The Cairns Memorial Lecture:

The Cairns Tradition

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The aims embedded in the activities of the Sir Hugh Cairns Memorial Trust—to stimulate original work, to enable young people to travel and be exposed to work going on in centres overseas, and to prevent the isolation of neurosurgery from the wider aspects of medicine, reflect many of Sir Hugh Cairns' own precepts. It is therefore suitable to review some aspects of his personality and life-work, particularly in terms of their relevance to the training of neurosurgeons. For, sadly, there now remain relatively few who worked with him, and he is only a name to the younger generations.

Cairns was born at Port Pirie, South Australia, on the 26th June 1896. His father had emigrated from Scotland on medical advice, as it had been suspected that he was suffering from tuberculosis. Cairns obtained a bursary to Adelaide High School and an Exhibition to the University but his medical studies were interrupted by the first World War. He joined the Australian Army Medical Corps as a private, and was posted to the Mediterranean theatre, where the Gallipoli campaign was in progress. However, he caught typhoid and when No 3 Australian General Hospital was withdrawn from Lemnos, he was allowed to return home to Australia to continue his medical training. On qualifying he rejoined the Australian Army Medical Corps and was posted as a Regimental Medical Officer to an English battalion in France, where he served until the end of the war.

A Rhodes Scholarship took him to Oxford to work on anatomy and physiology. I know nothing of his studies at this period, but, exceptionally for him, he was not completely occupied with work, for he found time to marry one of the daughters of the Master of his College, Balliol, of which he himself later became a fellow. He also rowed for the University in the boat race of 1920 (which was won by Cambridge), and then held resident posts at the Radcliffe Infirmary. In 1921 he went to the London Hospital, where he was house surgeon to Sir Henry Souttar and house physician to Sir Robert Hutchison. It was there that Professor Turnbull stimulated in him a lasting interest in pathology. In 1925 Cairns gave a Hunterian Lecture at the Royal College of Surgeons on testicular tumours, and he wrote an important paper on the inheritance of polycystic disease of the kidneys,³ which clearly established the familial nature of that condition for the first time.

According to Clark-Kennedy,¹⁹ Souttar occasionally operated on the brain. It may have been this, together with inspiration derived from the writings of Harvey Cushing, that encouraged Hugh Cairns to go to Boston in 1926, on a Rockefeller Fellowship, to work with Cushing at the Peter Bent Brigham Hospital. The year which he spent there was to be of great importance; it set him on the road to a neurosurgical career, established friendships that lasted throughout his life and coloured his future aims and practices.

While I was in Boston some twenty five years later and

***Guy's Hospital and the Maudsley Hospital, London**

The twelfth Sir Hugh Cairns Memorial Lecture was delivered at Oxford in April 1988

Figure 1 Sir Hugh Cairns (Photograph by Dr Franc D Ingraham).

working in the same hospital, I searched out some of the case histories of Cushing's patients that had been clerked by Cairns. Two of them were photocopied and are now in the Cairns Memorial Library of the John Radcliffe Hospital in Oxford. One concerned the first operation at which Dr Bovie demonstrated his innovative apparatus for coagulating blood-vessels; until 1926, haemostasis had usually been achieved with stamps of beaten muscle, or by the use of silver clips. This patient had a large occipital meningioma and at the beginning of the operation note Dr Cushing wrote "*I anticipated that we would not only have to have a transfusion but that we would have to get muscle from the patient's leg as we started in with the operation without muscle in hand. Consequently I hesitated to put the patient in the face down position which I ordinarily would have preferred, for we could not have gotten at his arm and I would prefer to take muscle from his tibialis than from his gastrocnemius.*" It makes one ponder on the difficulties a neurosurgeon had to face at that time and illustrates the style in which Cushing wrote his operation notes, a style that has influenced several generations of surgeons. I have also chosen to quote from the Discharge Note that was written by Cairns. "*Fundi, cup showing on Lt side, margins*

hazy still on both sides. Feels very well, but he complains that the fields are not out yet. Flap up. Wife says that he is more placid, more like himself. Friends say how much younger he looks. He has a little buzzing in the Lt ear still. Still slight confusion about names. Readings not improved. Quickly gets tired. Still slight subjective alexia. Straight lines appear to him to have a notch, or a knob at the fixation point. Hemianopsia, see charts. Bone flap riding up slightly. Wound well healed." The order leaves something to be desired, but the situation is made clear in very few words.

