debris and continued in pursuit. Dan said admiringly afterwards, 'When I saw you guys going through the debris and not stopping or hanging around I knew you was professional' – a tribute indeed.

Phil Hill always drove me at Long Beach: in 1980 when Regazzoni had his big accident and in 1981, 1982 and 1983, when we last went there. Dr Macdonald seemed to appear in alternate years, for sometimes he was in jail – as he was in 1980 – when Dr Rosumoff was the Chief Medical Officer, and sometimes he was out on appeals. Finally the poor chap was totally jailed, but before that in 1981 he came to Las Vegas to act as Chief Medical Officer when we went to Caesar's Palace to do a Formula One race in the hotel car park!! Whether Jeffrey Macdonald is guilty or not I have no idea, but he always seemed well-balanced and sensible to me. It was hard to believe he was guilty.

Caesar's Palace was great fun, with the massive foyer a timeless (no clocks allowed) den of gambling machines with breakfast served night and day at any time in the adjoining coffee shop. Some of the higher notables were housed in Fantasy Towers, the most exotic wing of the hotel, where the rooms, including the ceilings, were lined with mirrors and there was a step-down, in-built, Italian-tiled floor-bath alongside the focal point of the room – the bed. I had to be content with a room equipped only with mirrors (not on the ceiling) and an ordinary tub and shower.

Phil Hill also drove me at Imola in 1981 to celebrate the twentieth anniversary of his Formula One World Championship for Ferrari. Having spent a lot of time in Italy he was, of course, absolutely fluent in Italian. Enzo Ferrari had invited him to drive the following car, a Ferrari, and provided two identical cars for this purpose in case one broke down and had to be substituted. We set off round the circuit with Dr Piano, the Chief Medical Officer, in the back of the car and came to the Tosa curve where I

knew the agreed medical plan provided for two standing doctors to be present. In fact there was only one and I asked where the other was. Piano, who did not know of Phil's fluency, spoke rapidly through the window to the one doctor who was present. Phil paraphrased the exchange from the angle of his mouth as follows: Dr Piano had told the doctor he'd better find his colleague and get his butt back to his post as quickly as possible, because 'the big bastard in the front [referring to my good self] is kicking up shit about the absence of the other doctor.' I indicated to Piano that we'd do one more lap so that the circuit could be got in order and off we went equably, chuckling to ourselves.

It was such a great pleasure to be driven by a proper driver as at Long Beach, and for the next European races if the local offering didn't seem up to scratch, we requested one of the non-qualifying Formula One drivers to drive the first lap. In Spain later that month it was Derek Daly.

The problems at Jarama in 1979 for the Spanish Grand Prix were a little different from Imola. Firstly, there was a reluctance to hand out much in the way of resuscitation IV fluids and sets to the ambulances because of the expected losses, and secondly, it was felt that the helicopter need not be on site but on call some distance away. I was not happy with this so we didn't start the Friday morning practice on time. I was reassured that it was only about twenty minutes by ambulance to the receiving hospital, and this would be quicker than starting up, flying and landing the machine at the place. I was not convinced by this argument so countered by saying we could test the road time to the hospital while the helicopter came.

Looking around for a victim (a reliable and honest one), I latched on to Ian Brown, Secretary of the Safety Commission of the FISA, and asked him if he would go in the ambulance to the hospital and personally telephone me at the circuit when he got there. This avoided any possible deception. Off he went and we waited . . . and waited . . . and waited . . .

Eventually, in the absence of any news from the ambulance or hospital the helicopter was brought in. The 'copter was in position so we started practice about one hour late. We were well into practice without hearing from Ian – I thought we had seen the last of him – when he finally phoned, by then a little heated, because he hadn't been able to get the circuit to answer the telephone. He managed to get back just before qualifying practice and, from time to time since then, if I want to tease him I suggest we send him off as a surrogate victim again.

The ride with Derek Daly was interesting. At one point the car jumped like a bucking bronco on one downhill lefthander and with a grin he told me he'd managed to engage reverse while going forward. In view of his Irish sense of humour I thought it best not to comment on this, save to congratulate him.

Problems later that year were of a varying nature. At Zolder and at a new non-championship Formula One race at Imola (the results did not count towards the World Championship) tents were provided to form the medical centre – not so bad in the sunshine of Italy, but pretty squalid in the rain of Belgium. At Dijon the medical centre left a great deal to be desired. At Monaco and Dijon there were objections to the FOCA team following. At Zolder two truck vehicles had to be used – one on each side of the narrow paddock area. Eike Martin and I jumped out of one truck, ran across the paddock and jumped in the other truck, thus following most of the first lap. At Monza we insisted on taking the German ONS drivers and Porsche cars with us and didn't win any popularity contests for that. Herbert Linge was instructed that in no event was he to overtake at the start in front of the stands a Ferrari that the Italians had arranged to follow the pack. Herbert agreed blithely, but then said his foot slipped on the throttle when we left it standing at the start.

All in all, 1979 had continued as a steep learning curve and my notes at the end of 1979 to enumerate the problems and suggest improvements for 1980 went as follows:

- 1 The anaesthetic support agreed in Montreal in 1979 had worked well overall.
- 2 The following FOCA chase car for the first lap had been accepted, except at Argentina, France and Monaco, but the provision of a suitable vehicle had been sporadic and poorly organized.
- 3 We had ONS intervention cars at Germany, Austria, Holland and Italy, and Herbert Linge was prepared to do more.
- 4 I had arranged with Transcare and Euromed to have Lear jet air ambulances available where we felt necessary.
- 5 Appendix 'H' of the FISA Handbook for 1980 had been rewritten declaring the need for much higher standard medical facilities and support. This had been accepted by FISA.
- 6 FOCA and FISA (endorsed by Mr Jean-Marie Balestre, the new President of FISA) had agreed that pro-forma questionnaires laying down medical requirements would be circulated in advance of the events with commitment required in writing to reach the mandatory standards.
- 7 The following circuits would need to reach new standards:
 - Sweden – medical centre, helicopter availability.
 - France (Dijon) – medical centre, first lap procedure.
 - Austria – equipment for medical centre, (usually borrowed).

Holland – enlargement of and equipment for medical centre.

Italy (Imola) – medical centre (not tents). Monza – attitudes of officials and radio-links.

USA (Watkins Glen) – medical centre.

Argentina – circuit recovery and first lap procedures.

South Africa – medical centre needed repair, numbers of medical staff inadequate.

Spain – ambulance equipment, circuit recovery.

Belgium (Zolder) – medical centre (not tents).

Monaco – first lap procedure.

UK (Brands Hatch) – medical centre.

Germany – medical centre.

8 Helicopter cover had been available at all the Grands Prix in 1979 for all practice sessions and races.

At least some progress had been made, and we had a good year – apart from Piquet's foot, Pironi had received a mild crack on his head from a broken catch fence post at Kyalami but this had not improved him.

OceanofPDF.com



CHAPTER NINE

THE TRIPLE PRESIDENT – JEAN-MARIE BALESTRE

When I first saw President Balestre in June 1978 he was banging the table loudly with his fist and apparently berating the Clerk of the Course, Amadeus Pavesi, in the administration building at Paul Ricard. Robert Langford raised his eyebrows and rolled his eyeballs up under his eyelids in response to my query, ‘Who on earth is that?’ ‘Jean-Marie Balestre,’ he murmured quietly in reply. It was a scene to which I was to become accustomed over the years.

Although he was new to me, Monsieur Balestre was already a great power in France as President of the French Fédération Société Automobile (FFSA), and as a powerfully connected businessman of political clout with the French government. In the next few months he came to absolute power in international motor racing. His emergence electrified the general organization of the CSI (Commission Sportive Internationale), which had been dormant and in the doldrums for some time. As his powerful personality became revealed to me I found him a fascinating and at times difficult character to deal with. One thing was certain – he was a very live wire and rapidly dominated everyone and everything around him. His ebullience and sudden outbursts of apparent rage certainly got things going, but his unexpected switches to charm and persuasion made it difficult to decide how to deal with him on any issue or to predict how he would respond to problems. In the early months my role was that of medical

adviser and representative of FOCA, so I was protected from direct contact through Bernie and through Basil Tye who was then Chairman of the International Safety Commission and who had replaced Dean Delamont as the RAC Motor Sport Division Chief.

Balestre was charming and polite whenever I did come into contact with him and I later found out from Jean-Jacques Isserman that he had warned Jean-Jacques when I first appeared at Paul Ricard that ‘an eminent surgeon and friend of Bernie Ecclestone was coming, and that he was to be treated accordingly’.

In any event, the rapid restructuring of the international organization into the Sport Division as the Fédération Internationale de Sport Automobile (FISA) went ahead with Balestre as the President – a hands-on type of president who got into everybody’s hair pretty quickly. Subsequently he displaced Paul Metternich as President of the overall automobile international organization and became President of the Fédération Internationale de l’Automobile (FIA). Thus he ultimately became, as he proudly declaimed, ‘A Triple President’ – of the FFSA, FISA and FIA – and was ‘the only triple president in the world, outstripping such mortals as Presidents of France and the USA’. This grandiloquence was part of his charm and his success, for his regal posture frequently overawed his opponents. He was and remains an excellent advocate, and his aura, combined with his intelligence and ability to snatch arguments, made his performance at times unbeatable and unbearable. He was and is a wonderful actor and speaker – inherent and inherited genetic talents. His autocratic style of summoning one to his presence was very effective.

On one occasion in Estoril he was very upset because we started the Friday morning practice thirty minutes late owing to the late arrival of the local doctors and the fact that the medical centre was not ready for the ten o’clock start. He was actually in Paris but arrived the next day and summoned the Chief Medical Officer and myself to a meeting to explain our default. He said to me it was a disgrace for the doctors not to be ready and this was my responsibility. I replied that I agreed it was a disgrace, but I preferred to be in charge of a disgrace rather than a disaster – not to be ready if there was a first lap accident at ten o’clock was a worse option in my view than to delay the practice. He accepted this point of view and enquired of the Chief Medical Officer very mildly as to the time his doctors turned up. Consoled by the gentleness of this approach, the doctor told the

truth. 'Fifteen minutes to ten o'clock.' BANG went Balestre's fist on to the table. 'IT'S TOO LATE, DOCTOR!' he roared, and went into one of his wonderful rages. 'THE MEDICAL CENTRE SHOULD BE READY ONE HOUR BEFORE PRACTICE!'

On the other hand, he could be so remarkably helpful. In Brazil at Rio de Janeiro before a Grand Prix it was the custom to assemble a pre-fabricated structure to serve as the medical centre which was usually ready some time on Thursday and operational by Friday morning – after the race the structure was dismantled till the next year. At the Executive Committee of the FISA the previous autumn, I had proposed that all international circuits holding FIA events should have a permanent, properly built and serviced medical centre. Balestre had dismissed my proposal as 'a dream, doctor', to which I replied that, in fact, for myself and the doctors, 'it was not just a dream, but a nightmare' and I explained why. Nevertheless this appeal was dismissed out of hand on the grounds of expense.

It was with some cynical amusement that I arrived at the Jacarepagua circuit on the Thursday to find that torrential rain and bad weather for several days had prevented the erection of the temporary structure. By Friday morning it was constructed, but the floor was still being laid and there were no services. I told Bernie that I didn't believe we could be ready and, meantime, I went off to place and inspect all the ambulances around the circuit. Bernie had said he would do his best to get the building prepared and he recruited Jean-Marie's help as well. When I returned to the medical centre at about 9.30 I found that both Bernie and Balestre had been fetching and carrying supplies and equipment into the centre and had concluded that all was well. When I arrived Bernie said, 'Professor Watkins, it's all ready for your inspection,' with one of those quizzical and amused expressions on his face. I went in accompanied by the group and it all looked OK, but there were no lights on. I snapped a switch down and nothing happened. Accepting that we might not need the lights on, I asked one of the Brazilian doctors to take his shirt off. Bernie looked puzzled till I said to the medical team, 'I would like an ECG done on this doctor.' The electrocardiogram equipment needed a power source to be operable and when the electrodes were connected to the chest wall and the machine was switched on there was no joy, for there was no function. It took another thirty to forty minutes to get everything hooked up, and we started practice at 11.00 a.m.

However, at the end of the morning practice I was summoned to the presence. Balestre had now assumed the other end of the spectrum of his

personality. ‘Doctor, why was practice delayed one hour?’

‘Because, President, the medical centre was not ready.’

‘Ah,’ he said, ‘and why was the medical centre not ready?’

‘Because, President, it was built too late – being a temporary structure its completion was delayed by bad weather.’

‘Doctor,’ he breathed gently, ‘why do we not have permanent buildings for medical centres at the permanent circuits for FIA events?’

‘Because, President, when I proposed this last year it was turned down.’

‘By whom,’ he asked.

‘By you and the Executive Committee,’ I replied, and tapped him on the chest.

‘By me?’ he queried innocently.

‘Yes,’ I said. ‘By you, and to remind you, you said it was “a dream”, and I replied, “no, it’s actually a nightmare”.’

‘Ah,’ he said with an intelligent and amused gleam in his eyes. ‘I remember and we must do it, so this problem does not happen again.’

And so it was done.

I always admired the courage with which Jean-Marie took on arguments publicly or privately, with the press or with the drivers and the FISA. He was challenged by Derek Ongaro, who had succeeded Robert Langford in 1979 as the FISA safety delegate, to do the first lap in my following car at the Dutch Grand Prix in Zandvoort. He accepted the challenge and turned up at the pit exit to meet Herbert Linge and myself, who were waiting in a Porsche to take our place at the back of the grid. Balestre was a bit worried that he hadn’t got a crash helmet, so I gave him mine and I wore my Goodyear Grand Prix Doctor hat – the sight of which was a constant irritation to him because it had ‘Goodyear’ across the front. He was always telling Yvon Leon, the FISA Secretary-General, to instruct me to get rid of it.

We got to the rear of the grid with poor Balestre jammed in the back seat. During the fifteen-minute wait I showed him over the ONS Porsches, which were supporting the Dutch Grand Prix, and explained the equipment for extrication and resuscitation. Herbert Linge was mightily amused by the sight of the great Balestre being thus educated, and when the parade lap started Jean-Marie again crammed himself into the small space behind our seats. Round came the cars, on flashed the red and green lights and off we went.

Herbert in a Porsche 911 turbo is a pretty quick merchant, and we were well up with the back-markers when there was a big shunt at Tarzan, the first corner. Bits of cars and wheels came off, and one came bouncing over the roof. However, all the drivers who were marooned in the crash looked all right, so on we went. In the S-curves we overtook Mario Andretti who had been in a bit of trouble. Mario waved nonchalantly. Herbert was enjoying having the President aboard, and was handling the Porsche with verve and enthusiasm so it was sliding a bit here and there and we did a pretty quick lap. We extricated the President when we got back to our race position at the beginning of the pit lane. I asked Balestre what he thought of it – he said, ‘I didn’t realize it was so fast.’

At the drivers’ briefings through the years Balestre always provided a good show. In fact after he retired from the FISA at the end of 1991 we all missed him, and Senna confided to me that although he frequently did not get on with J-MB, he missed the lively exchanges that occurred at the briefings. Although he addressed the drivers as ‘Gentlemen’, the President delivered his comments as if he were talking to a bunch of errant schoolboys. He always did a great job on his ‘Safety Plank’, and recurrently reminded them that he had done so much for their safety and well-being. In return he expected good behaviour and demanded some self-discipline from the drivers and mature conduct during the start and during the race.

Usually he spoke in English and he spoke well and with effect. He had some difficulty at times dealing with Piquet, for whom I suspect he had a soft spot. Nelson was and is incorrigibly naughty, and his mischievous streak cannot be contained for long. On one occasion at Paul Ricard, while Balestre was delivering a long speech on safety, Piquet sidled up alongside him and was quietly and calmly pouring a bottle of mineral water into the left-hand pocket of Balestre’s FIA blazer. When the presidential left leg became wet as the water ran down his trousers, even Balestre could not contain his laughter. Long before this happened everybody else was in convulsions of mirth.

At one briefing at Hockenheim there was a discussion about tyre chicanes that Senna and others wanted changed. After listening to the arguments for and against, Balestre was about to make a Presidential Decision when he suddenly decided to go the democratic route. ‘No,’ he said. ‘We will have a vote.’

Piquet immediately put up his hand.

‘What are you doing, Piquet?’

‘I am voting, President.’

‘But, I haven’t announced the vote yet.’

Piquet replied, ‘It doesn’t matter, I want you to win, President.’

Balestre struggled not to laugh, concealing his sense of humour, and said, ‘You must wait till I say what the vote is.’ He then formulated the proposal, for or against the tyres, and proposed to count the raised hands.

Piquet immediately put up both hands saying, ‘I am making sure you win, President.’

The matter was resolved unanimously in the end – against the tyres.

In 1981 when the FISA-FOCA so-called war about commercial and political control went on I found myself in a difficult position. In Spain, as a result of the dispute, the FISA officials were all withdrawn on the Saturday of the race weekend. Even Derek Ongaro was unable to stay. I had a problem with the Spanish Federation doctors who were also under a threat of being withdrawn. However Professor Nalda, the Chief Medical Officer at Jarama, and myself were able to persuade them that the medical staff should remain. Before the warm-up and the race went off, I did the track inspections, and there were no accident or injury problems. However, I had isolated myself from the FISA by staying, but clearly my first responsibility was to the drivers. Subsequently, I found myself on the other side, when FOCA refused to run in the San Marino race and I was clearly the FISA medical delegate. Neither Bernie nor Balestre ever passed any comment that I had remained politically neutral. Lesser men might have complained.

However, he could also be manipulative. On one occasion at Paul Ricard in 1980 there was no appropriate medical helicopter available on Friday morning. The practice did not start when the green light went on as I had tipped off John Watson who tipped off the other drivers who refused to start practice and a row then ensued. The helicopters were elsewhere. Derek Ongaro was in Race Control arguing our safety position, and was given a press release stating there was an uprising of the serfs which was being dealt with. On the side, Jean-Marie Balestre was persuading Dr Isserman that he should sign a document accepting personal responsibility for there being no helicopter. Jean-Jacques was not too keen on this but was defeated when his patriotic soul was seduced by Balestre declaiming, ‘Let’s defeat the English.’ Meanwhile a civilian helicopter was being converted so all was well in the end.

When Martin Donnelly was injured during the Spanish Grand Prix in 1990 Jean-Marie Balestre considered the accident a personal insult against all his work for safety. He got on the phone to me at Jerez and said, 'How could this happen after all my work on safety?' I replied, 'President, it is a matter of physics over which you have no control and you must not blame yourself.' He was only partially mollified by this, and I was left with the vision of a similarly puzzled King Canute looking gloomily at the tide.

OceanofPDF.com



CHAPTER TEN

THE MEDICAL COMMISSION OF THE FISA

I was in Montreal in September 1981 when I heard that Balestre had called a meeting to be held in Paris to form a Medical Commission of the Fédération Internationale de Sport Automobile. The decision to start to influence medical arrangements worldwide with the authority of the FISA was a brilliant step in Balestre's March on Safety. Hugh Scully was also in Montreal as we were at the Canadian Grand Prix, and we had a few words about this proposal. As the most eminent surgeon involved in motor racing in Canada, Hugh had been invited to attend the forthcoming meeting as the representative of North America. I was to go as the UK delegate and, of course, I was still wearing my hat as FOCA's surgeon.

The meeting was held on 3 October 1981 in a boardroom in the FIA's Paris offices in the Place de la Concorde, and Dr Jean-Jacques Isserman was there to meet us. Dr Scarlot from Monaco, Professor Rovelli from Italy, Dr Welkenhuyzen from Belgium, Dr Hugh Scully from Canada, Dr Zunan Kipri from Africa, and Klaus Steinmetz, an official from the ONS representing Germany, were also there. Ian Brown, Secretary to the Safety Committee, officiated. I spoke first and began outrageously by saying that we needed an interim Chairman and that I was the ideal person as my only language was English. Having proposed myself as Chairman, Hugh Scully was swift to move politically and spoke in support of this motion to second me. I asked if there were any objections, and as there were none that I could understand, I walked over and took the position at the head of the table. The

climate was pretty hostile as I had by now upset most of these people at their circuits.

We had a pretty good meeting despite this. I pretended not to understand a good deal of the discontent expressed in French about my role as FOCA's surgeon. I was castigated about all sorts of tortures I had inflicted on certain members of the new Commission, some real complaints, some imaginary. I asked Ian Brown, an English ex-pat and completely fluent in French, what the discussion was about and he told me. I ruled that it wasn't on the agenda and we went on to discuss important matters.

It was agreed we needed to rewrite the articles within the FIA Handbook of Regulations (the Yellow Book), to upgrade medical examination of drivers, medical centres and equipment, and the medical response on the circuit and at referring hospitals. The doctors were all united and committed to getting improvements, and we saw the Medical Commission as the way to harness the formal authority of the FISA to legislate over pre-existing inferior facilities. It was agreed to ask for reciprocity between the Safety and Medical Commissions, so that the President of the Medical Commission would be a member and have a direct line to the Safety Commission and vice versa. It was understood that our standing as medical representatives of our individual countries was subject to the acceptance of the Executive Committee of the FISA, and that the appointment of the President of the Medical Commission was a gift within the power of the FIA Executive Committee.

A few weeks later I heard that I had been elected as President of the Medical Committee, and the original members present at the first meeting of doctors were elected to the Medical Commission – eight in all. Two others had been added by the Executive Committee, a representative from Austria whom we saw only once in subsequent meetings and one from Argentina whom we never ever saw at all!

This was the beginning of a great deal of work and long meetings of the Commission to hammer out detail and to examine carefully the legal, ethical and political consequences of the measures and standards we were trying to evolve. Ian Brown, as Secretary of our new Commission, was instrumental and indefatigable in getting the paper work done. Dr Jean-Jacques Isserman was vital in writing and rewriting countless prescriptions of procedure to be incorporated in the FIA Yellow Book. Hugh Scully was a tower of strength and good sense, and a loyal and faithful supporter without

whom I could not have managed. He, with a great command of the French language, Dr Scarlot of Monaco and Isserman did a lot of valuable subcommittee work and slowly we got our act together. Once the Commission was promulgated, in 1982 we were able to tackle the deficiencies which had come to light since 1978 with the authority of the governing body.

Medical centres had been a low priority for many of the circuits and although it took some more years to gain acceptance of permanent buildings as mandatory, we were able to get away from tents and primitive huts. Before 1982 considerable progress had already been made. Starting like charity at home, Silverstone had a new centre by 1979, and Brands Hatch by 1980. Imola, with tented accommodation in 1979, had built a lovely centre by 1980. In Belgium, Zolder, which had tents in 1979, had produced a nice building with a viewing and leisure room for the doctors on the second floor by 1980. Zeltweg in Austria, Hockenheim in Germany, Dijon and Paul Ricard in France had built or improved their facilities.

As we went to new circuits now with the authority of the FISA, the centres were built to the minimum specifications laid down by the Medical Commission at Nürburgring, Mexico City, Estoril, Jerez de la Frontera, Budapest and Suzuka. The regulations demanded adequate size, resuscitation rooms, beds, equipment, burns facilities, communications, site security and helicopter pads. All around the world at the circuits where FIA World Championships are conducted, the medical centres are now model and modern Intensive Care Units capable of providing excellent care. Many have excelled the requirements by providing X-ray equipment, ultra-sound diagnosis, laboratory facilities and even operating theatres as at Imola and São Paulo. Imola recently made available CT scanning and even Magnetic Resonance Imaging – the most eloquent diagnostic technique for brain and spinal cord injuries.

Some places have continued to be intransigent – naturally Monza, where the centre continues to be badly situated, has weak security and is of poor design. Despite my congratulating the authorities there on having the worst medical centre in the world, little has been done to make it more than the basic standard acceptable. We are promised each year, including this one, that a new centre will be built with good circuit access by next year. But with the restrictive regulations of the local authority to control the

environment within Monza Park, among other difficulties, so far it has not happened.

As I look through the calendar for the 1995 Grand Prix season, at all seventeen circuits on the list fourteen medical centres are up to modern standards, including new units at Magny Cours, Barcelona, Estoril and Aida. Buenos Aires is being built, Monaco is an exception as a street circuit (the Centre Hospitalier being of such easy access), and only Monza remains a problem.¹

Helicopter availability was a struggle for the first few years, although from the beginning of the 1979 season we insisted and achieved full cover, even if it meant delaying the practice on Friday morning. Balestre introduced a system of fining the circuit if the practice did not start on time, and the pecuniary threat worked very well.

I remember taking Balestre around Monza in 1979 to show him the ropes as he was getting short-tempered with the difficulties I was raising. Finding that many of the doctors were not on post but were either eating or at the latrine was a great revelation to him, as was the demonstration that the helicopter had not arrived. 'Is it always like this?' he wondered. My reply was, 'It depends where you are.' Bernie told me afterwards that certain of the authorities wanted me removed from the circuit because I took the doctors' names as I went round. He told them I only needed the names so we knew who to sue!

The various reasons advanced for difficulties in providing helicopters spanned a remarkable spectrum. One morning at Paul Ricard we were told that a revolution of the peasants had to be subdued by using civil helicopters. In fact, the French farmers were demonstrating about something and the problem was solved with another machine. Before the British Grand Prix at Silverstone in 1979 I was told helicopters were too expensive and anyway they were not necessary. The Royal Navy came to our rescue but caused a commotion when a Sea King landed at the medical centre blowing away tents and concessions. Fortunately, a charming naval officer was on hand to deal with the anguish, and Jimmy Brown, manager of the circuit, was mollified by a typical exhibition of best naval manners and salve.

Six years later there was a different kind of problem with helicopters at Silverstone. It had been necessary to delay non-timed practice progressively on the Friday morning because of the weather. The rain had started early

enough to prevent the medical rescue naval helicopters from leaving their base to come to Silverstone. Other helicopters had got in but we had no way of getting to any of the hospitals quickly without the naval helicopters so we could not start practice. Under some pressure to agree that we could rely on ambulance transport so that we could start, I asked the police to estimate the transport time necessary to get to the nearest hospital, Northampton General. The reply was with the road conditions and the traffic they thought at least forty minutes. I maintained that we should not start and the Clerk of the Course (now Robert Langford) agreed. The Stewards of the Meeting were extremely polite to me and all seemed settled.

Suddenly Bernie, emerging from under a large dripping umbrella, appeared in the Stewards' Room and demanded 'Why aren't we starting practice?' I replied that we did not have a medical helicopter there – hence the delay. I will never know whether or not he was pulling my leg but deadpan he replied, 'What do we need one of those for?' I said we didn't at the moment but would do if somebody got hurt on the circuit. He grumbled and said, 'Why can't we use an ambulance?' I explained and, surprised that he was taking this unusual stance, I got a bit nettled. 'Mr Ecclestone,' I asked, taking a gamble, 'how did you come to the circuit this morning?'

'Helicopter,' he replied.

Warming to my task, I continued, 'And are you fit and well?'

He answered with some surprise, 'Yes, I'm OK.'

I saw the opportunity. 'Yet you would deny somebody who is severely injured the convenience of leaving the circuit by helicopter and taking the risk in a road ambulance?'

'Of course not,' he grinned. 'You can use mine.'

Pressing a rare advantage, I went on. 'Can we go and see it and make it ready then?'

'Yes,' he replied, 'I'll take you to it.'

We set off by car and reached a trim Augusta parked up the runway. We went in and I looked at the nice fittings, the carpet and the upholstered seats – a really comfortable scene. 'Bernie,' I said, 'I'm sorry but we'll have to take all these fittings and seats out so we can get a stretcher in.'

'All right,' he said. 'I don't think any bloody fool should go out on the circuit in this weather anyway!'

On one occasion at Zolder when I first met Roland Bruynseraede there as Clerk of the Course, the military helicopter promised the day before

practice failed to materialize at the due time. Roland was told the Minister of Defence had to authorize its movement from Ostend to Zolder, and that the Minister was in a meeting and could not be disturbed. Bernie agreed that no Formula One car left the pits till the deficiency was amended. Half an hour later the miscreant turned up.

Many of the helicopter pilots are intrepid – such as the Brazilian diving down among the skyscrapers in an attempt to reach the Syrio-Lebanese Hospital in São Paulo. One extraordinary individual with whom I flew in Rio took me from the circuit at Jacarepagua to the Souza Hospital so that I could look around and meet the medical director. On landing he asked how long I would be as he did not want to shut the motor down. Twenty to thirty minutes was the answer. Next thing, an urgent message came to the director's office from the pilot. I was to return to the machine immediately. Thinking there was a medical problem at the circuit, I quickly complied and was surprised when we took off to find we were heading for the lagoon and not back to the circuit over the hills. On being asked why, the pilot grinned and tapped the fuel gauge which showed completely empty. We then swooped down to the lagoon and landed at the police helicopter station. The pilot got out and we were fuelled up. While preparing to take off I noticed the gauge had not moved and drew this fact to the pilot's attention. He grinned again and said that it had been broken for three months.

On returning to the circuit we flew up the coast towards a headland where there was a large motel, which was well known for a certain purpose. As we approached, the lascivious grin of my flying colleague broadened and he became positively excited, winking and gesticulating in a manner I could not fail to understand. The excitement he was manifesting was due to the fact that if one flew close enough to the balconies overlooking the sea, one could peer into the windows to examine the sexual proclivities of the occupants. As he approached near-orgasm in his preoccupation I began to wish I had taken flying lessons as I feared I might need to take over if he stroked out. We made it nevertheless to Jacarepagua and our adventure was over. The following year when I returned there was a different helicopter and a different pilot. I asked where my friend was and all the thumbs pointed down. Apparently one day he was not able to second-guess his defective fuel gauge and he crashed, leaving the motel occupants to conduct their affairs in greater privacy.

Ambulances were sometimes a problem, particularly at Watkins Glen. One year they did not want to come as they had not been paid for the previous year! When the roads are crowded with race traffic it is difficult for them to make progress and certainly they are not a fast form of transport. I remember Carlos Reutemann complaining after his accident in Spain in 1978 that the ambulance taking him to the hospital was very slow and, in addition, stopped at all the traffic lights! At Watkins Glen in 1969, the ambulance taking Graham Hill took to the field to get round the traffic, got lost, and finally went to a hospital that did not expect any business. Eventually he had to be taken on to Corning, a further twenty miles away. The best story is that of Jacky Ickx who, upon leaving the circuit in an ambulance, was surprised to be asked if he had any dollars as the ambulance needed petrol. Ickx obligingly provided a loan but never got it back.

