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THE ULSTER MEDICAL JOURNAL

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If you are not a member of the Ulster Medical Society, we would appeal to you to give the question of joining your consideration. The Society has been in existence since 1862 (and is the direct descendant of the Belfast Medical Society founded in 1806), and has always been active in keeping its members interested in the advances in medical science. Meetings are held at intervals of a fortnight during the winter months, and papers are contributed by members and distinguished guests. Facilities are provided for doctors to meet informally afterwards and have a cup of tea. *The Ulster Medical Journal, the official organ of the Society, is issued to all Fellows and Members free of charge.* The Society will soon be rehoused in its own Rooms (in the new buildings at the Medical Biology Centre) which will replace the Whitla Medical Institute which had to be vacated in 1965.

May we, therefore, appeal to you to join the Ulster Medical Society, and so enable us to widen its influence and sphere of usefulness still further? A proposal form is appended: your proposer and seconder must be Fellows of the Society. If you do not know any Fellows please contact the Honorary Secretary. All persons registered as medical practitioners under the Medical Acts shall be eligible for election as members of the Society (Constitution, Section VI). Temporary membership may be allowed at the discretion of the Council.

If you do not wish to become a member of the Society, will you consider entering your name as a subscriber to THE ULSTER MEDICAL JOURNAL? The subscription is £2.00 per annum, payable in advance to the Honorary Treasurer.

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To DR. N. C. NEVIN,
DEPARTMENT OF MEDICAL STATISTICS,
INSTITUTE OF CLINICAL SCIENCE,
GROSVENOR ROAD, BELFAST BT12 6BJ.

.....19.....

Dear Sir,

We nominate for $\frac{\textit{Membership}}{\textit{Fellowship}}$ *of the Ulster Medical Society—*

Name of Candidate .....

Postal Address .....

.....

Year of Qualification and Degrees .....

.....

Signature of Proposer .....

Signature of Seconder .....

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A HISTORY OF THE BELFAST CITY HOSPITAL

by

DAVID H. CRAIG, F.R.C.S.(Ed.), F.R.C.S.(I.)

Presidential Address to Ulster Medical Society, Session 1973–1974

THIS IS A STORY about a town that grew into a city, a Board of Guardians, and a hospital that was not wanted, certainly not to begin with by the Poor Law Commissioners in Dublin, who protested most strongly that they did not want their Workhouse to become a hospital.

It all began in 1838, one hundred and thirty five years ago, when an Act of Parliament – The Irish Poor Law Relief Act – was passed to provide for the building of Workhouses in Ireland, and to create Boards of Guardians to supervise their running. Our Workhouse opened on 11th May 1841. It cost £7,000 and had taken two years to build. It was planned to admit about 1,000 inmates, and it was not ready any too soon.

The Board of Guardians appointed to supervise the running of the Workhouse were all very worthy and prominent citizens. But the Workhouse was not a very socially acceptable object for good works in Victorian times; a bit smelly and a bit dirty, I expect, and a lot of undeserving poor about it. Anyway no carriages rolled up the drive with ladies in crinolines forming Ladies' Committees. No business magnates left the Workhouse any money. Nobody cared very much about it at all. Except of course the Board of Guardians. I think they quite enjoyed being on the Board. They seemed to have had plenty to talk about at their meetings. But they were more enlightened than the Poor Law Commissioners sitting in Dublin, because when they opened for business in May 1841, and this upset the Poor Law Commissioners quite a lot, they slipped in half a dozen beds for the use of sick inmates – and this rapidly increased to 100 beds for all comers. They appointed Dr. Thomas Andrews to look after these beds and paid him £60 per annum for doing it; and this is how our hospital first started.

Dr. Andrews was an unusual young man. He was born in Belfast in 1813. His father was a linen merchant. He went to school first at the Belfast Academy and then to the Academical Institution. They were not Royal Institutions at this time. He tried the linen business for a short time, and then went to Glasgow University to study chemistry. This was the main interest in his life. But he may have thought that there was not much of a living to be made in chemistry, because he took up medicine and studied first in Glasgow, then in Belfast, finally qualifying in Edinburgh in 1835.

He came back to Belfast to practise medicine and to teach chemistry at the Academical Institution as well. When the Guardians made him their first Medical Officer he was only 26. I expect he was quite glad of the money. He certainly must have had a baptism of fire in our wards. The paupers slept on straw, rather like cows in a byre. But as far as I can find out the Guardians provided beds for Dr. Andrews' patients; at first wooden ones, but in January 1852 bugs in the wooden beds were reported to the Guardians; you will be glad to learn they changed them all to iron beds. In the 1840s it was a bad thing to be ill; it was worse to be destitute; but when you managed to be ill and destitute you were in real trouble.

There were two quite devastating events in the early years of the century; first the potato famine and the resulting general destitution, and second was the industrial development which hit Belfast in a big way about this time. This was the period when so many of the linen fortunes were founded. There was a tremendous influx from the countryside of poor hungry people hoping to find means of survival in the town. In Victorian times Belfast grew from a town of 30,000 inhabitants to become a city of 350,000. We were not very good at solving the housing problem then either. The mud cabins of old Belfast had been done away with, but the housing standards were pretty terrible. Most streets were less than 20 feet wide. Many houses were built back to back. There were usually four rooms to a house, each about 10 feet by 7 feet, and usually two families lived in each house.

But the big problem in Belfast was the lack of a water supply. There was just no water available. No water closets, no water carriage sewage system, no piped water to any of the houses. In 1853 the Guardians got a report from one of their officers. "The poor" he wrote "have a habit of keeping their nuisances in the room with the sick during the day and throwing them into the street at night. If some method could be found to obviate this filthy practice it would contribute to the healthy and cleanly habits of the poor". You must admit he had something there.

It is not surprising that the City Fathers in Belfast had a problem with "fever". This portmanteau term embraced all the enteric disorders you can imagine; all those infections which dirt and overcrowding foster. Typhoid, typhus, erysipelas, dysentery, smallpox, even cholera, struck the poor citizens of Belfast in waves.

Though the Frederick Street Hospital – it was then called the General Dispensary and Fever Hospital – had been opened in August 1817 to deal with fever cases, it was full to the doors and overflowing by 1841. So it is not surprising if Dr.

Andrews must have been a bit overwhelmed by this terrible tide of disease, because he very soon, and I think very thankfully, gave it all up, turned his back on medicine and became Professor of Chemistry at Queen's University. He was a very distinguished Professor of Chemistry.

The Poor Law Commissioners in Dublin kept protesting that they did not want a hospital on their hands – they realised that they had troubles enough. But nevertheless, partly in response to the clamant needs of the poor sick people in Belfast, and partly due to the enlightened efforts of the Board of Guardians, behind these entrance gates, through which such a tide of unhappy humanity must have flowed during the last 131 years, almost by accident, and with no practical help from the wealthy citizens of Belfast, there grew up almost unknown and unnoticed what eventually became the largest general hospital in the Kingdom. But this happened very slowly over the years.

However in the early days of the century all sorts of exciting things were happening in Belfast. Some people began to make a lot of money. On 23rd September 1845 a pair of great auks were observed on Belfast Lough. The last pair recorded as having been seen by human eyes. A channel was constructed so that deep water ships could discharge their cargoes right in the heart of the City. Belfast had become a port. Queen Victoria came and formally opened the channel in 1849.

But enteritis, not ornithology, was the problem. Maybe the sick poor of Belfast did not care very much for great auks (or maybe not all that much about Queen Victoria either). They were too busy being sick. The Board of Guardians were pretty busy too. Just how formidable were their problems is hard to realise today. The Frederick Street Hospital, as Dr. Sydney Allison describes in his book "The Seeds of Time", was full to the doors. Built to hold 100 patients in 1837, it contained 250. Typhus fever, typhoid, smallpox, scarlet fever, erysipelas, cholera – you name it, Belfast had it.

Treatment is best described as empirical:

Sinapisms or blisters to the epigastrium - in case you don't know what a sinapism is, its a mustard plaster.

Effervescent draughts.

Small doses of calomel, opium and hydrocyanic acid.

Brandy has a good effect.

In typhoid fever camphor, ammonia and ether are useful, but wine is most to be depended on.

Opium is of invaluable benefit.

Cautious leeching to the cranium where the sensorium is affected will help.

I cannot help wondering if 130 years from now our great-grandchildren will find our efforts to treat diseases we do not understand equally diverting.

One rather interesting feature about medical practice in Belfast at that time was the very close association between the Board of Guardians and their Infirmary and the Belfast General Hospital. There was an interchange of medical staff. Dr. Andrews, the first medical officer, was also on the Royal Staff – it is easier to refer to the embryo Royal by its mature name. So was Dr. Seaton Reid, Dr. McCormick,

and Dr. Brown, R.N., who became Belfast's first ophthalmic surgeon, and others as well. Dr. Samuel Brown's responsibilities as additional medical officer (for which he was paid £100 per year) were to be in charge of the supplementary wards, to act as medical inspector to the paupers who were coming in from Scotland, and to be inspector of nuisances. It is perhaps not surprising that he resigned after a few years and took up ophthalmology.

In 1847 the Board of Guardians built a Fever Hospital and enlarged it to 600 beds in the following year. Dr. Seaton Reid at the age of 36 was appointed physician in charge. It continued as a Fever Hospital until 1949. Born in Ramelton in 1811, a son of the manse, his father, a distinguished historian, Dr. Seaton Reid was to make the Fever Hospital his life's work. In his later years he is described as being stoutly built with an abundance of snow-white hair, most punctiliously dressed, dogmatic in manner and always decided in his opinions and actions. He became an accepted authority on fevers and his opinion was much sought after. The method of treatment he used I have quoted earlier to you. He was Senior Physician at our Infirmary for about forty years. He was President of this Society in the 1867–1868 session and died in Ulsterville House on the Lisburn Road on 3rd May 1896 in his 85th year.

During many of his 85 years of life he conducted a vigorous correspondence with the Guardians. In February 1847 he sent them a good rocket. "Urgent necessity" he wrote, "induces me to request more extensive and suitable infirmary accommodation. The nature of the diseases makes them most offensive in smell and so many huddled together renders any attempt to supply the necessary comforts and proper medical attention utterly fruitless." This is of course no more than the simple truth, with the enormous numbers of acute infections and the very limited water supply the wards in our infirmary must have been in indescribable chaos. Nursing these vast multitudes under such primitive conditions must have presented some appalling problems. There are continual references to these problems in the minutes. The Master was provided with chloride of lime solution to put in the night buckets. Charred peat was tried to diminish the offensive odour arising from the privvies and the sewers. Repeated appeals were made to Mr. Lanyon the architect to improve the sewers. Frequent complaints were made to the Water Commissioners that the supply of water was inadequate. Finally a big moment in 1853 – water closets were fitted in the new buildings. But only one per 65 patients, at this stage – perhaps a little frugal.

Later Dr. Reid strikes again: "It is admitted by everyone acquainted with the arrangements of hospitals that the more crowded the sick the higher is the rate of mortality and in the Infirmary there are 100 in a space which would not admit more than 65". "I am anxious that the Board would allow paid nurses for both male and female wards as the sick, now so numerous, will never be attended otherwise". He went on to suggest "the propriety of erecting a proper Death House. Nothing can be more injurious than keeping a dead body beside a patient who is perhaps suffering from the same disease". The Board decided to build a proper Dead House. They appointed two paid nurses, who could read and write, at a salary of 2/6d a week. "No risk or inconvenience" they told Dr. Reid, "can arise from two young persons or even a mother and child being placed in the same

bed". Dr. Reid wrote back: "I have three or four children in the same bed. Several young children have been admitted with their mothers by way of accommodation. Some have not had fever. This hazards the lives of both mother and children, it being impossible for mothers to care for children at the breast when they are so ill and frequently delirious that they cannot take care of themselves. The mothers are deprived of rest and let their children fall out of bed".

Though there were a number of doctors employed by the Board of Guardians – Drs. McCormick, McGee, McFall, Aicken, Coffey, Black, Cairns, Wheeler and Brown – Dr. Seaton Reid was the Senior Physician, who had overall charge, though his main responsibility was the Fever Hospital. Surgeon Mulholland had some 500 beds in the main Infirmary, where he looked after the acute sick, the syphilitic cases and the children. He also did the surgery – this was rather a side line.

There were four outbreaks of what is described as cholera in Belfast in the early part of the century. Two before we came on the scene in 1832 and in 1834. The epidemics which concern us because we were involved in them began in 1853. The first case of Asiatic cholera in the outbreak which began in 1847 – Mary Sherry – came in on 9th December, having taken ill at 6 o'clock in the morning, and died at 3 p.m. that afternoon. Later in the month Dr. Reid wrote a report to the Board. "There were three cases of cholera on 15th; on the 16th three more, and two more on the 19th. Eight cases in all. All fatal. Another woman brought to me this morning in a state of collapse on admission, with little chance of recovery, having been ill since 12 o'clock last night. I would suggest some kind of patrol through the wards of the Workhouse each night. Because all our cases, with the exception of one, were in a complete state of collapse on admission. From which states the most persevering application of stimulants failed to revive them. As I write another case of cholera has been brought in".