On returning to Britain, Cairns was appointed to the honorary consulting staff of the London Hospital, and, inspired by Harvey Cushing, he decided on a career in specialist neurosurgery. It took seven years, and much argument, to establish a neurosurgical unit there, for the London teaching hospitals were violently opposed to specialisation. They felt that for the proper teaching of undergraduates it was necessary for every consultant to practice either general medicine or general surgery, although a special interest was permitted. Cairns took Cushing's advice about this problem. Among the "blue" copies of patient records at the Radcliffe, I once found a letter from Cushing in answer to one from Cairns, in which Cushing made suggestions about what should be demanded when setting up a new neurosurgical department. For all I know it is hidden away there still.

Lady Cairns probably exerted a very significant influence at this time, by introducing her husband to the people who might be most influential in setting up a unit in Oxford, and in particular to Lord Nuffield (fig 2). From then on a special relationship existed between Lord Nuffield and Cairns—the one who wished so strongly to benefit medicine, and the other who was filled with ideas and ambitions for advances in the neurosciences. Their ideal of a postgraduate medical school was achieved in 1936, and Cairns was appointed the first Nuffield Professor of Surgery. The neurosurgical unit within the Nuffield Department of Surgery was opened at the Radcliffe Infirmary, Oxford in 1938. Cairns had achieved his object; a specialist neurosurgical unit, to which laboratories and a library and offices were added during his lifetime.

By this time the inevitability of the second world war was apparent. It is certain that preliminary discussions were held with Cairns in 1938 at the War Office (as the Ministry of Defence was then called), concerning the arrangements that would be required for the treatment of head injuries in the army. George Northcroft told me that he recalls a day in July or August 1938, before Chamberlain went to see Hitler

Figure 3 The Combined Services Hospital for Head Injuries at St Hugh's College, Oxford, showing the corridor leading from the College to the wards. (By courtesy of the Imperial War Museum—Reg No H 10.071)

in Munich, when he was assisting Joe Pennybacker to remove an abscess. Cairns looked in before going to the War Office, and again thirteen hours later at the conclusion of the operation. We now know that after this Cairns went without delay to that master-craftsman, Mr Lewis of Marylebone High Street, and ordered all the instruments which would be required by army neurosurgical units during the impending war. Consequently they were never in short supply. This was in sharp contrast to the situation in other specialties, when the demand for steel for war materials made it extremely difficult to obtain instruments. There will be many other examples of foresight of this kind, and we should note this as one of the marks of Cairns' character. The organisation of the neurosurgical facilities of the Emergency Medical Service, which was effectively a nationalisation of all the hospitals in the country, was placed in the hands of Cairns and Jefferson, who divided the country between them. However, this did not last long, for Cairns was soon commissioned in the Royal Army Medical Corps and placed in charge of army neurosurgery. During World War I there were no specialised neurosurgical services in the British army, and head injuries were treated along with all other types of wounds. Cairns appreciated the need for centralisation of the head injury services and began to plan this immediately after the Munich crisis. With Sir Charles Symonds, who was consultant neurologist to the RAF, George Riddoch, neurologist to the army, and Sir Farquhar Buzzard, the Regius Professor of Physic, the Combined Services Hospital for Head Injuries was created at St Hugh's College, Oxford (fig 3).