The medical questionnaire I first devised with Robert Langford in 1978 was quite basic (Appendix III A, page 215) and received short shrift from rebellious circuits who claimed never to have received it or did not recognize its authority. By 1979 with the endorsement of the FISA it was more complete and taken more seriously (Appendix III B, page 219). Since the Medical Commission was formed it has been progressively polished and modified and is now a mandatory and important part of the normal protocol. The document and the commitments are quite demanding in terms of detail and contractual obligations, and the questions span all the concerns that have been mentioned throughout this book. The present form (Appendix III C, page 227) comprising multiple pages, has to be returned by the circuit to the FIA office in Paris completely filled in two months before the event. It is scrutinized by Dr Jean-Jacques Isserman, Permanent FIA Medical Delegate in Paris and now also Honorary Vice-President of the Medical Commission. Any deficiencies are then detected and the circuit is obliged to rectify them before the Grand Prix.

All new circuits and new medical centres are inspected by Dr Isserman during construction and well in advance of any event. The plans for the construction of any new medical centre have to be submitted to the FIA for examination and endorsement by the Medical Commission.

Immediately prior to any event, either myself or Dr Isserman inspects the receiving hospitals, and during the event supervises the spinal extrication teams practising rescues from Formula One cars. The Formula One teams

have been very helpful in allowing us to use the actual cars that are being run at the Grand Prix races for these exercises.

Each day thirty minutes before the international stewards inspect and take over the circuit, a medical inspection of the trackside medical units is made. This applies to each practice, to the warm-up, and to the race. A full report of the state of the medical centre and the performance of each medical team is made and kept on file in Paris (Appendix III D, page 241). Similarly, each time a new receiving hospital is viewed, a full statement of its facilities and capabilities is recorded to be filed in the FIA in Paris (Appendix III E, page 247).

Each major accident with an injury to a driver is analysed and examined by video-replay and the rescue performances scrutinized at the Medical Commission meetings. By this means it is possible to gauge and permanently record the medical and rescue responses in order to improve performance. It is hoped that the loopholes for error or omission have been gradually closed by these processes.



CHAPTER ELEVEN

1982 – ACCIDENTS AND THE GROUND EFFECT CAR

The capacity of the ground effect car to get a launch and basically fly was the result of the aerofoil design of the bottom of the car – like an aeroplane wing upside down so that a negative pressure effect built up with velocity, but if the car lifted the vacuum effect was lost and the car would be projected upwards.

René Arnoux's accident at the Dutch Grand Prix in 1982, for example, while frightening was also amusing. He got a launch in the race at the fast first corner called Tarzan and ended up with the car balanced high on the top of the tyre barrier. Fearing the worse, I struggled through the gravel and climbed the tyre barrier to find him lying unharmed, serenely contemplating the clear blue sky in a most tranquil manner. A sharp injunction from me disturbed his reverie and he regained reality as he complied with my impolite request to get out of the xxxxing car! At least he survived to tell the tale.

1982 was a terrible year for Formula One racing, only equalled or surpassed by 1994. I suppose the psychological problems resulting in the first tragedy at Zolder began earlier in April at Imola. The Ferrari team drivers, Gilles Villeneuve and Didier Pironi, were both brilliant, aggressive and competitive. Of the two I always thought Pironi was the more highly strung. His pulse rate, as shown by the studies of Doctors Richelet and

Bertrand (see Appendix I, Tables 1 and 2) was consistently higher than those of Gilles.

At Imola my car sits out on the apron to the left of the last chicane into the pit straight. The two Ferraris on the last lap came past my car with Villeneuve in the lead and Pironi fast behind. They turned into the pit straight and Villeneuve appeared to ease off to take the chequered flag, when his team mate Pironi accelerated to beat him to the line. I saw later on television that on the podium Gilles looked a bit sick and upset, if not dejected.

It was a bright Saturday afternoon at Zolder, 8 May, and we were in the last few minutes of qualifying practice – always a dangerous period and, as always, I was looking forward to the chequered flag to end practice. I was in a Mercedes station wagon with a fine young Belgian driver when I saw Roland Bruynseraede with the red flag at the pit exit line beckoning us to go. As we pulled out in front of a Ferrari just leaving the pit lane I recognized it was Pironi's car, and he held back for us to go. As we got round the back of the circuit bits of debris appeared, and finally the empty wreck of the Ferrari. I knew then it was Villeneuve, and my heart sank remembering his words when we first met: 'I hope I will never need you.' The first medical intervention vehicle was there, and the Belgian surgeon, already alongside Villeneuve's form, was waving for my attention.

Gilles had been thrown right across the circuit and lay at the bottom of some catch fencing. As I got to him it was clear he was not breathing, so we intubated him immediately and without difficulty and started ventilating him with an Ambu bag and oxygen. It had taken about two minutes for me to get to the scene but the surgeon had been there within thirty-five seconds. My surgical colleague carried on 'bagging' while I looked at Gilles. He was quite flaccid and his pupils were dilated. Generally he looked otherwise uninjured, so we concluded he probably had a cervical spine fracture with high spinal cord injury. The strange feature was that his shoes and socks were off, and his feet quite bare. I looked up and found Pironi had stopped and was behind me, but after a few seconds he turned and left. Other help arrived and we set up intravenous drips. Gilles's pulse had been present throughout and was quite strong, but the situation looked pretty bad. The Belgian marshals formed a circle around us with their blankets to shield us from the public view and we transferred Gilles to a stretcher and into the

ambulance with me controlling his head and neck in traction to avoid further damage.

Once in the medical centre we got the situation stabilized, though the outlook appeared hopeless, and left for the University St Raphael Hospital at Louvain in the large military helicopter that had been on standby alongside the circuit hospital.

Arriving there, Professor De Looz, in charge of the Intensive Care Unit was excellent, X-ray were standing by and we soon had the diagnosis – a fatal fracture of the neck just where the spine meets the base of the skull. I spoke with Madame Villeneuve and explained the position – she left Monaco at once to come to Louvain. Jody Scheckter was also on the phone from Monaco and was devastated to hear about the serious condition of his friend.

Meantime, Marco Piccinini, the Ferrari team manager, had been wringing his hands all round the Intensive Care area and was refusing to believe that nothing could be done apart from life-support. He believed he could find somebody somewhere in the world who could save the situation. After a while he called me out to speak on the phone to ‘the best neurosurgeon in the world’, who was in Montreal and wanted to talk to me. I asked Piccinini the name of the neurosurgeon and he said, ‘Professor Gilles Bertrand.’ I picked up the phone and said, ‘Hello, Gilles. The last time I saw you we were in the Imperial Hotel in Tokyo – this is Sid Watkins speaking.’ ‘What the hell are you doing there?’ he asked. I explained the situation and the injuries to poor Gilles. As I handed the phone back to Marco for them to talk, Piccinini, who had been listening open-mouthed to the conversation, said, ‘You know each other?’ ‘Yes,’ I replied. ‘We are old pals. The neurosurgical world is quite a small one.’

Finally, Madame Villeneuve arrived. I had a long talk with her and explained the hopelessness of the situation. She was very brave, dignified and rational, so we bore the last minutes together in silence.

There was a lot of conjecture and subsequent investigation about the accident, and so far as one can piece these things together, it appeared Villeneuve was going for a very fast lap in the closing minutes of the practice to try to beat Pironi’s time which was faster. At one part of the circuit he tried to get past Jochen Mass but when he got there his own theory had failed disastrously – there was no gap. There was a big impact, a launch, and Gilles was thrown from the car with his seat, and seat-belt

restraints still attached to him – all having been wrenched from the car – so high was the energy. Whether his neck fracture occurred when he left the car or landed near the catch fencing will never be known, but I am sure he did not in any conscious sense suffer. His family and his friends did, and still do, so revered is his memory.

There were several sequels to this tragic event. Firstly, I was impressed with the response and the calm management that Roland Bruynseraede showed, and with the Belgian medical team and the University Hospital. Roland continued as Clerk of the Course at Zolder, and subsequently at Spa when we started to go there again in 1983. I grew to respect Roland a great deal, and when Derek Ongaro resigned as the Formula One Safety Delegate and Starter in 1987 the subject came up as to who might replace him. Bernie asked me my view and I suggested Roland if FISA could get him. The FISA succeeded, much to the benefit of Formula One. With his multilingual ability, his calm and serious demeanour, he has been instrumental in reaching the present safety standards in Formula One and in circuit motor racing generally. He has a great sense of humour, a charming wife, Francine, and a supportive family. He has one serious failing, however, which cannot be overlooked: he puts Coca-Cola in Scotch, even in malt whisky – anathema to the addict for the real thing.

The other sequel to this story is that although I have not had any close contact with the Villeneuve family since, I know despite the accident, Gilles's brother, Jacques, entered a career in motor racing, and Gilles's son, also called Jacques, has become an internationally acclaimed driver in Indy-Cart racing and is joining the Williams team for the 1996 season.

After Zolder we went to Monaco and Detroit where I was sickened by the television showing time and time again (even in the airport lounge) Gilles's accident and telephoto lens close-ups of intubating him. Then on to Montreal in June to suffer another grave and fatal accident.

My dear friend Mario Vallee has driven me on the Isle Notre Dame circuit regularly and we have a good and close understanding. We started as usual at the back of the grid with the green light – and then could not believe our eyes. A race car at the front on the left was stationary and the field went funnelling to the right of the obstacle like peas down a channel. Save for one car, the car immediately in front of our chase car. Starting from the back of the grid, Riccardo Paletti went straight as a die and accelerating, right into the back of the stalled car. There was a massive

impact and both cars were hurled down the circuit. Paletti's car went to the right, and the Ferrari of Pironi down the circuit to the left. As we passed Pironi I could see he was all right and struggling out of the car. Paletti, however, was slumped in the cockpit.

Mario stood on the brakes and I ran back to the wreck. I opened Paletti's visor. He was deeply unconscious, so I thrust an airway into his mouth and lifted his eyelids to inspect his pupils. They were dilated. I had heard consciously, but as at a distance, the sound of running fluid which I realized was fuel. At that moment there was the whoosh of an explosive burst of flame which shot high in the air. I had had my leg pulled a great deal for wearing Nomex overalls, gloves and a crash helmet by a variety of people – some of the press, and Bernie who would frequently ask for my autograph. My replies to Bernie on these occasions remain unprintable. Nevertheless my precautions paid off; I had taken off my right glove before the fire and my hand got a bit scorched. The legs of my uniform had absorbed fuel and ignited, and to my regret I had on expensive Argentinian leather boots instead of Nomex and these too caught fire and melted. I'd closed Paletti's visor to protect him as the fire fighters arrived. It was all a matter of seconds between the accident and the fire – I reached Paletti sixteen seconds after the impact.

Ralph Baldwin, the driver of the support pursuit medical car, appeared spraying down the flames with great courage. He is accomplished as a paramedic, a race driver, and clearly also as a fire fighter. Pironi appeared on the other side of the car, having wrestled a fire extinguisher from a fireman, and was battling into the flames. On the periphery of the fire was a photographer who was getting in the way as he got the best shots – I could have performed a similar act upon him! But the worst of all was Paletti's mother who had escaped on to the circuit and was, naturally, beside herself with anxiety, hysteria and grief.

The fire was quickly put out and in we went to get Paletti out of the car. The steering wheel and column were jammed in his chest. One of the team managers, John MacDonald, appeared and together we wrenched it out. We got the helmet off and Dr Jean Taillefer, the anaesthetist from Ralph Baldwin's car, performed a miracle. He got a tube down the unconscious Paletti in bright sunlight with the driver sitting trapped in the car. (It is extremely difficult to intubate a person in the sitting position in a car, and bright sunshine interferes with seeing clearly into the throat in order to

place the tube correctly.) It was very hard to release the boy from the concertinaed car and while that was being done intravenous infusions were up and running, but there was no detectable pulse at the wrist. Dr Bouchard and Hugh Scully had alerted and brought the race helicopter to the accident so we transferred Ricardo to the 'copter. He went straight to Hospital where, shortly after arrival, he was pronounced to have lost his life from massive chest and abdominal injuries.

There was a delay before the restart so I went to see Pironi. He was very uptight and still shocked from the accident and fire. He had been very brave to get into the act, though I think the fireman would have done equally as well. At times I get the feeling that a driver is getting to the stage of being stressed out. Pironi had now been at close quarters in two huge accidents within two months. I gave him a few words of fatherly advice and told him to take it easy. Unfortunately by August in Germany he had either forgotten or discarded my advice, and he got into a huge and purposeless accident which ended his career as a Formula One driver.

It was bucketing with rain in Hockenheim and had been throughout the Saturday morning – not many race cars were circulating for Friday had been dry and there was no prospect of the drivers improving their positions in such wet conditions. The grid was basically set, and Pironi was on pole; in terms of points he was also in the lead for the World Championship. Herbert Linge, myself and the ONS anaesthetist were sitting in the Porsche on the apron of the Motodrom part of the circuit when we got the red flag.

The accident was on the other side of the circuit, and the wrecked car was a couple of hundred yards before the entrance into the amphitheatre. The ONS teams were there when we arrived, there being both rescue and the fast intervention Porsche medical cars stationed at the beginning of this final straight into the loops of the Motordrom. Pironi was conscious, his helmet already off and he knew that his legs were terribly injured. He implored me to make sure his legs would be saved and I gave him my word. He was in a great deal of pain, and his legs cruelly deformed by the impact.

The ONS anaesthetist set up intravenous analgesia and soon the boy was asleep and out of pain. The Ferrari car was a terrible wreck and we had to cut quite a bit of it to get Pironi's legs free. He was still asleep so we splinted his legs. It was now raining furiously and mist hung low over the treetops of the Hockenheim forest.

The helicopter was sent for. I suppose it took about half an hour to get the situation in order before Pironi was sufficiently stabilized to get him to the 'copter. Some well-meaning individual arrived in this mêlée with an umbrella which he held over the unconscious Pironi in such a position that the deluge from it ran neatly between my tunic and trousers – not that I could get any wetter – but the flow was distracting. Keith Botsford in his account in the *Sunday Times*, of 8 August 1982, stated, 'For twenty minutes Didier was trapped in the car before anyone thought of bringing an umbrella to protect him from the rain.' I don't think I ever told Keith what had really happened, nor did I respond to other press criticisms about our getting on with the rescue rather than worrying about umbrellas. Pironi was already unconscious and was not aware of the rain. He was also shocked and, in fact, it was better for him to be cold because the peripheral skin circulation will shut down, conserving blood flow to vital organs. His uniform also was pretty effectively waterproof and he was surrounded by helpers standing over him.

When we were finally ready to stretcher him to the helicopter the umbrella man came too. There was a loud bang as the rotating blades of the helicopter took off the tip of the umbrella which the well-meaning gentleman had thrust into the rotors. Derek Ongaro said, 'That's the top of the brolly.' I replied callously that it was a pity it wasn't the top of the umbrella man!

We took off. Pironi's blood pressure, respiration and pulse rate were stable and he was stirring and responding well. I had made no attempt to take off his racing boots because of the injuries around the ankles. We skimmed over the tree tops to Heidelberg University Hospital where the surgical team was waiting. I took him into the Emergency Room and asked the team not to take off his boots till we had him anaesthetized for surgery. X-rays were being organized, so I went back to the helicopter pad to thank the crew for taking us. They looked pretty glum and told me the helicopter was no longer serviceable as the umbrella tip had distorted the blades, and they were worried about them failing if it flew again.

Professor Mischkowski, the consultant surgeon, arrived and by now Didier was awake and very anxious about his legs. To my surprise Mischkowski was quite blunt, and said that an amputation may be necessary. Poor Pironi needed a lot of consoling and cajoling but by the time he went to theatre he'd cheered up a bit and accepted my promise that

I would not agree to any such course of action now, whatever may happen later.

The operation was long and difficult, for the fractures in the right leg just at the ankle and also above were both compound (through the skin), and complex. Once Didier was asleep I took his boots off, cutting the laces and ankle part of the boots with scissors so the feet could be eased out without further damage. Mischkowski did a brilliant job getting the fragments together in good position with external fixation (like external scaffolding). The main artery (posterior tibial) to the right leg was damaged but Mischkowski patched it up, and did an X-ray dye study to show it was patent and the blood flow unobstructed. The left leg fractures were not so bad. Pironi's condition was absolutely stable and he came round well after the anaesthetic.

Dr Wolfgang Gruh, the Chief Medical Officer, came over to Heidelberg from Hockenheim at the end of the qualifying practice. Reconstruction of the accident indicated that Pironi was going hard in the wet and had gone to overtake what he thought in a mass of spray was one car. In fact, there were two and Pironi hit the rear of Prost's car and got a launch, landing first on the rear and then being projected again into the air for the final impact. Later Pironi told me he could see the tops of the trees during his flight! It was amazing that he was alive but the brunt of the damage had been on the front end, hence the leg fractures.

Pironi was now back in the Intensive Care Unit, and blood circulation of the right foot was fine, so Gruh and I set off back to Ludwigshafen. I spent an anxious night worrying about the circulation to that leg but at midnight all was well, and the next day the circulation, nerve supply and movement of his toes were all intact. I saw him again on the Monday before leaving Heidelberg and physically he was fine, but he launched into a harangue, saying it was only by good luck that we had a competent surgeon on call. So much for the painstaking back-up preparations, and for the reputation of the Heidelberg University Clinic!

A few days later Pironi was transferred to Paris – much to Mischkowski's relief and mine – and he went on to make a good recovery. He limped a bit when I saw him a few months later but otherwise walked well. He did not return to Formula One racing, but Bernie told me he had come to one of the Formula One Commission meetings and had complained that he heard me say at the scene of the accident, 'Let's take his legs off. It will be quicker to

get him out of the car.' To Bernie I replied, 'No, it was his head I wanted to cut off.' In explanation when I was asked by the press, I said I was sure that the poor boy had had a bad dream while under sedation in the car, and had dreamt he heard the words he feared the most as part of it.

The Medical Commission made strong recommendations about the doctors getting fed up with flying accidents and the Safety Commission were independently concerned, for there were other instances of launches that year: Pironi in unofficial practice at Ricard and Jochen Mass in the race at the French Grand Prix, for example. Much to everybody's relief the car design was changed for the following year, 1983, and flat bottoms were the order of the day. Of course, although the design of the ground effect car led to the launches, it was driver error in all three cases that led to the tragedies. Certainly in Pironi's case, already holding provisional pole position from Friday, there was no need for him to go barrelling into any ball of spray unsighted. Didier's thirst for speed remained unquenched and he took up power boat racing and, unfortunately, lost his life in an accident in 1987.



CHAPTER TWELVE

GRAND PRIX DRIVERS OF THE EIGHTIES

Nelson Piquet

It was rumoured that when Bernie put Nelson Piquet in the third Brabham car in 1978 in Montreal Nelson protested, 'But I don't know the circuit!' To which Bernie allegedly replied, 'When you leave the pit exit the first bend is left, so turn left when you get there.'

Nelson is one of those mischievous people whom everybody likes. The fact he was World Champion three times (1981, 1983, 1987) says enough about his driving and tactical ability. He had quite a lot of accidents during his fourteen years in Formula One, though the incidence decreased as he matured. His approach was always direct; when I hauled him out of an accident in practice in Brazil he greeted my arrival by saying, 'How the fuck did you get here so quick?'

Fortunately he never injured himself seriously in Formula One, but after a big accident at the Tamburello at Imola in 1987 during a Friday afternoon practice he was concussed and went off to the Hospital Bellario neurosurgical unit by helicopter. As I walked up the pit lane afterwards Murray Walker, with his microphone in hand, asked me how he was. I said, 'He's all right, he knows who he is, where he is, and who I am.' Murray replied, 'I see; then confusion is a sign of having a head injury.' I couldn't resist it – I said, 'Murray, you of all people ought to know better than that.' I hoped Murray would soon forgive me for that unkind remark, and was relieved later to hear him delivering a marvellously funny after-dinner

speech where he dwelt on the frequent confusions in his commentaries as his stock-in-trade.

I went to see Nelson in the hospital after the practice session ended and advised him to withdraw for the weekend. I was surprised on the Saturday morning when Bernie got hold of me and said, 'Nelson's turned up and wants to drive.' The naughty boy had discharged himself from the neurosurgical unit against advice, and had arrived at the circuit. He came to see me and I told him, 'Nelson, you can't drive, you've got brain damage.'

He shot back immediately, 'How do you know?'

I pointed out that he only had one shoe on and he'd clearly forgotten to put on the other one.

'I didn't forget,' he said. 'I can't get that shoe on, my foot is too swollen and painful.'

This gave me the opportunity. 'Brain damage, foot damage – I don't care, you're not driving!'

Nelson was upset with me and so were many other people, but the local medical team and their neurosurgeon Dr Servadei supported me and common sense prevailed. Some of the Italian newspapers said that as a Brit I'd deliberately kept him out so that Mansell could get a one-race advantage over his team mate.

I have only seen Nelson once since he retired from Formula One in 1991 and after he had his huge accident at Indy in 1992. I ran into him in the pits at Monaco in 1994, and he greeted me as usual by trying to rip open my fly!! Since I wrote this I have seen him again at Interlagos in 1995 – once again for starters he had a go at my fly.

Jacques Lafitte

Jacques Lafitte is another great favourite of mine. After our first introduction I thought him to be quiet and serious, until one morning I was driving to the circuit at Zandvoort and stopped at an intersection as the traffic light was red. The next moment I felt my rented car being propelled forward into the crossing traffic. Looking in the rear-view mirror, I saw the driver behind me was Lafitte. He had gently engaged his car bumper-to-bumper with mine so skilfully that I had not felt it. Much to his joy (and with appropriate gestures to prove it) he had the upper hand. I was also terribly pleased with him one day when we were both waiting to check in at a hotel in Montreal. The receptionist was insolently feigning both central

blindness and central deafness, as they tend to do at that hotel until Jacques, becoming impatient, suddenly sprang over the counter and on to the floor alongside the man, grabbing him by the throat. We received very prompt attention thereafter.

I was very sorry when Lafitte's Formula One career ended in 1986 after a freak accident at the start of the British Grand Prix at Brands Hatch. His car was knocked onto a driving line that made impact with a wall inevitable. He was pretty well trapped in the car, and we had to spread the cockpit both ways to get him out, and also to jack the car up from underneath to deliver his fractured legs without further injury. After initial treatment in St Mary's Hospital, Sidcup, near London, he went off to Paris a few days later and made a good recovery after a long convalescence.

Last year in Spain he was driving in the Porsche series race and I was chatting to him in the paddock along with Jochen Mass and Jean-Pierre Jarier, and for a few minutes it was like the old times with a great deal of fun and banter going on – an ambience which is progressively disappearing in the new age.

Alain Prost

This remarkable driver is also remarkably singular in my experience – I have never had to go to him in an accident on the circuit! I have never hauled him out of a wreck – I thought perhaps on one occasion it might have been necessary at Rio when he hit the wall in practice, but he was out of the car like a shot and uninjured. I do not remember him ever, otherwise, having a big accident. He had mild concussion in practice in Watkins Glen in 1980 and did not start, and earlier that year hurt his wrist at Kyalami in practice and again did not start. After those two mild injuries his learning curve to avoid hurting himself was very steep. Jackie Stewart used to say he had never drawn any of his own blood in an accident in his whole racing career (nobody can get anything else either out of a Scot), but Prost is another superb example of intelligent self-preservation.

I have never known him well, but have always respected him. He has always been sociable and polite in my dealings with him. I rated him as the cleverest driver in the era of my stewardship, inheriting this award from Niki Lauda. When Alain returned to Formula One in 1993 and won the World Championship it was as if he had never been away.

He does possess a penetrating sense of humour. At the end of one briefing in Mexico, when Nigel Mansell had let the world know that he was suffering seriously from uncontrollable diarrhoea and needed to interrupt practice several times on this account, Prost drily asked Roland Bruynseraede, 'If Nigel has to come in during the race will you show a brown flag?'

Gerhard Berger

I have great respect for this fine man. My first close contact with him was in Detroit in June 1985. While driving in practice sessions for the Arrows he suffered a seat-belt injury to his chest wall, and the specialists at the Detroit Receiving Hospital proposed some complex angiography just in case he had internal vascular injury. This seemed highly unlikely to both him and me, so he politely declined invasive investigation which would have put him out of contention. He had only just recovered from a broken neck sustained in a road car accident at the end of 1984, but once we knew his neck X-rays at Detroit were OK he was able to drive in the race and came in eleventh.

The Tamburello incident in 1989 when Berger went straight off was an epic; three laps into the race the red flag came out. Mario Casoni was driving me and we were soon at the accident (twenty-seven seconds after the flag was shown). The firemen had just put the fire out, Gerhard was unconscious and still in the car. The scene was looking very threatening, for the grass around the Ferrari was soaked in fuel which was still pumping out of the car in volcanic waves. The fire marshals and I picked him up and carried him up the circuit to a safe place. I opened his visor and got an airway into his mouth. His helmet strap was very tight and we had a bit of trouble getting under it. He started to come round at this point and began to struggle. I had visions of him escaping from his rescuers and, thinking himself pursued, fleeing up the circuit like a scene from *Monty Python*, so I sat on his chest and straddled him. We had a fire marshal on each limb so he couldn't strike back and Dr Frederico Baccarini got an IV drip up. Gradually his consciousness cleared, he recognized me and, immediately, became tractable and composed. His hands were burned so I cut his gloves off with scissors. The pattern of the burns fitted the configuration of the leather on his gloves where it had been included in the seaming without a Nomex layer! His uniform was soaked in fuel so we cut the legs, arms and

torso of it open. By then we had an ambulance, so he was lifted on to a stretcher and we went off to the medical centre.

There was a huge crowd around the centre when we got there, but the ambulance and my car drove straight through the opened gate of the security fence, and we were not molested. Gerhard was in good condition now, but was pink all over from the chemical action of the fuel on his skin. The rest of his uniform was removed, and he was washed down with bottles of sterile saline to decontaminate him of the fuel. His burnt hands were not too bad and were dressed simply.

Nigel arrived at the medical centre anxious to know what had happened. I told him Berger was OK and he went to see him. I went back to my car and Mario Casoni. Nigel was very brave to take the restart.

Once we were back out on the circuit I began to get a hot feeling from the waist down and realized that my uniform had picked up fuel from Gerhard's when we carried him and while I was sitting on him. The fuel was now having a go at my legs and all my delicate parts. But there was no respite as the race was about to restart, and I found out what it is like for a race driver to sit in fuel for one and a half hours.

Berger went off in the helicopter to the Maggiore Hospital and was intact. Later I heard he had fractured a rib, so the next time I saw him in the pit lane at Monaco I apologized in case I was the guilty party when I jumped across his chest.

I got to know Gerhard better during his years at McLaren with Senna as his partner. They were inveterate practical jokers and perpetrated all sorts of torture on each other and on Ron Dennis, Head of McLaren. Senna had a carbon fibre briefcase; Berger tested its indestructibility by dropping it from the helicopter they were travelling in. Ayrton responded by pinching Berger's credit cards and getting them drilled and bolted together with a massive nut and bolt! On another occasion at a small hotel near Spa where I was staying with my family, Ayrton joined us for dinner, but arrived late owing to some difficulty with his footwear; Gerhard had filled all of his shoes with butter.

In 1993 Berger returned to Ferrari and at Interlagos I attended him for two big accidents, one in practice and the other at the first corner at the start of the race when Michael Andretti took him off. Alex Ribeiro was driving, and we stopped at the scene, having witnessed the fracas as it happened. Michael was quick out of his car, but Gerhard looked a bit stunned. Andretti

and I got him out, and I bundled both of them into the back of my car. We took off to complete our following lap with the two heroes crammed in the rear with the anaesthetist. Michael actually sat on Berger's head by accident as they tumbled in, and we were down the long straight before they were composed enough to have a discussion as to whose fault it was. Alex took a short cut towards the end of the lap as we had lost some time at the shunt. We nipped into the pit lane and dropped them off before we resumed our station at the pit exit.

In the last year since the inception of the Expert Advisory Group on safety in Grand Prix racing, Gerhard and I have worked closely together. He has been a tremendous help in the group, sensible and constructive, he has made a big contribution to the development work, and his zany sense of humour has lightened and enlightened our meetings.

Nigel Mansell

This intrepid pilot is a man who is in many ways an enigma – brave beyond belief in the car, dauntless and fiery on the track, but at times behaving like a naughty lad whingeing and whining unnecessarily when the moments of victory and triumph call for a more composed public performance.

His achievement as Formula One World Champion in 1992 and Indy-Cart Champion in 1993 will not be equalled for a long time to come, if ever. When he came back to Formula One in 1994 at Magny Cours I thought he was not going to recapture his former glory. But his drive at Suzuka in the wet, contesting every lap with Jean Alesi was superb, and his performance and victory at Adelaide put him right back at the top.

I have gone to Nigel's assistance on many occasions. His tendency to flake out at the end of a race was captivating, and I recall his collapses at Spa, Detroit, Paul Ricard, Mexico and Dallas with tolerant amusement. He was usually attended by his personal physician Dr Rafael Grazales Robles, so I was always one level removed from getting too involved in these manifestations. But he has caused me a great deal of worry in a whole variety of other circumstances during practice and in the races.

His first adventure in Formula One in 1980 was in a Lotus at Austria when he sat with his rear end in fuel for a very long time. Having suffered myself to a small degree after Berger's accident at Imola, I now have more sympathy with this particular plight. When he was driving for Williams at Paul Ricard in 1985 he got concussed in practice, and spent the night in the

hospital at Marseilles missing the race the following day. I remember the great mass of journalists outside the medical centre at the circuit which gave testimony to his ability to attract a wide and faithful following everywhere in the world. By the time he went off in the helicopter he was well enough bravely to return good wishes to all and sundry.

On another occasion at Spa in 1990 as we shot towards La Source at the start of the race, I saw Nigel slumped in his car with its nose at an angle into the wall. My driver Michel Gilsoul, braked hard as we went round the La Source corner and stopped a bit further down the hill. I ran back up the hill to Nigel on the circuit. There were several cars scattered about and the red flag was out. Suddenly I heard a crack like a rifle shot and was seized with pain in my calf – I had ruptured a tendon above my ankle. Now limping, I made it round the corner. Nigel was still slumped in the car with his head on his hands and resting on the driving wheel. I thought he must be unconscious, but on tapping him on the helmet he raised his head and looked at me. I said, ‘What’s wrong, Nigel?’ He replied, ‘Nothing,’ so I turned and limped back to the car, muttering imprecations about his mental powers and parenthood. We took the next start and again there was a shunt at the top of Eau Rouge. There was a little delay for the third start, so Michel whipped me round to the medical centre to get my leg strapped up. Despite all the accidents, I was the only casualty.