The Guardians must have been at their wits' end, and no wonder. They had to deal with at least 15,000 cases, with nearly 3,000 deaths, on top of the usual ration of smallpox, diphtheria, scarlet fever and everything else. They rented various homes about Belfast. They rented a part of the Academical Institution. They rented disused mills. They erected tents. They built temporary sheds, the roofs and walls of which let in both wind and weather, so that, as some of the doctors complained, the patients got wet and cold. They caused to be inserted an advertisement in January 1848 in the Belfast newspapers: "The Belfast Poor Law Guardians beg leave to call attention to the propriety of immediately releasing from work any person labouring under diarrhoea or the premonitory symptoms of cholera, so that immediate medical aid may be had. Delay even for an hour may much lessen the chances of recovery".

Meantime the Board of Commissioners bombarded the Guardians with admonitions. It was "inexpedient" they had told them to build a fever hospital. The Belfast General Hospital would take care of the fever cases. They suggested that the Idiot Ward "be laid off" for such fever patients as could not be admitted to the Belfast General Hospital. The Board of Guardians were at last goaded beyond endurance. They wrote a letter to the Commissioners: "The Board are of the opinion that the Commissioners interfere unnecessarily in the details of management. The Commissioners exercise power in an arbitrary way in matters which

had much better be left in the hands of the Guardians, who administer fairly and considerately the trust committed to them and have more accurate means of judging on many points than a body who can only form its opinions from reports". The Commissioners were offended. "We'll tell on you for that" they said. At least that is what they meant. They phrased it rather better. "We will inform Lord Fortescue, Chairman of the Committee on the Irish Poor Law in the House of Lords and Sir John Jury, Chairman of the Committee in the House of Commons, of the Guardians' views".

It is of course easy from the safe distance of about 130 years to poke fun at the efforts of our forebears. But I wonder if we had been faced with the same problems, with the same lack of facilities, and shackled with the same ignorance, if we would have done as well. For make no mistake the Guardians did very well indeed, and Belfast owes them a debt that we are quite unaware of today. They were responsible for all the fevers which virtually means all the sickness, not only in Belfast, but in an area extending from Greencastle on the one side of the Lough to Holywood on the other.

A system of dispensaries had been established – some six to begin with, later eight. These were the responsibility of the Guardians. They were responsible for staffing them, paying for them, and supervising their running. During epidemics some were enlarged to become small subsidiary hospitals. It was in fact a very efficient health service. Not only did the Guardians pay the doctors who worked in the dispensaries, they also paid the committee of the General Hospital 1s. 3d. per day for each fever patient. The medical committee had asked for 2s. 6d. for each cholera patient, but the Guardians jibbed at this. One and three pence, they said, was the agreed price, but they agreed to pay 2s. 6d. for the first day of the cholera patients staying in hospital. The doctors in the Belfast General Hospital pointed out that they did not mind treating charity patients for free, but this was different, and the Guardians should pay them as well. Three pence each per patient per day was agreed as the rate for the job, which for that day and age wasn't bad at all.

About the end of 1849 the cholera outbreak subsided and our Infirmary slowly returned to the even tenor of its ways.

In 1849 a decision of enormous importance was made. All fevers were to be removed from the wards of the Frederick Street Hospital. This was a very wise thing to do at that time because Belfast, with its large manufacturing and marine population, needed a casualty hospital, where there was a reasonable chance of operations being carried out without too much risk of infection. This decision enabled surgery in the Belfast General Hospital to grow and develop, and while the work done in our Infirmary was perhaps less spectacular it was quite vital for our citizens, and especially our poor citizens in the nineteenth century.

Surgery in our Infirmary was at a very primitive level for many years. The very first operation I have found recorded took place on Saturday 5th January 1850. Surgeon Mulholland reported: "W. Smith was admitted about 5.30 p.m. with a compound fracture of the leg and great laceration of the ankle joint, received by a log of timber falling on him in a sawpit on the morning of that day. The leg required amputation. I performed the operation, assisted by Dr. Reid, and Surgeons

Brown and Black. I am sorry to state that he gradually sank and died during the night. An amputation case is much required in this hospital". It is nearly 30 years later in November 1877 that I found recorded the suggestion that a separate room should be provided in which operations could be carried out.

For a few years things went quietly along. The deliberations of the Guardians make interesting reading. They were very much men of their times. They became alarmed to discover in 1850 that one of their rate collectors – a Mr. Gaffiken – "had betted and won largely on the late Derby and that he was in the habit of indulging in such speculations". Mr. Gaffiken at once admitted that "having been summoned to London on the business of the Belfast Improvement Board, he had on the holiday of Derby Day accompanied some of his townsmen to the race course and there he had betted £5 against £50 and £1 against £15 on the race and he had won £65". The minutes read – and one can almost hear our Victorian forebears pontificating – "Though the liability on the late occasion was but £6 your committee are of the opinion that the dangers of such practices are not to be measured by the amount won or lost, as success invites the prospect of future gain, and failure tempts another trial in the hope of retrieving". Mr. Gaffiken's books were examined and found to be in perfect order. Incidentally "Voltigeur" won that year. Alas for human frailty; a year later Mr. Gaffiken's books were deficient in a sum of £1,061. I have not been able to find out what happened next.

Our Infirmary did not escape unscathed on the night of the "big wind". On 6th February 1850 Surgeon Mulholland reported the death of three children "in consequence of injuries received by the falling in of part of the roof about 1 a.m. during the frightful storm of last night".

Then in March 1852 Dr. Seaton Reid is faced with a problem which is still difficult of solution today. He begs leave to report that there is not sufficient accommodation in the Workhouse for the aged and incurable. No solution was offered.

However the decision to transfer all the fever patients to the Infirmary had one unexpected result. The bed occupancy of the infant Royal fell to between 70 and 90. In order to secure recognition by the examining bodies medical schools had to have access to hospitals of at least 100 beds, so the authorities of Queen's College – it was not then a University – were anxious that the Board of Guardians should open our wards for clinical teaching.

But there was a difficulty. Dr. Seaton Reid (who had been appointed Professor of Materia Medica in 1857) unfortunately was a most terrible lecturer. The students, apparently in an agony of frustration and boredom, created such an uproar in his classes that he had to appeal for help and protection to the President of the College, who stationed an additional porter in Dr. Reid's class, but alas with no great improvement in the students' behaviour or apparently in Dr. Reid's lectures either. Dr. Reid's poor relationship with the medical students was to have a profound effect on the relationship between the Medical School and our Infirmary for many years.

The Board of Guardians were clearly influenced by Dr. Reid's views on the character and disposition of medical students. They decided that they would not allow any University professors to teach in the Infirmary but Dr. Reid could hold

clinical classes. However Dr. Reid and the medical students did not get on any better and he stopped the classes in 1862, though he owed his chair to his position in the hospital. There was a considerable outcry about this. Dr. Reid had to appear before the Treasury Commissioners and judging by their Report in 1876 he was very sharply handled. He fought back at his inquisitors – "Patients did not like to be tossed about by students and as they had a statutory right to treatment in the Union, they were in a different position to those in a hospital supported by voluntary contribution". The Treasury Commissioners recommended that the Guardians be requested to re-admit students, and that Dr. Reid should either revive his clinical teaching or resign his chair. But the medical students stayed out and Dr. Reid stayed in.

The relations between the Medical School and the Board of Guardians were obviously not very cordial at this time. In November 1863 the Board of Guardians had stopped the supply of corpses to the anatomy school on the grounds that the "procedure was objectionable and the dissection room was a source of infection". More than half of the 95 students in the practical anatomy class could not begin their studies in the autumn term in 1863. This produced another uproar and the Guardians relented, but the uneasy relationship persisted.

However I am running ahead of my story. In 1853 the cholera returned. This time it arrived in an unexpected way. The "Guiding Star", an emigrant vessel en route from Liverpool to New York was forced by stress of weather to put into Belfast. It had cholera on board among its 600 passengers. The epidemic continued on until December of 1854. In this epidemic about 8,000 people were treated in our infirmary and the dispensaries, with about 2,000 deaths. But the records kept in the dispensaries were scanty and the total number treated was certainly higher. The Guardians had to get a second cholera van. The driver must have found his task unnerving because he was dismissed for being drunk on duty.

The Guardians had a variety of problems, not all medical, to engage their attention. Dr. Reid complained that there was a large manure heap in front of the fever hospital. The Guardians seem to have coped with this situation very well. In June 1876 it was reported to them that the car driver had taken out the horse in a private car with matron on her private business, and on return the parties in the car were intoxicated and the horse was lame.

The Guardians appeared to have a genuine concern for the children under their care. There were a lot of them. Though the Poor Law regulations which they had to administer decreed that families should be split up, they insisted that children and parents should meet at least "once a week" so that "family ties might be maintained". They arranged for the children to be taken sea bathing down the Co. Down coast several times each week during the summer. They advised that flannel belts should be provided for all such young people as needed them. On one occasion they arranged for a party of young girls to emigrate to Australia, and provided suitable trousseaux for the expedition. Unhappily this venture turned out to be ill-starred and was not repeated; because after a year or so reports filtered back that some of these young Belfast ladies thus transplanted did not behave with the decorum that might be expected, even in Australia. We find them thanking the proprietors of the Bangor boat for arranging for the Workhouse

children to have a trip to Bangor, and an outing to the theatre and the circus seems to have taken place, in spite of Mrs. Blair, the schoolteacher, who wrote to the Board stating her opinion that "the theatre and circus are very far from elevating, and considering the moral degeneration of the inmates of the Workhouse, both old and young, these entertainments have a detrimental effect". She suggested that the Board reconsidered the matter. The Board resolved that Messrs. Clark and Powell's invitation for the school children be accepted and that the best thanks of the Board be conveyed to these gentlemen for their kind invitation – passed unanimously – collapse of acidulous school teacher.

All through the minutes down the years we come on examples of little human kindnesses to the children under the Guardians' care. Toys and sweets at Christmas; footballs and hand balls to play with during the winter; cricket bats and pads and balls to play with in the summer. Arrangements were even made for them to pay visits to the Botanical Gardens and to have a trip to Portrush. On the other hand the infant mortality was 26 per cent. It is evident that the Guardians were worried about this and did not quite know what to do. We must not forget that in Victorian times death was never far away from any large family. But perhaps if Charles Dickens had known about our Workhouse, Oliver Twist might have fared a bit better.

During the remaining years of the nineteenth century the quite extraordinary volume of work continued. In August 1868 Dr. Johnston, who had replaced Surgeon Mulholland (resigned under something of a cloud) told the Guardians that "The General Hospital would not take in any burns, and all such cases were now sent to the Infirmary, entailing a large expenditure of lint and stimulants as well as a prolonged stay in hospital." The Infirmary had also agreed to take in from the General Hospital "any cases of old fractures and such other tedious and incurable cases as the authorities of the General Hospital wanted to transfer".

On 11th December 1882 Dr. Brice Smyth told the Guardians that there are now a vast number of patients present in the Infirmary, at the moment 1,338. Two-hundred had been admitted during the past week, nearly all urgently and dangerously ill and requiring the closest attention. In the middle of all this turmoil Dr. Brice Smyth found time to look after 302 lunatics. He did wish however that the Board of Guardians would give him somewhere to treat the many cases of delirium tremens. All he could do was to strap them to their beds in the ward. He thought that "this was an objectionable habit".

In February 1883 the Guardians installed a telephone.

Meanwhile, in the Fever Hospital, Professor Seaton Reid was battling away with his epidemics. Belfast then, as now, was a place for living dangerously. No one seemed to pay much attention to outbreaks of measles, diphtheria, typhoid, or scarlet fever – they called it scarlatina then. But Dr. Seaton Reid did comment on smallpox.

SMALLPOX

From 1870 to 1872: Admitted 1,103; Died 220; Mortality 19.15%.
From December 1877 to August 1878: Admitted 115; Died 30; Mortality 19.35%.
From May 1881 to August 1882: Admitted 547; Died 81; Mortality 14.8%.

He suggested that Nurses Wilkinson, Halliday and Collins should be given a bonus "in recognition of the efficient way in which they had carried out their duties, which were at times very exacting and very disgusting". The ladies were awarded £5 each.

In fact this pattern of infectious diseases continued until the end of the century. Smallpox returned in February 1891. On the seventh seven constables were admitted from the Donegall Pass Police Station. Dr. Reid reported towards the end of the year that there had been 24 cases admitted; three had died. He proposed that pay beds for private patients be introduced into the Fever Hospital. The Guardians approved. Private patients came in by a separate entrance from the Donegall Road.