St Hugh's was to become the training school of a whole generation of neurologists and neurosurgeons; it became their "alma mater" and was regarded by them with the same affection and gratitude that might be given to a college or other similar institution. No less than 13 000 servicemen and women were treated there before it closed in 1945.⁹ The training concentrated on the needs of the times, and prepared the personnel of the mobile neurosurgical units, of which I shall say more later. Cairns was the inspiration of the place, and the driving force, as he was with everything he undertook. In fact his work in the army was in many respects the high point of his career. Symonds describes the situation at St Hugh's very clearly. He said in his Memorial Lecture in 1970:³⁴ "At St Hugh's he and I got on happily together, though there were one or two collisions and sore heads before I learned that I served in Cairns's hospital."

At the end of the war Cairns returned to the Radcliffe Infirmary, but barely seven more years of life were left to

Figure 2 Lord Nuffield, Sir Hugh Cairns and Major General Barnsley in the grounds of St Hugh's College, Oxford. (By courtesy of Mr Peter Stanworth.)

him. The Medical School was no longer a postgraduate institution and Cairns never really became a dedicated undergraduate teacher, although he continued to hold the Chair of Surgery.

Joe Pennybacker, who had been his assistant at the London Hospital, moved with Cairns to Oxford when the unit had been opened there in 1938, and "JP", as he was fondly known to everybody, had run it throughout the war. After the war, he remained the essential support and much loved "Grey Eminence" of the department. He was the complement and balance to Hugh Cairns. Pennybacker was almost never ruffled and his reassuring slow way of talking was more than a comfort to us in moments of stress. He was generally acknowledged to be the better operator of the two, and at least as good a diagnostician, but there was no division of loyalties since both provided essential ingredients to the team. Nevertheless, one can never overestimate how much the Oxford unit owes to "JP".

Hugh Cairns died on the 18th July 1952, with all manner of projects and ideas for the future that were unfulfilled. According to Paul Glees,²³ these included the founding of a neuropsychiatric institute. He had even prepared the room in which he intended to work after his retirement, although that would have been as much as nine years hence, if he had lived. This was typical of him.

But biographical details are a mere skeleton and mean nothing without a knowledge of the personality of the individual. I must therefore try to tell you something of Hugh Cairns' character, for as John Donne²¹ said, "*I study the physician as he studies disease*", and I ask those of you who are still early in your neurosurgical careers, to distil from what follows those of Hugh Cairns' many principles and precepts that are still of present value. I am sure that if you do, you will find much that is of worth.

Jefferson²⁷ observed that "*work dominated his life from the earliest days; it was dogged that did it*". However, application alone would not have been enough, and his administrative genius complemented all his efforts. He was "*always one to enlist advice and to get the right people on his side, people with different knowledge and different influences, people who could help*."²⁷ This principle was applied in all his projects, whether it was the setting up of a neurosurgical unit, the introduction of crash helmets, research, or even the daily care of patients. Some people are prevented from acknowledging the need for assistance from motives of jealousy or fear of competition. This would never have happened to Cairns, for one of the most striking features of his personality was the very lack of jealousy. He always saw himself as the leader of a team and he obtained some very good players, such as Dorothy Russell, Rio del Horta, Almeida Lima, Hugo Krayenbühl, Douglas Northfield and Joe Pennybacker. But he was also quite ruthless in dropping anyone who, in his opinion, did not match up to the required standard.

He was emphatically a perfectionist and published nothing that was not carefully scrutinised and usually revised five or six times. If one wrote a case report or any other work for publication, it had to be submitted to him, and this even applied to Joe Pennybacker. He would go over it word by word, changing this and that, moving the text about, deleting and suggesting. This would be done on a Saturday afternoon or in the evening, and one would go away to rewrite it, only having to go through the same process on two or three more occasions before the work was finally approved. It was very good training, quite apart from the fact that a badly presented paper reflects as much on the inabilities of the teacher as on those of the author. Case histories and operation notes were all read by Cairns with the same scrutiny and criticism, and this extended to case presentation as well. The descriptive operation notes that Harvey Cushing wrote are little masterpieces and those of Cairns also bring the situation to life, as I have

shown. On reading them one can imagine the thoughts behind the actions, and drop into the situation as it existed at the time. A little habit that Cairns inherited from Cushing was that of writing all his working notes on primrose coloured paper, so that anything on that paper was instantly recognised as from his hand. It would have been a terrible crime for anyone else to have used it and on one occasion I remember him saying to his secretary, who had let him run out of this material, "*How can I possibly work without any yellow paper*". It was a symbol of his assertion of command, of the importance of what he had to say, and his conviction of the rightness of his views.