The best fun with Nigel was in Adelaide in 1991. It was a wet weekend and during practice the red flag came out. It was raining hard and Frank Gardner took me round the circuit to find the accident. There was Nigel parked against the wall on the right of the Brabham straight. He was sitting in the car with his helmet on and had been doing so for several minutes. Frank got me there so quickly my cigar was still alight and I just remembered to quench it into the rain before I got to Nigel. He looked up and grinned and seemed OK. I asked why he hadn’t got out of the car. He grinned more and replied, ‘It’s dangerous to get out here.’ I then asked why he hadn’t taken his helmet off if he was unhurt. With an even more wicked grin and with his unmistakable Birmingham accent he answered, ‘It’s rhining!’

When I received the Labatt’s Award for Safety from the Duke of Kent in 1992, Nigel could not come to the ceremony so he sent his apologies and a short video congratulating me on the award, and recalling with relish the above incident. I thought it was very nice of him to go to this trouble, and

was touched. Ayrton came to the ceremony, but turned up tieless and coatless and had to borrow spares of these items from Jackie Stewart who was fortunately equipped with spares as he was staying at the hotel. Jackie had been the only previous recipient of the award. We had left my hospital late for the ceremony which was at the Grosvenor Hotel, and as we went round the Victoria Memorial on the way I spotted the Duke of Kent's limousine in front of us in the Mall. I instructed our driver to beat him to the Grosvenor to avoid creating a breach of Royal protocol. We managed to get alongside the Duke going up Park Lane and took him on the U-loop above the Grosvenor, where the turning is to return down Park Lane. Accelerating down Park Lane we won the race with a few seconds to spare.

Nigel is a man who occasionally leads a cause. Arriving in Rio at the Intercontinental Hotel very early on a Thursday morning, I was surprised to see a deputation of drivers waiting to see me. The leading trio were Nigel, Alain Prost and Martin Brundle – the cause of their mental turmoil was that the Aids epidemic was sweeping the world and they had heard you could get it from a blood transfusion. Nigel and Alain asked me to guarantee that no driver would get contaminated blood. We were using the Armed Forces Hospital at Rio, as back-up if necessary, and in fact I already had assurances that the blood bank there was Aids tested and negative. Nevertheless, I was unable to resist replying, 'Aids negative blood is expensive and hard to get and I would not want to waste it by giving it to an Aids positive person.' They looked non-plussed so I went on, 'However, I will guarantee that if you are Aids negative I will get negative blood for you on an individual basis. Anybody who is interested should come to the medical centre this afternoon and I'll get your Aids tests done.' Nobody showed and I heard no more save for Mrs Brundle who, sitting next to me at dinner, said in a rather hurt fashion, 'I hear you think Martin might have Aids.' I said hurriedly (and falsely), 'Well, now the mosquitoes are carrying it anybody could!'

In 1993 Mansell, who had promised earlier to give me an autographed helmet to auction for charity, provided a winning helmet from his Indy-Cart Championship success. He presented it to me at Donnington when he came to participate in the saloon car race in October 1993. Fittingly it was auctioned for Research into Dementia.

Keke Rosberg

Keke Rosberg was an unusual man in the era of Eighties' Grand Prix racing. He was very much an individualist and during his stint was the fittest man around. For a Scandinavian used to a less than temperate climate he could sustain heat terribly well, hence his performances in Dallas in 1984 and at Rio in 1983 where on the podium he looked as cool as a cucumber while Piquet, the winner, was pooping out and had to be resuscitated. He stayed fit despite smoking, and shared this habit with a few other drivers – James Hunt, for example, and Niki Lauda who liked the odd long thin panatella in the Brabham motor home van in the late Seventies.

Keke was spectacular in the car and, like Prost, I never had to rescue him off the circuit. I will always remember the most remarkable feat he produced at Silverstone in 1985 when he lapped in qualifying practice at 160 m.p.h., the first time this was achieved, and on a circuit that was still drying from the heavy rain earlier in the day.

A couple of years ago a group of us went to dinner with him in Estoril. Ron Dennis took four of us in his car but on the way back there were six of us crammed in; Keke in high spirits was in the back. We stopped at a traffic light a few hundred yards from our hotel. Rosberg leaned over, grasped the ignition key, switched the car off and departed at a run with the key in his hand. When we got to the hotel, leaving the abandoned car obstructing a major intersection, we found Rosberg about to depart to his hotel in a rented car; he had left the key at reception unknown to us. Before he could escape I got the passenger door open and threatened to spring it if he drove off. He got out to deal with me and Ron nipped in, opened the engine compartment and expertly removed the electrics. Leaving Rosberg in fits of laughter, we retrieved our car key and Ron and I trudged back to the car to collect it. On returning we were just in time to see Keke attempting to leave for the second time, on this occasion in Mika Häkkinen's rented car. Ron just managed to give it a mild shunt up the rear with our front bumpers before he got away.

Overall, I would classify Keke Rosberg as an extremely robust person, physically and psychologically. Clearly his mechanics thought the same when they placed in the cockpit of his car a notice saying, 'Keke, treat it like a virgin, please.'



CHAPTER THIRTEEN

FRANK WILLIAMS' FOLLY

I'd been addicted to Porsches for some years and had possessed the range from 911, 912, 924 and now I fancied a 928. In a blissful state of mind I was out testing it early one Saturday evening in March 1986 when Bernie started looking for me. Once I surfaced I rang him back to hear that Frank Williams had suffered a neck injury in a road accident not far from Le Castellet in France. I gathered a few vital bits of gear together, and while I did so Nelson Piquet came on the phone. He explained that Frank had broken his neck and was at a hospital in Toulon. I spoke to the surgeon there, and it was agreed he would be transferred to Marseilles to the Hospital Timone where there was an excellent neurosurgical unit.

Meanwhile Bernie had been busy and there was a Citation jet waiting for me at Biggin Hill. I shot over there and was soon on the way to Marseilles. There was only one pilot up at the front, and me down towards the back of the aircraft, so it was a curious flight, but as there weren't any non-smokers to complain, I was able to enjoy a cigar without harassment.

We landed out in the bush part of the airport at Marseilles and it took some time to find Nelson who was picking me up. Eventually we connected and left in a big Mercedes. Nelson went like the clappers down the motorway towards town and nearly missed the exit. Any normal person would have had to go straight on but Piquet, seeing the far edge of the exit kerb at the last moment, flicked the big car into the correct line exclaiming, 'Shit, I nearly missed it!'

The hospital was pretty quiet when we arrived and Nigel Mansell, his manager, Peter Windsor, Nelson and myself had a brief chat about the accident. It appeared that the rented car Frank was in had rolled down a gully and the roof had caved in on his head. Peter Windsor, who had been on hand, managed to get him out. Frank was already in the operating theatre, so I changed my clothes and went in. I introduced myself to the operating neurosurgeon, Dr Vincentelli, who was expecting me and was very welcoming. I had a look at the X-rays and saw what I had feared the most – there was complete discolation at C6–C7 (the sixth cervical vertebra on the seventh) with gross reduction of the diameter of the spinal canal. It seemed highly likely that the spinal cord had been irretrievably damaged and one could only hope for the best. Dr Vincentelli and his team were performing a posterior open reduction of the fracture (an approach to the spinal column from the back of the neck), and this was soon accomplished. It was then necessary to rotate the patient, and from the front provide stability to the fracture with a bone graft and metal plate. At the end of the operation I suggested to Dr Vincentelli that we should get a CT brain scan as Frank was a bit slow waking up from the anaesthetic. This was done and showed no intracranial problem or brain injury.

We were back in the Intensive Care Unit when Frank opened his eyes and recognized me. He seemed pleased to see me and smiled. When he was able to speak a few words he said, ‘Hello, Prof. Thanks for coming to help.’ Vincentelli and I hit it off very well and we went to his office for a chat, where upon he kindly invited me to stay with him at his apartment. There was not much of the night left by then, and I was grateful for the offer of a few hours’ sleep. Before leaving we had another look at Frank. It was clear he was paralysed from the shoulders down but he was breathing well on his own and the vital signs were steady.

Vincentelli lived down on the harbourside and when we got there I rang Bernie and told him the bad news. Bernie said he’d instructed the Citation to stay at Marseilles so I could use it when I wanted to get back. Frank was OK through the night and next morning appeared remarkably cheerful, but neurologically unchanged. After checking Frank’s condition Vincentelli showed me round the harbour and we had some lunch. Once back at the hospital I saw Peter Windsor, Nelson and Nigel, and by now Mrs Williams had arrived. Giving bad news to the relatives of a patient has always been tough, even for cynical neurosurgeons. My old chief, Joe Pennybacker, who

trained me at the Radcliffe Infirmary, Oxford, said after he retired that the best bit about retirement was, 'There was no more bad news.'

It was a difficult interview with Mrs Williams, for it is very hard to explain the complexity of spinal cord injury, and forecasting the outcome is difficult because it is frequently so bad. I was not able to give her much hope of recovery of function, for it was now twenty-four hours since the accident, and the chances recede very rapidly if there is no improvement by then. In addition, with so high a level of paralysis, threat to life from chest complications or further deterioration in the spinal cord from swelling or bleeding in the cord itself is a serious hazard. Naturally steroids, which help to some degree in controlling swelling, had been given to Frank and all the usual measures to try to prevent further damage or chest problems were in place. Mrs Williams was very upset but sensible and courageous, and all of us were very cut up about it. Nigel was really upset and melancholic, and unusually Nelson was as serious as a church warden.

We agreed to transfer Frank as soon as it was safe to the London Hospital and I would ask one of my consultant anaesthetist colleagues to come over for the transfer. I was happy to leave Frank in Vincentelli's capable hands and was confident that Frank was as safe as he could be. Nelson and I then left for the airport late Sunday afternoon to pick up the Citation. Nelson wanted to come back to London, and once on board sat up front in the right hand co-pilot's seat. I sat at the back, but now had two pilots to come home with.

On Monday Paul Yate, one of the most accomplished young anaesthetists we had at the London Hospital, agreed to go to Marseilles and flew out on the same day. We were very worried that Frank would get a chest infection, and I was anxious that if this happened he should not have a formal tracheotomy because of the risks involved. I did not want Frank to have to be ventilated with a machine at any stage, because sometimes, once this happens, it is not possible ever to wean the patient off the ventilator. I stayed in close contact with Paul and Vincentelli and by the Wednesday Frank was still stable but starting to get into trouble. We agreed to ship him home on Thursday morning and bring him to the Intensive Care Unit at the London Hospital. All went well with the transfer, though that night we struggled a bit with his chest. I saw Peter Windsor and Mrs Williams that evening and took them over to the hospital pub known as 'The Grave' (The Grave Maurice) for a drink to try to cheer them up a bit.

Next morning it was clear we had to do something for Frank's chest so I got Johnny Weaver, our cardio-thoracic surgeon, to see him. We agreed that a procedure known as a mini-tracheotomy should be performed which, unlike tracheotomy, preserves the capability of the patient to speak, and can control the chest infection by allowing suction of the secretions from the lungs and bronchi. This worked very well and obviated any need for mechanical ventilation.

Frank was a wonderful and remarkably uncomplaining patient – he was suffering a good deal of pain and tingling in his shoulder and neck, but we could not sedate him too much because of the risk to his spontaneous breathing. He remained as polite as I always had found him to be in the past. I do not believe he ever omitted to say 'Please' or 'Thank You' for anything he needed to be done or had been done for him. He was tough and resolute and never once whinged about what had happened to him.

We had a few crises, one of which he pretends never to have forgiven me for. The weekend after Frank came to us his level of the loss of sensation suddenly rose to include the lower part of his face. This was a clear indication that swelling of the cord or bleeding into the cord had reached a higher level and might now incriminate his spontaneous breathing. If the swollen cord was being compressed within the spinal canal it might have necessitated cervical laminectomy, an operation to remove the bony posterior wall of the cervical canal to relieve the pressure.

To decide about this I had to do a myelogram to visualize the size and shape of the spinal cord where it reaches the brain stem. The procedure consists of putting a long spinal needle into the fluid around the spinal cord, injecting a positive contrast dye and taking X-rays to show the cord. I told Frank I had to do this, and it had to be done under local anaesthetic, to avoid the risk of a general anaesthetic for him. At the level of the puncture into the canal just below the right ear I could not use a lot of local anaesthetic in case the anaesthetic fluid ran into the spinal canal and stopped Frank's breathing. It was painful, therefore, but we got the pictures, which showed the cord to be swollen but not requiring surgical decompression. We just had to wait through this period while the swelling receded and, of course, the steroids and fluid control were already trying to limit water-logging in the cord. Frank still tells me that he thought I was a 'cruel bastard', but I still think that's better than being a negligent shit – and he agrees.

As time went on Frank's general state improved, and his fractured neck was healing well, so we were able to start mobilizing him. Ginny Williams and Peter Windsor were a tremendous support, and Peter was there so much he became the idol of the ITU, and a lot of famous personalities visited Frank, so the ITU nurses enjoyed seeing Jackie Stewart, Sebastian Coe and other celebrities. The Williams team handled the press relations so I was not concerned or troubled by this. Piquet and Mansell stayed in touch with the situation and Senna rang up regularly, though he had never driven for Frank. Bernie and Ron Dennis were super throughout the whole ordeal, helping enormously.

Eventually we were able to plan for Frank to go home and then to rehabilitation. It was arranged to convert part of his house into a mini-ITU and that some of our nurses from the London would look after Frank to begin with. Pat McCann, our head nurse in ITU, took a great deal of trouble organizing the equipment and the routine for Frank when he went. Brian Simpson, my neurosurgical colleague who was responsible for saving Frank's life in one of the early crises we had, took on the task of going down to see Frank at home.

I asked Brian Gardner, a Spinal Injuries Consultant from the Stoke Mandeville Unit, to take over Frank's rehabilitation and this was ultimately organized at the Paddocks Hospital and Spinal Unit at Princes Risborough. I went to see Frank there and found him to be in good general shape, and once again the hit of the Unit.

I did not see him again until he resumed travelling to the Grand Prix circuits where he has managed remarkably and has a rigid discipline. Before his accident he was always highly motivated with regard to physical fitness and kept himself in excellent shape. He continues to follow a strict physiotherapy regime, controlling his standing blood pressure, diet and the like. We have never become close or intimate friends, but I respect him greatly, and admire his fortitude and good manners.

Some eight years after his accident I was leaving the Montreal pits when one of the Williams crew caught me as I started on the boardwalk across the lagoon behind the pit lane. He asked me to come and see Frank. I thought it was probably a medical need, for over the years I'd sorted out the odd problem for him. However, when I got in the pit Frank said unexpectedly, 'I've never thanked you, Prof, for saving my life all those years ago but I'd

like to do so now.' I was surprised by this and replied, inadequately, 'That's OK, Frank.'

OceanofPDF.com



CHAPTER FOURTEEN

CIRCUITS I LIKE, AND FEAR

Two of the commonest questions I am asked are: Which is the safest circuit, and which circuit do you like best? The answer is that there is not a single safe one, and I fear them all. No doubt Bernie would say, ‘They’re all safe till the cars go on them.’

My Favourite Circuits

Hockenheim

I feel most uncomfortable where there are bad memories, and as I ride round a circuit I always remember the places where accidents occurred. I never pass around Hockenheim without thinking of Patrick Depailler at the curve where he lost his life in unofficial testing in 1980, or of Pironi where we struggled in the pouring rain to take him out of his wrecked Ferrari in 1982. Yet I like to be at Hockenheim, and am confident and relaxed with the knowledge that the ONS are there, and the medical centre and referring hospitals are first rate. But the long straights on a rainy or misty day as the high forest traps the spray are forbidding. When you enter the Motodrom with its amphitheatre-like atmosphere, the gloom lightens, but the configuration of the stadium when filled with spectators reminds me of Roman times and gladiatorial sacrifice.

Interlagos

Both the old and new circuits of Interlagos are wonderful rides if the car provided is decent, and the driver is up to handling the situation. If he is not, it is a hair-raising experience. On one such occasion in 1992 during the last few minutes of closing practice, Mansell, already on pole, was trying a quick one to get past Senna: he lost it and went off in the barrier. We got the call to go, and joined the remaining twenty-seven cars all trying to improve their positions. As we got to the bottom of the long straight after the pit exit, a Brabham appeared flat out and totally committed from behind and came hurtling towards our rear. We got off the line and hit the kerb as the Formula One car shaved past us with only centimetres to spare. I didn't know it at the time, but Mansell had got out of his car immediately after the crash and was safe behind the Armco, looking wonderfully unsteady and worn out, though uninjured. Our lives had clearly been at greater risk than his, but on rescuing him I put him in my car without comment and we waited a few minutes till practice ended to take him to the medical centre. He recovered in a couple of hours, and next morning made amends by turning up at the centre with T-shirts for the nurses, signed autographs, posed for photos and charmed all the girls.

Leaving this experience aside, I like Interlagos because Wilson Fittipaldi who also used to drive me at Jacarepagua, regularly drove me there and, in recent years, Alex Ribeiro has been my driver. Wilson was great fun. One Saturday afternoon after Formula One practice, he was asked to follow a saloon car race and do exactly what he would do when following the first lap of the Grand Prix the next day. He asked me if I wanted to come along, but I had something else to do and had to leave him to perform alone in our Mercedes 500. I think his sense of humour got the better of him for at the first bend he was lying sixteenth among about thirty saloon cars and at the end of the first lap he was lying first! He was admonished, but remained unrepentant, saying he was doing exactly as he had been told – to go as he would after the Formula One cars.

Alex is more serious, but a superb driver. His quiet and unassuming manner fits well with his deep religious beliefs. He has written a text about life being like a Formula One race, which is very moving. He promised me a copy – so far I haven't got it. But if anybody could convert me to Christianity, he would be the one.²

There is always a great deal of music from the stands at the Brazilian races and a very festive atmosphere both at Interlagos and Jacarepagua. At

Interlagos at the bottom of the long straight there is a large stand where the fans are particularly lively. When Senna and Balestre were not the best of friends, Balestre came to Brazil and as I was going round the circuit with Wilson the crowd mistook me for the President. They gave me what they considered the appropriate treatments with fingers, catcalls and shouted messages. When I politely requested a translation I learned that I was being hailed with a spectrum of accusations from adulterer, homosexual, pederast, to being a practitioner of incest and worse. This has become a ritual, and though the crowd know that Wilson or Alex is driving me around, a wonderful performance ensues, causing my distinguished driver and accompanying anaesthetist to collapse with mirth.

Jacarepagua was similarly light-hearted. Once we had completed the first lap of a race there I turned to find my medical colleague, Dr Andréa, grovelling in the unfinished sticky trim of the floor of our chase car. He told me he had lost his dentures during the lap. Finding them on the floor, now covered with tarry black adhesive, he opened his visor and with an embarrassed grin popped them back in. I have never understood how they managed to get out of a full-face crash helmet – but wonders never cease.

Once during practice there Bruno Giacomelli's car caught fire and, seeing my car with attendant fireman, he wisely drove to our spot. I helped Bruno out but we discovered the fireman had fled, leaving his extinguisher on the ground. Bruno picked it up and put his own fire out – together we agreed that it clearly was do-it-yourself week.

Spa Francorchamps

At the moment, part of the circuit is composed of ordinary country roads, so it is the last classical road circuit apart from street races such as Monaco and Adelaide. It is situated in beautiful countryside and with its long sweeping curves it is an exhilarating drive in a quick car. Michel Gilsoul drives me there, and we have been to a lot of accidents together. Our car sits on the inside of La Source, and we have a good view down to Eau Rouge and of the climb up on the opposite side. There is always a lot of controversy about the best configuration for the track for this dangerous section, and the matter will not be resolved till the circuit becomes dedicated and no longer uses public roads. It is wonderful in the dry, but terrifying in the wet, particularly if the car does not have much grip. Because the circuit is so long we have to go pretty hard during our first lap

to get back in time, even with a light car (i.e. without much heavy equipment).

Gary Hartstein, an American specialist now practising in Liège, has been my steady anaesthetic colleague there for some years. He has a penchant for Havana cigars, a pungent, dry sense of humour and is excellent at his job. The Belgian rescue teams and doctors are well trained and over the years we have dealt with some huge crashes, particularly at Eau Rouge. Palmer and Streiff destroyed each other's Tyrrells, thereby eliminating the whole team, on the second lap of the race in 1987 and we hauled them off to the medical centre, both unhurt. In 1992 Berger and Martini during practice in the wet, and Badoer in the Formula 3000 race had big accidents there. When I ran across the gravel to Berger he was terribly pale but otherwise appeared intact. He said, 'Don't hurry, Professor, I'm OK.' We took him to the medical centre and later he was lying on a cot watching television coverage of the practice when Martini had the same accident. We duly took Martini to be checked over at the centre and as we got him in, Gerhard looked at him, grinned, and said, 'Snap!'

Kyalami

Having served in the Army in West Africa, which I loved, I always like the romantic notion of returning to the great continent, although I must hurriedly state that West Africa in 1954 was much more the real jungle than South Africa in the Eighties or Nineties. Nevertheless, it is lovely countryside and the circuit is beautifully situated. Facilities are excellent though the new circuit is not as much fun as the old one that Reutemann drove me on in 1985.

My old friend, John Pringle, has been the Chief Medical Officer there, and has the first prize for the best legs in medical motor racing. He is so proud of them that he always wears shorts, and down the external side of his right stocking he tucks a comb, which he really doesn't need as his hair is quite scanty. He is a farmer as well as an anaesthetist, and likes a few beers when he's farming. He's a good man in a crisis, and together we sorted out Marc Surer in 1980 when he broke both legs, and again in 1982 when he did the same trick. Prost had one of his few accidents there in 1980 and hurt his wrist, and Ghinzani had a nasty fright and got a bit burnt in 1984. One of the funny sights we witnessed one year was Carlos Reutemann, having got entangled with the catch fencing wire in an accident

during practice, trussed up like a chicken when we got to him and looking the most miserable I've ever seen him – and that is saying something.

Suzuka

I like Suzuka because of the immense politeness of the Japanese officials and doctors. I have some good friends in Japan, and see Dr Tsuneo Sakai and Professor Kenichi Uemura at Hamamatsu University whenever I am there. Professor Uemura trained with my unit when I was Professor at Syracuse in the States in the Sixties, and he is now a very eminent surgeon.

I think it was the first year we went there in 1987 that Mansell had his accident and hurt his back. He was yelling with pain like a stuck pig when I got to him, and later it was easy to locate him in the hospital when I went to see him. Characteristically English moans led me inevitably and accurately to his room, once I found the correct floor.

Schumacher had a huge accident on the Saturday of the first year he drove Formula One at Suzuka in 1991. As my driver Osamu Hatagawa and I arrived to pick him up there were a lot of small bits of car all over the circuit on the curve coming into the pit straight chicane. He looked a bit pale and not quite as chirpy as usual, having ricked his neck. But his potential was undoubted, and I told him that if he survived he would undoubtedly be World Champion one day. He looked a bit paler and more uncomfortable after that, but the next day was back in form and fit to race.

In 1994 and 1995 he won the World Championship. The celebrations after the race in 1995 were such that in the end Schumacher was paler than he had been after the accident of 1991 – due to a monumental hangover.

Barcelona

I like both the beauty of the city and the beauty of the circuit. The views as one drives round it are lovely. The facilities at the circuit are very good and Professor Nalda and his team are polite and efficient. The atmosphere there in 1994 was a bit fraught and got worse after the Montermini accident during the final minutes of a practice session, when his Simtek crashed into a wall protected only by a single row of tyres. Following the tragedies of Imola and Karl Wendlinger's accident during practice for the Monaco Grand Prix just two weeks earlier, there was a great deal of speculation about what the new Expert Advisory Group on safety would recommend – so much so that I issued a press release to state that no decisions would be

made until sufficient research and development into safety aspects had occurred for them to be valid, and that it would take a considerable time to achieve this.

I've only had one exciting incident there, which happened when we were going to a red flag incident. Senna had blown his engine and left a nice patch of oil on the line. The medical car hit it and spun so much that Nigel Roebuck reported it in *Autosport* – it had been the most exciting happening of the practice.

Adelaide

Everybody likes Adelaide because it's the end of term, there's usually nice weather, the street circuit and facilities are quite remarkable for a temporary structure, and the Aussies are so charmingly quaint. The first year I was there in 1985 one of the marshals showed me an ordinance in the written material about behaviour and protocol in the pits, forbidding the drinking of Coke from cans and the use of bad language. I wasn't sure if he was complaining about me but, having spotted Bernie a little way down the pit lane, I suggested the marshal inform Mr Ecclestone and pointed him out. The poor innocent did, and I would like to have heard – though I can imagine – the reply. The marshal disappeared pretty quickly.

Frank Gardner drives me at Adelaide, and he is a wizard in a car – in the wet or dry. He is also an astute judge of mankind, machinery and motivation, a delight to be with and his droll comments are unique. We were listening on the radio to the commentary during practice one Saturday afternoon, the topic of discussion being the slippery condition of the circuit because nobody had gone faster than the qualifying times the day before. Then Senna came out and Frank chortled, 'Watch – the circuit is suddenly going to get unslippy now Senna is on it.' He was right. Ayrton was quicker than on the day before. During the lull in practice Frank is always ready with a fund of funny stories, most of them hypothetical and told in a dead-pan way – many of them are unrepeatable in polite company.

In the pouring rain of the famous deluge of 1989 Frank settled himself comfortably at the start and, going through his usual pre-race relaxing and balancing routine, stated, 'You've only got yourself to beat on a day like this.' In 1990 as we went blind round the first chicane we saw Nakajima spinning in front of us. Frank remarked, 'Shall I take him at the front or the rear?' He then added, 'I'll take the front, it's lighter!!' Fortunately Nakajima

had got into reverse and out of the way. One of Frank's most arduous tasks in recent years, which kept him sighing deeply at his extreme misfortune, was teaching Elle McPherson, the famous model, to drive quickly on the circuit for the Celebrity Race. I think she spun off. He has tremendous insight and self-critical objectivity. He claims to have originated the aphorism, 'When the flag drops the bullshit stops.' But I know it is true that he said (and I quote from Steve Small's wonderful *Grand Prix Who's Who*), when asked why he suddenly quit single seaters after four races in 1973, having won the F5000 Championship in 1971 and 1972, 'I drove like an old woman'. His results in those four races were a first and three seconds! Not bad for a granny!

Mexico City

I don't like Mexico City but I did like the people at the circuit there and the general atmosphere of the race. When we stayed at the Hotel Aristos, one of the great advantages was that one could go from the roof of the hotel by helicopter directly to the circuit. The Chief Medical Officer, Dr Francis Martinez Gallardo, and the Clerk of the Course, Roberto Arnstein – an immense heavily bearded and hearty person – were great fun, and the brothers José and Julio Abed, race promoters, entrepreneurs and owners of the Aristos hotel chain, most hospitable. I was also always blessed by being driven by an excellent pilot, Danielle Contrerez De Nava, who was very quick at getting me to the accidents.

Because of the altitude we had an interesting crusade by some of the drivers, again led by Nigel Mansell, who demanded to have oxygen available to breathe when they came in the pits. It was pretty useless to try to explain to them that the extra oxygen saturation of the blood achieved by so doing was so transient as to be useless. So I took another tack, and said that if examination showed any driver to be deficient in the oxygen carrying capacity of his blood I would agree to let them have oxygen in the pits. I then explained that to determine their own individual capacities a large needle would be placed in the groin to puncture the femoral artery to get an arterial sample of the blood. I pointed out that sometimes, although the puncture was not very painful, the artery leaked for a while, causing a painful lump in the groin which took a couple of weeks to subside. Interest by the drivers in undergoing such a procedure (like the Aids test) rapidly evaporated and the need to have oxygen evaporated as quickly.

We had two remarkably similar accidents at Mexico City at different times. In 1989 Alliot turned upside down after losing it at the big hairpin, and to everybody's relief slithered out unhurt from underneath the overturned car shell, like a snail leaving its discarded home. At that particular race I was accompanied by Professor Gérard Saillant, an eminent spinal and orthopaedic surgeon from Paris. This was at the request of Alain Prost and two other Parisian surgeons, Professor Letournel and Professor Roy-Camille, who were worried that the medical arrangements for Formula One racing in Mexico City left something to be desired. These worries had arisen following the tragic accident in unofficial practice in Jacarepagua, in which Philippe Streiff had broken his neck and been left tetraplegic.

The other similar accident was Senna in the gravel run-off in the same corner in 1987. He also emerged unhurt after he delivered himself from the upturned vehicle. Ayrton had another accident there the following year, when he injured his legs just below the knees. He was so convinced he'd broken his legs I cut open his overalls to demonstrate to him they were intact before we lifted him out of the car. He came out rather dishevelled with his Y-fronts fully exposed and didn't appreciate the humour of it till later.

Circuits I Fear

There is a schizophrenia that I develop about some circuits. I hate them for motor-racing purposes, and yet I like the place geographically or the people who are there. Generally the reasons for hating a circuit from the racing point of view boils down to two: either the configuration or nature of the circuit or the attitudes of the people there.

Monaco

Monaco epitomizes this duality, for I like the Principality as a place for a whole variety of reasons, but I feel that the race participants are trapped within an Armco prison of the barriers around the tarmac. The festival atmosphere of the town and the lively harbour, the marvellous boats, the romantic palace on the hill and the charm of the old town tend to produce a holiday mood. The entertainment for us there is unequalled, with invitations each night to sumptuous receptions and dinners, and lunch in the Auto Club

if one has the time to take it – a gustatory delight. Michel Boeri, the Director, and Madame Boeri host the events indefatigably and Madame Serena serenely oversees '*tout le monde*' to be sure all runs smoothly. Dr Robert Scarlot, now an old friend, is the Chief Medical Officer and has done stalwart work on the Rally Regulations for the FISA Medical Commission, of which he is a founder member. His organization is remarkable: as the access and space for intervention cars at the circuit is limited, he recruits one hundred doctors who are placed strategically at the marshal points to deal with any accident. But I hate the thought of dealing with a big accident in the confined space, and heave a sigh of relief if we all get through Ste Devote without a big shambles.

Driving with Jacky Ickx in the following car at Monaco was a great experience, for his precision in just missing Armco barriers or tyres is phenomenal. But it doesn't always work out exactly to his wishes. One year, pursuing the parade lap, even in the wet we got left behind a bit. Around the swimming pool section we had a spin and ended up at right angles to the required direction. The front of our Lamborghini was a matter of millimetres from the Armco. Mr Ickx was contrite. 'I'm very sorry, Professor.' He soon became embarrassed when I cheerfully told him that I was sure they'd captured this epic on worldwide television. He backed the car off and we shot around the hairpin just in time to see the green light and the Formula One cars departing.