Both Dr. Reid and Dr. Brice Smyth resigned in November 1892. Dr. Robert Hall was appointed in December of that year to replace Dr. Brice Smyth. Dr. Coey Bigger, who replaced Dr. Reid, served 18 years until he left to begin a most distinguished career in the Ministry of Health in Dublin. He is the only member of our Infirmary staff who has been knighted. I mean of course so far. But perhaps we can boast of a more recent and greater distinction, which I think not many people know about. In 1895 Dr. Bigger reported treating 26 cases of diphtheria with anti-toxic serum. Two of these required tracheotomies and one died. The serum was discovered in 1890. The very first time the serum was used was on a child in Berlin on Christmas night 1891, and it was first made in England by the Lister Institute in 1895; so Dr. Bigger was obviously very well abreast of developments. His cases must have been among the very earliest treated in the British Isles.

The citizens of Belfast had to face another hazard in the declining years of the century – rabies. Between 1894 and 1897 there are records of fifteen people being admitted. Fourteen were bitten by rabid dogs and one by a rabid horse. Seven were children and eight were adults. One of the adults was a policeman who had been bitten when he was trying to protect two children from a rabid dog. The Guardians rose to the occasion again and sent them all off to the Pasteur Institute in Paris. It is interesting to read of the humane and human way they conducted this enterprise. Quite a formidable expedition at that time. They arranged for the victims to be suitably clad for the journey; they sent one of their officials to look after them and to meet them coming back, and as James Hilditch, one of the children, was very homesick, they sent his father out to keep him company. We learn that they wrote a sharp letter to Madame Voiry, the owner of the hotel the victims were staying in, because she was not looking after her guests in a proper manner. Madame Voiry wrote and apologised and promised to mend her ways. Mr. Pasteur himself wrote a polite letter to the Board in July 1895. He died on 28th September in that year so this must have been one of his last letters. It is satisfactory to discover that all the patients apparently recovered.

Nursing in our Infirmary was slow to develop. In the early days, as I have told you, there were paid nurses; decent, hard-working and courageous women they were, but untrained, and there certainly was the odd Sarah Gamp, bottle of gin and all, among them. They were very thin on the ground. In the year ending 29th September 1867, 3336 patients were treated, comprising 1695 acute contagious medical cases, and 1641 acute and chronic non-contagious medical cases. For this there were 15 paid nurses. Their task was to supervise the unpaid paupers, who

lived in the wards and were given hospital diet, and in return for these privileges carried out all the actual nursing duties. These pauper attendants were far from satisfactory but had to be retained for years. The visiting Medical Officers complained about them in 1897. "They are mostly unreliable" they said, "and in many cases extremely unsuitable for persons attending on the sick. They are supposed to act under the supervision of the nurses, but very often commit grave acts of indiscretion behind their backs".

In November 1884 Miss Ellie Pirrie was appointed Superintendent and Head Nurse at a salary of £30 p.a. I can find nothing about her early training. She was not a product of the Florence Nightingale school, though apparently she had some friendly contact with her; because in December 1884 we read of a Christmas present being sent to Miss Pirrie from Miss Nightingale for the children in the Infirmary. The Guardians were very pleased when they heard about it. Miss Pirrie seems to have got everyone moving because the month after she was appointed the Guardians approved a uniform for the paid nurses, and a distinctive apron for the unpaid female attendants.

In May 1887 the Guardians agreed to Miss Pirrie's plan to admit six suitable persons between 20 and 35 to train as probationers. They were to be employed for three years; the first year they were paid £10; the second year £15; and the third year £18. After all this they were to be absorbed into the paid nursing staff. The Poor Law Commissioners sitting in Dublin were most put out by these proposals and told the Guardians that they had no right to propose any such plan. But as was usually the case the Guardians seem to have got their way and nurse training began for the first time in our hospital. In July 1889 the very first nurse went down to Dublin to sit for a nursing examination. Her name was Nurse Craig. I think she must have passed all right because in 1892 she was appointed Superintendent.

This was the slow beginning of our Nursing School, and it was a slow beginning.

	Nurses
1880	13
1885	21
1890	26
1895	48
1899	78

Quite a lot was expected of our poor nurses in those days. Not until November 1900 were nurses given late passes to 11 p.m.

It is interesting to remember that our Nursing School was apparently the first to train male nurses.

But once again I am running ahead of my story. The love-hate relationship of the Guardians and the Medical School continued. Because the University were most anxious to get the benefit of the wealth of clinical material on their very door step, they brought considerable pressure to bear on the Guardians. In June 1877 there is a minute which reads:

"In compliance with the wishes of Her Majesty's Government we consent to open the Workhouse Hospital and Infirmary to the students of Queen's College,

Belfast. At the same time reserving to our Medical Officers the right of making such arrangements with the Authorities of Queen's College as they may deem necessary for securing a proper recognition of the services they may be called upon to render".

"It is further understood that Dr. Seaton Reid is to be exempt from taking an active part in giving clinical instruction".

However the poor medical students found themselves so hedged around with restrictions and prohibitions that they could hardly get into the wards at all. They grumbled very bitterly about this. There was a rather curious development; though the Royal Colleges of England were quite prepared to recognise our Infirmary as a teaching hospital, the Royal College of Surgeons in Ireland would do no such thing. The reason they gave was that there were not enough clinical teachers. I wonder if the hidden hand of Dr. Seaton Reid had been at work; this seems possible because the month after he resigned, on 29th November 1892, the Guardians received a communication from the Secretary of the Belfast Medical Students Association. This was very eloquently and politely phrased, traced the history of the medical school and the Infirmary and suggested that the objections of the Royal College of Surgeons in Ireland to recognition of our Infirmary would be met if the Guardians would appoint honorary clinical teachers from the Faculty of Medicine. The memorandum was signed – T. Houston. The Board of Guardians was quite prepared to agree with these proposals but the Local Government Board in Dublin would have nothing to do with them. So to the great loss both to the Infirmary and the Medical School, there was to be no systematised undergraduate teaching in our wards for another generation.

All through this talk I have said very little about our Infirmary buildings. Mr. Lanyon designed most of them. The wards were enormous, holding up to seventy beds. The ceilings of the ground floor wards were so high that they were hard to heat. The ceilings of the top floor wards were so low that they were difficult to ventilate. But the wards were all kept spotlessly clean by pauper labour; the ward sisters in those days had their problems. You will all I am sure be gratified to learn that the wards were heated from 1870 by good coal provided by Hugh Craig & Co.

But though building went on through the years, it is not the buildings in the hospital which are important; it is the human beings in the wards. The doctors, the nurses, and the patients, who build up the tradition of a hospital. The physicians who made a considerable impact on their generation were Dr. Robert Hall, Dr. Gardner Robb and Dr. McLeish.

Dr. McLeish is perhaps less well known than the other two, yet he deserves to be remembered because it was he who really established the Maternity Hospital in our Infirmary.

Dr. Robert Hall was appointed in 1892 at the age of 31. It is hard to realise today the problems which he faced then. Tuberculosis in the closing years of the nineteenth century and in the early years of the 20th was a real scourge. When he was first appointed tuberculosis cases were nursed in the general medical wards among the other patients. He introduced separate tuberculosis wards, bacteriological diagnosis and disinfection of sputum – no easy task at first. The

numbers were formidable, 1900 cases of tuberculosis were nursed in the half year ending December 1899. It was entirely due to Robert Hall's efforts that the first sanatorium for tuberculosis in Belfast was established. He, more than anyone else, laid the foundations of what became the North of Ireland Tuberculosis Authority. He was President of this Society in 1921 – fifty-two years ago. He died in 1941.

Dr. Gardner Robb was an entirely different personality to Robert Hall, outgoing where the other was retiring, but an equally outstanding clinician, as those of us who were lucky enough to have worked under him will remember. He was appointed in 1900 at the age of 34 when Dr. Bigger retired; he inherited a legacy of smallpox and typhoid as well. Dr. Bigger, in his last report in 1900, described the typhoid outbreak as "phenomenal – larger than any hospital in the United Kingdom had to deal with". Cases were even admitted from Adelaide Park, Maryville Park and Cadogan Park. Dr. Robb was responsible for the building of what we now call The North of Ireland Fever Hospital. While that is no bad memorial, what is more important, like Robert Hall, he left behind a legacy of well taught clinical medicine. He was a President of the Society in 1915-16. He died in harness in 1941.

But again I am running ahead of my story. Surgery in our Infirmary was slow to develop. This is hardly surprising, in the overcrowded and understaffed conditions. This table gives an idea of the patient load:

	Patients treated
1897	10,161
1898	11,316
1899	12,208
1900	10,116

The nursing staff increased to 78 in 1899. Fortunately it was unusual for more than 2000 patients to be in our Infirmary at any one time.

Nothing much happened until the appointment of Dr. Lynass. (He seems to have been largely self taught). It was true that he had been an assistant surgeon at the Belfast Hospital for Sick Children, but at this time it was common – almost the usual thing – for a young man appointed as a surgeon to change his coat at the first opportunity and become a physician. When Dr. Lynass was refused permission to carry out this manoeuvre he resigned from the Children's Hospital and became our first surgeon. He was given a room – called a theatre – whose roof let in rain, and which was illuminated by gas, apparently not very well, because a complaint was soon made of poor lighting. He was however allocated two operating room nurses, and the Guardians were persuaded to put in a sterilizer for dressings.

For the first two years of Dr. Lynass's appointment they were apparently quite interested in his doings and quite newfangled about him. Though there are absolutely no clinical records, there are references in the minutes to a report he submitted to the Board of Guardians. 51 operations carried out under chloroform anaesthesia in the year ending June 1900; fractures, dislocations, burns, and the results of tuberculosis provided the bulk of the surgical problems. It would appear

that no abdomens were being opened at that time, which of course is not surprising. There is however one interesting reference in these minutes. X-rays "have been successfully supplied on several occasions by Messrs. Clarke & Co. to determine the exact nature and extent of fractures, and on one occasion to determine the exact location of a bullet which was then successfully removed".

Dr. Lynass died very suddenly in 1905 at the age of 40 and was replaced by Dr. Joseph Fulton, who had worked for several years as Dr. Lynass's assistant. Old Joe, as we called him behind his back, worked on until 1940. He too was I think largely self taught, and though this may seem extraordinary to the young men of today's jet set, this was a long time ago and was not surprising or uncommon about that time. He worked in isolation all his life and had few contacts with any of his surgical colleagues. But this again was quite common in those days. Even the surgeons in the Royal corridor had relatively little contact with each other. There were no keen young surgical registrars about to keep everyone on their toes. His results were as good as many better known surgeons. He was a remarkable personality.

And now I must come to the end of my story, and if I finish almost in midsentence, well stories often come to an end that way, especially when it is time for bed.

Many of you will remember the physicians and surgeons of the City Hospital of the last generation. So you will be able to answer for yourselves the question which all story tellers are asked – what happened next?

If you think that medical eccentricity was exclusive to an earlier generation you have not had the privilege of looking at yourselves through the eyes of a medical student.

Before I do close however I must thank Mr. Harry Miller, without whose encyclopaedic knowledge of Irish Poor Law, and without whose generous help this tale could never have been told by me.

I must however give you a glance into the future – what our new hospital will be like:

Twenty stories; 540 beds. Every facility that imagination and ingenuity can produce. I forget how many million pounds.

Well we have travelled a long way from the Workhouse ward which Dr. Andrews came into that summer morning so long ago. It is a rather chastening reflection that before very many years have gone by this magnificent building may be as archaic and out of date as our old hospital is today.

But as Kipling said:

Dearly Beloved, that will be another story.

THE WORKING MAN OF THE PROFESSION

Being the address to the students of the medical school of the Royal Victoria Hospital, Belfast, at the opening of the session 1973-74, and including a short memoir of Andrew George Malcolm, M.D., formerly attending physician to the hospital.

Quaerere verum

By J. S. LOGAN

Physician to the Royal Victoria Hospital

THIS DAY opens the 1973–74 session of the medical school of the Royal Victoria Hospital, the 155th year of the school, and the 176th year of the hospital. The medical staff have laid on me the agreeable duty of welcoming the whole student body to the beginning of the new session, but especially of speaking to those admitted to the practice of the hospital for the first time. I can hardly hope to equal my predecessors in oratory, but I can and do welcome the new students with all the kindness and warmth with which we have always received them. Your admission to the hospital brings the first meeting with the sick, to the care of whom your life is henceforth to be given. We for our part undertake to put before you the whole pattern of medical knowledge and the medical art, so far as it is seen in this city. You for your part need to bring to the work an active determination to learn, and to learn for yourselves, at the bedside in the wards, at the couchside in the outpatients. These are the only places to learn, that is the only way to learn, the fundamentals of professional knowledge. I am bound to admit that you will likely find the system in some respects against you. All sorts of obstacles and discouragements will seem to obstruct your work with patients, and you may be tempted to take refuge in reading only, or in classes where you are talked to, and talked at. You should resist this temptation. Medicine that is not learned at the bedside will not be learned in the library or in the laboratory (though it can be vastly enlarged there). All grades of the medical staff will help you if you ask them. Your own shyness will in the beginning inhibit your approach to patients; but you must overcome that. It will help you to know that no courteous, tidy, kindly student in a clean white coat is ever rebuffed by a patient, and you need not be afraid of it.