Cairns had no time for small talk, cocktail parties, or any event that he regarded as unproductive. If he did find himself at a party, he would listen rather vaguely to what was being said, with his eyes focused in the distance, until some point in the conversation cropped up which caught his attention. There would then be a series of quickfire questions to develop the subject and see if more information was to be obtained. If this seemed likely, the conversation continued, but if not, the eyes drifted again to the horizon and it soon came to an end. As Jefferson said, "*he had a sort of puritanical belief in the rightness of his own causes*" and he was "*at times not a little insensitive to the views and claims of others*". The same author and respected friend painted a delightful picture of life at 29 Charlbury Road,²⁷ where "*one might see Hugh in slippered ease making notes or listening to music, while Barbara ironed the family washing, both of them in the drawing room*". Listening to music was a permissible occupation and so was the reading of literature, provided that there was no work to be done. He was widely read and well informed on many subjects outside the realm of medicine and he always wanted to learn something new.

The degree of influence that Cushing had upon Cairns was very significant and has been remarked upon by Ingraham and Symonds, who knew them both. One notes that they even had the same initials, HC. Cushing had many admirable traits, but he was also an extremely irascible and difficult person, nicknamed "Pepper Pot", and this characteristic came through to Sir Hugh, but modified in his case by courtesy and innate kindness. If Cairns considered that one had failed him, the castigation that followed left one in no doubt of the error of one's ways. However, the following day the chief was just as likely to put his arm round your shoulders and ask how it was that you had obtained results from some project or other that had proved stubborn on another occasion. This made you forget the gloom of the previous twenty four hours, and for a few minutes you walked on air. However, I remember Olive Jones, his dedicated anaesthetist, telling me how she had met him on the stairs after she had returned from a stay in America and the only greeting she received was "*You will have that patient on the table by 8.30 won't you*"? He was least appreciative of other people's feelings when he was worried about an operation.

Hugh Cairns did not find operating easy, though he probably would not have admitted it. I think that he was really happier in a neurological or administrative role than in the theatre. He was very tense before and during an operation and would scrub up in silence. Everything had to be exactly as he wanted it and on time. Conversation was restricted to the barest minimum. If some hapless assistant moved too slowly, sucked too hard or too long, or misused the diathermy electrode he would be told about it in no uncertain terms. If one's foot got in the way, it would be gently kicked, followed by the remark that a neurosurgeon should move with the quickness and lightness of a ballet dancer. He advocated sitting down while operating, and said (possibly thinking of Vermeer's "Artist's Studio") "*had we not observed that all artists worked sitting down*"? There was no point in arguing the matter. After one

particularly trying session in the theatre, in which he had told me a good deal about what I had not but should have done, he said “*remember that I am doing this not only for your own good, but for the good of those that you are going to have to train*”. I wonder if Harvey Cushing had said the same thing to him; I suspect so. But this was Cairns’ way of thinking, always with an eye on the future.

An amusing example of his forward thinking was related to me by Cairns himself. At Oxford there was an incomparable male “scrub nurse”, who had been a theatre assistant at the London Hospital, and who was later trained in theatre instrument technique without the benefit of any nursing qualification. He had sadly lost his wife and his young son often came to the operating theatre after school, to wait until his father had finished work. Cairns decided that his cook should become B’s second wife. The Cairns family had a house in the country near Arundel, so down to South Stoke went Cairns, and B and the cook were left together in the orchard. Unfortunately, that is the end of the story. For once the plan went wrong, and for once also, Cairns did not try to force the issue.