I cannot state the exact number of starts I have followed in Formula One but, counting restarts, and the fact that I have so far attended 264 consecutive Grand Prix meetings, it must be around 300. On only one have we had a mechanical problem, and that was in 1993 when the Renault engine blew going up the hill into Casino Square. We managed to coast slowly down the hill past Leows Hotel and get off at the only place where there was some run-off area – at the entrance to the tunnel. We bundled out of the spent vehicle and commanded the intervention car that normally sits there just as the Formula One cars went past on their second lap.

Zeltweg

I like the place but the circuit is so fast that even the most hardened stomach tends to leave its attachment as the road sweeps up and down in those long, exciting curves, particularly the Bosch curve. Fortunately we have not had significant trouble there apart from deer, although one morning in 1980

Jochen Mass lost it and rolled, ending upside down with his roll-bar and top of his helmet gently (and fortunately) half buried in mud. I crawled under to have a word with him and he was OK but had some back pain. Once rescued and transferred for X-ray we knew he had crushed a vertebral body, but apart from the pain there was no danger to him. He did try to drive again the following day but was too uncomfortable so he withdrew.

Thinking about restarts, the Österreichring has the record for this. In 1987 it took three goes to get away, and the debris at the first two attempts was amazing. The funny side of these two fiascos was when Herbert Linge and I drew up behind the mayhem the first time, Balestre appeared from the control tower building shouting, with his arms thrown above his head. I could almost hear the '*Merde*' through my crash helmet. Nobody was hurt, and we started again forty minutes later. Then, to my utter astonishment, they did it again – I couldn't believe it! And once more Balestre appeared shouting, but the repeat performance was louder and the arms higher, '*Merde! Stupide.*' I imagine. The ONS cars retired to the country for a while as it was a nice afternoon, and on the inside of the Rindt curve the birds and butterflies were flitting about in the sunshine. It was an hour as we timed it before the third start got off. We were told there would be some cars coming from the pit lane as they had been repaired too late to get on the grid, but we didn't expect six as we passed the pit exit. Six Formula One cars and three ONS Porsches were now in contention for the first corner!! It was a tight squeeze and Herbert had to take a bit of avoiding action. We have not been back to Zeltweg since.

Dijon

Dijon was a place I never liked and where I always felt insecure. Despite the reassuring presence of Jean-Jacques Isserman, my anxiety was never quite assuaged. In 1979 when I first went there the medical centre was basically a tin hut. We returned in 1981 to find a new building in a much improved design, but to my horror the toilet facility put in as part of the upgrading was what is colloquially known as a 'ski-pad' – open to the supposedly clinical atmosphere. I always thought the general attitude at Dijon poor and, in fact, in 1979 in qualifying practice on Saturday afternoon it was necessary for one of the Formula One drivers to report that there had been an accident at the beginning of the pit straight and the car was entangled in the catch fencing. Robert Langford seized the red flag and

stopped the practice, for which he was heavily castigated. There was a big scene – nearly a brawl – involving Pavesi, Balestre, Langford and, ultimately, Bernie.

Still, there were lighter moments, and to follow the race in 1981 two Renault Alpine cars were provided with Jean-Pierre Jarier and Wilson Fittipaldi deputed to drive. These two highly skilled rogues immediately started racing each other, slipping and sliding, when we did a few trial laps, and were cautioned by the authorities. As we went round the circuit to get on the back of the grid just before the start, they were no better behaved – much to the delight of the crowd. We had two starts because more than halfway through it rained and the race was stopped, which gave them an opportunity to have more fun. In 1982 we returned to Dijon for the Swiss Grand Prix (Switzerland having banned motor racing from taking place within its borders), and Chico Serra drove me quickly but quietly. I have been glad not to go back.

Jerez

When I first went to Jerez the Chief Medical Officer was a charming and helpful orthopaedic surgeon, Dr Garcia. We struck an immediate chord for he had been trained by Spain's most famous orthopaedic surgeon, Professor Trueta, who made his reputation in the Spanish Civil War. By coincidence, when I trained in neurosurgery at Oxford I had under my tutelage a young Spanish surgeon, Dr Valderama, who married Trueta's daughter and became a well-known orthopaedic surgeon in Madrid.

The town of Jerez de la Frontera is good fun, and the circuit itself much improved over the years. However there had been a pervasive sense of apathy surrounding the circuit. It was also the site of the Donnelly accident in 1990. An air of disorganization and confusion began to dominate, so I was pretty pleased not to have to go back after 1990.

In 1994 the circuit configuration was changed to avoid the limited run-off at the place where Donnelly crashed. In addition, there was generally a great deal of improvement in attitudes and in co-operation. Jean-Jacques and David Cranston, Chief Medical Officer at Silverstone, were there, so the three of us presented a considerable force.

The highlight after the race in 1994 was the McLaren party to which Ron Dennis took me at the Mesón el Coto, a restaurant that boasted a mini bullring. When we arrived Ron disappeared, and Didier Coton provided me

with a marvellously large and excellent malt whisky. Ron, looking defiant, reappeared in the bullring in full matador's gear, together with Martin Brundle, Mika Häkkinen, Jo Ramirez, and Dave Ryan, stalwarts of the McLaren team, all geared up and accompanied by rousing matadorial music. The bull was let in (a mini-bull, but none the less fearsome), and there was great fun as the team mates tried to push each other out of the shelters into the ring when the bull charged. They were all very brave. Jo took the prize for best artistic footwork, and David for dauntlessness in outstaring the beast. Nobody got hurt in the first round. In the second round, I think somebody had slipped the bull a large malt whisky, for he was a bit unsteady, rather confused, and had to be pushed into the ring!

Monza

I don't think I need to elaborate much further on how I feel about Monza. It is *the* place I approach with resigned reluctance, it is my personal nightmare of the year, and it is with great relief that I suffer the traffic on the way to the bedlam of Linate Airport to leave on Sunday night.

There are two bright spots, however: the presence of the same CEA (Costruzione Estintori Automatica) firefighting teams that we have at Imola where they did such a fantastic job rescuing Berger in 1989 and who have also accompanied Formula One to Portugal and Spain, and secondly, the extraordinary lunch put on by the Firefighters' Association. An amazing spread of food and wine waits to reward us after qualifying practice each day. The host, Sr Giovanni Amadesi and his daughters Rosa and Carla, as principal hostesses, provide an elegant reception and friendliness beyond one's expectations. Monumental whole Parmesan cheeses await the diet unconscious – I know Parmesan is a bankable asset in Italy, but I have no compunction or hesitation in nibbling away chunks of this particular asset of the CEA whenever I can.

Zolder

When I wrote my outline I put Zolder on the list of circuits I hate, not for reasons of circuit configuration, speed or ambience, but because of Villeneuve's accident. In fact since Roland Bruynseraede became Clerk of the Course there I grew to like the place and all of the people there. I like Belgium because it makes the best chips and as a Scouser (Liverpudlian) scouse and chips were my staple diet during school and University days –

so the food, apart from the gourmet side, is OK. My dislike of Zolder really is because of Villeneuve and the fact that I had to relive the experience of intubating him so many times, thanks to telephoto lenses capturing every detail of our resuscitation and then endless television repeats thereafter.

Las Vegas

Leaving aside the racing, going to Las Vegas was fun not only because of Caesar's Palace but because of the personalities there. The circuit in the car park was extraordinary, though somewhat Mickey Mouse, but Phil Hill, who drove me, enjoyed it as did Tim Evans, who took over from Phil. In one of the supporting races when we went there the first year Phil and I became confused about whether we were on the warming up lap or the parade lap so we did a couple extra to make sure. The marshals were dressed like Roman gladiators and the marshalling flags were delivered by sky divers.

Walking into the medical centre, which was a temporary but very adequate pre-fabricated structure, I was hailed by a young man. 'Hey, Doctor Watkins.' He was Lonnie Hammergren, a former resident of mine from Syracuse, now a neurosurgeon in town. Lonnie had wanted to be the first doctor astronaut in the NASA space programme when he was training in neurosurgery, but I had not seen him in many years. I had once before met a neurosurgeon from Las Vegas at a neurosurgical conference in Tokyo and from this encounter I had concluded that eccentricity was the norm, for this particular guy wore a suit of forest green, fashioned in the Robin Hood style. But he had nothing on Lonnie, as I found out when he threw a party at his home to which Ernie Huppert, one of Bernie's business associates, and I went.

The party began in the drawing room with an organ recital on a full sized organ with Lonnie on the keys playing romantic music. There were a lot of birds and booze too. Then we had a conducted tour of the house which was a museum of Egyptological and archaeological items. The party then grouped on the balconies of the house which was U-shaped, with a pool between the two wings of the building. Across the pool at first floor level height was a tightrope with a small enclosure at each end. Lonnie disappeared and shortly thereafter, the sound of a revving motorbike shattered the evening, following which Lonnie appeared on the bike, riding the tightrope with panache. There was then a large thud as he and the bike

disappeared into the energy absorbing material which lined the inside of the other hut.

This was just for starters. It was followed by a supposedly occult exposure in the dark in the basement, with a voice intoning the history of the discovery of the tomb of Tutankhamen. Even I felt a bit eerie and some of the ladies were reduced to nervous giggles and stifled screams. At the climax a floodlight lit upon a pyramid standing in the middle of the floor and a hoist slowly hauled up the pyramid from the ground. The voice promised a full frontal of the mummy of Tutankhamen but instead there was a Messerschmitt three-wheeler car standing plumb in the centre.

The *pièce de résistance* was the garage containing the psychedelic Bentley purported to have come from the Beatles, Evil Knievel's motorbike, upon which he had unsuccessfully attempted to leap over the fountains at Caesar's Palace and a wonderful open Duesenberg. It turned out that Lonnie had resuscitated Evil Knievel when he crashed during the fountains attempt and Evil had donated the bike, and some lessons to teach Lonnie the motorbike tightrope trick. When Huppert and I decided to leave Lonnie tossed us the keys of the Duesenberg and Ernie competently drove us back to town. We asked Lonnie what to do with the car. He said stick it in the hotel garage and throw the keys into reception!

When he was training with me Lonnie had chided me for some of my comments, mannerisms and attitudes while opening someone's cranium in a bit of a hurry. Subsequently I assisted him with a similar case and after a little while I briefly stopped him operating and said, 'Lonnie, you remind me of somebody I know when you operate.' 'Jeez,' he replied. 'I sound like you!'



CHAPTER FIFTEEN

1983–1993 – THE ‘GOOD’ YEARS

After Imola in 1994 the media made much of the twelve years, 1982 to 1994, during which there were no deaths in Grand Prix racing. This claim is nearly right – but not quite. It was also generally asserted that because of this quiet period attention to safety had slipped, and standards declined in circuit security and in the stringent regulations affecting the cars. This claim is not valid.

Firstly, the loss of Elio de Angelis seems to have been totally forgotten. In May 1986 at Paul Ricard in unofficial testing he had a massive accident which turned his car over and involved a fire. Bernie phoned me immediately in London; Elio was taken to the hospital in Marseilles where Frank Williams had been a patient earlier that year. The neurosurgeon, again Dr Vincentelli, was in the hospital so I spoke to him by telephone immediately. The situation was hopeless and signs of fatal brain damage were already present when de Angelis arrived at the hospital.

In June 1986 Patrick Tambay suffered a concussion in a crash during warming up in Montreal. One month later, in July 1986, Jacques Lafitte had an accident at Brands Hatch, severely injuring his legs and pelvis and ending his Formula One career. So, in review, 1986 was a bad year for Formula One. In fact during each year in this decade there have been severe and spectacular accidents, but this is the inescapable nature of motor racing.

In 1981 and in 1983 there were no injuries I can recall – but in July of 1984 Martin Brundle broke his legs in Dallas. Two weeks later Johnny Cecotto had very severe leg injuries at Brands Hatch, which ended his

career in single seaters. Earlier that year, in April, Piercarlo Ghinzani crashed at Kyalami in the warm-up and received burns. In May, during the Monaco Grand Prix, Tambay fractured his leg in an accident at Ste Devote. So 1984 had its incidents, all of which could have been more serious.

We got off lightly in 1985 with minor injuries to Berger in Detroit, and Lauda at Spa where Niki hurt his wrist in practice and did not race.

Piquet provided a most spectacular accident at Imola's infamous Tamburello curve in 1987, the details of which are elsewhere, and could not race, lending some advantage to his team mate Mansell. Mansell reciprocated in Suzuka in November of the same year, so that with the resultant equity in loss of motor racing points Piquet triumphed in the end, taking the Championship.

In 1988 there was only a single injury – Modena suffered slight concussion at Detroit – but the next five years provided a series of spectacular accidents and injuries, of which Donnelly's in 1990 was the worst.

Philippe Streiff crashed at Rio in unofficial practice in 1989, injuring his neck and, unfortunately and tragically, developing spinal cord complications which left him tetraplegic. This was a terrible start to the year, and at Imola in May everyone thought the worst when Berger went straight off and into the wall at Tamburello, but he miraculously escaped serious injury.

In July 1989 Mauricio Gugelmin had a monumental escape from injury at Ricard, when he rolled in his car at the start and ended up inverted. Mansell took a knock on the head in the same multiple accident but was valiantly able to take the restart of the race after being examined medically.

In 1990 we had major accidents at Imola, when Martini was trapped in practice at the far top of Aqua Minerali. I sustained multiple carbon fibre splinters in the skin of both forearms while getting him out and protecting his injured leg. Emanuele Pirro was mildly stunned in Hockenheim at the start but was extricated without the race being stopped.

Monza at the end of the first lap produced a remarkable accident in which Derek Warwick rolled his car at the Parabolica and scraped it upside down along the tarmac at the end of the first lap. He was not only uninjured, he was quite unperturbed. By the time I got there he had sprinted to the pits to get the other car. When he was examined to determine if he was fit to restart, his pulse and blood pressure were normal, his skin was as dry as a

bone, and he had no tremor. Of the doctors who checked him, namely Professor Rovelli, Dr Isserman and myself, we concluded as a group he was fitter than we were. The consequences of this accident could have been unthinkable. In September Alessandro Caffi needed a rescue, having hurt his legs in an accident with Suzuki in Estoril and the race was stopped short. To cap 1990 we had Martin Donnelly's enormous shunt at Jerez.

For Caffi, the Monaco Grand Prix of 1991 produced another big accident in practice. When I got there, apart from the shell in which the concussed Caffi sat in a daze, he had done a good job on the car – not much left. Not surprisingly, he was unable to start in the race.

In Hockenheim in 1991, Erik Comas had a remarkable rotating corkscrew aerial accident while still moving forward, having had a launch from the tyres. Though he was a bit stunned, a CT scan of his brain later revealed the usual amount of brain to be expected, and he was able to race. Towards the end of the season Eric Bernard had a compound fracture of his leg in an accident in practice in Japan, and as a consequence was not able to race the next season.

1992 saw Christian Fittipaldi break his neck at Magny Cours in July; Comas did a repeat performance of the rotating corkscrew at Spa in August 1992 and was concussed, had to be extricated by the spinal team and could not race. Senna was the first person to the accident and when I got there he gave me Comas's helmet and told me he had held Comas's neck to retain it in a good position, and also made sure that Erik's airway had been OK. Senna was a good pupil.

Finally that year at Estoril Patrese crashed after hitting Berger at the pit entrance and was launched in the pit straight. Had his car come down on the inside of the pit wall rather than the outside the carnage would have been inestimable. Patrese hurt his knees but was otherwise undamaged if not unshaken.

Christian Fittipaldi emulated Patrese's epic at Monza in September 1993 on the last lap. After his remarkable flight and, by good fortune, landing the right way up, he skidded past my car and the finishing line wheelless and in a belly slide. He was unhurt and when I saw him in the paddock afterwards I suggested he should get himself a parachute. Earlier in 1993 Zanardi had a miraculous escape in August at Spa, and at the end of July Warwick had his adventure in the gravel at Hockenheim. He said that after the accident when he opened his eyes he could only see gravel. Certainly his helmet had a lot

of gravel in it. More interestingly, when we got him to the medical centre I found gravel in both of his ear canals. When I showed it to him, saying, 'Here are your brains,' Derek denied it vehemently and said, 'I recognize the gravel. I got it at Monza in 1990!'

This litany of incidents should be a reminder that although there were a lot of accidents – many violent and frightening – there were remarkably few terrible injuries. Apart from paying tribute to providence, this was, in my view, testimony to the continuing search for improvements in the safety and integrity of the cars – a ceaseless occupation of the engineers and constructors. Derek Ongaro and Roland Bruynseraede as Safety Inspectors, and the Safety Commission had continued through the decade to press for improvements at the circuits, better layout, more run off, more gravel and more tyre barriers. In fact, Balestre at Magny Cours in 1994 claimed there was more gravel in the safety area at the circuit than there was on the beaches of the Côte d'Azur. To discredit the efforts of so many people in motor racing is, therefore, neither accurate nor admirable.

That there is more to be done there is no doubt. It is clear there is still much to learn about the biophysics of injury in car accidents, in road vehicles as well as in racing cars. There is much more research and development to be pursued before any of us can become complacent.

Niki Lauda, I believe, summed up the situation within Grand Prix racing safety after Imola succinctly by saying, 'God had his hand on Formula One for ten years, but had taken it off that weekend at Imola.'



CHAPTER SIXTEEN

GRAND PRIX DRIVERS OF THE NINETIES

Earlier I commented on the driving talent that was around when I first started in 1978 but there has been another wave of talent with the appearance of Jean Alesi and Johnny Herbert in 1989, Mika Häkkinen and Michael Schumacher in 1991, Damon Hill in 1992 and Rubens Barrichello in 1993.

Jean Alesi

Jean Alesi is a thoroughly nice man to deal with and seems to have the most unfortunate luck that a nice man could have. His performances with the Tyrrell team were very exciting but since he went to Ferrari the last four years must have been frustrating for him. He has required my attention only once when he spun off in practice in Japan in 1990 and injured his neck. He took it all very philosophically as he was unable to start the race because of pain. Early in 1994 he had bad luck with his neck again but made a rapid recovery, once again without complaint.

At Suzuka in that year he produced a blistering performance in the rain, competing in every lap with a feisty Nigel Mansell and thrilling all who saw it.

His win in Montreal in 1995 was one of the most popular victories in motor racing. Everybody was overjoyed by his success.

Mika Häkkinen, the Flying Finn

Mika Häkkinen I think has great potential and once he matures (he is still in his twenties) will be a star. He has always been most polite and respectful to me and is, in fact, the only driver I have been called upon to present the Victor's Laurel wreath to at Silverstone in a Formula 3000 race some years ago. I was unexpectedly asked to the honours by the RAC when I was at the meeting, having a busman's holiday. Being both experienced and cunning, once the deed was done I slipped quickly behind the podium outsmarting Mika and avoiding the salutary deluge of champagne. He and his colleague Didier Coton were generous enough to play golf at the Charity Game the day after the British Grand Prix that my wife and I organized at the RAC course at Woodcote Park last year. At the same event Damon Hill and John Watson, both winners of the British Grand Prix, played as did Mark Blundell, Ukyo Katayama and Martin Brundle.

As a protégé of Keke Rosberg's, he surprised everybody in 1993 when he replaced Michael Andretti at McLaren by being quicker than Senna in qualifying. Since then his career has been blunted by difficulties with the car and some unfortunate accidents and unforced errors. But in 1995, having had his appendix removed and therefore missing the Pacific Grand Prix he performed better at Suzuka – to everybody's delight!

In the next race at Adelaide, in November 1995, he had a massive accident in the qualifying practice on Friday afternoon. The cause of the accident was a sudden deflation of his left rear tyre which caused him to spin and be launched by a kerb so that there was little deceleration before his car struck the barrier at approximately 125 m.p.h., according to Ron Dennis, the owner of McLaren.

When I arrived at the accident two minutes after the crash he was unconscious and having serious difficulty breathing. We removed him from the car and had to perform a tracheotomy at the trackside. Fortunately, although he had a fractured skull, his brain injury was not severe. He regained consciousness on Saturday morning and when I told him that he had had a big accident, his first words were: 'Was it my fault?'

Reassuring him that it was due to a puncture I gave him further good news that Mr Dennis was giving him a few days off and that he didn't have to drive in the race the next day. He grinned crookedly in response to this and, knowing his sense of humour was recovering, I felt very optimistic about his recovery.

After two weeks in hospital in Adelaide, he came to London for a few further tests and, five weeks after his injury, he went off to Monaco to convalesce and to start to prepare himself for the 1996 season.

Johnny Herbert

I first met Johnny Herbert in the hospital at Sidcup shortly after his awful accident at Brands Hatch in 1988. His legs and feet were badly fractured but he was as cheerful and cheeky as ever. I was amazed at his equanimity about the whole affair, and his tolerance of his plight. Peter Collins, then of Benetton, had asked me to see Johnny with a view to the future. Over the next few months he improved to the point where he could get around. Everybody was anxious that Johnny should take up his opportunity with the Benetton team for 1989. At the beginning of the year I arranged for him to be seen and reviewed by Nigel Cobb at Northampton. Nigel Cobb is a brilliant orthopaedic surgeon who was responsible for putting together the pieces after Barry Sheen broke his legs. He also gave us good advice after the Johnny Cecotto and Jacques Lafitte accidents at Brands Hatch. Nigel Cobb felt that Herbert had recovered sufficiently, and Johnny in his first Formula One race in Brazil in 1989 exonerated this opinion by coming in fourth. As the season wore on, increasing mobility in Johnny's ankles showed up shortcomings in the power of his calf muscles and a long course of leg training was necessary to get back the strength.

I thought Johnny had a chance to show his true potential at Monza in 1994 when he qualified so well with the new Lotus. However as I arrived at the multiple shunt at the first chicane I was sorry to see Herbert sitting disconsolately in his wrecked Lotus.

Johnny has a great and cheeky sense of humour; he is quite irrepressible and extroverted. He seems to enjoy the parade of drivers, now traditional again after the drivers' briefing on Sunday morning, more than any other driver. The crowds love his antics.

In 1995 he has won two Grand Prix Championships, the British at Silverstone and the Italian at Monza, admittedly in lucky circumstances. But overall he has driven brilliantly in 1995 and has, together with Schumacher, secured the Constructors' Championship for Benetton–Renault. I understand he now is an extroverted disco dancer – a tribute to his orthopaedic treatment.

Michael Schumacher

Michael Schumacher burst on to the scene at Spa in 1991. Since then his rise has been as spectacular as that of Senna in 1984. I have mentioned elsewhere his accident in Japan at Suzuka in 1991. Since then I have had occasion only once to collect him from a wreck. In 1994 he crashed towards the last two or three minutes of final qualifying practice in Adelaide, and the red flag came out. The accident was in the first chicane so Frank Gardner had us there very quickly as it was a matter of a few hundred yards from the pit exit where we sit at this circuit. Michael was out of the car, unhurt and glad of a lift back to the pits. Without doubt he is probably the fittest Formula One driver about at the present. From his remarks when he got into the back of the car alongside Roger Capps, our anaesthetist, it became clear he is also one of the coolest. Sampling the air with a sniff he said, 'The air-conditioning is on. Would you please mind turning it off as it upsets my nose.' Frank, with a wink, switched it off but he was mighty impressed and said, 'If he's sharp enough to react to the air-conditioning after a 100 m.p.h. crash he certainly is fully switched on.'

Michael had been elected to represent the new Grand Prix Drivers' Association as driver on the Safety Commission of the FIA. As Chairman of the Advisory Group I have been at a few meetings with him. He is a very lucid, rational and intelligent young man. He is always smartly turned out whether at the circuit or in a meeting. He clearly loves what he does and is cheerful about it – and when the chips are down we know he is a hard enough competitor to be a continued great success. His phenomenal season in 1995 when he won nine Grand Prix races will stand as a record for a long time.

Damon Hill

Damon Hill is a gentle man, and a gentleman as well. He has had a tough struggle to the top. I saw him once or twice when he'd had a whiplash neck injury and I thought he did a great job to bring the ailing Brabham into eleventh place at Hungaroring in 1992. He was incredibly brave and cool to restart at Imola in the Williams after Ayrton's accident. I was sorry he didn't make the Championship, particularly in the controversial circumstances that occurred in Adelaide, when he and Schumacher collided on the thirty-fifth lap and were both forced to retire from the race. But when I saw him on the flight back at Singapore Airport he was talking to the press in a very

balanced way. I clapped him on the shoulder and we exchanged understanding looks. He's a very good golfer and won the Charity Match at Woodcote Park in 1994, the day after he won the British Grand Prix. He's not a fisherman, however, so I have promised to teach him to fish salmon in Scotland. I have to say that I have never met a nicer guy. He had a bad year in 1995 despite several victories but remains determined and philosophical. He is very good in the wet and put in blistering drives in Japan and Australia in 1994.

Rubens Barrichello

Rubens Barrichello is another potential Brazilian genius at the wheel. He is very young and very innocent – it is terribly easy to pull his leg, and when he finally realizes it he has a pleasing smile. The day after his accident at Imola, he came to see me to say thank you for his rescue and was so polite and charming he could soften even a neurosurgical heart. He put in a wonderful drive at Donnington in 1993 and was stranded with cramp out on the circuit, where we found him after the race when I went round with Walter Robinson, who drove me there in torrential conditions. To cheer him up, I told him that Senna used to suffer from cramp and that this was a good sign but he should put more salt in his drinks. I suspect with Eddie Jordan looking after him I won't be able to fool him for much longer. Rubens had rather a lot of accidents towards the end of the 1994 season and I told him I was fed up going out to collect him and cart him back to the medical centre. One day at Suzuka in Japan we had to examine him twice within a few hours and he looked very shy the second time around.

Ayrton Senna

It was Saturday, 21 February 1991. We were lunching at the Tilmouth Park Hotel near Coldstream in the Tweed Valley. In the bar Ayrton was enjoying a joyful and unusual experience – nobody recognized him! We had met the previous evening at Heathrow, flown to Edinburgh and made our way to Belmont, my home in Coldstream. Ayrton had always wanted to go to the Jimmy Clark Museum at Duns, and arrangements had been made with the Curator for us to visit that afternoon. The one proviso Ayrton made was that it was to be a private visit, no press, no publicity and, apart from the staff at the museum, nobody else was to know. Next to Fangio, Jimmy Clark was the driver Senna most admired – and, of course, the precision of Ayrton's

technique was reminiscent of Jimmy Clark's clockwork driving in the Sixties. We had hoped to fish the Tweed for salmon that morning but there had been a big storm and the river was swollen and unfishable. Instead, we'd walked along the beat at Tweedmill, and Ayrton had his photograph taken with my friend Mick Osinski, with whom I usually fished. The photo is one of Mick's treasured possessions.

I was driving as we went into Duns and, turning into the road where I thought the museum was, I hesitated, looking for a signpost to indicate its precise location. 'There's the sign to it,' said Ayrton. 'Where?' I replied. At the top of the road he said, 'It says Jimmy Clark Museum.' I couldn't even see the post the sign was on, let alone the inscription, as it was about one hundred yards away. Extraordinary visual acuity was one of Senna's attributes and I am sure this is a requirement for top Formula One drivers. Jackie Stewart possessed remarkable vision, and such a faculty enables depth perception and judgement of distance to be so developed that overtaking manoeuvres, horrifying to the ordinary person, can be accomplished with computer-like accuracy.

Once in the museum, we looked around, Ayrton agreed to be photographed, signed the visitor's book and then he asked if he could borrow a slide of Jimmy Clark to show at his lecture that night at Loretto, Jimmy Clark's old school. At the school Senna went to see the memorial plaque to Jimmy in the chapel and paid his respects. At the end of the evening I drove on to Edinburgh Airport to drop Ayrton off at his aeroplane to return to Estoril. On the way he said, 'Professor, I want you to know that I think you are a very good driver and very safe but I have to say you are very, very slow!'

This was certainly not the case for him in a road car. On one occasion when I had a lift from London to Bologna in his plane I asked him out of courtesy if he would like to drive the car I had rented. Despite the presence of his calm mother and sister in the car, he went off on the Autostrada Tanzeniale like greased lightning. As we approached Castel San Pietro, where he usually stayed, there was a long line of two lanes of traffic waiting at a traffic light intersection. Without hesitating or slowing, he shot up the middle with a centimetre or so of clearance on each side, the light changed and we'd gone before any outraged motorist could blow his horn. I sat with clenched jaws in the front passenger seat and my jaw muscles were sore by the time we reached the hotel.

In the early days when he was awaiting confirmation of his contract with Lotus he had a facial weakness from a virus infection and he couldn't close his eye. Peter Warr, then the Lotus Team boss, used to ring me up with great concern about the possibility of complete recovery. I was always reassuring but Peter said one day, 'How can he drive for us if he can't close his eye?' I replied that I thought it better if Formula One drivers drove with their eyes open. In fact, I suggested that one or two drivers might be less hazardous on the circuit if they could see where they were going and if they could see in their rear-view mirrors. Peter's main concern was that in the event of an accident if you couldn't close your eye you would be more liable to get an eyeball injury. This is a fair point but I was doing my best to avoid the possibility of Senna's losing his chance to join Lotus. As it turned out he made a virtually complete recovery – but his smile tended to be a bit one-sided thereafter.

Of course he had that insatiable desire for speed and many times I told him he didn't have to go so fast to win. When I again renewed this admonition he once confessed 'I remember what you tell me, Sid, when I go past your car parked at pit exit but then I forget as I go round till I see it again.' On one occasion in Mexico, on his slowing-down lap, after he had won the race he went past my car, which was parked on the back straight before the Parabolica. He was so pleased to have won he turned his head to wave excitedly as he passed, nearly lost it, corrected and apologized afterwards for his momentary loss of concentration.

In March 1993 on the Thursday before practice at Jacarepagua for the Brazilian Grand Prix at Interlagos he invited me to go fishing on his beloved farm. I met him at the circuit after I'd done my medical inspection with Dr Renato Duprat, the Chief Medical Officer, and he took me by helicopter via the roof of his office where we called in briefly. Once at the farm he moved me into his own lodge, giving up his own quarters for me to stay that night. He had had the lake in front of his farm stocked some years earlier and we fished with poles, a fixed line (no reel) and corn cob seeds as bait. There was plenty of action and in about an hour we had caught about thirty good-sized fishes. He had these packed up and sent down to the little village where his farm workers lived. While we were fishing Milton, his father, was ripping in a reckless fashion round the estate on a motorbike.

That night there was a massive thunderstorm and the power and telephone supply was knocked out of action. I had to phone home so Senna

said there was a town a few miles away and we'd go there. Getting out a four-track jeep, we set off across flooded laterite roads with Ayrton driving rapidly and happily.