If you ask what the hospital's effort is all about, I tell you that the hospital was dedicated by our founders to the care of the sick and dying, the comforting of the broken-hearted, the improvement of the arts of medicine and surgery, the study of disease and the advancement of the public health. A teaching hospital is perhaps ill-named. It should be called a learning hospital, because while it is our business to make the opportunities of learning available to you, to illustrate the natural history of disease, to demonstrate methods, to show an example of practice, the learning has to be done by you. *What* is this skill, this knowledge that has to be learned, and can be learned only at the bedside and in outpatients?

For one thing, it is the language. The doctor's main method is linguistic, and on that there is no textbook. You do not now speak the language or understand the thought of patients, but you will come to do so, if you listen to them, and talk to them, but mainly listen. You will also learn here something of human behaviour, something also of the convictions, beliefs and opinions on which behaviour is based – much of it erroneous and irrational, some of it based upon eternal truth. You will begin to learn something of the family and kinship organisation of Belfast life, and something of the social importance of employment, and its implications for physical and mental health. You will meet both good and evil, and it is important to be able to recognise the one and the other for what they are. You may in the end begin to be something of a judge of personality and character. It is a life-long study. This is the wisdom of Solomon. This is the wise and understanding heart. If you can attain to that, all else, including the technology of medicine may well be added unto you. I would not have you think that bedside medicine is inexact, or imprecise. The methods of truthful thinking, the collection of evidence, its assessment for relevance, for completeness, for weight, for credibility, and the right consideration of it in the light of the principles of medicine are just as essential and as possible at the bedside as anywhere else. And about this also, there is no textbook.

I never think it necessary to warn Ulster students to be kind and considerate to the sick. It is not in them to be other than considerate. But I do wish to urge you to make professional competence your chief aim. There are few things worse in a medical man than incapacity to help the people who have put themselves in his care. Such incapacity is disastrous for the patient and his family, and is demoralising for the doctor. No intellectual excellence, no grasp of principle, no historical knowledge, no literary grace, no brilliance in research, will make up for inability to treat the sick competently and promptly, if you have undertaken to do it. You should prepare yourself for all foreseeable circumstances, and be as ready to do your best on the back of Slieve Gullion as on the hospital corridor.

If there is one thing more important than professional competence, it is professional honour – I will take the risk and say righteousness. You are coming to medicine at a time when our standards are under attack both from members of the public and from some inside the profession. There are, and always have been, those whose aim is to manipulate the profession, to use its undoubted position, its knowledge, its skills, its powers for their own ends. Unscrupulous, unprincipled people would like to use us to obtain possession of drugs for improper use, to use medical certificates to evade their responsibilities or to commit fraud, and worse under the name of abortion or euthanasia to make us paid assassins. You need at all times to be beware of such. Your only duty is to the true interest of the patient, and it is for *you* to judge what that true interest is. No pronouncement of the State, of Parliament, or learned bodies, of the church, no importunity of the patient himself ought to change your opinion or your advice when you have decided what is right. Your conscience is to be your guide. Seldom, if ever, will the true interest of the patient be contrary to the interest of the commonwealth. To make use of the phrase of Burke's, the patient and the

commonwealth are entitled to your entire devotion to their true interest, but they are *not* entitled to your abject submission to their will.

If it is my duty this morning to point you to the stars, I must point you to a guiding star and I will point you to the brightest and best, a light still shining, Andrew George Malcolm, one of the most gifted, most warm-hearted physicians the hospital has had. And perhaps the most tragic.

He was born in 1818, 3 years after Waterloo, 2 years after Laennec invented the stethescope, the fourth son of Andrew George Malcolm, the minister first of Dunmurry and then of Newry. The father died when the boy was five. His mother was Eleanor Hunter of Dunmurry. His grandfather James Malcolm, the minister of Drumbo. At the end of his schooling at Inst he had been assistant to Henry Montgomery, the famous headmaster of the English department and his father's successor at Dunmurry (Crozier 1875). There at the medical school at Inst he began his medical studies (that was long before the foundation of the Queen's College) and in 1842 at the age of 24 graduated at Edinburgh. His thesis was on the pathology of continued fever and he received one of the three gold medals of the year. No copy of his thesis is known but the next year (1843) he published what may be the substance of his thesis, his work on the Proportion of Carbonic Acid formed during Respiration in Typhus. The work had been done in the fever wards of the hospital when we were in Frederick Street. That, together with a paper on carbon dioxide formation in phthisis published in 1854, makes him our earliest respiratory physiologist. In that year, 1843, he was appointed medical attendant to the Dispensary, to attend the sick at the Dispensary rooms and in their own homes – much as young physicians now are appointed to outpatients. In 1846 he was appointed to the hospital as physician (at the age of 28), and then began that remarkable period on the staff, brief and brilliant. It was to last 10 years, and end at his death at 38.

From 1846 then he was in regular attendance on the sick in the old hospital in Frederick Street. He lived nearby in York Street as medical men did in those times. In 1848 he helped to found, and the Hospital Report for 1850 says that he himself conducted, an outpatient or extern department. No doubt it was a development of his work at the Dispensary. Doctor Allison has pointed out the importance of that department for surgical treatment and medical advice. It continues to this day, now in the new outpatient centre on the Falls Road, and many physicians feel their best and most fruitful work is done in outpatients. Malcolm was a powerful and assiduous teacher. Besides his general medicine, we know he had a class in skin diseases. His views on the duties of a teaching hospital and teaching physicians and surgeons are set out in his paper of 1851. He had a high sense of a teacher's duty and equally of the student's duty. He says in his History, as Doctor Allison has reminded us, "Clinical instruction is not to be imparted by a careless walk through the wards." "On the part of the teacher, the most patient, assiduous, vigilant, zealous and unceasing labour, and on the part of the pupil, the most rigid attendance, are absolutely necessary to develop the educational resources of a Hospital." I am satisfied that 122 years later we have not yet developed the educational resources of the hospital. He was engaged, it

seems almost daily, in morbid anatomy in the postmortem room; when not with autopsies, then with surgical specimens sent in by the practitioners of the town and also by those of Antrim and Down. Those were the days when surgery was done at home. He was a main contributor of specimens to the pathological museums of the Belfast Medical Society and the Belfast Clinical and Pathological Society. Wet specimens were inconvenient in those days, and he made many plaster and wax casts and contributed many photographs and daguerreotypes. He was an enthusiast for the microscopical examination of tissues and pathological fluids, highly imperfect as it then was. There survive to us two drawings which Malcolm made of his microscopy of the rice-water stools of Asiatic cholera in Belfast. (Figures 1 and 2). At this time, remember, (1853) Pasteur was still a chemist. Bacteriology had yet to be born. Thirty years were to elapse before Robert Koch went to Alexandria and was the first to see the cholera vibrio. No doubt with a better microscope and with a mind better prepared. At this time began a flow of Malcolm's reports to the journals of the day, mainly on clinical and pathological correlations. It is clear that Malcolm saw the importance of these correlations. He says, "If our profession is to advance much as a practical study, it can only be by elaborate, but ordinary, intelligent observation at the bedside, going hand in hand with the results of a pure scientific research."

Then we have his important reports on the Sanitary State of Belfast. To make you understand this achievement, I would have to take time to picture to you early and mid-19th century Belfast, the town overcrowded far beyond its resources, deficient in water, dirty, fouled with excreta, lousy, and racked with fever. The reports were the result of several years of study of the housing, the water-courses, the sewers and drains of Belfast, the water supply, and the statistics or estimates of disease and mortality, some of which he had to compile for himelf. Malcolm knew that engineering alone would not be enough. (Figure 3). "To obtain the highest triumphs of the sanitary cause is the result of combined prudence, forethought, knowledge and zeal, gradually developed and matured in an entire people." Then the well-known statistical paper on the Influence of Factory Life on the Health of the Operatives, showing the harmful effect of flax dust on the lungs of the workers, and pleading for improvements in factory hygiene. There are two other major reports, among numerous lesser papers, one on the Asiatic cholera in Belfast (there were only 84 cases and Malcolm regretted the paucity of numbers) and one on the epidemic dysentery in the North of Ireland. "Statistical medicine", said Malcolm, "appears to be calculated to unfold much as yet hidden regarding the aetiology and treatment of disease."

Outside the hospital he became a member of council of the Belfast Social Enquiry Society, and it was mainly by his efforts that the Society for the Amelioration of the Working Classes was founded in 1845. Secretary of that Society and President of the Belfast Working Class Association, he worked successfully for the establishment of public baths and wash-houses, of incalculable value in days when there could be no washing at home. (Figure 4). The lady who was to be his wife, not behind him in welldoing, was the founder of the Belfast Domestic Mission to the Poor. Malcolm was the founder and soul of the Belfast Clinical and

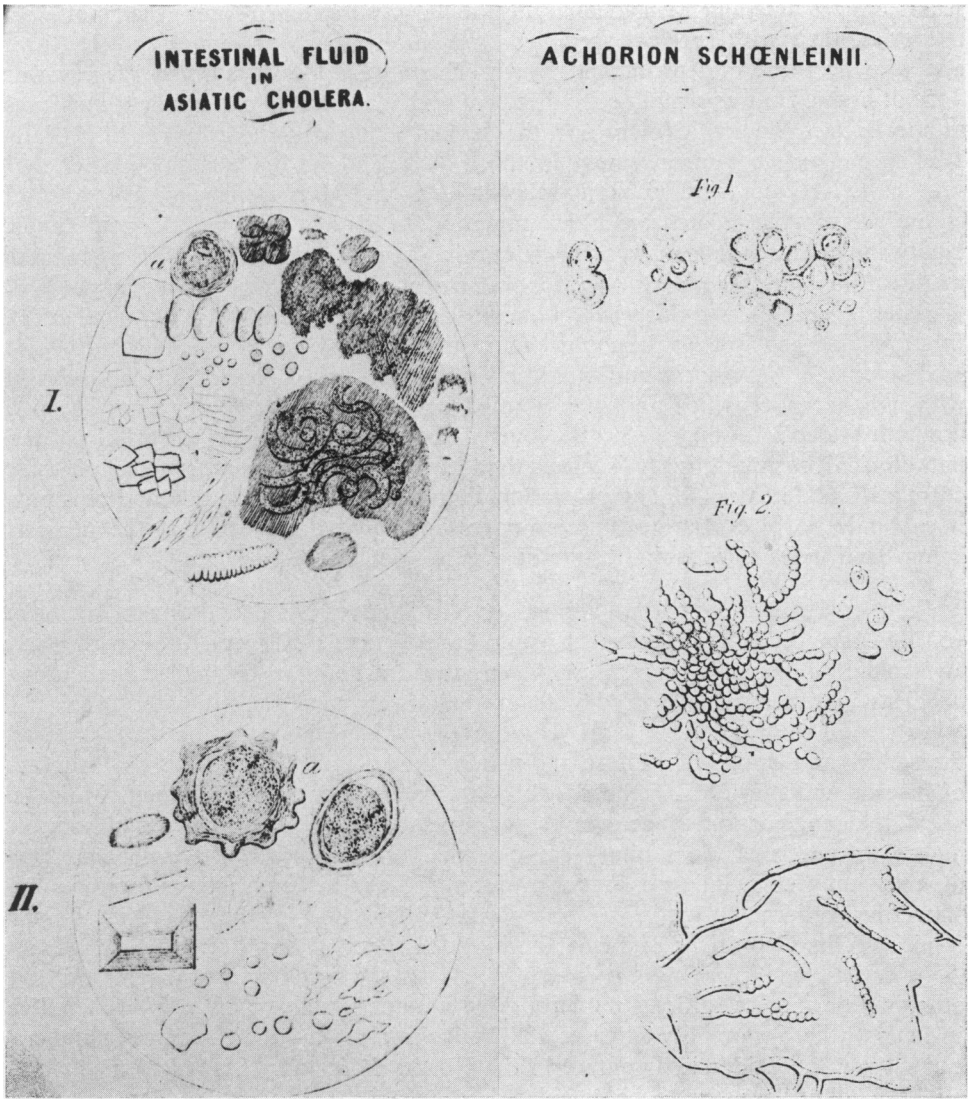

FIG. 1. *Malcolm's drawing of the microscopy of the discharges in Asiatic cholera. Swayne and Brittan had described "annular bodies" which they thought represented the agent causing cholera. The view was soon discredited. In the lower picture an ascaris ovum is probably seen, and in the upper perhaps a tapeworm egg.*