I hope that I have given you some insight into the kind of person we are commemorating. There were times when his dedication may have been too strong and Franc Ingraham once told me that his friend later regretted not having spent more time with his children. This was a consequence of his way of life and the pattern which he inherited from Cushing. Herein lies a crucial issue. Cairns would have been horrified to think of anyone working for a given number of hours or sessions. Work was something that had to be done until it was finished, and the purpose of relaxation was to enable one to do it better. This placed a very heavy burden on the junior staff. He took his responsibilities as a teacher and trainer of future neurosurgeons very seriously, and showed the greatest concern in shaping the early part of a career. This is in the Oslerian tradition, and we can remind ourselves that Cushing himself had been both Osler’s pupil and his biographer. “Hughie”, as we all referred to him amongst ourselves—using a nickname that implied a fundamental affection—would offer advice and help to his trainees, and would occasionally find some money in a fund that would enable one to visit a foreign unit and meet some eminent person when on holiday abroad. These were inspiring opportunities which had a tremendous influence on a developing career.

Neurosurgery is a demanding specialty; it is essential not only to master a unique form of surgery, but also to be a tolerably good neurologist, to maintain an interest in research and to be alive to its possibilities. One has to add to this the requirement for administrative skills that were just as necessary in Cairns’ day as they are now, though the demands were then created by the neurosurgeon instead of being imposed upon him. Cairns felt strongly that a lost opportunity was a disaster and that no chance of creating one should be overlooked. His whole career was based on objectives that had to be reached; yet he was always in control of his destiny. No neurosurgeon now or in the past has ever attained the highest peaks without sacrifice and unfortunately the family are the usual libation. The view of Sir Geoffrey Keynes²⁸ is of interest, “*I liked indeed to have some recognition, but not coupled with the burden of ‘eminence’ . . .*”. “Eminence” is a burden, and not everybody is destined to achieve it, but some recognition should be within the reach of every British neurosurgeon and it should be his aim. Cairns found “eminence”, but at a price.

There was another legacy from Cushing that must be mentioned. It was the realisation that a neurosurgical illness is a crisis for a family, and often a matter of life and death. The fullest explanation possible had to be given to the relatives and the patient, unless there was a special reason to withhold anything. In those days the importance

of this was not overshadowed by the threat of malpraxis litigation. The family were drawn into a circle that almost amounted to friendship. With this involvement the follow up was usually prolonged and accurate, and if the outcome was unsuccessful, permission for a post mortem examination was nearly always granted. This was another most important point. Cairns demanded an explanation why a post mortem had not been performed; it was not that a special reason had to be found for doing one, even if the diagnosis was apparently clear. Loss of the information that could be gained from an autopsy stultifies knowledge and impedes the possibility of clinical progress. Pathology is the key to the understanding of disease and an invaluable way of teaching. It is also the basis of diagnosis. However wonderful our imaging techniques may be and no doubt future achievements will be as incredible as our present ones seemed ten years ago, they must not be thought of as a substitute for pathology, for they are not.

I wish now to turn to his early neurological papers and original work in this field. In 1930 a very exclusive society was formed, of which Cairns was a founder member. It has fortunately been described for us by Macdonald Critchley.²⁰ Its members were Russell Brain, Denny-Brown, George Riddoch, Charles Symonds, Macdonald Critchley and Hugh Cairns. It was known as the Hexagon Club, on account of its six members, and they met for dinner and to listen to a paper by one of them. I have had the good fortune to have met or to have known all six of that brilliant group, and how exciting their meetings must have been. Cairns, who was the only surgeon among them, read a paper on pituitary symptomatology on 8th April 1932. This could well have been the occasion when he demonstrated how the third nerve came into relationship with the pituitary fossa when the latter was enlarged, although this is not a normal anatomical state of affairs. He spoke to them again on 2nd June 1936 on the subject of colloid cysts of the third ventricle, although this work did not mature into the form of a paper until 1951.¹⁶

However, his first memorable publication of neurological interest, was the description of the ultimate results of operations that Cushing had performed for intracranial tumours in 1926. After his return from Boston, Cairns made a special report to the Medical Research Council on the work that he had seen in America. There had been 369 cases, of which 157 were tumours. In 1936 he returned to the United States and followed up 139 of the survivors. This report was published that year.⁴⁵ It drew attention to the quality of the results that could be achieved by a highly skilled specialist neurosurgeon.