Forty miles later we arrived in a small town and tried a telephone box without success. While we were so doing a few Brazilian children arrived to view the scene. Nearby was a small garage and the mechanic there recognized Ayrton but would not let us use his phone for a transatlantic call. Senna was very gentle with him and behaved with his usual humility – no attempt to pull rank. I got Ayrton to explain to him I could use a British Telecom telephone card so that the garage would not incur any charges. That did the trick and we made the call. By the time we left, there was a large crowd of youngsters waiting for autographs which he signed under a street lamp. We made our way back to the farm and Ayrton told his father with some wonderment, 'Sid has this marvellous card and a number, and you can make calls anywhere all over the world with it.'

It is clear I think that we had an unusual bond. When he visited London he would pop around to the East End for us to have supper in one of the local Chinese restaurants near my hospital. The other clientèle were never quite sure whether he was Senna or not. There were a few curious looks from time to time – but it could not be *the* Senna having supper in a modest Chinese restaurant in the back streets of the East End in the most deprived borough of Tower Hamlets. Or could it?

There is nothing I can add to what has already been written about him as a driver. As a man he was so committed to his driving and to his sport that he infuriated and alienated many people in the Grand Prix world – drivers, officials and the media. But he had this other side to him which I knew well.



CHAPTER SEVENTEEN

28 SEPTEMBER 1990 – JEREZ DE LA FRONTERA

It was the Friday morning prior to practice and I didn't much like the car that was being offered for me to follow the first lap – and I said so. The response was that efforts would be made to get a quicker vehicle and in the meantime we got on with the morning practice which passed without event.

We were well into the qualifying practice that afternoon when out came the red flag. There was no radio information as to the location so my driver shot off and we went looking for the accident. The trouble with the circuit at Jerez is that there are no roads across the interior so there are no short cuts – not that we could have taken one, without knowing the accident location. So we did our best, but we had to follow the whole route. The lap seemed interminable as we flogged round the circuit.

I think it took the best part of three minutes to get round to the back of the paddock, where I saw a group of people in the middle of the tarmac. There was a bent and crumpled figure on the ground. The Spanish anaesthetist and I jumped out and we got to the driver. I was unsure who it was as I couldn't see any race car or remnants that were recognizable. There was a lot of debris around but the urgent thing was to get the driver's crash helmet open and then off. On opening the visor I could see the driver's face was blue with lack of oxygen so we sucked out his airway through his nose and connected an oxygen flow. We cut the helmet strap and with me

supporting his neck, my Spanish colleague slid the helmet off gently. It was Martin Donnelly and he was completely unconscious.

The next step was to get an airway in; I slid a finger around the inside of his mouth. His teeth were tightly clenched, but I found a gap to try to force his jaws apart. I used a Guedel airway inserted upside down on an artery clamp to separate the teeth and, as his jaws opened, rotated it and shoved the business end into his throat. We were now able to suck out secretions and blood from the pharynx and nose, and get a good flow of oxygen into him. He started to 'pink up' as his blood oxygen level improved; we now turned our attention to getting up some intravenous infusions.

There were obvious deformities to his legs so we gently dealt with these fractures with inflatable leg splints. By now there was plenty of medical help and an ambulance had turned up, so we lifted Martin on to a stretcher and into the ambulance to take him to the medical centre. He was starting to stir at this point and his level of unconsciousness was lightening; I began to feel a bit more cheerful.

We went back to the medical centre which is excellent at Jerez. The team of specialists was waiting, and they got straight to work. I didn't know at the time that Senna, who was circulating when the accident occurred, had stopped at the scene and had been standing behind me while we worked on Donnelly. I suppose it was about twenty minutes after the accident that Donnelly started to respond to commands and to speak. To my astonishment – and this serves to show the genetic structure of a Grand Prix driver's brain – he was preoccupied with what sort of a lap time he had done. He was clearly confused and kept repeating lap times.

The orthopaedic surgeon and neurologist in the centre made a good assessment of his condition, and his vital signs were nicely stable with the support of the intravenous drips. He had pretty bad fractures in the legs, particularly the right, and there was a lot of swelling and blood loss into the fracture sites. His legs were properly splinted with plaster supports, and then he went off in the helicopter to the Polytrauma Hospital at Seville. During this period practice had resumed and Senna, despite his presence at the accident scene, had gone out and did the fastest lap.

After the practice Dr Isserman and I went by helicopter to the hospital and to the Intensive Care Unit. During the flight Martin had apparently become very drowsy and on arrival at the hospital, although his blood pressure was satisfactory, he had lost a lot of blood in the fractured legs,

about half of his blood volume. The doctors had therefore sedated and intubated him, and he was being ventilated and transfused. Because of the head impact he had sustained, which was sufficiently severe to split his helmet, a brain scan was done which showed some bruising of the left side of his brain. His chest X-ray showed bruising of the lungs from the safety belt harness.

The team at the Seville hospital was excellent and, having done all the necessary investigations, we went off to the operating theatre. Again it was a long and complex procedure to get the leg fractures under control, with the bones in good position and properly fixated. Martin remained stable during the operation, and it was decided to keep him asleep and ventilated for the next few days. Jean-Jaques Isserman and I returned to our hotel in Jerez by car, having had an early morning supper with the surgical and anaesthetic team in the theatre anteroom.

The next morning the news was still good and I was waiting at the pit exit for Saturday morning practice to start when Senna came to see me. Leaning against the pit wall, he told me that he had watched the resuscitation and in his serious style questioned me about the technicalities involved. He had noticed that the airway had gone in, apparently wrongly, upside down, and then had been rotated and wanted to know the anatomical reason for doing this. I showed him the kit and he was intrigued about the trick, and he also asked why I had put my finger in Martin's mouth before getting the airway in. I told him this was to find a possible gap in his teeth. One of the things that flashed through my mind in May 1994 at Senna's accident at Imola was our conversation at Jerez, for I was following the same drill.

At the end of practice at Jerez on Saturday morning Paddy McNally, Chief of Allsport and responsible for providing the car I ride, had more bad news. He told me that Gerald Dubarr, who was responsible for sorting out my following car, had decided, having seen how slow it was round the circuit, to go Madrid to get a Porsche. He had flown up on Friday evening and having got the car – a 911 – was driving it back to Jerez when he had a big accident north of Seville and had ended up injured in another Seville hospital, different and distant from the one where Donnelly was. Paddy said that the doctors there were proposing to operate on Gerald.

It was clear that another rescue was going to be necessary. Jean-Jacques and I left the circuit immediately after the afternoon practice and first we

went to see Donnelly and were pleased to find that everything was proceeding smoothly. There were no new problems and the situation was under good control. We therefore went on by car to visit Gerald. We found him together with six or seven patients in a small, cramped ward where the beds were so close together that one could only sidle sideways between them with one's thighs trapped between the mattresses.

I have never seen a man look more pleased and relieved to see me. He seemed in pretty good shape, but told me that the surgeon in charge was proposing to operate on him to wire together a fractured sternum. We spoke to the nurse in charge and I asked if I could see the surgeon as I wanted to get his permission to take Gerald out of hospital. We were told that he would be coming and, meanwhile, the X-rays were to be made available to us. We waited a reasonably polite amount of time but there was no show on the part of the surgeon. I encouraged Gerald to get dressed and the three of us walked out of the hospital with Jean-Jacques on one side and me on the other, thus kidnapping him. We made him comfortable in the car and set off back to Jerez.

Gerald told us a horrible story on the way. He remembered seeing a big truck with headlights and the next thing he was in the ditch with a totally written-off Porsche. It must have been a pretty big accident, and he was lucky to get away with only a fractured chest bone. The ambulance that came for him had been collecting other accidents and Gerald found himself sharing the interior with three corpses. He was pretty relieved when he got to the hospital to be admitted, even to the poor accommodation that was offered to him, rather than the morgue with the others.

When we got to the hotel at Jerez we made him comfortable with some pain killers, anti-inflammatory tablets, and a bottle of whisky. Later that night I popped in to see him before I went to bed and he looked fairly comfortable, sitting up in bed with a lot of pillows and a broad grin. Arrangements were made to fly him home the following day.

On the Sunday between the warm-up and the race I took a helicopter to nip up to Seville to see Martin while Jean-Jacques stayed behind so that he could do the pre-race circuit inspection in case I was delayed. Everything was fine at the hospital and it was time to discuss when we could evacuate Martin to my hospital in London. It seemed best to arrange this for the Tuesday morning and I was very satisfied with the level of care that he was

getting from that nice group of doctors. I flew back to London on the Sunday night.

The next morning I got it organized that we would send a plane to collect Martin and that one of the crack anaesthetists from the London Hospital, Dr Alistair Marshal, and my Spanish-speaking neurosurgical assistant at the hospital, Dr Jose Arias, would go to supervise the transfer. This went without hitch and Martin travelled sedated and ventilated from Seville to the UK and then by the London Hospital helicopter to our helipad on the roof.

That evening in the Intensive Care Unit everything was good, but during the night Martin's urinary output was falling and by Wednesday morning he was in renal failure.

There was a long haul to recovery and Martin nearly got the world's record of six weeks before his kidneys functioned properly and started to excrete urine again. During this period of time he had renal dialysis when required, supervised by our renal expert, Dr Frank Marsh. Brian Roper, one of the orthopaedic surgeons, managed the leg fractures and all was going well till one day Martin had a torrential haemorrhage from the wound of his right femoral fracture. He had blown a hole in his femoral artery which Bob Ham, our vascular surgeon, closed with a vein patch.

There was a lot of gloom at this stage, with a great deal of pressure to amputate the leg, but I refused and was supported in my obstinacy by Brian Roper. To everyone's surprise and delight the femoral artery healed and so did the leg wound and the fractures. Martin kept his leg. For the first few weeks of this long period Martin was unconscious, initially from sedation, but clearly also caused by his head injury – I wondered at one stage that, with his brain injury and renal failure and at times problems with his chest, he might have the dreaded fat embolism like Ronnie Peterson.

When he did come round he started to talk and recognize people quickly and then began to press me very hard about going for rehabilitation in Austria and to return home before doing that. I kept fudging the issue and promised to get him home for a spell for Christmas. He made it on Christmas Eve so I didn't tell a fib, but I strung him along for a while until I was sure he would be safe at home.

He had a week off and then came back to continue his recovery at the London. In January 1991 we made arrangements for him to go to Austria to Willie Dungal and this finally happened in the early part of February. It had

taken nearly six months from his accident, but he had borne this period with great courage, as did his then girlfriend, who was a tremendous source of good sense and support. It was with the greatest pleasure that I heard later that year he was able to walk down the aisle for their marriage, and that he was even able to dance a bit to celebrate the occasion of his wedding day.

I've seen him a few times since then and he has made the most remarkable psychological and physical recovery. Though he has been unable to get back to single-seater racing because of limited movement in his knee joint, he appears to be the same old Martin Donnelly that I knew before the accident.

OceanofPDF.com



CHAPTER EIGHTEEN

1994 – THE EARLY RACES

The wait at Aida for the start of the Pacific Grand Prix in April 1994 seemed interminable, although it was probably no more than three minutes. I was sitting in the Porsche with my driver and Japanese anaesthetist waiting for the Formula One cars to finish their parade lap. A new manoeuvre was being tried – a pace car was being used to lead the racing cars round the parade lap. The pace car would pull off the circuit and into the pit lane entry, leaving the race cars to take the green light and go. I was uneasy about this new departure in procedure because, in the past, I had sometimes tried to follow the parade lap, but even on the slow circuits had been unable to stay with the back-markers. On the parade lap these Formula One cars are so quick that despite being behind a fast Porsche, they would be held up from their normal speeds. Consequently, race tyres, which these days are preheated till the last moment when the cars start to move, would be cooling and less adhesive. Equally important, the tyre pressures would be falling as the heat dissipated, bringing the bottom of the car closer to the ground. Result: they would have less grip and would be more likely to bottom.

At last they came, and off we all went. There was a bit of a shambles at the first corner, and four cars went off. Nobody seemed hurt, and as we flashed through I saw Senna off in the gravel. Otherwise, the race was eventless.

Because of the geography of Aida, many of the teams had been housed in small, compact outbuildings which were scattered not far from the

Clubhouse Restaurant and Race Control centre in the circuit. The security consisted of a high wire fence around the whole area which produced an enclosure. There was, therefore, a Formula One congregation which was captive and, once the race was over, there was quite a party. Everybody was there – drivers, managers, engineers, mechanics, journalists, officials and others, including Dr Isserman and myself – enjoying the warm hospitality of Mr Tanaka, owner and promoter of the First Pacific Grand Prix (Aida), who was hosting the event with unlimited quantities of food and wine. By the time I left for the airport at Osaka the next morning, some of the hotel outbuildings had acquired names – first I went past ‘Colditz’, and left the enclosure near a building named ‘Stalag Luft IV’ – the humour of the mechanics remains incorrigible and irrepressible.

I was sipping my preflight whisky in the airport lounge with two of the Goodyear chaps, Barry Griffin and Tony Shakespeare, who are my friends, and the chat turned to tyre pressures, grip and ride, and some of the concerns, which I had also felt, were voiced about the speed of the pace car. Senna turned up at this point and we had a few affectionate exchanges and boarded. As we parted he said he’d come and look for me some time during the flight to London. He eventually appeared about sunrise the next morning, collected me, and I sat alongside him in First Class (Bernie only lets me go Business Class!) till breakfast was served. He was more serious than usual and very disappointed about going off on the first corner when Häkkinen had given him a push. He said he’d had no grip, and he was worrying about the slowness of the pace car and its introduction into the parade lap procedure. He said the Williams rode very low. If the tyre pressures were down, the ride was even lower – one or two millimetres made a difference to the handling – and the tyres cooled and lost adhesion during the parade lap. He was upset about spinning off in the Brazilian Grand Prix two weeks earlier, and confessed that the start of this season had been a disaster for him. He was clearly getting worked up about safety to a point where I got a bit worried about him. He talked of resurrecting the Grand Prix Drivers’ Association, and asked me how it had worked in the old days with Lauda, Scheckter and Pironi. I told him it had been useful, if at times somewhat undisciplined, and that when I was the FOCA surgeon, I attended the meetings at the circuits as we had all worked together to get improvements. He said he might do something about it at Imola and perhaps have a first meeting in Monaco. I told him that if he went ahead he

should get it properly structured, with a sensible spokesman, and ask for representation on the FIA Safety Committee and with the World Council.

The next time I talked with him was at Imola after the Barrichello accident when we had only a few words. The following day was the Ratzenberger tragedy, and the day after that Senna's death.

Berger brought up the problem of the pace car leading the parade lap during the drivers' briefing on the Sunday morning at Imola. After some discussion about the dangers of a system that was too slow for Formula One, Roland Bruynseraede decided it would not lead at the start of the parade. This was a wise and sensible decision, and we have not seen it done since.

After the fracas of the first start, when J. J. Lehto stalled his Benetton and Lamy ran into the back of it, the pace car did come on the circuit, and during those slow laps I knew the thoughts that would be going through Senna's mind. Despite this, he went for it hell-for-leather when the cars were released; Schumacher said afterwards that in the lap before the crash Senna's car was highly unstable. I had seen Niki in the paddock on the Sunday morning between the warm-up and the race. He was as sanguine as usual about the Ratzenberger accident, but said Senna was serious about getting something like the old GPDA going for safety matters. I gathered the first meeting was to be in Monaco – where, in fact it was held – but without Ayrton.

I know that nobody had recovered from Imola when we went to Monaco. At the end of morning practice on the Thursday I had got out of the intervention car and was in the central tower with Jean-Jacques when I was told René Iseart, the Chief of Safety, wanted me. In fact, when I went out I met Michel Boeri, Director of the Monaco Grand Prix, who asked me to get into his car as there had been a serious accident beyond the exit of the tunnel. We went round posthaste, and found the scene at the entrance to the harbour. Karl Wendlinger had had a big one. He was unconscious and the extrication crew based at the chicane near to the harbour had taken him out of the car with the spinal and neck splint properly applied. The resuscitation doctors were with him, his airway was clear and he was being oxygenated properly. The whole matter was being managed excellently – even to the point that for possible brain injury he was being infused with mannitol (a substance which reduces the swelling of the brain that occurs after a brain injury). His pupils were working well and his limbs responding in a manner

which we call ‘decerebration’, indicating he’d had serious bruising of the brain. Michel lent me his radio so I could speak directly to Dr Robert Scarlot to tell him the problem with Karl was neurosurgical in nature, and would mean, after stabilization at the Centre Hospitalier in Monaco, transfer to the Nice neurosurgical unit. Once Karl was in the ambulance I followed close behind in a car, and took Mr Wendlinger, Karl’s father, with me.

The hospital performed perfectly and computerized scans of the brain, neck and chest were done on the excellent scanner there. Karl was intubated and ventilated, and steroids were given to control brain swelling. The brain scan showed bruising of the brain but there were no other trunk or limb injuries. I left there to get back to the circuit with Jean-Jacques and our driver. We just made it into Casino Square as the first car left the pit lane at the start of qualifying practice. It was a race to get into the pit lane before we were overtaken, but we made it – just! The next week was an anxious one, for current practice these days is to keep the patient asleep with drugs and ventilated mechanically until the threat of uncontrollable brain swelling recedes – usually seven to ten days. The outcome was happy, and after a time Karl went to Innsbruck, and then on to Willy Dungal for rehabilitation. By the time I saw Karl in Hockenheim in August he looked fine, and went on to make a wonderful and complete recovery.

After this accident there was a storm about safety. Max Mosley, President of the FIA, was getting a lot of stick. By the time of the Monaco Grand Prix we had had four accidents at the two most recent Formula One races – two fatal, one severe head injury and one lucky escape (Barrichello). By the end of May 1994 we had had eight big accidents, counting the three in unofficial practice – Lehto broke his neck at Silverstone, Alesi similarly in France, Lamy had major leg injuries at Silverstone. Montermini had a big accident in Barcelona, but received only slight injuries. All the European newspapers, TV and radio were up in arms – even the Vatican got in on the act – but in Britain the death of John Smith, the leader of the Labour Party in opposition, competed for space in the newspapers and on the television, somewhat reducing the media pressure.

On the Friday afternoon at Monaco I was seeing an old patient of mine, a lovely little girl upon whom I’d operated some years ago. Her mother congratulated me on my new appointment in motor racing. I had no idea what she was talking about and said so. She had heard on the French radio

that the President of the FIA had announced the formation of a new Expert Advisory Group whose remit was to examine all aspects of safety within the race car, and on the circuits, run off, safety barriers, and so on. I learned that Max Mosley had named me as Chairman. The committee was to be composed of Charlie Whiting, FIA Engineer, Roland Bruynseraede, FIA Safety Delegate, a Formula One driver from the GPDA, and a Formula One designer. Gerhard Berger and Dr Harvey Postlethwaite were subsequently appointed. It was a wide and heavy responsibility in scope and in stature, for the group was to make decisions and to report directly to the President.

I had not been asked about it but, as Max explained a day later, he knew I would accept the job and, of course, he was right. Clearly after the Wendlinger accident Max had spent a great deal of thought about how to solve the problems that loomed. He told me he felt he had to get on and improve matters, and as time was short, he made the announcement of his decision before he could get hold of me. In fact, the first official news I received about the committee was on Friday night when I saw Pierre de Coninck, Secretary-General of the FIA, at the official dinner that was being held in the Belle Epoque dining room of the Hermitage Hotel. Bernie, appearing briefly, said hello, pulled my leg about my appointment, and disappeared.

Apart from the description of the remit and power of the committee, Max stated in his announcement to the press that the FIA would make such funds available as were required for the necessary research and development programmes. He has been as good as his word, and his prompt decision in May has opened a whole new era of scientific research into cockpit design, safety barrier construction, circuit configuration, and run-off areas.



CHAPTER NINETEEN

THE PRESIDENT OF THE FIA AND THE ADVISORY EXPERT GROUP

Sometime in 1970 I got a call from Dr Dennis Williams, Senior Neurologist at the National Hospital for Nervous Diseases, London, and Physician to HM The Queen. Would I please present myself at the Bryanston Nuffield Hospital at 5.00 p.m. that evening to see a patient who was registered under a *nom de plume*. Great secrecy attended the matter and when I arrived there Dr Williams met me and explained the problem. The patient was, in fact, the author Nancy Mitford and she was my first introduction to the Mitford/Mosley literary circles.

Some eight years later I met Max Mosley himself with Bernie Ecclestone when I first started to represent FOCA, and we had an acquaintanceship which subsequently strengthened. In 1979 I was telephoned by Bernie to say Max's mother, Lady Diana Mosley, Nancy Mitford's sister, was acutely ill in Paris. I spoke to Max and organized for a colleague, Dr Gabor Szikla, a neurosurgeon pal at the Hôpital St Anne, to see her and sort it out. We made no progress with this arrangement, so a few days later Lady Mosley was transferred by air to the London Hospital. After a successful operation she was able to go to convalesce with her sister Deborah, the Duchess of Devonshire, at Chatsworth. Lady Mosley, also a distinguished authoress, remains very well fifteen years later, and is a marvellous lady, with a fascinating personality and penetrating intelligence.

Subsequently she published in 1985 a book, *Loved Ones*, and was kind enough to dedicate the work to myself, Sister Sherren and the nurses at the London Hospital who had cared for her. A few years after these events I operated on Lady Ravensdale, a stepdaughter-in-law of Lady Mosley, and also was consulted by Max's brother as a patient. Max and his family were, therefore, not unknown to me when he was elected President of the FISA in 1991 by defeating Balestre, the then incumbent, much to the latter's surprise and discomfiture.

He has been a very different President from Jean-Marie Balestre as their styles and approach are so very unlike. He has the enormous advantage of having trained as a barrister and has the poise, eloquence and penetrating logic that one associates with the eminent QCs of the British courts. Fluent in French, German, Italian, Spanish (he has a few words in Japanese), he is ideally suited to an international position of high stature. In addition, having been a racing driver, a team manager and owner he can meet most people on their own ground.

After the tragedies at Imola and the accidents at Monaco and Barcelona, he resolved to introduce various changes in car regulations which provoked both controversy and opposition. The concept of involving the FIA in research and development in its own authority was a novel and revolutionary approach. He told me at Monaco and subsequently at other meetings that he would provide the necessary support in personnel and finances to investigate any possible route or technique to improve safety for the drivers and for all the teams who are at risk at the circuits.

The Advisory Expert Group were given the following brief for investigation:

- 1 The design of the cockpit, or any aspect of the car
- 2 The integrity of crash barriers and a search for new materials
- 3 The configuration of the circuits and the size and length of run-off areas.
- 4 The protection of the personnel within the pit lane and in the public areas

Our first meeting was in June at Montreal and since then we have usually met monthly and reviewed progress at meetings at Magny Cours, Hockenheim, Budapest, Jerez, Adelaide, and at Heathrow in the winter months.

The main lines of attack on the problem soon became evident, for the biophysics of an accident in a Formula One cockpit had not been analysed in basic scientific terms.

We therefore commissioned a programme of high energy crash testing (HYGE tests) with the team of engineers and biophysicists at the Motor Industry Research Association at Nuneaton in the Midlands. This series of experiments involves the use of sophisticated dummies (HYBRID III) heavily equipped with sensors and accelerometers to measure the G-forces in the head, neck and chest from a variety of impacts.

Thus in frontal, rear, side impact or angled rear, or angled frontal, the response of the facsimile human form can be cinephotographed at high speed, and videotaped. Through a sophisticated system of computers the accelerometers will then provide information about the forces in G or energy terms with which to correlate the deformations of the dummy, and the dynamics of its movement within the cockpit.

When the vehicle is decelerating or stops in any accident at speed, the human form is thrown forward. The extent to which it moves depends on whether it is restrained by seat-belts, air bags or not at all. However, the inertia developed has to be absorbed when the human form stops moving. A tertiary level of internal damage may then be sustained as the internal organs, brain, heart, lungs and intestines still travelling at the same speed collide with the inside of the skull, chest or abdominal wall as the external form stops.

In direct head injury, when the skull is struck by an impact, or in indirect injury when the movement of the skull suddenly arrests, the semi-solid brain suffers action and reaction injury stresses or rotational injury, damaging the surface of the brain against the inside of the skull or tearing its internal structure by sheering or rotational forces.

In a frontal crash, therefore, the head may hit the steering wheel, the cockpit edge, or in a road car the windscreen. The head is then thrown backwards to sustain injury at the rear by hitting the back of the seat, the head restraint or the back of the cockpit.

In a lateral crash the neck is subject to lateral bending and the head describes an arc the extent of which may fracture the neck. The heavier the head (plus the crash helmet) the heavier the load and the more likely the possibility of sustaining fracture or dislocation of the neck vertebrae. In angled impacts the trajectory of the head becomes compound as lateral and anteroposterior forces, depending on the angle of impact, produce a vector.

MIRA have been testing responses in all these different situations, with and without rear energy absorbing head cushions, with different widths of

seat-belts and with different cockpit configurations. Our aim is to devise regulations which will reduce the internal G-forces within the human frame to below the level of tolerance at which injury is known to occur. Because of the expense of the high technological equipment for these sled crash tests and the time spent by highly skilled bio-engineers performing them, each test costs £2,500. The time taken to simulate the accident itself is a fraction of seconds but the preparation involved is complex and time consuming. In a day of research with such a team maybe three such tests can be accomplished.

With the results obtained from such a series of physical testing, computer graphic programmes have been developed which show the movement and the deformation of the human form obtained by direct study. Extrapolations can then be made for different configurations of accident or energy protection simulated to test various concepts or changes in the design of the cockpit configuration.

The energy levels of human tolerance at which injury occurs had been investigated over many years and there are known values for skull, brain, chest and neck injury and for damage to the internal organs such as the heart, lungs and great blood vessels within the chest or abdomen.

Investigation of crash barriers was initiated by the CSI in Milan at the request of the committee. Tyres in various configurations and numbers of layers have been compared with each other and with honeycomb materials supplied by Fabrizio Barbazza. In Australia a triple energy absorption system devised by Dennis Horley of Air Fence has been tested against tyres in the best configuration, (the so called Zolder Barrier). Representatives of CAMS and Frank Gardner on behalf of the FIA have attended the tests. We continue to search for new concepts and have recently cooperated with John Fitch and Ianto Roberts of Impact Attenuation Incorporated to explore new avenues.

Under the direction of Dr Harvey Postlethwaite all of the circuits used by Formula One have been analysed for velocity, G-forces in the corners and the high-risk areas identified using criteria related to length, speed and lateral G exceeding 4. Of the circuits in use, twenty-seven high-risk corners were identified, which matched well with the personal identification of high-risk areas that we asked Gerhard Berger to provide based on his experience. The measures introduced by the FIA for changes in the cars during 1994 reduced speed around the circuit by about three seconds – this

alone halved the number to thirteen high-risk corners by cutting the lateral to G less than 3. Changes to the circuits themselves have further reduced the number to 8. With the computer programmes now developed for the research by Dr Postlethwaite it will be possible to calculate the physics of the necessary run-off configurations and sizes, and provide improved gravel beds and barriers.

Protection of the pit lane and the public will demand a new approach to provide high debris fencing to the pit lane and public areas and the work to determine heights and strengths is going forward.

With the support of the new GPDA a greater discipline will be required and enforced on the Formula One drivers to control the quality of crash helmets, and the flammability of their underclothes, Nomex hood, racing overalls, driving gloves, socks and racing boots. As part of this protocol mandatory random testing of drivers' clothing and the standard of clothing will be performed. Already in 1994 at Magny Cours five crash helmets were taken for testing, and later at Jerez gloves, overalls, hoods, socks, boots and underclothing were likewise removed for testing. New materials are to be sought to prevent absorption or wicking of spilt fuel to avoid skin chemical injury. Such material at present available (which I wear in the race since the Berger accident at Imola) has so far proved too cumbersome to be enforced by dictate.

Future research for measures within the cockpit will encompass the possible use of frontal air bags to limit forward impact of the helmet on the steering wheel or cockpit edge, and the development of an energy absorbing seat which would serve as a spinal splint so that a driver may be extricated in the future integral with his seat.

After eighteen months' research, the Advisory Expert Group submitted to the World Council of the FIA in October 1995 a report of its activities. For 1996 the cockpit has been redesigned, with high lateral sides and energy absorbing protective padding on both sides of the driver's head, as well as behind it, which greatly reduces the forces likely to cause brain injury. The size of the cockpit has been increased to allow for this and to facilitate extrication of the driver. New seat belts were introduced in 1995 with an increased width from 50mm to 75mm. This reduces the possibility of chest injury. Work on the use of air bags has now reached the stage of evolving a suitable sensor system to fire the inflation, but which is robust enough not to fire accidentally.

Despite all this, the unpredictable is always likely to occur and the risk of injury or death can never be abolished – in motor racing as in many other sports.

OceanofPDF.com



APPENDIX I

Physiology of Motor Racing – the Limits of Human Performance



OceanofPDF.com

When I joined the Army in September 1953, a mere lieutenant in the Royal Army Medical Corps, there was planned an expedition to the Sahara Desert to investigate the physiological effects of heat on man in armoured vehicles. The Army was looking for a physiologist and, as I had a degree in physiology, I was the lucky guy. I was posted in January 1954 to the Hot Climate Physiological Research Unit in Oshodi, Nigeria. The human subjects, all volunteers, of course, from the British and Nigerian Army were exposed to different heat stresses in a climatic chamber and given various physical, mechanical or psycho-motor tests to perform. Tests were conducted to the point of physical collapse and psycho-motor failure. The subjects went into the climatic chamber once a week; I went in every day and managed to lose six stone (84 lb or nearly 40 kg) over the two years I was there.

I didn't realize at the time that much of the work would be relevant to Grand Prix racing in hot climates. However, in the last ten years the physical and thermal stresses for the drivers have become the focus of some medical attention. Research workers in Montreal, France, Italy, and more recently at the circuits, Doctors Portero and Duforez under the benevolent influence of Rhône-Poulenc, have been accumulating information about pulse rates, heart action, circulatory and respiratory problems, fluid balance, diet and metabolism and the acceleration and deceleration stresses of the G-forces sustained by the drivers.

In the early days we knew that the pulse rate and the blood pressures of the drivers responded to the psychological stress and the anxiety of the start of a race. Primitive estimations showed these to increase for most drivers – save for Jack Brabham whose pulse went down as did his blood pressure when he got into the cockpit on the grid! In fact, in the 1969 race at Monaco Jack had the rear of his car climbed over by Surtees in the tunnel and lost a rear wheel and his brakes. Exiting the tunnel on three wheels, he skilfully slid the vehicle down the barrier till it slowed and he got out and walked from the harbour to the pits. Cool as a cucumber, his pulse rate absolutely normal, his only remark was that his premature finish meant he could get

the early flight out of Nice Airport. Picking up his bag, he departed across the circuit at the end of the pit lane with a cheerful wave.