FIG. 2. *Malcolm's drawing of the fungus of favus, first described* 14 *years before in* 1839 *by Johann Schoenlein.*

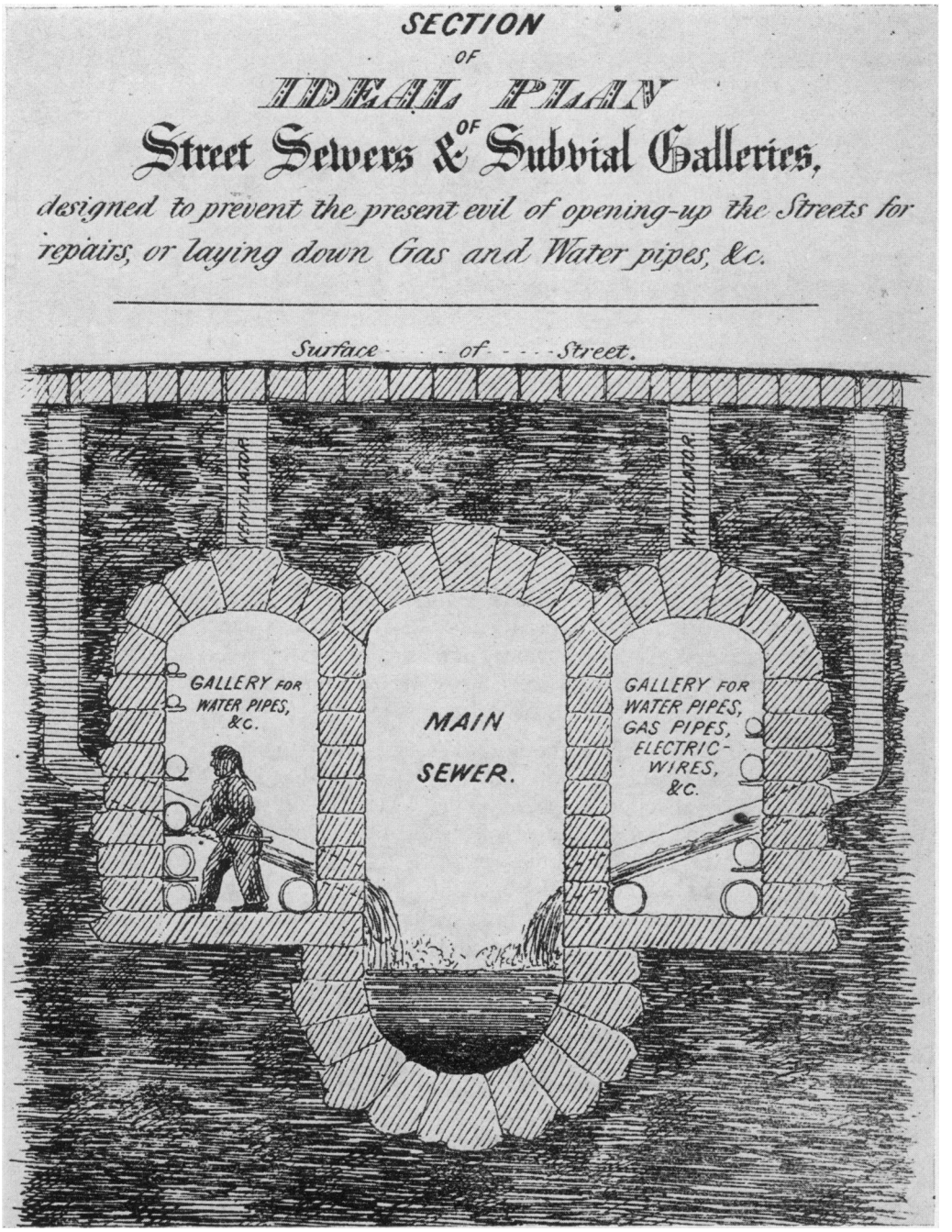

FIG. 3. *Malcolm's design for the ideal sewer* (1852). *The side galleries were to contain gas and water pipes and electric wires. The Corporation did not open an electricity generating station till* 1895.

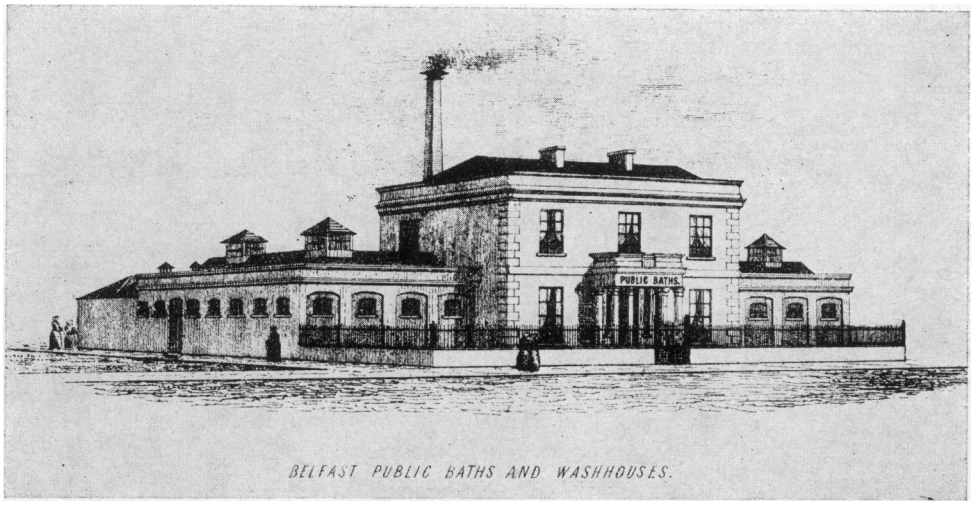

FIG. 4. *The baths and wash-houses, designed by Charles Lanyon. Situated "on the north side of the Falls Road, near Mr. Boomer's factory."*

Pathological Society, which, while it lasted, was more successful and active than any Belfast medical society before or since. Its transactions are a model publication, and it circulated a weekly medical news sheet to its members, besides undertaking to report on the members' specimens. He had no paid public appointment, and no private fortune.

More than all, Malcolm was the hospital's first historian. In 1851 he published his History of the General Hospital at Belfast, invaluable as a history, but also for showing us his affectionate heart, as he writes of his town, his hospital, his colleagues and his patients. He died of rheumatic valvular heart disease after a short terminal illness in 1856, at the age of 38. His brother Isaac had died at 16 of acute rheumatism. As he left the hospital for the last time a few weeks before his death, he might have used the words of that ancient servant of God, Andrew Stewart of Donegore, "I take timber and stones to witness that in my short time I have laboured to be faithful". Indeed if it be the duty of all of us to seek the truth and to communicate it, he might have gone on to say, with the dying Stewart, "according to my light, I have revealed the whole counsel of God to the people." Malcolm had married at 36, only 2 years before his death. His wife was Maria Glenny Home, a descendant of William Knox, brother of John Knox, the Reformer. Their only child, a son, died a few months after his father. They are buried in Dunmurry in the green of the ancient meeting house where his father was minister. Fifty years later his widow was buried in the place where her son and husband lay.

How did Malcolm come to be so successful? The answer lies partly in his ancestry, partly in the ethos of the community into which he was born, and partly in the spirit of the times. His father, also Andrew George Malcolm, was the

distinguished minister, first of Dunmurry, and later of Newry, where he died of typhus attending his people during an epidemic. His mother was Eleanor Hunter of Dunmurry. The Hunters had originally come from the Roe Valley where they were millers. The Malcolms came from Scotland in the seventeenth century and settled in North Down. There they flourished as small landholders through the 17th and 18th centuries, never dull if never distinguished, though the family liked to recall that a Malcolm had served with Nelson at Trafalgar. We first find distinction when we come to our Andrew George's father. Romantic and historic strains came into the Malcolm family with the father's mother. She was Fanny Kennedy of Mourne. Her great-grandfather, the Reverend Gilbert Kennedy, was a son of Colonel Gilbert Kennedy of the Ayrshire clan of Kennedys. Accounts differ as to whether he was of the Kennedys of Cassillis or the Kennedys of Ardmillan. The point is not settled but there is perhaps more evidence that Colonel Gilbert Kennedy was a brother of the 6th earl of Cassillis. He had fought with Cromwell against the King at Marston Moor, and had fought at Kilsyth for the Covenant against Montrose. Gilbert Kennedy had been minister of Girvan in Ayrshire and, being persecuted and deprived on the restoration of Charles II, he came to County Down, where he was minister of Dundonald. The line in Ulster descended to our Andrew George Malcolm, gathering, in fortunate marriages, strength of intellect and character (but not wealth). Eventually the Kennedy, the Laing, the Malcolm and Hunter strains blossomed in two remarkable men – Andrew George the father, the minister, and Andrew George the son, our physician. There is an interesting family connection to remember. Catherine, a daughter of the Gilbert Kennedy from Ayr who settled in Dundonald, sister of the younger Gilbert, married William Tennent, left County Down and went with him to America. This William Tennent was the historic minister and teacher who founded the famous Log College at the Forks of the Neshaminy in Bucks County, north of Philadelphia, on the road to New York. This Log College was the seed of the College of New Jersey, now the great University of Princeton. It was said of William Tennent's sons and students that they were to be found preaching from Massachusetts to the Carolinas, now to a sophisticated congregation in Boston or New York, now bringing their message to a handful of settlers on the upper Susquehanna, or else to homesteads under the shadow of the Alleghenies in the valley of Virginia. The story of Catherine Kennedy's sons, the four Tennent brothers, belongs to American history. The story of her brother Gilbert's children belongs to ours.

As to the community that Andrew George was born into, the flowing tide of European rationalism had had its full effect on eighteenth century Ulster. His people had spent that century, and were to spend the nineteenth, in the great debate between the rationalists and those who clung to the older thought, in religion, in politics, in sociology and biology. By the early nineteenth century a parting of the ways had come. The Malcolms belonged to that section which was won over to rationalism. Nevertheless, in their Ulster way, they realised that the exposure of error, rationalism's chief success, is not enough. It is, after all, loving-kindness, love and not logic, that makes the world go round. Malcolm's community therefore, rational, radical, utilitarian as they might be, preserved the ancient pieties, the ancient ethos, and a due regard for the ancient learning. I say that

born as he was into this intellectual climate, free but self-disciplined, dutiful to the past, but looking to the future, young Malcolm's heredity gave him the large heart, the large mind and the early intellectual take-off, which enabled him to do so much in his short life.

As to the spirit of the times, listen to Doctor Wales speaking of practice in Belfast. "About this time men began to rouse themselves out of the old grooves of thought. Physiological, pathological and chemical research took on more activity – a spirit of enquiry and criticism spread abroad, leading not only to a disposition to break new ground, but also to test afresh the foundations of received opinion and established practices. Among the foremost to catch the spirit of the times was the late Doctor Malcolm. Like a little leaven, he leavened the whole mass with the spirit which animated himself."

Let us hear further what his contemporaries said of him. At the opening of the session in the theatre of the General Hospital in 1856, shortly after Malcolm's death, Professor Ferguson gave the address. They met then as we meet to-day, to open the session. And we have a record of his remarks. He said they should have been addressed that day by Doctor Malcolm. Medicine had lost a most zealous and indefatigable and talented cultivator. This school one of its most admired and popular teachers. The student his kind companion, and his bright example. His colleagues a friend and fellow labourer. The sick a tender physician. Society an honest man. The amount of success in his professional career that the late Dr. Malcolm had achieved sprang not from patronage, nor from fortunate accidents. To his own talents, to his active philanthropy, to the weight of his moral character, and to the resistless force of industry, was he indebted for his position. Truth might perhaps oblige us to confess that unhappily these qualifications are not the most invariable, the most certain or the most unequivocal avenues to success in medical practice. Nevertheless Doctor Malcolm spent his time and exercised his energies in the acquisition of knowledge, rather than in a hunt after practice, and, said Ferguson, "I think he may be put before you, my young friends, as a good specimen of *the working man of our profession* well worthy of your imitation."

Death makes changes and time went on, but Malcolm was not forgotten. In 1874 Doctor Purdon said of Malcolm, "Though dead, he yet speaketh to the pupils of this institution in his exhibition founded and which bears his name." The Malcolm exhibition was first awarded in 1858 – to Mr. David Moore of Ballymoney. The chairman will shortly present the Malcolm exhibition for the 116th year to Mr. Allister Taggart, also of a North Antrim family, and we congratulate Mr. Taggart on it. Malcolm's message, however, is to you all, to us all. I have said elsewhere that this is not just a hospital. Here in Ulster we have brought forth a new nation. The great, the continuing endeavour within our walls is a manifestation of that nation's spirit. I am sure that in your new generation too it will breathe its life into your work, your studies and into you yourselves.