The next really important paper was on the pathology of Ménière’s syndrome. It was published with C S Hallpike in 1938.²⁵ Two patients had died from intracerebellar haematomas after partial division of the eighth nerve for the treatment of Ménière’s syndrome. Many surgeons would have tried to forget these disasters and would have moved on to something else. However, Cairns, with his usual percipience, obtained the temporal bones. He knew that within them could lie the answer to the pathology of the condition, and he also knew that it would require someone with considerable ability to reveal it. He kept the bones for sixteen months, and then, on the advice of Professor Turnbull, gave them to Hallpike. Together they produced the paper which demonstrated gross dilatation of the endolymph system of the internal ear. The pathology had been revealed even though the cause remained a secret, as it still does today. There can be no better demonstration of Cairns’ careful thought and caution and the ability to spot an opportunity.

We come now to the war period. During the first year (which included a long spell of relative military inactivity) three motor cyclists were killed every day. This was 21% more than in the previous two years. There was a head

injury in 92% of them, and it was the only injury in 85%. In the first 21 months, no less than 2 279 motor-cyclists and pillion passengers were killed on the roads of this country. One of the reasons for this was the blackout. There were no street lights or lights from shops or houses and lights on vehicles were dimmed to the degree of parking lights at the present time, and even these were shaded so that there was no direct forward beam. In 1935 Cairns had been subjected to the poignant experience of caring for T E Lawrence, or T E Shaw or Lawrence of Arabia, as he was variously known, when Lawrence was fatally injured in a motor cycle accident. Cairns had even performed the autopsy himself. It is true to say that the whole nation felt that it had been a possibly preventable and needless disaster, and it must have impressed Cairns, as was pointed out recently by Robb Smith.³¹

This earlier experience, linked with the new urgency for more protection for motor cyclists, brought home to him the need for something more efficient than the ordinary steel helmet in use in the army. Crash helmets had already been worn by racing motor cyclists, and a redesigned and improved version was introduced into the armed forces by Cairns.^{6,8,18} He produced a helmet with a smooth outer shell supported by a lining consisting of a series of webbing slings attached by the base of the lining to the outer shell; the space between could be filled with energy-absorbing material. It was held on by a chin-strap. In 1941 it became compulsory for all military motor-cyclists to wear these helmets. There was an immediate reduction in the number of deaths and in the seriousness of the injuries sustained. These were the forerunners of those helmets that were later worn by the police, and those that were ultimately made compulsory for all motor cyclists, according to a British Standard Specification.

This work led naturally to thoughts about the mechanisms of brain damage, and, following his usual method of looking for the right person to do the work, he chose a physicist named Holbourn, whose papers on the subject are a landmark and affected all future thinking on the matter. However, if it was Holbourn²⁶ who produced the explosion, it was Cairns who lit the fuse.

Perhaps Cairns' greatest contribution in the field of medical care in warfare was the institution of mobile neurosurgical units. To command the first of these, Cairns chose W R Henderson, who planned all the details of its personnel and equipment and kept a diary which was seen by Symonds;³⁴ I hope that it has been safely preserved. Lord Nuffield provided a special truck for the original unit which carried enough equipment for 200–300 operations, including its own electricity supply for light, suction and diathermy. Unfortunately, it was captured in France and its personnel were interned; but No 1 Unit was replaced and went on to serve in Africa, ending its existence at the 15th Scottish Hospital in Cairo. Seven more such units were created and happily there are still several among our more senior members who served in them.