I have mentioned earlier that Pironi was more highly strung than Villeneuve, as shown by their pulse rate differences, and their differential increments in similar situations (see Tables 1 and 2, page 202). In the early Eighties much of this work was done by Doctors Richalet^{1,2} and Bertrand et al.³ from Créteil with the then two Ferrari drivers, but saloon car, endurance and motor-cycle studies were performed as well as Formula One. The differences in resting pulse and maximal pulse for Pironi and Villeneuve and the influence of the home circuit (Fiorano) compared with Formula One circuits at Dijon and Monaco are shown in Tables 1 and 2. With increasing speed at Fiorano the increasing pulse rates at two different levels for these two drivers are shown in Figure 1, page 202, each point representing a lap. Pironi's pulse rate reached nearly 200/min at the highest speeds, while that of Villeneuve never exceeded 175. The two regression lines are clearly different.

In practice in Monaco, Pironi's pulse rate peaked at 212/minute – close to the point of human tolerance – and the influence of the stress of driving on the circuit is clearly shown in Figure 2, page 203. In Figure 3, page 203, Villeneuve's responses during the second untimed practice for the French Grand Prix show the cardiac response while trying hard at the end of the session reaching a maximum of 182 but falling quickly on leaving the circuit at the end of periods of seven laps, two laps and four laps as the stress ended.

Similar cardiac rates were attained by Jean-Louis Schlesser as shown in Figure 4, page 204, in production car racing with rapid acceleration at the start, a maximum of 195/minute, and the relief to the heart rate at the end of the race. A fascinating variation of Pironi's pulse rate was shown at Le Mans according to time during the first session in Figure 5A, page 204. The acceleration of pulse rate during cornering is shown clearly in Figure 5B, page 204, while the pulse rate is at its lowest on the Mulsanne Straight, despite the speed being at its highest – where, in fact, the drivers get a bit of a rest lasting sixty seconds!!

These high pulse rates are the result of a demand placed on the heart by several factors summarized well in Figure 6, page 205, (published by Bertrand in 1983) including emotional stress, fear, anger, pressure to excel, sponsor stress, muscular exercise in driving the car, the G-forces and

vibration sustained, and increased body temperature. Clearly being 'fit' is essential to sustain these cardiac effects and drivers exercise heavily to build up muscle and stamina. Jody Scheckter used to run at altitude and in hot climates and in 1981 was so fit he won the World Superstar Championship at Key Biscayne, beating the top flight field athletes. Senna used to run in heat in Brazil during the summer with a four-day schedule of 8 km, 16 km, and 24 km on successive days, followed by a rest day. Despite this Dallaire and his colleagues from McGill University in Montreal⁴ estimated his maximal cardiac rate to be 190. These two drivers were both aware of the need for heat acclimatization as a factor in their physical performance.

The heart rate increases when working approximately 25 beats per degree of body temperature increase⁵, so the cooler one can be in a heat load the less the strain on the heart: if the body temperature increases from 99°F to 103°F, this alone drives the pulse rate from 100 to 200/minute. Heat acclimatization also increases sweat rate response at lower body temperatures, producing more efficient body cooling and also lowers the salt loss in sweat – both factors helping performance. Loss of salt, or sweat gland failure as the result of not being acclimatized produces cramps, rising body temperature and ultimately collapse.

Experiments^{6,7,8} with aircraft pilots showed that competent performance in a flight situation at temperatures of 160–200°F could only be maintained for 20 to 30 minutes. Ambient temperatures at Jacarepagua in 1982 reached 122°F (50°C) and the effect on Piquet who collapsed on the podium due to dehydration and heat effects was such that he needed intravenous fluid. Patrese in the same race showed vagaries of performance, spinning and driving the wrong way and then retiring from the race.

Dehydration due to sweating can occur at the maximal rate of two litres per hour in a man working at high ambient temperatures so that in two hours up to 8.8 lb (4 kg) can be lost in body weight. Schumacher's claim to have lost weight in excess of this (8 kg) at Interlagos in cool conditions is clearly excessive.

Endurance racing takes a heavier toll because of the length of the driving stints and the enclosed space of the vehicle providing higher temperatures. Richalet and Bertrand estimated fluid loss in Formula One drivers to be between 0.5 and 1.0 litres (1 kg) per hour of driving, while at Le Mans loss of fluid led to an increase of the blood cellular volume from 46 per cent to

56 per cent in 24 hours indicating a 20 per cent reduction of fluid circulating in the bloodstream. They recommended drinking 1.3 litres per hour of driving at Le Mans to maintain body fluids. In the Gulf War the active infantry soldiers drank one litre per hour while awake to avoid dehydration. Naccarelli, Nanni, et al. and the research group at Bologna in 1983 and 1987^{9,10} confirmed similar concentrations of blood in rally drivers with 10 to 15 per cent apparent increase of the blood cells in the circulation due to fluid loss. Losses of circulating sodium, potassium and magnesium ions were recorded, and increased production of the hormones catecholamine, cortisol and aldosterone occurred from the adrenal glands as a biological response to counteract stress.

As a result there is a severe reduction of urine production to conserve body fluid and at the end of a race the driver may have an empty bladder. (On one occasion Nigel Mansell was unable to get us a sample of urine to test until he had been rehydrated – it took about an hour to squeeze it out of him!!) In 1982 the Medical Commission of the FISA¹¹ issued guidelines for diet and fluid management for racing in Formula One, recommending that one litre be taken before the race, one or two litres during the race and two litres afterwards, accounting to approximately five litres for the day. It was also pointed out that there was no scientific basis for special liquids or special tablets to be taken before the race, and no scientific justification for the complex mixtures made by attending gurus to improve the drivers' performance to go faster.

I remember advising Ken Tyrrell and Philippe Streiff before a race at Jacarepagua that Philippe should avoid drinking his 'special mixture' to 'go faster' because he had a stomach bug and was, in fact, likely to vomit any fluid intake. He ignored this sound and paternal counsel and at the start he failed to get going. As my car passed him he was vomiting into his helmet – so I was told – and, in fact, half-filled it with his go-faster 'mixture'. I had suggested earlier that if it was the car which needed to go faster his mixture should be put into the fuel tank – much to Ken's amusement. Later that morning and before the race I had seen the Streiff guru tucking into a splendid lunch at the Tyrrell motor home while his charge sat disconsolately holding his bottle of 'supercharger'.

The G-forces sustained by a driver while cornering, accelerating or braking provide another strain, particularly on the muscles of the head, neck and shoulders. The Advisory Expert Group set up by the President of the

FIA, Max Mosley, have found as a result of Dr Harvey Postlethwaite's research twenty-seven corners where the lateral G-forces were nearly 4. This indicates that the driver's head plus helmet normally weighing 14 lb (6.5 kg) would under $\times 4$ G-forces represent a load of 57 lb (26 kg) to be controlled by the neck and shoulder muscles. Building up these muscles by exercise and weight training is a high priority and accounts for the bullish appearance of the neck and shoulders in Formula One drivers (and no doubt their bullish approach).

At Fiorano in the Eighties Bertrand and Richalet plotted the pulse rate and G-forces under cornering, braking and accelerating, showing the heart rate going up to 178 during cornering while the G-forces on the corners reached 2.9 and during accelerating and braking fell from +1.1 to -2.8 – a sum of changing 'G' of 3.9 (see Figure 7, page 205). The cars in later years, of course, and now have been much quicker than the testing figures at Fiorano. At circuits like Monaco which are tortuous, the lateral 'G' is changing from side to side all the time and produces heavy work for the neck and shoulders, as well as exhaustion – remember Mansell falling all over the circuit at the end of the race in 1992.

Vibration is also a problem and the less suspension on the car the more vibration strain is experienced by the driver. The spine receives vertical loading as the result of the car bumping over irregularities in the surface of the circuit. This compresses and decompresses the intervertebral discs in the spine, which are made of fibrous and elastic material and act as the shock absorbing system. At the same time the spinal muscles are actively maintaining posture, counteracting G-forces and working constantly to minimize the vertical stretch and compression. Kim Burton in 1983¹² and 1987¹³ with his colleague, J. Sandover from Loughborough University, found that changes in suspension of Formula One cars between 1982 and 1983 significantly decreased the back strain and spinal pain occurring in the fifteen Grand Prix drivers studied. In 1982 fourteen of the drivers complained of lumbar pain and ten of neck pain, no driver being free from pain. The cars in 1982 had virtually no suspension (ground effect cars with high aerodynamic downforce and stiff suspension). But in 1983 the FISA introduced rules reducing downforce with a 50 per cent reduction in the stiffness of the suspension. In 1983 as a result (statistically significant – $p < 0.001$) only eight drivers had back pain and only seven neck pain – so almost half the drivers had no pain. Because of the vertical forces in the

spine, disc protrusion is more likely to occur vertically in line with the spine, rather than horizontally across it (as in the usual disc protrusion) and X-rays of the spines of some Formula One drivers show these unusual appearances. Wear on the neck due to vibration and G-forces leads to early arthritic change, as it does in a variety of sportsmen – boxers, footballers and jockeys in particular. Many of the drivers now use energy-absorbing padding on the seats to reduce these problems and it is hoped eventually to provide an energy-absorbing seat which would absorb significant ‘G’ in direct rear-end crashes.

Bruising of superficially lying nerves in the arms and legs of drivers has been seen in single-seater open cars. The formerly tight constraints of the cockpit can lead to pressure and malfunction of the radial nerves which run on the outside of the upper arm just below the shoulder. Mauricio Gugelmin had such problems in a race at Detroit and lost power in his forearms so that his wrists went floppy. Ayrton Senna in Brazil and at Imola was also similarly affected. In 1991 in Brazil at the end of the race, which he won, my driver Wilson Fittipaldi and I went out to rescue him from his cockpit and the wildly happy crowd who had invaded the circuit at the end of his last lap after he had taken the flag. Ayrton was unable to get out of the car because his arms and hands were floppy and could not sustain his weight. He soon recovered, however, and before he got to the podium both arms had regained their strength and he was waving wildly and happily back to his exultant admirers.

In the worst case I have seen the nerves on the outside of the legs just below the knees (lateral popliteal nerves) had been so damaged that both feet were paralysed in one Formula 3000 driver, who took months to recover. He had floppy ankles and walked with a gait with dropped feet, lifting his knees in an exaggerated fashion – so much so that his friends claimed he had wanker’s doom in his feet rather than in his hands!

It is of interest to speculate how these many factors can affect performance in this high-profile and high-risk occupation. During the Second World War and thereafter, there was much research carried out by military and defence scientists to define the adverse factors which would produce a decrement in high performance in air pilots, naval technicians, tank and truck drivers, and submariners in the extremes of climate, discomfort and distraction. Mackworth¹⁴ and his colleagues at the Cambridge University Psychological Unit investigated the decrement of

performance during heat stress – an obvious analogy to Formula One drivers encased in heat-insulated overalls, crash helmets, in restricted cockpits with poor air flow and in hot climates. Temperature in the cockpit can reach over 40°C (104°F), often exceeding the ambient temperature. Three sorts of tasks were performed by service personnel in differing climates providing effective temperatures of 76°, 81°, 86°, 91° and 96°F. To reach these test climates meant exposure at an air movement speed of 100 ft/min with dry bulb and wet bulb temperatures respectively of 85°, 75°F; 90°, 80°F; 95°, 85°; 100°, 90°F and the hottest 105°F, 95°F.

The tasks were, firstly, a simple one of mechanical dexterity, secondly, a task requiring concentration and effort tracking a marker through a complex, tortuous pattern (like a simulator task of driving) by moving a lever damped by a heavy weight, and finally a mainly mental task of receiving wireless telegraphy messages in Morse Code. Mackworth showed that in the simple manual dexterity test exposure to even the worst climate made no statistically *significant* difference to performance in tropically unacclimatized men. But in the tasks requiring intellectual attention or performance there was a severe decrement above the effective temperature of 86°F (Dry Bulb 95°F, Wet Bulb 85°F). In the pursuitmeter task at 91°F (Dry Bulb 100°F, Wet Bulb 90°F) there was a 37 per cent failure rate in performing the task compared with 12 per cent and 18 per cent at the lower temperatures. But at 96°F (Dry Bulb 105°F, Wet Bulb 95°F) the failure rate was 76 per cent. Similar results occurred with wireless telegraphy – from a resting rate 18 to 22 per cent faulty messages at the lower temperatures, the failures rose to 33 per cent at 91°F and to 40 per cent at 96°F.

While I was in West Africa I repeated this work.¹⁵ Troops tropically acclimatized from the Nigerian Regiment of the West African Frontier Force were exposed to similar climates and performed the same tests. The effective temperature at which performance started to decline significantly and rapidly was proved to be 86°F (Dry Bulb 95°F, Wet Bulb 85°F). Failure rate with the tracking pursuitmeter task was respectively for the five climates in the last hour of a three-hour exposure were 5 per cent, 5 per cent, 10 per cent, 25 per cent and 50 per cent at the hottest exposure. In wireless telegraphy the respective failure rates were 8 per cent, 9 per cent, 9.5 per cent, 13 per cent and 28 per cent at the hottest climate.

The remarkable feature of these experiments was that a logarithmic curve of performance deficit could be calculated that was independent of the

subject's body temperature but entirely related to the ambient effective temperature conditions. Both Mackworth's curves and those I obtained followed similar trajectories, but tropically acclimatized man had a clearly lower failure rate (Figure 8, page 206).

Pursuitmeter	Mackworth	$\text{Log } Y = 0.9172 + 0.1794 X$
	Watkins	$\text{Log } Y = 0.28932 + 0.26989 X$

where Y = percentage failure and X = effective temperature

Wireless Telegraphy	Mackworth	$\text{Log } Y = 1.1077 + 0.0957 X$
	Watkins	$\text{Log } Y = 0.6957 + 0.1271 X$

where Y = percentage failure and X = effective temperature

The possibility of making driving errors in high ambient temperatures is evident, and as mentioned earlier these factors may explain hitherto inexplicable errors of behaviour, e.g. Patrese in Brazil spinning and driving the wrong way, and Mansell attempting physically to push his expired Formula One car over the finishing line at Dallas when such a performance, even if successful, could not have affected his result. When I arrived with my friend and driver Tim Evans in response to the message that a driver had collapsed at the finish I found him rolling around on the tarmac physically intact but behaving quite foolishly.

The skill of the subject in determining response to an adverse environment proved to be of great importance. In Mackworth's and my own studies (Figure 9, page 209) if the wireless operators were split into three groups according to levels of skill it was found that the exceptionally skilled showed little deterioration in performance even in the worst climate. Many people have asked me how drivers like Ayrton Senna, Jackie Stewart, Niki Lauda, Jimmy Clark and Michael Schumacher could perform brilliantly and far outstrip their fellows in heat, wet or adverse circumstances. Here is the psychomotor explanation – exceptional skill and high motivation are the significant factors in delaying or limiting deterioration in performance.

Clearly in heat stress the cardiovascular changes, tachycardia, dehydration, rising body temperature, sweat gland fatigue, poor cerebral response and hyperpyrexia will overcome all in certain circumstances, but

as the experiments with the aircraft pilots at temperatures of 160 to 200°F showed, psychological tolerance deteriorates much earlier than physical tolerance.

In summary, it can be said that driving a vibrating Formula One car, with virtually no suspension, under the emotional pressures experienced by the drivers, working physically at high ambient and body temperatures, threatened by dehydration and sustaining G-forces which increase their body weight by a factor of 4 truly represents the limits of human performance and sometimes tolerance – apart from the dangers of death or injury if a serious error of judgement or mechanical failure occurs.

References

1. Richalet, J. P., and Bertrand, C.: 'Evaluation and Perspectives of Medical Study on Race Car Drivers', Créteil, Paris, 1983.
2. Richalet, J. P., and Bertrand, C.: 'Aspect Physiologique de la Compétition Automobile', Créteil, Paris, 1983.
3. Bertrand, C., Keromes, A., Lemeunier, B. F., Meistelmann, C., Prieur, C. and Richalet, J. P.: 'Physiologie des Sports Mécaniques', 1st International Congress of Sport Automobile, Marseilles, 1983.
4. Dallaire, J., Marisi, D. Q. and Fagnan, R.: 'Reports of Motor Sport Research Group', McGill University, Montreal, 1986.
5. Ladell, W. S., and Watkins, E. S.: 'Prediction of Body Temperature from Heart Rate', *Journal of Physiology*, 135.51, London, 1956.
6. Blockley, W. V., McCutchan, J. W., and Craig, L. T.: 'Prediction of Human Tolerance for Heat in Aircraft', Wright Air Development Centre Technical Report, 53.346, 1954.
7. Blockley, W. V., and Lyman, J.: 'Psychomotor Performance of Pilots as indicated by a Task Simulating Aircraft Instrument Flight', Air Force Technical Report, 6521, Wright Patterson Air Force Base, 1951.
8. Blockley, W. V., and Lyman, J.: 'Mental Performance under Heat Stress as indicated by Addition and Number Checking Tests', Air Force Technical Report 6022, Wright Patterson Air Force Base, 1950.
9. Naccarella, F., Nanni, G., Savoia, M., Barbato, G., Accorsi, A., Caldarelli, P., Bertacinni, P., Martuzzi, M., and Brachetti, D.: 'Cardiac, Holter Monitoring and Laboristic Evaluation of Fluid, Electrolytes and

- Stress Hormone Response to Prolonged Rally Road Racing', 2nd International Conference on Sports Cardiology, Sorrento, 1987.
10. Naccarella, F., Nanni, G., Savoia, M., Accorsi, A., Caldarelli, A., Venturoli, M. G., Bertacinni, P., Bertacinni, B., Martuzzi, M., and Brachetti, D.: 'Cardiovascular and Holter Monitoring and Assessment of Fluid, Electrolytes and Hormones Response Elicited by Psycho-physical Stress of Prolonged Rally Road Racing', Bologna, 1987.
 11. Communiqué issued by Issermann, J. J., FISA Medical Commission, 1982.
 12. Burton, A. K.: 'Back Pain in Grand Prix Drivers', Brit. J. Sports Medicine, 17.150, 1983.
 13. Burton, A. K., and Sandover, J.: 'Back Pain in Grand Prix Drivers; a "found" experiment', Applied Ergonomics, 18.1, 1987.
 14. Mackworth, N. H.: 'Researches on the Measurement of Human Performance', Medical Research Council Special Report, no.268, 1950.
 15. Watkins, E. S.: 'The Effect of Heat on Psychomotor Efficiency with particular reference to Tropical Man', M.D. Thesis, University of Liverpool, and reports to Medical Research Council, West Africa, 1956.

	FIORANO	DIJON	MONACO
D.P.	70	90	100
G.V.	70	80	–

Table 1: *The resting pulse rate for Didier Pironi and Gilles Villeneuve. Fiorano is their home circuit.*

	FIORANO	DIJON	MONACO
D.P.	178	191	198
G.V.	163	182	–

Table 2: *The maximal pulse rate for Didier Pironi and Gilles Villeneuve. Both trials showed that Pironi was more highly strung.*

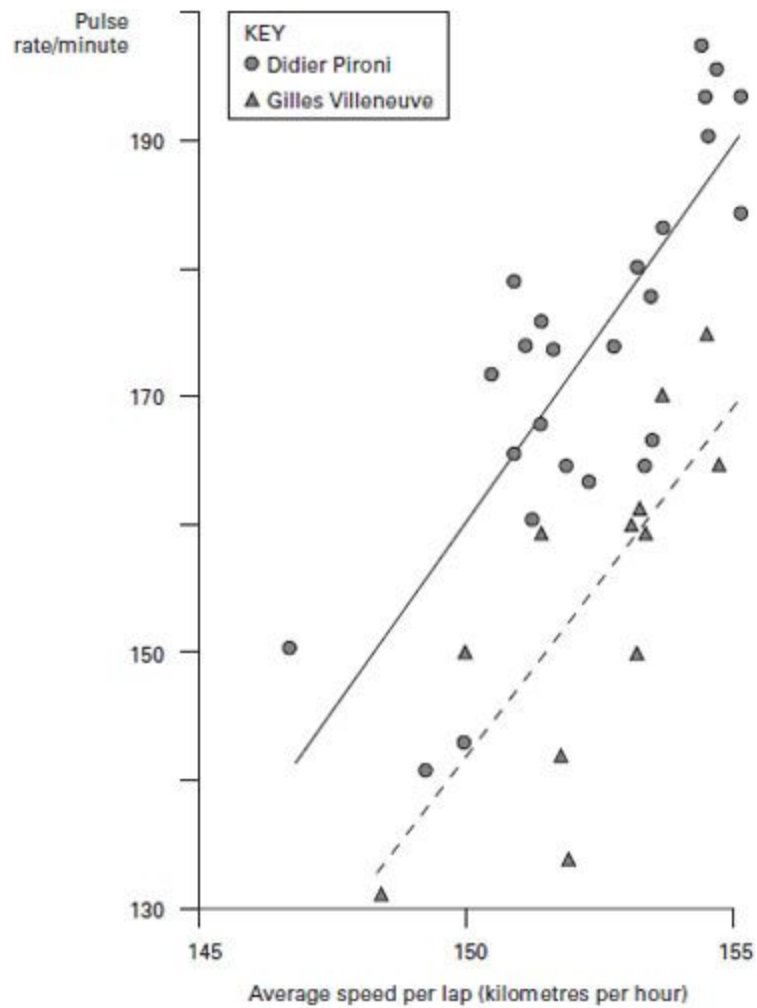


Figure 1: Formula One trials at Fiorano. Each point represents a lap. Notice how Pironi's pulse rate reached nearly 200 beats per minute at the highest speeds while Villeneuve's barely exceeded 175.

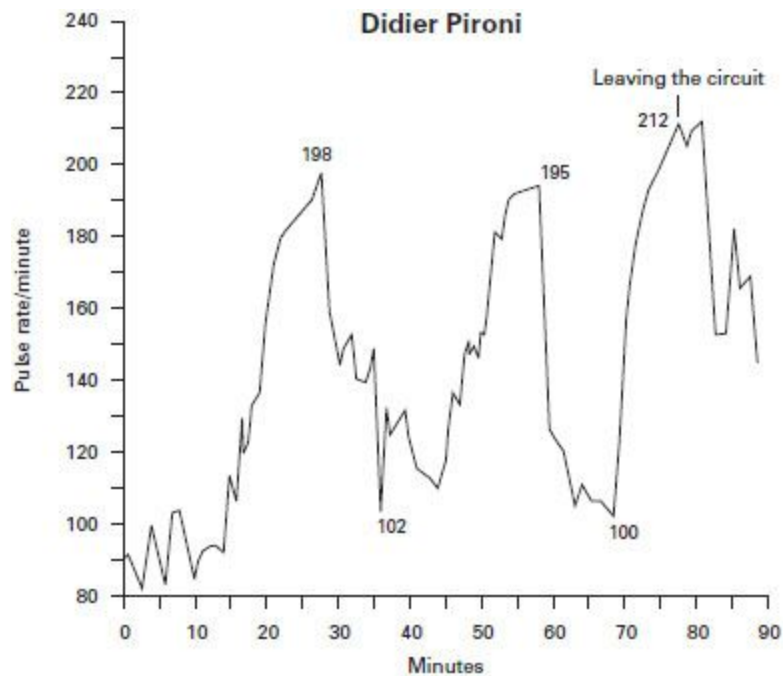


Figure 2: Monaco: Formula One practice. Didier Pironi's pulse rate reflects the stress of driving on the circuit.

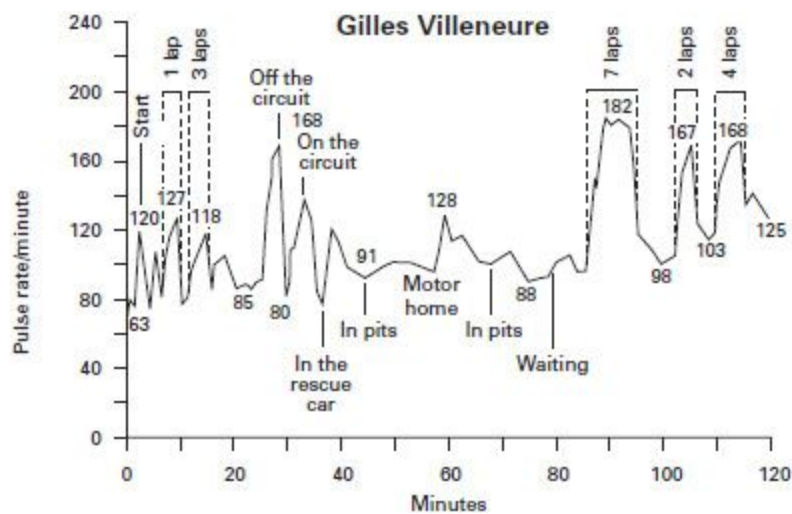


Figure 3: During the second series of non-qualifying practice, Villeneuve's cardiac response reached a maximum of 182.

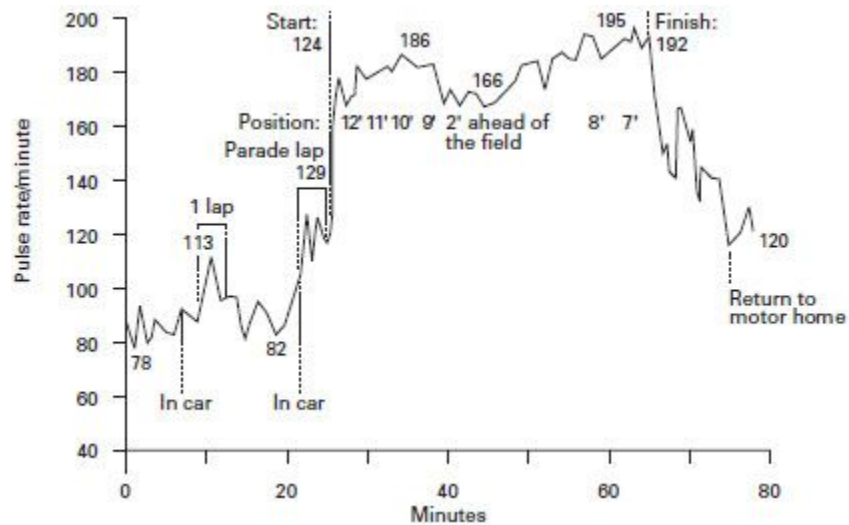


Figure 4: Cardiac rates for Jean-Louis Schlesser in production car racing show rapid acceleration at the start, a maximum of 195/minute, and relief at the end of the race.

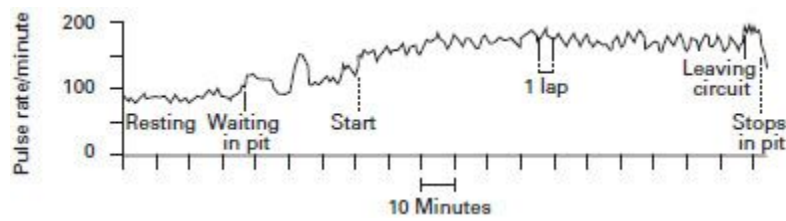


Figure 5A: Variations in Pironi's pulse rate during 24 hours at Le Mans against time (2 hours). First session.

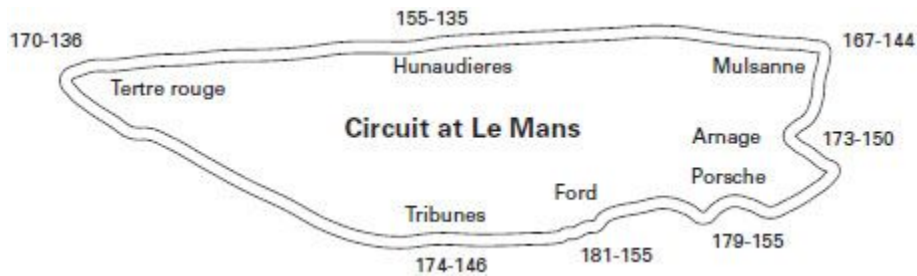


Figure 5B: Variations in Pironi's pulse rate, mean of 8 laps. The first figure relates to the first driving session and the second to the fourth and final driving session. The pulse rate is at its lowest on the Mulsanne Straight despite the speed being at its highest.

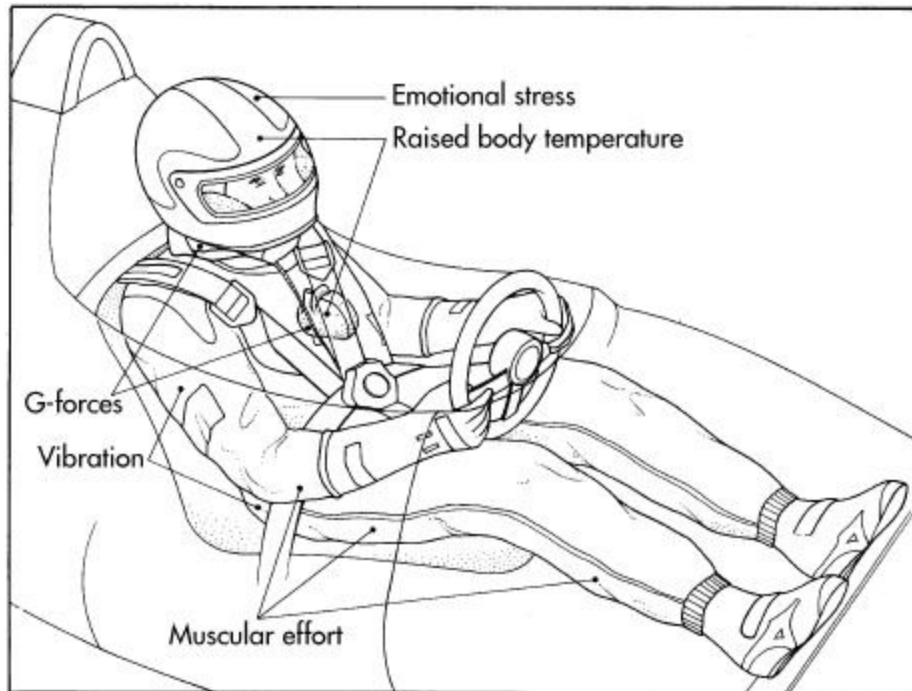


Figure 6: Emotional and physical stresses experienced by a Formula One driver.