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THE DEMONSTRATION OF PULMONARY SURFACTANT BY ELECTRON MICROSCOPY

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INTRODUCTION

IT IS NOW WIDELY ACCEPTED that the moist respiratory surface of the mammalian lung is lined by a material which is responsible for lowering the surface tension at the air-fluid interface. This material, which is generally referred to as "pulmonary surfactant", appears to account for much of the mechanical stability of the terminal air spaces during the movements of respiration (Clements et al, 1958; Pattle, 1958). Research into the biophysical and biochemical properties of pulmonary surfactant has been spurred on by the discovery that surface tension is abnormally high in the lungs of infants dying from respiratory distress syndrome (Avery and Mead, 1959).

The morphological demonstration of pulmonary surfactant *in situ* has proven difficult. The widely used practice of preserving lung by introducing a solution of fixative through the bronchial tree causes the surfactant lining layer to be displaced. Displacement of surfactant also occurs when attempts are made to excise small blocks of tissue from the surface of unfixed lungs. Vascular perfusion of fixative, a technique often used in the preparation of organs for electron microscopy, is seldom successful when applied to lung tissue: the pulmonary vascular bed can only be perfused with fixative solutions at pressures far above the physiological range and as a result gross pulmonary oedema invariably develops. Furthermore, the surfactant lining is rapidly dissolved by the organic solvents which are used in the preparation of tissues for electron microscopy. Indeed, the results of a recent study (Meban, 1973) have suggested that chemical extraction has probably been the major cause of failure in previous attempts to visualize surfactant.

In this paper an account is given of a study in which pulmonary surfactant was successfully demonstrated *in situ* by electron microscopy using a modified technique for tissue preparation. The lung of the Syrian hamster was used as an experimental model: in this species the micro-structure of the lung closely resembles that of Man (Ryan et al, 1969) and, in addition, tissue samples can be obtained from adult and foetal animals in a fresh state—a technical necessity for electron microscopy.

MATERIALS AND METHODS

Foetal (10th-16th day of gestation), neonatal (air-breathing for 5 minutes-12 hours), and young adult (9 months old) Syrian hamsters were used. The animals were killed by cervical dislocation, the lungs were dissected out and immersed for 15 minutes in an ice-cold solution of 3 per cent glutaraldehyde in 0.1M cacodylate buffer (pH 7.35). Small blocks of tissue were then cut from the subpleural region

of each lung and fixed for a further 2 hours in the same solution. The blocks were washed for 18 hours in buffer solution containing 0.25M sucrose, post-fixed in buffered 2% osmium tetroxide, and rapidly dehydrated in ethanol. The schedule for dehydration was as follows: (1) 60% ethanol at 4°C (5 minutes); (2) 80% ethanol at 4°C (5 minutes); (3) absolute ethanol at 4°C (30 minutes); (4) absolute ethanol at room temperature (30 minutes). Following dehydration the tissues were processed through 1,2-epoxypropane and embedded in Araldite or Epon-Araldite. Sections (50-70 nm thick) were cut on a Reichert ultra-microtome, stained with uranyl acetate and lead citrate, and examined in an AEI electron miscroscope.

Results

Lungs of adult animals

In electron micrographs of adult hamster lung a layer of pulmonary surfactant is seen to line the entire internal surface of the alveoli and alveolar ducts. In some specimens an incomplete surfactant lining is also present in the smaller bronchioles. The surfactant lining consists of two distinct parts: (1) a thin electron-dense superficial film, and (2) a thicker basal layer.

The superficial film extends as a gently curved line around the interior of each alveolus (Figure 1). The film is of uniform thickness (7 nm) and shows a strong affinity for heavy metal stains. When cut in true cross-section it is sharply delineated, but it is often indistinct in tangential sections. In some regions the film

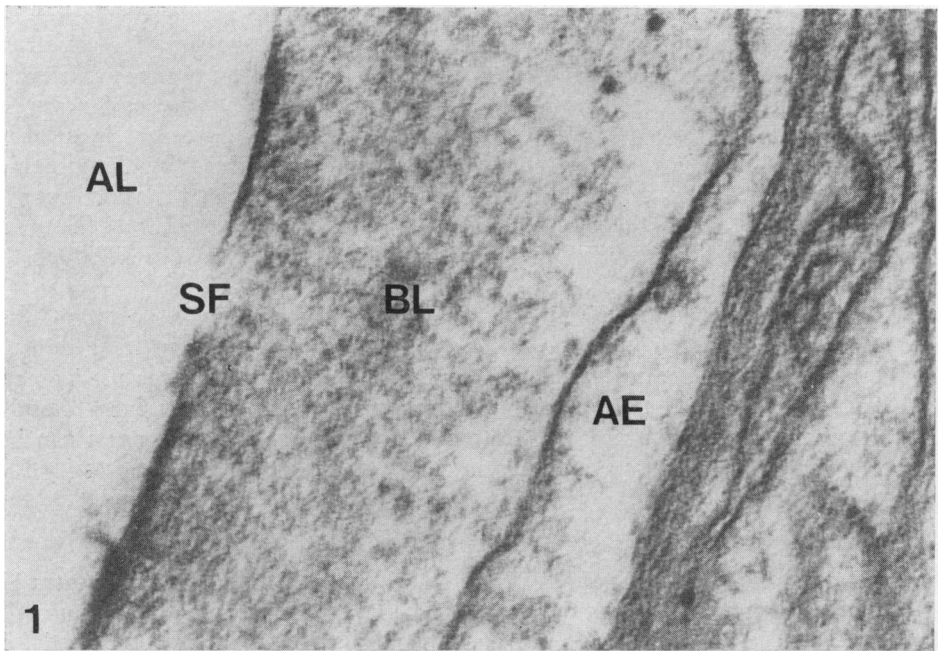

FIG. 1. *Surfactant lining in lung of adult hamster. AL, alveolar lumen; SF, superficial surfactant film; BL, basal layer of surfactant; AE, alveolar epithelium.* x 130,000.

is fragmented and appears as a series of electron-dense linear masses. High resolution micrographs have failed to reveal any regular substructure within the film.

The basal layer occupies the space between the superficial film and the underlying alveolar epithelium (Figure 1). In the depressions between adjacent pulmonary capillaries and at the angulated areas of the alveolar wall this layer is several micrometres thick. In contrast, it is very attenuated (as little as 50 nm thick) over regions of the alveolar wall where gaseous diffusion occurs. The basal layer has a floccular appearance and it contains membranous structures and small numbers of alveolar macrophages. The membranous structures are composed of lamellae which resemble the superficial film in thickness and staining properties. The lamellae are generally disposed in an orderly manner as square lattices or parallel arrays (Figure 2); less frequently, loose tangles or whorls are formed. Macrophages are normally present only in the thicker regions of the basal layer. In most cases they appear to be actively engaged in the removal of particulate matter from the superficial surfactant film.

Lungs of foetal animals

Osmiophilic surfactant membranes first appear in the lungs of foetal hamsters on the 13th day of gestation. The membranes are scattered throughout the fluid contained within the terminal respiratory spaces. They are most often arranged in irregular tangles, although in some areas square tubular arrays or concentric cylindrical sheets can be detected (Figure 3). The quantity of the membranous material shows a sharp increase during the last two days of gestation (15th and 16th days).

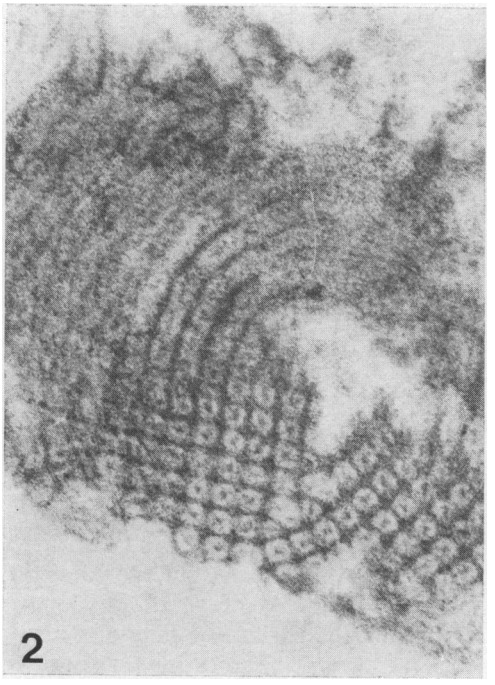

FIG. 2. *Adult hamster lung. Membranous material in form of a square lattice in basal layer of surfactant.* x 80,000.

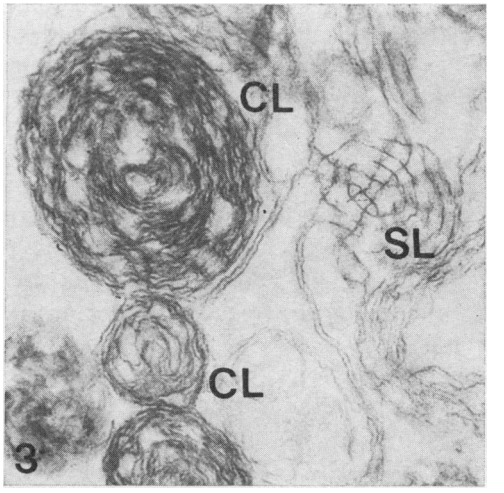

FIG. 3. *Surfactant membranes in lung of foetal hamster. CL, concentric lamellae; SL, square lattice.* x 80,000.

After birth the fluid within the respiratory passages is gradually replaced by air. During this process some of the surfactant membranes unite to form a continuous film at the newly formed air-fluid interface. Membranous material not used in this way is stored in the residual alveolar fluid and thus forms the basal, or reserve, layer of the surfactant complex.

Discussion

In the present study the layer of pulmonary surfactant that lines the terminal air spaces of hamster lung has been demonstrated *in situ* by electron microscopy. The morphological form of the lining layer corresponds closely to the structural model of surfactant proposed by Pattle (1966) on the basis of physiological and biochemical data.

Pattle (1966, 1967) has suggested that the superficial film of the lining complex consists of a monomolecular sheet of phospholipid molecules situated at the air-fluid interface in such a manner that the hydrophobic parts of the molecules are orientated towards the air phase. The basal layer is considered to be a colloidal solution of protein and phospholipid which serves as a depot from which the superficial film can draw during alveolar expansion.

Morgan and Huber (1967) have shown that 60-65 per cent of all lipids are lost during the processing of tissues for electron microscopy by conventional techniques; most of the loss appears to occur during the dehydration of the tissues in organic solvents. Obviously extraction of this order of magnitude greatly hinders the visualization of thin membranes, such as those of pulmonary surfactant, which have a high lipid content. In the present study the loss of lipid by chemical extraction was minimized by processing the tissues for electron microscopy by a rapid dehydration technique.

Gil and Weibel (1970) have had some success in preserving the surfactant lining in the lungs of rats. They perfused the pulmonary vascular bed with an anti-coagulant (heparin) and a vasodilator (procaine) and then with a solution of glutaraldehyde fixative. In this way they were able to stabilize the alveolar tissue components without causing massive pulmonary oedema. Their micrographs clearly show a duplex type of surfactant lining similar to the one seen in the present study. Chase (1959) has attempted to demonstrate pulmonary surfactant using a freeze-drying technique. Unfortunately tissues prepared in this way show little contrast in the electron microscope and hence the results of this study are difficult to interpret.

In the present study surfactant membranes were detected in the terminal respiratory spaces of foetal hamsters as early as the 13th day of gestation. The membranes took the form of loose tangles or, less commonly, they were arranged in square lattices or concentric cylindrical sheets. The first appearance of a continuous alveolar lining film was seen immediately after birth when air was first introduced into the lungs. The presence of large quantities of a surface tension lowering agent in the air spaces at this time is undoubtedly of great functional benefit: the surfactant would facilitate the removal of fluid from the lung and also greatly decrease the effort required to perform the first respiratory movements.

It now appears likely that the regulation of alveolar surface tension is not the sole function of pulmonary surfactant. It is well established that phospholipid films *in vitro* are capable of absorbing particles of insoluble material (Fergason and Brown, 1968) and Fronsolono et al, (1970) have recently suggested that the surfactant film may assist in the trapping of inhaled particulate matter. On the other hand, Meban (1972) has shown that the basal layer of the surfactant lining is rich in mucopolysaccharides which exist in a highly hydrated form. It is therefore probable that this component of the lining complex protects the delicate alveolar epithelium from dessication.

Summary

The pulmonary surfactant that lines the alveoli of hamster lung has been demonstrated *in situ* by electron microscopy. In the lungs of adult animals the surfactant lining consists of two distinct parts: (1) a thin superficial film, and (2) a thicker basal layer. Surfactant membranes first appear in the lungs of foetal hamsters on the 13th day of gestation. They are arranged either in loose tangles or in square lattices and concentric cylindrical sheets.