This is not the time to chronicle the history of the mobile units. Suffice it to say that they were the means by which very many lives were saved. They dealt with over 80% of the neurosurgical work in the African and European theatres of war and more than 20 000 patients were treated by them.⁹ In Italy one unit carried out 334 operations in 16 days and another performed 208 in 15 days. The mobile units were flexible. Sometimes they split into forward and rear sections, they could be independent or they could form a special centre attached to a general hospital. Almost all the staff had been trained at St Hugh's, and the standard of documentation and neurological examination never slipped, despite the circumstances in which they worked. It was observed that when general surgeons were responsible for the initial treatment of head wounds, there was a much higher incidence of complications and a lower incidence of

primary healing. After the introduction of mobile neurosurgical units an 85% primary healing rate was achieved, with a considerable reduction of the subsequent morbidity and mortality.²² In this connection it is also worth noting that Cairns believed that infection develops in the majority of brain wounds in the superficial layers and spreads to the deeper ones. He also emphasised that the dura is the most effective barrier against infection, cerebral herniation and the escape of cerebrospinal fluid, and the best prophylaxis against adhesion of the cerebral scar to the point of injury.^{7,13} Early exploration and the adequate removal of bone fragments and foreign bodies (though not necessarily all metallic fragments), the use of suction to remove dead tissue, careful closure of the dura, and closure of the scalp in two layers, were the principles which neurosurgeons followed with such success in World War II,² and more recently in Northern Ireland. It is salutary to remember that in World War I cranial wounds were left open, with the inevitable sequel of brain fungus and its complications. The ideals that have been mentioned can rarely, if ever, be followed when war time head injuries are treated by general surgeons in the field, as has been confirmed by experience. The mobile neurosurgical units were a brilliant solution to a tragic problem and we must not allow the principles that Cairns taught to be forgotten.⁹

Cairns summarised his war experience in papers published in a supplement to the *British Journal of Surgery*,⁹ some of which have been quoted. With his surgical and pathological colleagues, he also described localised hydrocephalus and ventricular loculation consequent upon penetrating wounds.¹⁴

The presence in Oxford, of Hugh Cairns and Howard Florey (both later to receive knighthoods), led to work on the application of penicillin to the treatment of war wounds, pyogenic meningitis, and the prophylaxis and treatment of cranial infections.¹⁰ Cairns visited the war zones with Ian Frazer (also subsequently knighted) and others.¹ Trials were set up and the resulting reduction in the number of infections was so great that the Germans even felt it necessary to decry the success which had been achieved.³⁰ The work was very difficult because of the impurity and scarcity of the first penicillin samples. In fact, the relatively low penicillin concentration in their solutions may have prevented such complications as epilepsy from occurring. The best available preparations were golden yellow in colour and contained not more than 50% penicillin. It is almost unbelievable that every case in the trial had the sensitivity and concentrations of penicillin in the cerebrospinal fluid or blood measured as appropriate, despite the difficulties inherent in working in the stress of battle and in extremely difficult conditions. Dramatic results were obtained in the treatment of pyogenic meningitis,¹⁵ and the incidence of brain abscess among the British casualties in north west Europe in 1944–45 was only 3%, compared with an incidence of 27% in the Middle East in 1941–42 before the advent of Penicillin.^{2,9,32}

On his return home Cairns continued his work with Honor Smith on the use of antibodies for the treatment of infections of the central nervous system. Soon they turned their attention to streptomycin and the cure of tuberculous meningitis,³³ with results that would have been unbelievable a few years earlier, as I can well remember. It required great courage and conviction to carry out this study, and the joy which Cairns felt when things went well was so great that it spread to the whole unit. He was a pioneer in the treatment of infections of the nervous system. One can learn from this that there should be a catholic approach to neurosurgery, the surgeon being at the same time a physician, an anatomist and physiologist, and a pathologist too. Some of this work on tuberculous meningitis was carried out abroad, where more cases were to be found.

This gives me the opportunity to mention the vital need

for British neurosurgeons to collaborate with workers in other countries. It is essential that we continue to train as many foreign surgeons as in the past, and this will not happen if we isolate ourselves from Europe and fail to attend meetings and read papers outside our shores. The last words that Cairns spoke to me were "Do not forget that the world is your oyster".