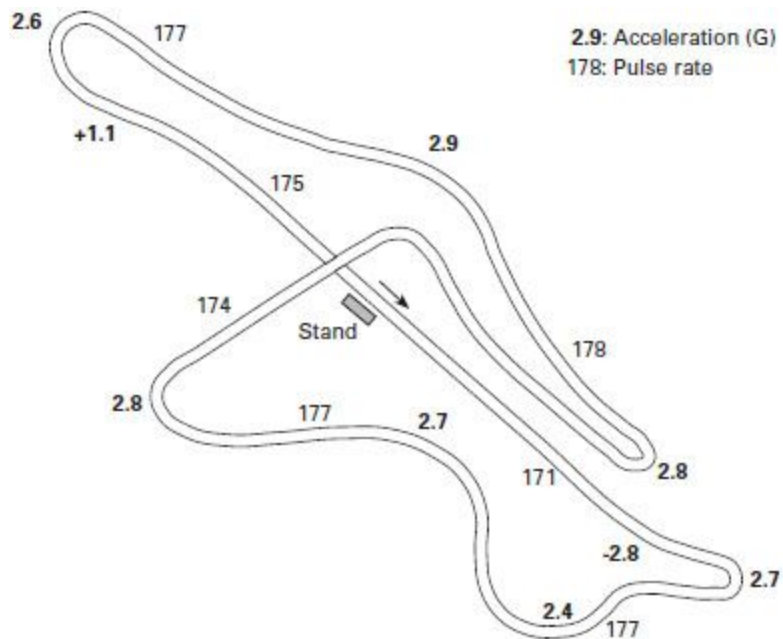
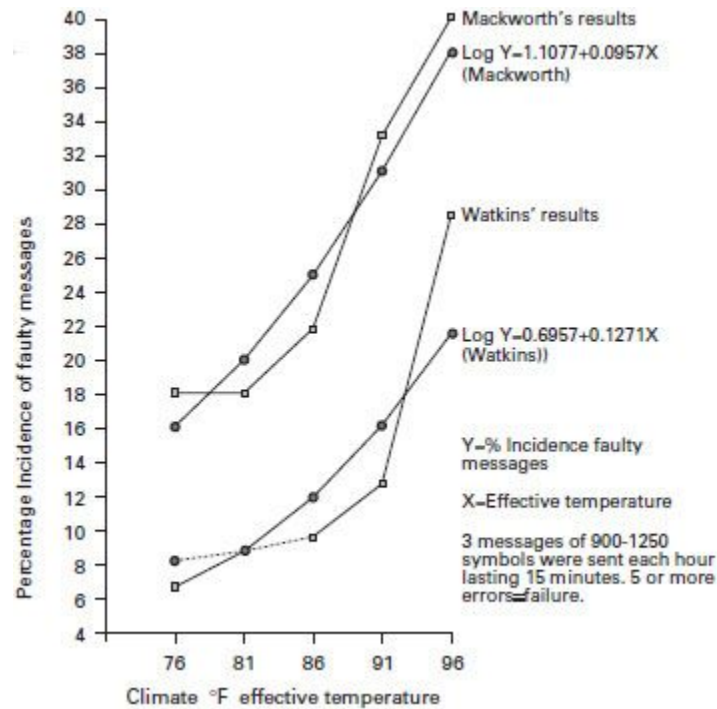
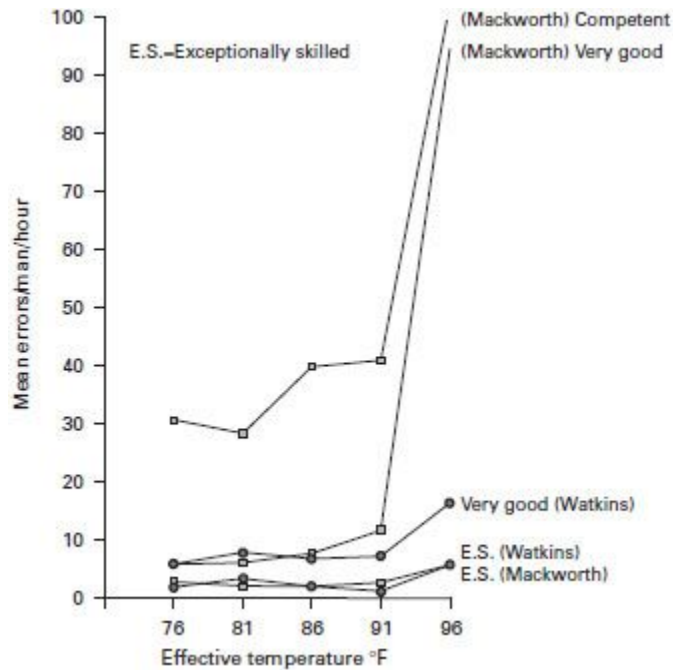


Figure 7: Pulse rate and G-forces under cornering, breaking and accelerating at Fiorano. The heart rate goes up to 178 during cornering while the G-force on the corners reaches 2.9.



Percentage Incidence Faulty Messages

Figure 8: Percentage incidence of faulty messages with climate and logarithmic curves of performance compared on the same scale.



Ability

Figure 9: Errors/man/hour classed by ability.

OceanofPDF.com



APPENDIX II

Safety in Grand Prix racing from 1963 to 1996



OceanofPDF.com

		INTRODUCTION
PERIOD	ACCIDENTS	CARS
1963–1967	GP races: 50 Estimated racing kms: 256.000 Accidents in races: 47 Severe injuries, drivers: 21 Fatalities, drivers: 3 Fatalities, officials: 0 Fatalities, spectators: 0	1963–65: Pump fuel only. Automatic starter; rollbar; double braking system; rules for seatbelt anchorages, fire protection, fuel tanks, fillers and breathers.
1968–1972	GP races: 59 Estimated racing kms: 227.000 Accidents in races: 88 Severe injuries, drivers: 31 Fatalities, drivers: 4 Fatalities, officials: 0 Fatalities, spectators: 0	1968: Electrical circuit breaker; reverse gear; cockpit designed for easy evacuation; oil catch tank; rollbar 5 cm above driver's helmet. 1969: Two extinguisher systems; parts with aerodynamic influence must be immobile, fixed to sprung parts of car only; maximum bodywork height & width limits. 1970: Safety bladder fuel tanks. 1972: Safety foam in fuel tanks; no
		magnesium sheet less than 3mm thick; 15W red rear light; headrest; minimum cockpit dimensions; combined electrical cut-off/ extinguisher external handle; FIA/spec/FT3 fuel tank.
1973–1977	GP races: 77 Estimated racing kms: 446.000 Accidents in races: 250 Severe injuries, drivers: 51 Fatalities, drivers: 5 Fatalities, officials: 1 Fatalities, spectators: 6 N.B: the spectators killed had all penetrated prohibited areas.	1973: Crushable structure round fuel tank; no chrome plating of suspension parts. 1974: Self-seal breakaway fuel coupling. 1976: 'Safety structures' around dashboard and pedals. 1977: Pedalbox protection defined.
1978–1982	GP races: 76 Estimated racing kms: 399.000 Accidents in races: 283 Severe injuries, drivers: 3 Fatalities, drivers: 3 Fatalities, officials: 1 Fatalities, spectators: 0	1978: Bulkhead behind driver and front rollbar defined. 1979: Bigger cockpit opening; 2 mirrors; improved extinguisher system. 1981: Reinforced 'survival cell' introduced and extended in front of driver's feet.

OF SAFETY REGULATIONS BY THE FIA		
CIRCUIT	DRIVERS	ORGANISATION
FIA begins taking over responsibility for circuit safety inspections from national authorities.	Protective helmet and overalls obligatory.	1963: Flag signalling code.
1970: Considerations on circuit design published: track verges minimum 3m.; double guardrails; spectators at least 3m. behind fencing; barrier between pitlane and track; track width, surface and gradient change regulations; strawbales banned; mandatory FIA inspections.	1968: Recommendations on seat harnesses, fire-resistant clothing, shatter-proof visors. 1971: Max. 5 seconds for driver evacuation from cockpit. 1972: 6-point harness. Drivers' Code of Conduct published. 1973: International medical	1971: Personnel, equipment and duties in race supervision, marshalling signals.
1972: Circuit Safety Criteria published; debris fence specifications.	card & examination for all drivers.	
1973: Catchfences; rescue equipment; starting grid dimensions. 1974: Catchfences + sand. 1975: Marshal posts; service roads. 1977: Gravel arrester beds defined.	1975: FIA standard for fire resistant clothing. 1977: Helmets must be to FIA-approved standards.	1973: Fire service regs. 1974: 2x2 staggered starting grid with 12m length per car. 1975: Medical service; resuscitation centre; obligatory rescue exercise.
1980: Obligatory permanent medical centre. 1981: Tyre barriers; pitlane minimum width 10m.	1978: Licence qualification requirements. 1979: Life support system (medical air) obligatory.	1978: Grid 14m per car. 1979: FIA-appointed permanent race starter. 1980: FIA approval of medical service obligatory; fast rescue car regulations. 1981: Grid 1x1x1.

		INTRODUCTION
PERIOD	ACCIDENTS	CARS
1983–1987	GP races: 79 Estimated racing kms: 428.000 Accidents in races: 218 Severe injuries, drivers: 2 Fatalities, drivers: 0 Fatalities, officials: 0 Fatalities, spectators: 0	1983: Flat bottom obligatory; skirts banned; red light increased to 21W. 1984: Refuelling in races banned; fuel tank in centre of car. 1985: Frontal crash test.
1988–1992	GP races: 80 Estimated racing kms: 478.000 Accidents in races: 305 Severe injuries, drivers: 1 Fatalities, drivers: 0 Fatalities, officials: 0 Fatalities, spectators: 0	1988: Driver's feet behind front wheel axis; static crash test of survival cell and fuel tank. 1990: Larger mirrors; quickly detachable steering wheel. 1991: FIA tested seatbelts; FT5 fuel tanks; rollbar test; dynamic test of survival cell. 1992: More severe tests with 75kg dummy and water-filled fuel tank.
1993–1996	GP races: 49 Estimated racing kms: 191.000 Accidents in races: 248 Severe injuries, drivers: 2 Fatalities, drivers: 2 Fatalities, officials: 0 Fatalities, spectators: 0	1993: Deceleration values for chest load reduced to less than 60G in dummy in crash test. Minimum cross-section of roll hoop must be 100sq cm minimum at 5cm below top 1994: May. Reduced downforce from diffuser and front wing end plates enforced. 1994: June. Confor foam head rest protection behind head introduced. Pump petrol imposed. Airbox holes introduced to reduce ram effect and engine performance. 1994: July. Skid block plate introduced to increase ride height. 1995: Side impact test for cockpit. Increased impact speed for frontal crash test. Increased side load test on nose box. Minimum height of survival cell increased by 10cm. Mandatory headrest protection posterior of 7.5cm. Confor foam. Width of seat belts increased for chest protection from 5.0cm to 7.5cm. Engine size reduced from 3.5 to 3.0 litres. Race car weight limit to include driver, clothing and helmets.

OF SAFETY REGULATIONS BY THE FIA (Cont.)		
CIRCUIT	DRIVERS	ORGANISATION
<p>1984: Concrete wall may replace guardrails.</p> <p>1985: Catchfences banned.</p> <p>1987: Criteria for temporary circuits.</p>	<p>1984: F1 'Super licence' required.</p>	<p>1986: Permanent FIA medical service inspector; medical helicopter obligatory.</p> <p>1987: Grid 16m per car.</p>
<p>1989: Trackside barrier min. height 1m.; pitwall min. 1m35.</p> <p>1992: Kerbs lowered; pitlane min. width 12m.; pit entry chicane obligatory.</p>	<p>1989: Anti dope testing regulations (test results all negative to date).</p>	<p>1988: Permanent FIA race director.</p> <p>1990: Driver extrication exercise obligatory.</p> <p>1992: Safety Car introduced.</p>
<p>1994: Circuit configuration changes to reduce the number of high level G corners.</p> <p>1995: Increased tyre barriers. Increased gravel beds and run-off areas</p>	<p>1994: Random testing of crash helmets, racing overalls, balaclava and gloves by post-race testing to FIA standards.</p> <p>1995: Anti dope testing – all results negative.</p>	<p>1995: Permanent FIA Safety Delegate/Starter and Permanent FIA Race Director appointed.</p> <p>1996: Separate Permanent FIA Starter appointed. New start lights procedure.</p>

		INTRODUCTION
PERIOD	ACCIDENTS	CARS
1993–1996 (<i>Cont.</i>)		1996: Increased neck and head protection 7.5cm Confor foam. Cockpit sides raised to increase lateral protection. Automatic closure of fuel breathers in case car overturns.

NOTE: 'Estimated kms.' refers to racing only; practice sessions at events would increase this by up to 150%.

NOTE: Since 1969 the FIA has continuously adjusted the dimensions of bodywork and tyres in order to control performance and cornering speeds.

OF SAFETY REGULATIONS BY THE FIA (<i>Cont.</i>)		
CIRCUIT	DRIVERS	ORGANISATION



APPENDIX III A

Grand Prix Medical Facilities



OceanofPDF.com

MEDICAL HQ		
Size	.....
Facilities	.....
Capability	.....
TRACKSIDE AMBULANCES		
Number	.....
VEHICLES WITH DOCTOR		
Number	.....
Type	.....
Suitability	.....
TECHNIQUE		
Resuscitation	.....
Assessment	.....
Stabilisation	.....
EVACUATION	Distance	Road Time
Local hospital	.....	.....
Area hospital	.....	.....
Specialty facilities	.....	.....
AIR EVACUATION		
Practice Days	.....
Race Day	.....

CIRCUIT MEDICAL PERSONNEL

Number

Type

Orientation

CIRCUIT NURSING PERSONNEL

Number

SPECIAL INFORMATION REGARDING FACILITIES

.....



APPENDIX III B

Fédération Internationale du Sport Automobile

F1 World Championship – Grand Prix Questionnaire



OceanofPDF.com

The following questionnaire is to be completed and returned to the FISA Circuit Check Inspector six weeks prior to the GRAND PRIX together with:

- i. A circuit plan showing all emergency evacuation routes.
- ii. Written confirmation of hospital awareness of Race and Practice time schedules.
- iii. Written confirmation that practice sessions will be fully manned.

DETAILS REQUIRED

1. CIRCUIT

2. DATE OF RACE

3. NAMES OF OFFICIALS

TELEPHONE NUMBERS

(a) CLERK OF THE COURSE _____

(b) CIRCUIT DIRECTOR _____

(c) CHIEF MEDICAL OFFICER _____

(d) CHIEF SCRUTINEER _____

(e) ASN STEWARD _____

(f) FISA OBSERVER _____

4. MEDICAL HEADQUARTERS FACILITIES

	YES	NO		YES	NO
(a) Permanent	<input type="checkbox"/>	<input type="checkbox"/>	(i) Direct Telephone	<input type="checkbox"/>	<input type="checkbox"/>
(b) Number of Rooms _____			(j) Radio Links	<input type="checkbox"/>	<input type="checkbox"/>
(c) Floor Space _____ sq. m.			(k) Decontamination Shower	<input type="checkbox"/>	<input type="checkbox"/>
(d) Electric Lighting	<input type="checkbox"/>	<input type="checkbox"/>	(l) Refrigerator	<input type="checkbox"/>	<input type="checkbox"/>
(e) Electric Power	<input type="checkbox"/>	<input type="checkbox"/>	(m) Security Fence/Guard	<input type="checkbox"/>	<input type="checkbox"/>
(f) Water Supply	<input type="checkbox"/>	<input type="checkbox"/>	(n) Ambulance Parking	<input type="checkbox"/>	<input type="checkbox"/>
(g) Hot Water Supply	<input type="checkbox"/>	<input type="checkbox"/>	(o) Helicopter Pad	<input type="checkbox"/>	<input type="checkbox"/>
(h) Heating	<input type="checkbox"/>	<input type="checkbox"/>	(p) Number of Ambulances _____		

5. MEDICAL FACILITIES AND EQUIPMENT AT HEADQUARTERS

	YES	NO		YES	NO
(a) Oxygen	<input type="checkbox"/>	<input type="checkbox"/>	(h) Cervical Traction Apparatus	<input type="checkbox"/>	<input type="checkbox"/>
(b) Power Suction	<input type="checkbox"/>	<input type="checkbox"/>	(i) Burr Hole Capacity	<input type="checkbox"/>	<input type="checkbox"/>
(c) Anaesthetic/ Ventilator Machine	<input type="checkbox"/>	<input type="checkbox"/>	(j) Arterial Injury Control	<input type="checkbox"/>	<input type="checkbox"/>
(d) ECG/Defibrillator	<input type="checkbox"/>	<input type="checkbox"/>	(k) Blood Transfusion	<input type="checkbox"/>	<input type="checkbox"/>
(e) Resuscitation Table	<input type="checkbox"/>	<input type="checkbox"/>	(l) IV Infusions Rheomacrodex	<input type="checkbox"/>	<input type="checkbox"/>
(f) Chest Drainage Tubes/Suction	<input type="checkbox"/>	<input type="checkbox"/> Mannitol	<input type="checkbox"/>	<input type="checkbox"/>
(g) Splints Thomas/ Inflatable	<input type="checkbox"/>	<input type="checkbox"/> Haemocil	<input type="checkbox"/>	<input type="checkbox"/>

6. MEDICAL SPECIALISTS AT HEADQUARTERS

(NAMES)	1st Practice	2nd Practice	RACE
(a) ANAESTHETIST	_____	_____	_____
(b) GENERAL/THORACIC	_____	_____	_____
(c) ORTHOPAEDIC SURGEON	_____	_____	_____
(d) PLASTIC/BURNS SURGEON	_____	_____	_____
(e) NEUROSURGEON	_____	_____	_____
(f) NURSING/PARAMEDIC	_____	_____	_____

7. TRACKSIDE MEDICAL OFFICERS

Post No	NAME	SPECIALITY	1st Day	2nd Day	RACE
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

8. TRACKSIDE NURSES/PARMEDICS

	1st Practice	2nd Practice	RACE
(insert names if possible	_____	_____	_____
if not supply numbers of	_____	_____	_____
nurses/paramedics that	_____	_____	_____
will be available on each	_____	_____	_____
day. Note number who	_____	_____	_____
are intubationists each	_____	_____	_____
day).	_____	_____	_____

9. TRACKSIDE AMBULANCES

	Practice Days	Race Day
Number Available	_____	_____
	_____	_____

10. FAST INTERVENTION VEHICLE

	Practice Days	Race Day
Number Available	_____	_____
WITH DOCTORS	_____	_____
WITHOUT DOCTORS	_____	_____

11. EVACUATION FACILITIES

	HOSPITAL	SPECIALIST	ROAD TIME	HELICOPTER TIME
(a) PRIMARY	_____	_____	_____	_____
(b) GENERAL SURGERY	_____	_____	_____	_____
(c) ORTHOPAEDIC	_____	_____	_____	_____
(d) NEUROSURGERY	_____	_____	_____	_____
(e) CARDIOTHORACIC	_____	_____	_____	_____
(f) BURNS/PLASTIC	_____	_____	_____	_____

12. MEDICAL HELICOPTER FACILITIES

- (a) NUMBER AVAILABLE _____ PRACTICE DAYS _____ RACE DAYS _____
- (b) SIZE NUMBER OF PERSONNEL _____
- (c) NUMBER OF PATIENTS CARRIED ON STRETCHERS _____
- (d) EQUIPMENT _____

YES NO

- IV DRIP
- OXYGEN
- VENTILATOR
- ECG/DEFIBRILLATOR

13. FIRE FIGHTING VEHICLES

	PRACTICE DAYS	RACE DAY
Number Available	FAST MOBILE _____	_____
	HEAVY _____	_____
	SPECIAL _____	_____

14. TOW TRUCKS/RECOVERY VEHICLES

Number Available	LIGHT _____	HEAVY _____
------------------	-------------	-------------

15. MEDICAL FAST INTERVENTION VEHICLE

ONE FAST INTERVENTION VEHICLE EQUIPPED WITH CIRCUIT RADIO (Medical HQ and Race Control Channels) AND CAPABLE OF CARRYING A DRIVER, THE FISA DOCTOR, AN ANAESTHETIST AND MEDICAL EQUIPMENT, MUST BE AVAILABLE AT ALL TIMES DURING PRACTICE AND RACING.

IT MUST BE PERMITTED TO FOLLOW THE FIRST RACING LAP OF THE GRAND PRIX.

THE DRIVER OF THIS CAR SHOULD PREFERABLY BE A RACING DRIVER

FAMILIAR WITH THE CIRCUIT.

APPROVAL OF THE DRIVER MUST BE GIVEN BY THE CIRCUIT CHECK INSPECTOR.

16. RESPONSIBILITY

It is the responsibility of the CHIEF MEDICAL OFFICER and the SECRETARY OF THE MEETING to complete this Questionnaire and return it to the Check Inspector.



APPENDIX III C

Medical Services Questionnaire Events of the FIA Championships on Circuits



OceanofPDF.com

The following questionnaire is to be completed and returned to the FIA 2 MONTHS prior to the event, together with:

- i. A circuit plan, clearly showing:
 - a) the location of:
 - intervention vehicles with doctor on board;
 - normal or intensive care ambulances with doctor;
 - rescue vehicles;
 - extrication teams;
 - trackside doctors on foot or with a light vehicle;
 - ambulances without doctors.
 - b) routes to be used for emergency evacuations.
- ii. Written confirmation that the hospitals are fully aware of Race and practice time schedules.
- iii. Written confirmation that the required personnel will be present from the start of the first practice session until the end of the race.
- iv. A copy of the rescue plan (see FIA medical regulations 9.2e).

Note: Send only i a), i b) and iv):

- if your circuit is new or has been modified, or if you are filling in this questionnaire for the first time,
- if you have modified your rescue service this year.

DETAILS REQUIRED:

1. CIRCUIT:

2. DATE OF RACE:

3. NAMES OF THE OFFICIALS:

a) Clerk of the Course
Address:

Telephone no: Fax no:

b) Circuit Director
Address:

Telephone no: Fax no:

c) Chief Medical Officer
Address:

Telephone no: Fax no:

4. MEDICAL CENTRE:

YES NO

(a) Permanent ☐ ☐

(b) Total number of rooms:
 . reserved for resuscitation
 - number of beds
 . reserved for current treatment
 - number of beds

(c) Floor space sq.m.

(d) Electric lighting ☐ ☐

(e) Electric power ☐ ☐

(f) Water supply	<input type="checkbox"/>	<input type="checkbox"/>
(g) Hot water supply	<input type="checkbox"/>	<input type="checkbox"/>
(h) Heating	<input type="checkbox"/>	<input type="checkbox"/>
(i) Direct telephone	<input type="checkbox"/>	<input type="checkbox"/>
(j) Radio links	<input type="checkbox"/>	<input type="checkbox"/>
(k) Shower	<input type="checkbox"/>	<input type="checkbox"/>
(l) Refrigerator	<input type="checkbox"/>	<input type="checkbox"/>
(m) Security fence/Guard	<input type="checkbox"/>	<input type="checkbox"/>
(n) Ambulance parking	<input type="checkbox"/>	<input type="checkbox"/>
(o) Helicopter pad	<input type="checkbox"/>	<input type="checkbox"/>
(p) Number of ambulances stationed at the medical centre	.....
(q) Is the centre reserved exclusively for the track?	<input type="checkbox"/>	<input type="checkbox"/>
(r) Does the centre have direct access to the track?	<input type="checkbox"/>	<input type="checkbox"/>
<i>(IF POSSIBLE, ATTACH A PLAN OR PHOTOGRAPHS)</i>		
5. EQUIPMENT STOCKED AT THE MEDICAL CENTRE:		
(a) Compulsory FIA list, in sufficient quantity to equip two resuscitation beds:		
	QUANTITY	YES NO
– Stethoscope	<input type="checkbox"/> <input type="checkbox"/>
– Tensiometer	<input type="checkbox"/> <input type="checkbox"/>
– Manual ventilation	<input type="checkbox"/> <input type="checkbox"/>
– Mechanical ventilation	<input type="checkbox"/> <input type="checkbox"/>

- Reserve of oxygen	<input type="checkbox"/>	<input type="checkbox"/>
- Suction apparatus	<input type="checkbox"/>	<input type="checkbox"/>
- Casualty immobiliser (bean bag)	<input type="checkbox"/>	<input type="checkbox"/>
- Intubation unit	<input type="checkbox"/>	<input type="checkbox"/>
- Tracheotomy unit	<input type="checkbox"/>	<input type="checkbox"/>
- Unit containing sterilised surgical instruments including vascular clamps	<input type="checkbox"/>	<input type="checkbox"/>
- Sterile burn dressings	<input type="checkbox"/>	<input type="checkbox"/>
- Unit for central or peripheral venous infusion with adaptable needles	<input type="checkbox"/>	<input type="checkbox"/>
- Apparatus for thoracostomic drainage	<input type="checkbox"/>	<input type="checkbox"/>
- First aid medical box	<input type="checkbox"/>	<input type="checkbox"/>
- Various crystalloid solutions and solutions containing large molecules (plasma expanders)	<input type="checkbox"/>	<input type="checkbox"/>
- Defibrillation unit	<input type="checkbox"/>	<input type="checkbox"/>
- Unit for checking the functioning of the heart (possibility of remote transmission)	<input type="checkbox"/>	<input type="checkbox"/>
- Inflatable devices for the setting and retention of fractures	<input type="checkbox"/>	<input type="checkbox"/>
- Cervical collar	<input type="checkbox"/>	<input type="checkbox"/>

Optional:

- | | | | |
|-------------------------------|-------|--------------------------|--------------------------|
| - Inflatable anti-shock suit | | <input type="checkbox"/> | <input type="checkbox"/> |
| - Cervical traction apparatus | | <input type="checkbox"/> | <input type="checkbox"/> |

(b) Equipment 'not on the list', for traditional or other examinations, and
foreseen stocks:

.....
.....

6. TRACKSIDE EQUIPMENT:

	QUANTITY	YES	NO
(a) At least one is compulsory:			
- KED ou RED type vertebral immobilising extractor	<input type="checkbox"/>	<input type="checkbox"/>
(b) In all cases it is compulsory for the following to be brought to an injured person:			
- Intervention box for resuscitation	<input type="checkbox"/>	<input type="checkbox"/>
- Casualty immobiliser	<input type="checkbox"/>	<input type="checkbox"/>
- Surgical cervical collar	<input type="checkbox"/>	<input type="checkbox"/>
(c) Other trackside equipment (not compulsory):			
- Cardioscope/defibrillator	<input type="checkbox"/>	<input type="checkbox"/>
- Scoop stretcher	<input type="checkbox"/>	<input type="checkbox"/>
- Other	<input type="checkbox"/>	<input type="checkbox"/>

7. MEDICAL CENTRE PERSONNEL:

A) Compulsory medical specialists:

(From here on, answer only YES or NO)

Prior to the 1st practice session, hand the nominal list to the FIA Medical Delegate, for F.1;

For F.3000, in the absence of a Medical Delegate, hand the nominal list to the Permanent Steward of the Meeting.

	1st Practice day	2nd Practice day	RACE
(a) 2 Anaesthetists:

(b) General/thoracic surgeon:
(c) Orthopaedic surgeon competent for treating spinal injuries:
B) Para-medical: (Indicate only the number and speciality):			

8. TRACKSIDE MEDICAL OFFICERS:

**(If you wish, from here on, indicate the post numbers and place a cross
for each corresponding heading)**

Prior to the 1st practice session, hand the nominal list to the FIA Medical Delegate, for F.1;

For F.3000, in the absence of a Medical Delegate, hand the nominal list to the Permanent Steward of the Meeting.

Post No	1st Day Name & qualificat.	2nd Day Name & qualificat.	Race Name & qualificat.
---------	-------------------------------	-------------------------------	----------------------------

(a) Doctors 'on foot':

(b) Doctors with a vehicle (apart from intervention vehicles):

(c) Fast intervention vehicle doctors (must be skilled in resuscitation):

(d) Doctors with ambulances:

(e) Doctors with extrication team:

All the doctors a), b), c) and the extrication teams e) must wear regulation medical overalls; for d) and the doctors in the medical centre, 'Hospital' type clothing is sufficient.

9. TRACKSIDE AMBULANCES:

		Practice days	Race day
Number available	NORMAL	.....	.....
	SPECIAL	.....	.....
Post no		.....	.....

10. HOSPITALS APPROACHED AND GIVING A POSITIVE ANSWER:

The replies from the hospitals must be received before the first practice session.

For F.1: to the FIA Medical Delegate;

For F.3000, in the absence of a Medical Delegate, to the Permanent Steward of the Meeting.

SPECIALITY	NAME & PLACE	HEAD OF DEPT	JOURNEY TIME		
			Road	HELICOP. direct	HELICOP. indirect*
Multiple injuries 1					
2					
General surgery 1					
2					
Neurosurgery					

Cardiothoracic					
Severe burns					
Orthopaedic					

* In the event of helicopter transport requiring transfer, indicate the total real time required.

11. MEDICAL HELICOPTERS (must be present for FIA inspection at least 60 minutes before the start of practice):

(a) Number provided Practice days Race day

(b) Type Number of personnel

(c) Number of patients able to be transported lying down

(d) Equipment:

	1st YES/NO		2nd YES/NO	
- IV Drip	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Ventilator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- ECG/Defibrillator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Oxygen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Other				

.....
.....
. Carried permanently on board the helicopter:

. Brought on site in case of accident:

12. EXTRICATION TEAM (compulsory):

- Number of extrication teams made up of at least 6 persons, including a doctor:

- For each team, is the entire team located in one single vehicle?

YES NO

- If it is not, in how many vehicles is each team divided up?

- Do these teams undergo regular training?

YES NO

Note: A SAFETY EXERCISE is compulsory for each event, using either an F.1., or F.3000 car as appropriate. Unless there is a case of force majeure, it must be carried out before the first official practice, with or without the KED (or similar device).

13. FISA MEDICAL FAST INTERVENTION VEHICLE (F.1):

1 fast intervention vehicle equipped with circuit radio (Medical Centre and Race Control Channels) and capable of carrying a racing driver, the FIA Doctor, an anaesthetist and first aid equipment, must be available at all times during practice and the race.

This vehicle must be permitted to follow the cars on the first racing lap of the event.

The driver of this car should preferably be a racing driver familiar with the circuit.

Approval of the driver must be given by the circuit check inspector.

14. RESPONSIBILITY

It is the responsibility of the Chief Medical Officer and the Secretary of the Meeting to complete this questionnaire and return it to the Check inspector.

I, THE UNDERSIGNED:

Chief Medical Officer of:

confirm that I have contacted the designated hospitals, and undertake to hand in, prior to the first practice session, the replies from the hospitals contacted and the list of medical personnel present on the circuit (centre and track).

I also confirm that the material mentioned in the present questionnaire will be present in the required quantity and quality.