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TITUBATION IN HEREDITARY ATAXIA

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INTRODUCTION

"AS THE DISEASE progresses some jerky irregularity develops in the movement of the neck and head so that the head presents slight movements, sometimes like an irregular tremor, sometimes simulating chorea". This is how Gowers in 1899 described the occurrence of titubation in hereditary ataxy in his book on the diseases of the nervous system. But this feature of hereditary ataxia seems to have received scant attention in recent textbooks. Two siblings of a family are reported here to stress the fact that titubation may be a predominant feature of this condition. One had also a persistent tachycardia, a normal glucose tolerance test (g.t.t.) and normal peripheral nerve conduction whereas her brother (Case 1) had an abnormal g.t.t. and impaired nerve conduction.

CASE REPORTS

Case 1

J.E., a single man first went to hospital at the age of 24 years with symptoms of duodenal ulcer. He was observed then to be unsteady while walking. At the age of 35 years he developed pulmonary tuberculosis for which he received a course of treatment. He was first seen in the neurological unit, aged 38 years, with the complaints of pain in the back and was then noted to have titubation and ataxic gait. Ten years later when he was admitted to Claremont Street Hospital, Belfast, his main symptoms were "shake in the head and in the hand and unsteadiness". His walking had deteriorated considerably over the years. An examination revealed titubation – slow (4 per sec) head tremor which was a rotatory movement of the head with a range of about 30° and which was present on sitting and standing but disappeared on lying down; he had intention tremor and inco-ordination in the upper limbs, the tendon reflexes were depressed and plantar responses flexor. He had an ataxic gait. A routine full blood count, E.S.R., E.C.G. and C.S.F. examination was normal; a g.t.t. was abnormal (106, 140, 200, 180, 130 mg./100 ml.). Nerve conduction studies were abnormal; the motor velocity of the ulnar and the median nerves was slow (40 and 28 metres/second respectively), with prolonged distal latency (5.8 and 6.3 milliseconds respectively); the sensory potentials from 5th digit to wrist and from ankle to knee were absent. He developed jaundice eight months later and was admitted to a surgical unit where he was found to have carcinoma of the pancreas at operation. His general condition gradually deteriorated and he died three months after the operation. No autopsy was performed.

Case 2

M.J.E., an unmarried sister of J.E., aged 39, was first seen in hospital at the age of 24 years with complaints of nervousness in the preceding 18 months. She was then noted to have titubation and tremor and inco-ordination in the upper limbs. She was also found to have tachycardia (100/minute) and was treated with Carbimazole with no improvement. Gradually the head shake got worse and more persistent and inco-ordination in the hands became more obvious. She attended the neurological unit two years later with the main complaint of head shaking and unsteadiness of

the upper limbs. She had markedly depressed tendon reflexes and flexor plantar responses. The abdominal reflexes and gait were normal. There was no dysarthria nor any nystagmus. She was again found to have tachycardia (108/minute). A C.S.F. examination was normal. A radiograph of the skull and chest was normal. Urine chromatography revealed generalised aminoaciduria. A recent examination revealed the further deterioration with progress signs and, in addition, a markedly ataxic gait. The titubation although like that of her brother was much more marked. A g.t.t. and the peripheral nerve conduction were found to be normal.

There was no family history of similar disease or pes cavus and two members of the same generation were examined personally and were found to be normal.

Comments

The main features of the two siblings described here are titubation and ataxic gait with mild inco-ordination of the limbs. There were neither any pyramidal signs nor any suggestion of posterior column involvement. These features perhaps fall into the predominantly cerebellar form of hereditary ataxia in Greenfield's classification (1954). Although titubation has been noted in nearly all types of spinocerebellar degeneration including Friedereich's ataxia, it has been observed mostly in the type with mainly cerebellar and/or brainstem degeneration (Fickler, 1911; Thorpe, 1935; Aring, 1940; Rosenhagan, 1943; Hall, Noad and Lathum, 1941). Generalised aminoaciduria noted in one of the siblings raised the possibility of Hartnup's disease but many of the features of the latter including photosensitive skin rash were absent (Baron et al 1956). Aminoaciduria has also been noted in a number of other neurological disorders including paraplegia (Banerji and Millar, 1971). Disseminated sclerosis can also affect several siblings in a family but many of its features and the pattern of involvement of the nervous system (Millar, 1971) makes it unlikely in the present cases.

Russell in 1946 reported histological findings in the hearts of four cases of Friedereich's ataxia. Since then there have been many reports of heart disease in this condition (Novic, Adams and Anderson, 1955; Hewer, 1969). An electrocardiographic study (Thorén, 1964) showed an abnormality in 92 per cent of 49 patients, and also a changing E.C.G. pattern. In case 2 there was a persistent tachycardia but no other abnormality in E.C.G. Perhaps this indicated that the heart was involved.

Electrophysiological studies in Friedereich's ataxia have demonstrated the absence or marked reduction in amplitude of the median and ulnar sensory nerve action potential and also some slowing of motor conduction (Bauer, Meyer and McMorrow, 1963; McLeod, 1971). The involvement of the peripheral nerves has been further supported by histological examination (McLeod, 1971) but the causative factor has not been identified so far. The other association of note with Friedereich's disease is that of diabetes mellitus (Ashby and Tweedy, 1953). Recently Hewer and Robinson (1968) found that out of a series of 113 cases of Friedereich's ataxia, 9 were diabetic and a further 12 had abnormalities of the glucose tolerance test.

Peripheral nerve conduction studies have supported the suggestion that peripheral neuropathy in diabetes is due to a disturbance of carbohydrate metabolism

(Chopra and Hurwitz, 1969). The electrophysiological study in synalbumin positive and negative subjects, however, turned out to be inconclusive (Chopra, Connon and Banerji, 1969). However, no one has so far attempted to show whether there is any relationship between impaired peripheral nerve conduction in Friedereich's ataxia and the associated diabetes mellitus. It is of interest to note that one of the siblings, reported here, who had an abnormal g.t.t. also showed an abnormal peripheral nerve conduction whereas the other with normal g.t.t. had a normal nerve conduction. It is possible that the impaired nerve conduction in the former and perhaps in hereditary ataxia is due to a disturbance of carbohydrate metabolism, as in patients with diabetes mellitus.

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A DENTAL EPIDEMIOLOGICAL STUDY IN A HIGH FLOURIDE AREA OF COUNTY FERMANAGH

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INTRINSIC STAINING OF TEETH, apart from being caused by localised injury or infection, may be due to one of a number of factors. For example, the white patchy hypoplasia sometimes seen on the tips of the permanent incisors may have been due to a debilitating illness, such as broncho-pneumonia, in infancy. Pink staining of the teeth may occur in porphyria and in icterus gravis neonatorum the teeth, when they erupt, may be stained bluish green. Osteogenesis imperfecta may cause, in addition to blue sclerotics, a distinctive brownish colour of the teeth, which soon wear down due to poorly formed or absent enamel. Several of the tetracycline group of antibiotics are known to cause yellowish staining of the teeth in children (Stewart 1964, 1973) and the time of administration of the drug may be calculated approximately from the area of tooth so discoloured.

It has been known for many years that people living in certain districts have peculiar staining or mottling of the teeth. One such area in Mexico was mentioned by Kuhns in 1888. The inhabitants of a district of Italy, near Naples, were described by Eager (1901) as suffering from a dental peculiarity known as "denti di chiaie".

Black and McKay (1916) gave the classic description of mottled teeth which they found in inhabitants of parts of Colorado. This was followed by reports of similar conditions in China by Anderson & Stevenson (1930), in Japan by Masaki (1931), in North Africa by Velu (1932) and in Argentina by Chaneles (1932).

The association of this type of mottling with fluorides in drinking water was established by Churchill (1931). McKay (1929) had noted that children with mottled enamel were less susceptible to dental caries than those with normal teeth. Since then research in many parts of the world, e.g. Weaver (1944) has shown that, if flourides are present in or added to drinking water at the amount of 1 part per million, caries is reduced by approximately 50 per cent.

In Northern Ireland, Stoy (1952) saw cases of enamel hypoplasia strongly suggestive of dental fluorosis and it was decided to carry out a survey of drinking waters in Northern Ireland. The results of this survey have been published (McKay 1973). Samples were obtained from over 1,300 drinking wells and tests were carried out to ascertain total hardness and hydrogen ion concentration in addition to fluorides and other trace elements. Several wells in County Fermanagh were found to have a high fluoride content. It was decided to carry out an epidemiological study of the dental condition of school children in the area concerned.

The district is sparsely populated. It lies between the south-western shore of Upper Lough Erne and Slieve Rushen which is in the Republic of Ireland. The country is low-lying and is made up of small farms. There are few shops in the district. Free milk is provided for school children and school meals are available.

Four schools were selected. Two of these, Aughakillymaude Primary School and the Earl of Erne Primary School, are situated close to the Lough shore and are

attended by all children of primary school age (i.e. 5-14 years) in the district. The other two schools selected, Clonmaulin and Cornagague Primary Schools, lie a little to the East in an area where one or two deep wells had been discovered to have high fluoride content. Although it was known that some wells had a high fluoride content no detailed knowledge of the fluoride content of the water supply used by these individual children was available at the time of examination.

Two hundred and twelve children, between the ages of five and fifteen, were examined. Full dental charting was carried out; decayed, missing and filled deciduous and permanent teeth were noted, using the methods described in the Report on the Incidence of Dental Caries in School Children (1960). Examination was carried out using mirror and probe. Only lesions penetrating into the dentine, i.e. Grades 4, 5 and 6 described in this Report, were noted. Oral hygiene, periodontal condition and any evidence of mottling were observed. Oral hygiene was, generally speaking, poor. Some mouths appeared to be neglected, but there was little evidence of periodontal disease. No marked mottling of the enamel was seen in any of the mouths examined.

After the inspection was carried out, samples were taken and tests carried out for fluoride content of the drinking water used by the children. Sampling was made difficult by the fact that none of the children used piped water, but families were generally quite large and in some cases two families used the same well. It was found that, of the 212 children involved, 150 used well water containing less than 1.00 p.p.m. fluoride, 6 used well water of 1.0 p.p.m., 10 of 1.4 p.p.m., 6 of 1.5 p.p.m., 12 of 1.6 p.p.m., 9 of 2.3 p.p.m., 4 of 3.9 p.p.m., 7 of 5.0 p.p.m., 2 of 5.5 p.p.m. and 6 of 6.0 p.p.m. All the children examined had been residing continuously in the area.

Detailed lists of the results of the survey were prepared and statistical analyses were carried out. Due to limitation of space these figures are not reproduced in this paper. They are, however, available for inspection in the School of Dentistry, Royal Victoria Hospital, Belfast, and will be sent to anyone expressing a special interest.

A summary of the results follows :

34 children between 5 and 10 years of age and 42 children between 8 and 15 years of age were found to use drinking water from wells with a high fluoride content. This was compared with 70 children between 5 and 10 years and 117 between 8 and 15 years who were using wells containing less than 1.0 p.p.m.

A marked difference in the caries rates of the various groups was found. For example, 70 children aged between 5 and 10 years using well waters containing less than 1 p.p.m. fluoride were found to have a total of 508 decayed, missing or filled (D.M.F.) deciduous teeth, an average of 7.36. This compared, unfavourably, with 34 children of a similar age group, using well waters containing more than 1 p.p.m. fluoride, who had a total of 71 D.M.F. teeth, an average rate of 2.06.

In the older age group, 117 children using well water with less than 1 p.p.m. fluoride had 419 decayed, missing or filled teeth, an average of 3.53, whereas 42 children, using water containing more than 1 p.p.m. fluoride had 57 D.M.F. teeth, an average of 1.36.

Further examination of the results showed that, in the 5-10 age group using water with less than 1 p.p.m. fluoride, 16 children of the 70 examined had each more than 10 deciduous teeth decayed, missing or filled and 3 children had each more than 18 D.M.F. teeth, whereas in the similar age group using water with more than 1 p.p.m. fluoride, only one child of the 34 examined had more than 6 D.M.F. teeth. Similarly, in the 8-15 year olds. of 117 children examined in the low fluoride group, 55 had 4 or more permanent teeth decayed, missing or filled, while only 4 children had 4 or more D.M.F. out of 42 examined in the high fluoride group.

Various statistical tests were carried out to test the significance of these findings. The results of these tests show the difference between the low and high fluoride groups to be significant in all the categories tested.

Conclusions

In a sparsely populated area of South Fermanagh, in the Aughakillymaude district, some wells used for drinking purposes contained amounts of fluorides varying from 1 part per million to 10 parts per million. A dental examination of school children in the area showed evidence in a few cases of mottling of enamel which was strongly suggestive of fluorosis. It also showed that children drinking water from wells with even a very high fluoride content had significantly less dental decay than children using wells containing less than 1 p.p.m. fluoride.