Cairns picked up the work of his pupil Krynauw, and studied the use of hemispherectomy in the treatment of epilepsy. This stimulated his long standing interest in neurophysiology,²³ and, as usual, he assembled a team to study the implications of hemisphere ablation. He had also a deep interest in the mechanism of consciousness and wrote an important paper on akinetic mutism,¹⁷ the state in which a patient is devoid of all movement and speech, yet has some awareness and follows one with his eyes. When further advances had been made by the neurophysiologists, he enlarged his ideas and gave clinical support to the relevant animal work.¹² The paper relating to this subject was the last to be published by him in his lifetime. One is impressed by the fact that it was based on a framework of cases that were not in themselves unusual, but which were subjected to intense observation followed by logical deduction based on clinical reasoning, backed up by physiological experiment. This method was regularly practised in the unit, for after a problem had been discussed on a ward round, it was common for JP or someone else to say "Do you remember so and so who had a similar history?", and there was a competitive effort to remember other cases. After the round the "Blue Folders" would be produced; they contained carbon copies of all the typed notes and were kept in the unit. These debates often formed the basis of a new paper. Computers may classify and provide information, but they are a poor substitute for discussion. Anyone present was free to participate and it sharpened ones wits to do so.

I think that the mind and the brain were one to Hugh Cairns, and thus it was natural for him to have had an interest in the treatment of psychiatric disorders. However, he did not become involved until it was apparent that the existing operations, particularly the so called "standard leucotomy", were inadequate, to say the least. He encouraged Macdonald Tow³⁵ to produce his monograph which proved the point, if proof were needed. John Fulton, who had introduced the idea of leucotomy to Egas Moniz, further suggested that a lesion in the anterior cingulate region, area 24, would affect pathways that would give beneficial results without some of the undesirable effects produced by lesions elsewhere. The idea was also taken up by Le Beau in Paris.

However, it was Cairns' cautious and scientific approach that first of all produced a paper²⁴ on the effects of lesions in the cingulate gyrus and adjacent areas in monkeys, in which it was concluded that "Such marked behaviour changes, especially in emotional reaction to external environment, following so limited a lesion of the cortex, have implications for the therapeutic operations on the frontal lobe at present used in psychiatry". He then went on to operate upon suitable cases and to prove his point. In these days when operations for the relief of intractable psychiatric illness have been all but banned in many parts of the world, cinglectomy survives as one of the means that is left of relieving suffering when all else has failed. One wonders if the legal restraints, that may now conflict with clinical judgement, might have been different if Cairns had been around to exert his influence.

So let us step back from the picture, and regard our study. I have offered some glimpses of a complicated and almost always attractive person, who was devoted to neurosurgery, but not to the exclusion of a great appreciation of music and literature. We see a man of tremendous energy, single-mindedness and determination, who had compassion for his patients, great kindness, and a concern

that was of Hippocratic intensity for teaching his trainees. He was a man of vision with a genius for organisation, and he always remained true to his personal beliefs.

We are fortunate that Cairns left us a record of some of his principles in an address which he gave to the medical students of King's College Hospital in 1949.¹¹ He said "A good doctor is shrewd in diagnosis and wise in treatment, but more than that he never spares himself in the interest of his patients; and in addition he is a man who studies the patient not only as a case but as an individual . . . you study not disease, but disease in a patient". He continued . . . "nearly every young doctor should try his hand at . . . investigation—should try to carry knowledge of some disease or symptom or function, or the effect of some form of treatment a stage further than it has been carried before. Otherwise he will not find out what he is good for, nor will he appreciate the difficulties and labours involved in discovering new things".

In concluding, it is appropriate that Sir Hugh Cairns himself should have the last word, and I give it to him gladly. At the end of his address to the medical students he said: ". . . The greatest personal success is usually incidental to a life spent in service to patients or in research . . . the direct pursuit of material objectives is usually disappointing". Verbum sapienti sat est. A word is enough for a wise man.

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