Date: Signature:



APPENDIX III D

Check Report on the Medical Services at Circuit Events

Circuit Facilities



OceanofPDF.com

Name of the event:

Date of the intervention:

P.S.: (All notes and comments at the end of the report).

1) MEDICAL QUESTIONNAIRE:

handed in:	Before:	Complete/Incomplete:
not received:	Modified on site:	Partially/Totally:
	Completed on site:	Partially/Totally:

2) MEDICAL CENTRE:

Already seen:	Unchanged:
Modified:	Equipment:
	Preparations:

First visit:

- Location:	Central:	Distant:
- Access:	Easy:	Difficult:
- Isolation:	Mediocre:	Average: Good:
- Disposition:	Mediocre:	Average: Good:
- Non-medical		

equipment (water, WC, etc.):	Complied:	Did not comply:
- Transmissions:	Complied:	Did not comply: Absent:
- Medical equipment:	Insufficient:	Complied: More extensive:
- Additional equipment:	Radiography:	Echotomo: Other:
- Medical and paramedical personnel:	Complied:	Incomplete: More extensive:

3) HELICOPTER:

Nombre:	Type:	Capacity for injured persons:
---------	-------	-------------------------------

Origin:	Private:	Administration: Civil:
		Military:

Helicopter on stand-by:	YES/NO:	Type:
-------------------------	---------	-------

- DZ:	Close:	At a short distance/Ambulance transfer:
-------	--------	---

- Basic equipment		
-------------------	--	--

on arrival:	Present:	Absent:
-------------	----------	---------

- Punctuality:	Yes:	No:
----------------	------	-----

- Delay in minutes:	Friday:	Saturday:	Sunday:
---------------------	---------	-----------	---------

- Case of force majeure:	Yes:	No:
--------------------------	------	-----

4) HOSPITALS:

Already seen:	First visit: (see appendix):
---------------	------------------------------

5) TRACKSIDE EQUIPMENT:

- 'Extrication Team'			
----------------------	--	--	--

equipment:	Did not comply:	Complied:
------------	-----------------	-----------

- Fast car		
------------	--	--

equipment:	Did not comply:	Complied:	Better:
------------	-----------------	-----------	---------

- Ambulance		
-------------	--	--

equipment:	Did not comply:	Complied:	Better:
------------	-----------------	-----------	---------

- KED or similar:	Yes:	No:	How many?
-------------------	------	-----	-----------

- Casualty		
------------	--	--

immobiliser:	Yes:	No:	How many?
--------------	------	-----	-----------

- Cervical collar:	Yes:	No:	How many?
--------------------	------	-----	-----------

6) TRACKSIDE PERSONNEL (Medical and paramedical for ambulances, Extrication, Fast Car and Track Posts):

- Complying with the questionnaire: Yes: No:
- Modified: Yes: No:
- Punctuality: Yes: No:
- Case of force majeure: Yes: No:

7) SAFETY EXERCISE:

- | | | |
|--|------------|--------------------------|
| Not performed: | Performed: | with KED: |
| | | without KED: |
| - With driver: | Yes: | No: |
| - Number of cars involved: | | |
| - Acceptability TEAM and DRIVER: | Good: | Bad: |
| - Number of extrication teams concerned: | Day: | Time: |
| - Running: | Mediocre: | Average/Good: Very good: |
| - Reality of the training of the teams: | Yes: | No: |

8) CHIEF MEDICAL OFFICER:

- | | | | |
|--------------------|-----------------|-----------|--------|
| - At race control: | Permanently: | At times: | Never: |
| - Elsewhere: | Medical centre: | Other: | |

9) RACE CONTROL INFORMATION METHODS:

- T.V.:	Yes:	No:	How many?
- Video:	Yes:	No:	How many?
- Picture selected for the medical centre:	Yes:	No:	

10) NOTES AND COMMENTS:

OVERALL APPRECIATION:

MEDICAL ORGANISATION:

MEDICAL DIRECTION:

MEDICAL CENTRE TEAM:



APPENDIX III E

Check Report on the Medical Services at a Grand Prix Circuit

Preliminary Visit to Designated Hospitals



OceanofPDF.com

PRELIMINARY VISIT TO THE DESIGNATED HOSPITALS

HOSPITAL VISITED:

Name:	Place:	Date:
For cases of:	Multiple injuries	Neurosurgery
	Orthopaedics	Burns
	Vascular	General

DZ Helicopter:

In the hospital:	yes	no
Outside the hospital:	yes	no
In the hospital ambulance transfer (from the helicopter)	yes	no

Preparation for emergencies:

Airlock for ambulances:	yes	no
Access to first aid:	direct	indirect

First aid:

Examination boxes :		how many?
Initial resuscitation:	yes	no how many?
Emergency radiography:	yes	no
Plaster room:	yes	no how many?
Surgery room:	yes	no how many?

Intensive care:

Experience of multiple injuries:	yes	no
Resuscitation beds:	how many?	
Isolation possible:	yes	no
Equipment:	mediocre average	good exceptional
Preparation:	mediocre average	good exceptional
Availability of beds:	difficult	usual
	bed reserved	

Bloc:

Total number of rooms:

Number of specialised rooms:

Equipment:	mediocre	average	good	exceptional
------------	----------	---------	------	-------------

Preparation:	mediocre	average	good
--------------	----------	---------	------

Further examinations:

Radiography equipment:	mediocre	average
	good	exceptional

Angiography:	yes	no
--------------	-----	----

Scanner:	yes	no
----------	-----	----

IRM: MRI	yes	no
----------	-----	----

Exchange of mail:

Coming from the organiser:	received	not received
----------------------------	----------	--------------

Coming from the hospital:	sent	not sent
---------------------------	------	----------

Duty list including practices:	not received
	received complete
	to be completed

MISCELLANEOUS COMMENTS AND INFORMATION:**APPRECIATION OF THE EXPERTS:****OPINION OF THE FISA DOCTOR:**

Endnotes

1. Monza in 1995 built (finally) a splendid new medical centre with excellent access from the circuit. Trees were also felled to improve the safety at the Curva Grande and Lesmos Corners.

2. I got it in 1995.

OceanofPDF.com

Index

Abed, José *and* Julio, [ref 1](#)
Adami, Dr Bernd, [ref 1](#)
Adamich, Andrea de, [ref 1](#)
Adelaide circuit, Australia, [ref 1](#), [ref 2](#) [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#)
Advisory Expert Group, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#)
Aida circuit, Japan, [ref 1](#), [ref 2](#)
Air Fence, [ref 1](#)
Alboreto, Michele, [ref 1](#)
Alesi, Jean, [ref 1](#), [ref 2](#), [ref 3](#)
Alliot, Philippe, [ref 1](#)
Amadesi, Giovanni, [ref 1](#)
Anderstorp circuit, Sweden, [ref 1](#), [ref 2](#)
Andréa, Dr, [ref 1](#)
Andretti, Mario, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#)
Andretti, Michael, [ref 1](#), [ref 2](#)
Argentine Grands Prix, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#)
Arias, Dr Jose, [ref 1](#)
Armco safety barrier, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)
Arnoux, René, [ref 1](#)
Arnstein, Roberto, [ref 1](#)
Arrows team, [ref 1](#)
Athenaeum Club, London, [ref 1](#)
Australian Grands Prix, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)
Austrian Grands Prix, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#)
Autosport, [ref 1](#)

Baccarini, Dr Frederico, [ref 1](#), [ref 2](#), [ref 3](#)
Baldwin, Ralph, [ref 1](#)

Balestre, Jean-Marie, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#)
Bandol, island of, France, [ref 1](#)
Barcelona circuit, Spain, [ref 1](#), [ref 2](#), [ref 3](#)
Barrichello, Rubens, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#)
Belgian Grands Prix, see Spa circuit; Zolder circuit
Benetton team, [ref 1](#)
Berger, Gerhard, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#), [ref 11](#)
Bernard, Eric, [ref 1](#)
Bertrand, Dr C., [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)
Bertrand, Professor Gilles, [ref 1](#)
Blash, Herbie, [ref 1](#)
Blundell, Mark, [ref 1](#)
Boeri, Michel, [ref 1](#), [ref 2](#)
Boeri, Madame, [ref 1](#)
Bogetti, Dr Hugo, [ref 1](#)
Bologna, Italy, [ref 1](#), [ref 2](#)
Botsford, Keith, [ref 1](#)
Bouchard, Jacques, [ref 1](#), [ref 2](#)
Brabham, Jack, [ref 1](#), [ref 2](#)
Brabham team, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#)
Braga, Antonio, [ref 1](#)
Brambilla, Vittorio, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)
Brands Hatch circuit, England, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#), [ref 11](#)
Brazilian Grands Prix, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#)
Briggs, Peter, [ref 1](#)
British Grands Prix, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#)
Brodie, David, [ref 1](#)
Brown, Ian, [ref 1](#), [ref 2](#)
Brown, Jimmy, [ref 1](#)
Brundle, Martin, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)
Bruynseraede, Francine, [ref 1](#)
Bruynseraede, Roland, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#)
Budapest, Hungary, [ref 1](#), [ref 2](#)

Buenos Aires circuit, Argentina, [ref 1](#) [ref 2](#), [ref 3](#)
Bunge, Dr Hernan, [ref 1](#)
Burton, Kim, [ref 1](#)
Byles, Professor Peter, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#)

CEA (Constructions Estintori Automatica), [ref 1](#)
CSI (Commission Sportive Internationale), [ref 1](#), [ref 2](#), [ref 3](#)
Caffi, Alessandro, [ref 1](#)
Cairns, Hugh, [ref 1](#)
Cambridge University Psychological Unit [ref 1](#)
Canadian Grands Prix, *see* Montreal circuit
Capps, Roger, [ref 1](#)
Casoni, Mario, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#)
Cecotto, Johnny, [ref 1](#), [ref 2](#)
Cevert, François, [ref 1](#)
Chapman, Colin, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)
Clark, Jimmy, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#)
Cobb, Nigel, [ref 1](#)
Coe, Sebastian, [ref 1](#)
Coldstream, Berwickshire, [ref 1](#)
Collins, Peter, [ref 1](#), [ref 2](#)
Comas, Erik, [ref 1](#)
Contrerez De Nova, Danielle, [ref 1](#)
Coton, Didier, [ref 1](#), [ref 2](#)
Cranston, David, [ref 1](#)

Dallaire, J., [ref 1](#)
Dallas circuit, Texas, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)
Daly, Derek, [ref 1](#), [ref 2](#)
de Angelis, Elio, [ref 1](#)
de Conninck, Pierre, [ref 1](#)
De Looz, Professor, [ref 1](#)
Delamont, Dean, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#)
Dennis, Ronald, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#)
Depailler, Patrick, [ref 1](#), [ref 2](#)
Detroit circuit, Michigan, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#)
Dijon circuit, France, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#)

Ditzinger, Jurgen, [ref 1](#)
Donnelly, Martin, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#)
Donnington circuit, England, [ref 1](#), [ref 2](#), [ref 3](#)
Dubarr, Gerald, [ref 1](#)
Duforez, Dr, [ref 1](#)
Dungl, Willie, [ref 1](#), [ref 2](#), [ref 3](#)
Duns, Borders, [ref 1](#)
Duprat, Dr Renato, [ref 1](#)
Durran, Mrs, [ref 1](#)

Ecclestone, Bernie, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#), [ref 11](#), [ref 12](#), [ref 13](#), [ref 14](#), [ref 15](#), [ref 16](#), [ref 17](#), [ref 18](#), [ref 19](#), [ref 20](#), [ref 21](#), [ref 22](#), [ref 23](#), [ref 24](#), [ref 25](#), [ref 26](#), [ref 27](#), [ref 28](#), [ref 29](#), [ref 30](#), [ref 31](#), [ref 32](#), [ref 33](#), [ref 34](#), [ref 35](#)
Estoril circuit, Portugal, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#)
Euromed, [ref 1](#)
Evans, Tim, [ref 1](#), [ref 2](#)
Expert Advisory Group, *see* Advisory Expert Group

FFSA (Fédération Société Automobile) [ref 1](#), [ref 2](#)
FIA (Fédération Internationale de l'Automobile), [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#)
FISA (Fédération Internationale du Sport Automobile) Medical
Commission, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#), [ref 11](#), [ref 12](#), [ref 13](#)
FOCA (Formula One Constructors' Association), [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#)
Fabrizio Barbazza, [ref 1](#)
Fangio, Juan Manuel, [ref 1](#)
Ferrari, Enzo, [ref 1](#)
Ferrari team, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#)
Fiorano circuit, [ref 1](#), [ref 2](#)
Fitch, John, [ref 1](#)
Fittipaldi, Christian, [ref 1](#)
Fittipaldi, Emerson, [ref 1](#), [ref 2](#)
Fittipaldi, Wilson, [ref 1](#), [ref 2](#), [ref 3](#)
Formula One Commission, [ref 1](#)

French Grands Prix, *see* Dijon circuit; Paul Ricard circuit
Frumolt, Uvi, [ref 1](#)

Garcia, Dr, [ref 1](#)
Gardner, Brian, [ref 1](#)
Gardner, Frank, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)
German Grands Prix, *see* Hockenheim circuit; Nürburgring
Ghinzani, Piercarlo, [ref 1](#), [ref 2](#)
Giacomelli, Bruno, [ref 1](#), [ref 2](#)
Gilsoul, Michel, [ref 1](#), [ref 2](#)
Gordini, Dr Giovanni, [ref 1](#)
Grand Prix Drivers' Association (GPDA) [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#)
Grazales-Robles, Dr Rafael, [ref 1](#)
Griffin, Barry, [ref 1](#)
Gruh, Dr Wolfgang, [ref 1](#), [ref 2](#)
Guerder, Dr Alan, [ref 1](#)
Gugelmin, Mauricio, [ref 1](#), [ref 2](#)
Guinness Complete Grand Prix Who's Who (Small), [ref 1](#)
Gurney, Dan, [ref 1](#)

Häkkinen, Mika, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#)
Ham, Bob, [ref 1](#)
Hammergren, Lonnie, [ref 1](#)
Hartstein, Gary, [ref 1](#)
Hatagawa, Osamu, [ref 1](#)
Hencher, Lynne, [ref 1](#)
Herbert, Johnny, [ref 1](#), [ref 2](#)
Herrman, Dr John, [ref 1](#)
Hill, Damon, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)
Hill, Graham, [ref 1](#), [ref 2](#)
Hill, Phil, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)
Hockenheim circuit, Germany, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#)
Horley, Dennis, [ref 1](#)
Hot Climate Physiological Research Unit [ref 1](#)
Hungaroring circuit, [ref 1](#)

Hunt, James, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#)
Huppert, Ernie, [ref 1](#), [ref 2](#)

Ickx, Jacky, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)

Iguazu Falls, Brazil, [ref 1](#)

Imola circuit, Italy, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#), [ref 11](#), [ref 12](#), [ref 13](#), [ref 14](#), [ref 15](#), [ref 16](#), [ref 17](#), [ref 18](#), [ref 19](#), [ref 20](#), [ref 21](#)

Impact Attenuation Inc., [ref 1](#)

Indianapolis 500, [ref 1](#)

Interlagos circuit, Brazil, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#)

Ireland, Innes, [ref 1](#)

Iseart, René, [ref 1](#)

Isle Notre Dame circuit, *see* Montreal circuit

Isserman, Dr Jean-Jacques, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#), [ref 11](#), [ref 12](#), [ref 13](#)

Italian Grands Prix, *see* Monza circuit

Jabouille, Jean-Pierre, [ref 1](#)

Jacarepagua circuit, Brazil, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#)

Jakobi, Julian, [ref 1](#)

Japanese Grands Prix, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#)

Jarama circuit, Spain, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#)

Jarier, Jean-Pierre, [ref 1](#), [ref 2](#)

Jenkinson, Dennis, [ref 1](#)

Jerez de la Frontera, Spain, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#)

Jones, Alan, [ref 1](#)

Jordan, Eddie, [ref 1](#)

Katayama, Ukyo, [ref 1](#)

Kent, Edward, Duke of, [ref 1](#)

Kipri, Dr Zunan, [ref 1](#)

Knieval, Evil, [ref 1](#)

Krantzler, Dr Rheinhold, [ref 1](#)

Kyalami circuit, South Africa, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#)

Labatt Award, [ref 1](#)

Lafitte, Jacques, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)
Lamy, Pedro, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)
Langford, Robert, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#), [ref 11](#), [ref 12](#), [ref 13](#), [ref 14](#)
Las Vegas circuit, New Mexico, [ref 1](#), [ref 2](#)
Lascelles, Gerald, [ref 1](#)
Lauda, Niki, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#), [ref 11](#), [ref 12](#), [ref 13](#), [ref 14](#), [ref 15](#), [ref 16](#), [ref 17](#)
Le Castellet, France, [ref 1](#), [ref 2](#)
Le Mans circuit, France, [ref 1](#), [ref 2](#), [ref 3](#)
Le Mans (film), [ref 1](#)
Letournel, Professor, [ref 1](#)
Lega, Dr, [ref 1](#)
Lehto, J.J., [ref 1](#), [ref 2](#)
Leon, Yvon, [ref 1](#)
Linge, Herbert, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#)
London Hospital, Whitechapel, London [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#)
Long Beach circuit, California, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#)
Loretto School, Musselburgh, [ref 1](#), [ref 2](#)
Lotus team, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#)
Loughborough University, [ref 1](#)
Loved Ones (Mosley), [ref 1](#)
Lunger, Brett, [ref 1](#)
Lux, Peter, [ref 1](#)

Macdonald, Dr Jeffrey, [ref 1](#), [ref 2](#)
Macdonald, John, [ref 1](#)
McGill University, Montreal, [ref 1](#)
Mackworth, N.H., [ref 1](#)
McLaren team, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#)
McNally, Paddy, [ref 1](#)
McPherson, Elle, [ref 1](#)
McQueen, Steve, [ref 1](#)
Magny Cours circuit, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#)
Mansell, Nigel, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#), [ref 11](#), [ref 12](#), [ref 13](#), [ref 14](#), [ref 15](#), [ref 16](#), [ref 17](#)
Marino, Dr Raul, [ref 1](#), [ref 2](#)

Marseilles, France, [ref 1](#)
Marsh, Dr Frank, [ref 1](#)
Marshal, Dr Alistair, [ref 1](#)
Martin, Dr Eike, [ref 1](#), [ref 2](#), [ref 3](#)
Martinez Gallardo, Dr Francis, [ref 1](#)
Martini, Pierluigi, [ref 1](#), [ref 2](#)
Mass, Jochen, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#)
Mclaren team, [ref 1](#)
Merzario, Arturo, [ref 1](#)
Metternich, Paul, [ref 1](#)
Mexico City circuit, Mexico, [ref 1](#), [ref 2](#), [ref 3](#)
Mischkowski, Professor, [ref 1](#)
Mitford, Nancy, [ref 1](#)
Modena, Stefano, [ref 1](#)
Monaco Grands Prix, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#),
[ref 10](#), [ref 11](#), [ref 12](#), [ref 13](#), [ref 14](#), [ref 15](#), [ref 16](#)
Montermini, [ref 1](#), [ref 2](#)
Montreal circuit, Canada, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#)
Monza circuit, Italy, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#),
[ref 10](#), [ref 11](#)
Moody, Charles, [ref 1](#)
Mosley, Diana, Lady, [ref 1](#)
Mosley, Max, [ref 1](#), [ref 2](#), [ref 3](#)
Mosport circuit, Canada, [ref 1](#)
Motor Industry Research Association [ref 1](#)
Motor Sport, [ref 1](#)
Murray, Gordon, [ref 1](#)

Naccarelli, F., [ref 1](#)
Nakajima, Satoru, [ref 1](#)
Nalda, Professor, [ref 1](#), [ref 2](#)
Nanni, J., [ref 1](#)
Netherlands Grands Prix, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#)
Nürburgring, Germany, [ref 1](#), [ref 2](#)

ONS (Oberste Nationale Sportkommission) [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#),
[ref 6](#), [ref 7](#), [ref 8](#)

Ongaro, Derek, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#)

Osinski, Mick, [ref 1](#)

Österreichring, *see* Zeltweg circuit

Pacific Grands Prix (Aida), [ref 1](#), [ref 2](#)

Paletti, Ricardo, [ref 1](#), [ref 2](#)

Palmer, Jonathan, [ref 1](#)

Patrese, Riccardo, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#)

Paul Ricard circuit, France, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#),
[ref 9](#), [ref 10](#), [ref 11](#)

Pavesi, Amadeus, [ref 1](#), [ref 2](#)

Pennybacker, Joe, [ref 1](#), [ref 2](#)

Penske, Roger, [ref 1](#)

Peterson, Barbro, [ref 1](#)

Peterson, Ronnie, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#)

Pezzi, Dr, [ref 1](#)

Piano, Dr, [ref 1](#)

Piccinini, Marco, [ref 1](#)

Piquet, Nelson, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#)

Pironi, Didier, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#),
[ref 11](#)

Pirro, Emanuele, [ref 1](#)

Portero, Dr, [ref 1](#)

Portuguese Grands Prix, *see* Estoril circuit

Postlethwaite, Dr Harvey, [ref 1](#), [ref 2](#), [ref 3](#)

Prada, Dr, [ref 1](#), [ref 2](#), [ref 3](#)

Prevel, Dr Guy, [ref 1](#)

Pringle, Dr John, [ref 1](#), [ref 2](#), [ref 3](#)

Prost, Alain, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#)

RAC (Royal Automobile Club), [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#)

Radcliffe Infirmary, Oxford, [ref 1](#)

Ramirez, Jo, [ref 1](#)

Rasumoff, Dr David, [ref 1](#), [ref 2](#)

Ratzenberger, Roland, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)

Regazzoni, Clay, [ref 1](#), [ref 2](#), [ref 3](#)
Reichert, Dr, [ref 1](#)
Reutemann, Carlos, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#)
Rhône-Poulenc, [ref 1](#)
Ribeiro, Alex, [ref 1](#), [ref 2](#)
Richelet, Dr J.P., [ref 1](#), [ref 2](#), [ref 3](#)
Rio de Janeiro, Brazil, [ref 1](#)
Rio de Janeiro circuit, *see* Jacarepagua circuit
Ritchie, Professor David, [ref 1](#)
Roberts, Ianto, [ref 1](#)
Robinson, Walter, [ref 1](#)
Robles, Dr Rafael Grazales, [ref 1](#)
Roebuck, Nigel, [ref 1](#), [ref 2](#)
Roper, Brian, [ref 1](#)
Rosberg, Keke, [ref 1](#), [ref 2](#), [ref 3](#)
Rovelli, Professor, [ref 1](#), [ref 2](#)
Rowe, Trevor, [ref 1](#)
Roy-Camille, Professor, [ref 1](#)
Ryan, Dave, [ref 1](#)

Saillant, Professor Gérard, [ref 1](#)
Sakai, Dr Tsuneo, [ref 1](#)
Salcito, Dr Domenico, [ref 1](#)
San Marino Grands Prix, *see* Imola circuit
Sandover, J., [ref 1](#)
São Paulo circuit, Brazil, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#)
Scarlott, Dr Robert, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)
Scheckter, Jody, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#)
Schumacher, Michael, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#)
Schvarcz, Dr Jorge, [ref 1](#), [ref 2](#)
Scully, Professor Hugh, [ref 1](#), [ref 2](#), [ref 3](#)
Senna, Ayrton, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#),
[ref 11](#), [ref 12](#), [ref 13](#), [ref 14](#), [ref 15](#), [ref 16](#), [ref 17](#), [ref 18](#), [ref 19](#), [ref 20](#),
[ref 21](#), [ref 22](#), [ref 23](#)
Senna, Leonardo, [ref 1](#)
Senna, Milton, [ref 1](#)
Serena, Madame, [ref 1](#)

Serra, Chico, [ref 1](#)
Servadei, Dr Franco, [ref 1](#), [ref 2](#), [ref 3](#)
Shadow-Cosworth team, [ref 1](#)
Shakespeare, Tony, [ref 1](#)
Sheen, Barry, [ref 1](#)
Silverstone circuit, England, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#),
[ref 9](#), [ref 10](#), [ref 11](#), [ref 12](#)
Simpson, Bill, [ref 1](#)
Simpson, Brian, [ref 1](#)
Small, Steve, [ref 1](#)
South African Grands Prix, *see* Kyalami circuit
Spa-Francorchamps circuit, Belgium, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#)
Spanish Grands Prix, *see* Jarama circuit; Jerez de la Frontera circuit
Stanley, Louis, [ref 1](#), [ref 2](#)
Steinmetz, Klaus, [ref 1](#)
Stern, Gene, [ref 1](#)
Stewart, Jackie, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#)
Streiff, Philippe, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)
Stuck, Hans, [ref 1](#)
Sullivan, Dan, [ref 1](#)
Surer, Marc, [ref 1](#)
Surtees team, [ref 1](#)
Suzuka circuit, Japan, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#)
Suzuki, Satoru, [ref 1](#)
Svenby, Staffan, [ref 1](#), [ref 2](#), [ref 3](#)
Swedish Grands Prix, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#)
Swiss Grands Prix, [ref 1](#)
Syracuse, New York, [ref 1](#), [ref 2](#), [ref 3](#)
Szikla, Dr Gabor, [ref 1](#)

Taillefer, Dr Jean, [ref 1](#)
Tambay, Patrick, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#)
Tamburello circuit, Italy, [ref 1](#)
Toleman team, [ref 1](#)
Transcare, [ref 1](#)
Trueta, Professor, [ref 1](#)

Tye, Basil, [ref 1](#), [ref 2](#), [ref 3](#)
Tyrell team, [ref 1](#), [ref 2](#), [ref 3](#)
Tyrrell, Ken, [ref 1](#)

Uemura, Professor Kenichi, [ref 1](#)
USA Grands Prix, *see* Watkins Glen circuit

Valderama, Dr, [ref 1](#)
Vallee, Mario, [ref 1](#)
Villeneuve, Gilles, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#)
Villeneuve, Jacques, [ref 1](#)
Vincentelli, Dr, [ref 1](#), [ref 2](#)
Von Trips, Wolfgang, [ref 1](#)

Walker, Murray, [ref 1](#)
Wallman-Carlson, Dr, [ref 1](#)
Ward, Dr Francis, [ref 1](#)
Warr, Peter, [ref 1](#)
Warwick, Derek, [ref 1](#), [ref 2](#)
Watkins Glen circuit, New York, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#)
Watson, John, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#)
Weaver, Johnny, [ref 1](#)
Welkenhuysen, Dr, [ref 1](#)
Wendlinger, Karl, [ref 1](#), [ref 2](#)
West African Frontier Force, [ref 1](#)
Whiting, Charles, [ref 1](#)
Williams, Dr Dennis, [ref 1](#)
Williams, Frank, [ref 1](#), [ref 2](#)
Williams, Ginny, [ref 1](#)
Williams team, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#)
Windsor, Peter, [ref 1](#), [ref 2](#), [ref 3](#)
Woodcote Park Golf Club, [ref 1](#), [ref 2](#)

Yate, Paul, [ref 1](#)

Zächz, Dr, Chefartz, [ref 1](#)
Zanardi, [ref 1](#)

Zandvoort circuit, Holland, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#)

Zeltweg circuit, Austria, [ref 1](#), [ref 2](#)

Zolder circuit, Belgium, [ref 1](#), [ref 2](#), [ref 3](#), [ref 4](#), [ref 5](#), [ref 6](#), [ref 7](#), [ref 8](#), [ref 9](#), [ref 10](#)

OceanofPDF.com

LIFE AT THE LIMIT

As the Grand Prix on-track surgeon for nearly twenty years, Professor Watkins has constantly campaigned for better safety measures and medical support at circuits right round the world. He qualified at Liverpool University Medical School and subsequently trained as a neurosurgeon at the Radcliffe Infirmary, Oxford, where the Neurosurgical Unit is an integral part of a world-renowned Head Injury and Accident Service, providing unequalled experience in treating major, complex trauma.

Appointed Professor of Neurosurgery in New York in the 1960s, he returned to the UK in 1970 to become the first Professor of Neurosurgery at the London Hospital, famed for its neurosurgical excellence. His research work has led to great improvements in the treatment of Parkinson's tremor, movement disorders, intractable pain and cerebral palsy.

His interest in motor cars dates from his childhood in Liverpool, where his family had a bike shop and garage. He was later able to indulge a growing fascination with Grand Prix racing by slipping away from Oxford to Silverstone. Wide experience of all types of motor racing at Watkins Glen in New York State led to the invitation to join the RAC medical panel in 1970 and to becoming Grand Prix Surgeon in 1978.

Sid Watkins was honoured to be presented by the Duke of Kent with The Labatts Award for Safety in 1992. He continues to practise as a neurosurgeon in London, and is the President of the Medical Commission and Chairman of the Expert Advisory Safety Committee of the FIA, the World Governing Body of Motor Sport.

‘This anecdotal account of Watkins’ work in the tragedy and trophies of so many big name drivers will rivet enthusiasts’ *Daily Mail*

‘Few books have been more eagerly anticipated within the Formula One community – a measure of Professor Sid Watkins’ stature and contribution to the sport. That it will leave anyone who knows the man feeling this is only a part of the story is also a measure of his stature and contribution to the sport’ *Independent*

‘Watkins’ book cannot maintain a clinical detachment from the subject. The drivers, as outlined here, are not one-dimensional case studies. They are uniquely vulnerable human beings. Beautifully observed, it offers an intimate portrait of the realities of the sport’ *Daily Telegraph*

‘Over the years Watkins has known them all: a gallery of heroes and patients beautifully recalled’ *Sunday Times*

OceanofPDF.com



First published 1996 by Pan Books

This electronic edition published 2013 by Pan Books
an imprint of Pan Macmillan Ltd
Pan Macmillan, 20 New Wharf Road, London N1 9RR
Basingstoke and Oxford
Associated companies throughout the world
www.panmacmillan.com

ISBN 978 1 447 24101 0 EPUB

Copyright © Sid Watkins 1996

The right of Sid Watkins to be identified as the author of this work has been asserted by him in accordance with the Copyright, Designs and Patents Act 1988.

You may not copy, store, distribute, transmit, reproduce or otherwise make available this publication (or any part of it) in any form, or by any means (electronic, digital, optical, mechanical, photocopying, recording or otherwise), without the prior written permission of the publisher. Any person who does any unauthorized act in relation to this publication may be liable to criminal prosecution and civil claims for damages.

A CIP catalogue record for this book is available from the British Library.

Visit www.panmacmillan.com to read more about all our books and to buy them. You will also find features, author interviews and news of any author events, and you can sign up for e-newsletters so that you're always first to hear about our new releases.

OceanofPDF.com