It is of interest to note that, according to the health authorities in the county, there is no evidence of any ill-health in the area which could in any way be attributed to the high fluoride content of the water supplies. Sickness and mortality rates are about the average for the county. (Moore 1973).

Summary

In South Fermanagh, the only area in Northern Ireland where wells with a high fluoride content were found, an epidemiological survey was carried out on two hundred and twelve school children. A statistical study of the figures shows that there is a difference, which is of statistical significance, between the number of decayed, missing and filled teeth in the children examined using well water with a high fluoride content and those using well water with a low fluoride content. The D.M.F. rates found were 6.74 (boys) and 7.90 (girls) for deciduous teeth (low fluoride) compared with 1.70 (boys) and 2.64 (girls) for deciduous teeth (high fluoride) and 3.60 (boys) and 3.61 (girls) for permanent teeth (low fluoride) compared with 1.35 (boys) and 1.36 (girls) for permanent teeth (high fluoride).

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SOFT WATER AND ISCHAEMIC HEART DISEASE
A STUDY OF TWO TOWNS IN NORTHERN IRELAND

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I HAVE BEEN STIMULATED by the present controversy relating death from cardiovascular disease to a soft water supply (Shroeder, 1960; Crawford, Gardner and Morris, 1968 and 1971) to make an individual comparison of crude cardiovascular death rates in two adjacent towns in Northern Ireland in which the water supply is derived from different levels of the same watershed.

Portadown and Lurgan have had very similar populations during the years 1950-1970 and the water supply to each has been established for the past 50 years. Portadown draws its very soft water by aqueduct from two reservoirs on the western face of the Mourne Mountains (at Foffany and Spelga), and Lurgan is supplied by less soft water drawn from Lough Neagh which is at that area largely supplied by the River Bann. The total hardness for the Portadown water supply is about 13 parts per million, and for the Lurgan water about 95 parts per million. There is no reason to suppose any deviation from these figures over the past 20 years.

The population, total deaths and deaths certified as due to heart disease (classification 410-443, Annual Reports of the Registrar General for Northern Ireland) have been obtained for the Lurgan and Portadown Municipal Boroughs between 1950 and 1970. The population of Lurgan rose from 16,112 in 1950 to 20,673 by 1970, and that of Portadown from 17,159 to 20,766 during the same period. The crude annual death rate from heart disease per 1000 population varies between 2.7 and 6.2 during the 20 years but there is no consistent difference between Lurgan and Portadown.

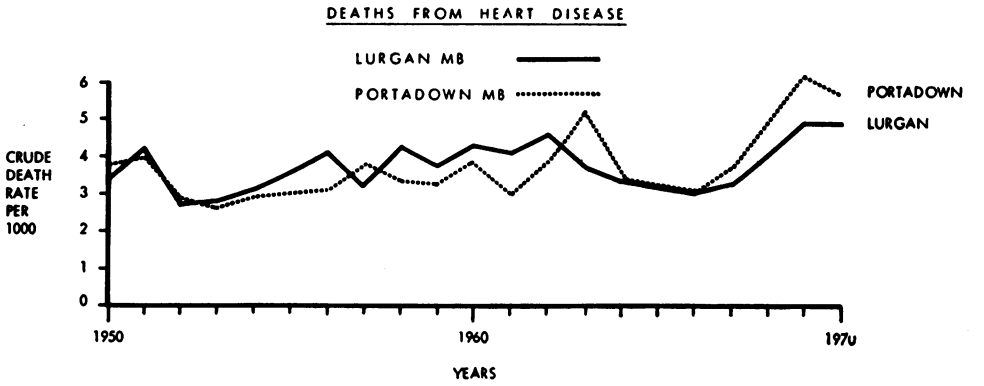

FIG. 1. *Death rates per* 1000 *population from heart disease in Portadown and Lurgan between* 1950 *and* 1970

These negative results are of some significance for several reasons. Due to various factors, an increasing proportion of the city of Belfast is being supplied with Lough Neagh water rather than the longstanding supply from the Silent Valley Reservoir in the Mournes: the hardness of these two supplies is in the same proportion as that of Lurgan and Portadown. However, due to population shifts, and the absence of accessible records of death for different parts of the city of Belfast, it is unlikely that any prospective study of morbidity or mortality can be undertaken to assess the effect of this change in water supply, and in any case the results from Lurgan and Portadown seem to indicate that the difference in hardness, or any other possible difference between 'pure' Mourne mountain water and that obtained from Lough Neagh, although of an order of difference of about ten times, is not important.

The hardest water in Northern Ireland is obtained from wells in the Aughnacloy area (921 ppm), and the softest from lakes fed by rain water on the western side of the Mourne mountains (Leitrim, near Hilltown, Co. Down—7.9 ppm) (McKay 1965). However, the inverse relationship between total water hardness and cardiovascular mortality which has been shown to exist in large towns in England and Wales, and in the U.S.A., does not achieve significance in Ireland (Mulcahy, 1966). This may simply represent the fact that very little piped water of a hardness greater than 100 parts per million is available in any part of Ireland, or may be due to the interaction of other as yet unrecognised risk factors.

I am grateful to Dr. Norman Agnew, previously Secretary to the Belfast Water Commissioners, for his help in obtaining details of water supplied by various undertakings in Northern Ireland. This paper is based on a communication to the Ulster Society for Internal Medicine, in May 1972.

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ACUTE PANCREATITIS IN A PERIPHERAL HOSPITAL

by

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PANCREATITIS is a disease of variable aetiology and the acute form usually presents as an acute abdominal pain. The incidence in the general community has been estimated as five cases per hundred thousand per year. (Trapnell, 1968). In hospital the incidence has been put at one in six hundred admissions (Robbins, 1967) or at one hundred cases in fifteen hundred acute abdominal emergencies over a period of six years (Walker, 1972). This account is a review of the cases of acute pancreatitis seen in one surgical unit in a peripheral hospital in one year.

Case History

The data on all cases is set out below.

Case 1

This was a 36 year old male with a six year history of indigestion and was prone to drink a bottle of spirits and some beer daily. He was a publican by trade. He was admitted with a steady epigastric pain which radiated through to the back and was associated with vomiting. The abdomen was soft and the only clinical finding was tenderness in the epigastrium. A serum amylase of 788 Street Close units was found and the initial diagnosis of perforated duodenal ulcer was corrected to one of acute pancreatitis.

He was treated conservatively by naso-gastric suction and intravenous fluids. Trasylol 200,000 units were given stat. I.V. followed by 200,000 units four hourly via the I.V. drip for three days. In addition D.F. 118, 50 mg., atropine 0.6 mg., and ampicillin 250 mg. were given six hourly. Nine days after admission he was symptom free but later became jaundiced. The amylase at this time was 48 S.C. units and the liver function tests which had been normal until now showed a bilirubin of 0.86 mg. per 100 ml. This was associated with a pyrexia of 101°F and settled over the next four days.

One week later he had a similar attack with a pyrexia of 103°F and the full I.V. regime restarted but without Trasylol in the drip. He settled and was discharged 43 days after admission.

Three months later he was re-admitted with acute abdominal pain and a pyrexia of 103°F and at this time a pancreatic pseudocyst was diagnosed and confirmed on barium meal. This was later drained surgically via a tube drain. A sinogram via the drain site demonstrated a communication to the small bowel. He was discharged symptom free and an amylase of 18 S.C. units. The drain site fistula had closed at this time.

Case 2

This 52 year old female was admitted via the cardiac ambulance complaining of severe epigastric pain and vomiting. There was shortness of breath but no shock. The

pain moved to the left lumbar region and a diagnosis of diverticular disease was made. On examination there was marked tenderness and rebound tenderness in the L.I.F. The E.C.G. was normal and the amylase 350 S.C. units. She was treated by conservative methods and settled by the sixth day. Barium meal and cholecystogram showed a poorly functioning gallbladder and no evidence of peptic ulceration. She was discharged one week after admission and her name placed on the waiting list for cholecystectomy.

Case 3

This 44 year old female was admitted with a two day history of epigastric pain and vomiting. She had had a similar attack three months before and denied any fatty food intolerance. She had a pyrexia of 99°F and a mass could be palpated in the left flank. Rebound tenderness was present. The serum amylase was 50 S.C. units and X-ray did not reveal any pathology. However, at laparotomy a swollen pancreas and massive fat necrosis was found and confirmed by omental biopsy. Post-operatively full conservative treatment was started including Trasylol. On discharge the amylase was 29 units and the convalescant mumps anti-body was slightly elevated.

Case 4

A 78 year old female admitted with a severe pain in the left flank with shortness of breath, a cough and sputum. On examination she was dehydrated, cyanosed and shocked with a B.P. 80/50 mm. Hg. There was generalised rhonchi and crepitations in both lung bases. The abdomen was distended, rigid and tender in the left half. X-ray showed consolidation of the left lower lobe. She was treated as for intestinal obstruction and given antibiotics for her chest infection. She deteriorated over a period of one week and died in renal failure without laparotomy being carried out. The diagnosis of pancreatitis was made at post mortem.

Case 5

This 73 year old man was admitted with a two day history of pain in the L.I.F. and vomiting. There was generalised abdominal tenderness, distension, and rebound tenderness. Slight jaundice was present. At laparotomy a diagnosis of acute haemorrhagic pancreatitis was made. There was marked fat necrosis. He collapsed and died shortly after the operation.

Case 6

The patient was a 76 year old female with a four day history of epigastric pain radiating through to the back. This was associated with vomiting. She had a past history of hypertension and heart disease and an itial diagnosis of mesenteric embolism was made. The amylase was 1080 S.C. units and she was treated by conservative measures including Trasylol. She deteriorated and died within 24 hours.

Case 7

This 70 year old lady had a one week history of crampy upper abdominal pain with slight jaundice and vomiting. On examination she was fat with coexistant obstructive jaundice and a pyrexia of 100°F. She was diagnosed as cholecystitis with bile duct obstruction. Serum amylase was 173 S.C. units and the gall bladder failed to concentrate the dye on two cholecystograms. Six days after admission pancreatitis was found at operation and at the same time cholecystectomy was carried out. She was discharged two weeks after admission and at follow up was symptom free and the convalescent serology showed a 10 unit rise in mumps antibody.

Case 8

A 66 year old male was admitted via the cardiac ambulance complaining of epigastric pain radiating to the chest and left arm. He was short of breath but there were no

abnormal clinical findings. The E.C.G. was normal and the amylase 143.6 S.C. units. All other blood tests were normal. He was initially treated as a myocardial infarction and settled and was discharged one week later. The diagnosis was mild acute pancreatitis and the amylase on discharge was 21 S.C. units.

Case 9

This 50 year old male who had never had any history of heart disease or ulcers was admitted via the cardiac ambulance with epigastric pain and nausea. He had marked epigastric tenderness and his E.C.G. was normal. The amylase was 210 S.C. units and a diagnosis of acute pancreatitis was made. He was treated conservatively including Trasylol and settled within a week. The amylase had fallen to 28 units. The only complication was an initial pyrexia of 100.4°F. There was a slight rise in the Coxackie B_4 antibody level and no evidence of ulceration was found on barium meal.

Case 10

This 35 year old obese female was admitted with a sudden onset of severe epigastric pain and vomiting. There was epigastric tenderness and a diagnosis of acute pancreatitis was confirmed by an amylase of 588 S.C. units. She was treated by the full conservative regime until the pain settled five days after admission. Cholecystogram showed a non-functioning gall bladder and on discharge after three weeks the amylase was 27 units. She was re-admitted three weeks later with more pain and a routine cholecystectomy was carried out.

Case 11

This 47 year old female was admitted with severe upper abdominal pain and vomiting. The pain moved into the back and was eased by sitting up. On examination there was marked epigastric tenderness. The initial diagnosis of duodenal ulceration was changed to acute pancreatitis and confirmed by a serum amylase of 1300 S.C. units. She was treated by the full conservative regime and gradually improved so that at three weeks on discharge the amylase was 21 units. A non-functioning gall bladder was noted and removed four months later. Viral studies showed a 20 unit rise in the mumps antibody.

Discussion

It can clearly be seen that the diagnosis of acute pancreatitis is not often made correctly, and that there was only one correct diagnosis in this series of eleven cases. The general practitioner who sees less pancreatitis per year than hospital staff diagnosed myocardial infarction in three cases, the remainder being sent direct to the surgical unit with a diagnosis of "acute abdomen". House officers dealing with the cases on arrival in the hospital medical unit changed the diagnosis to pancreatitis in one of three cases brought in by cardiac ambulance. Surgical advise was sought in all cases. On the surgical side the house officer made only one correct diagnosis in the remaining seven cases. The main confusion was with peptic ulceration, gall bladder disease and diverticular disease. The diagnosis of other acute abdominal conditions also being made in four cases.

Aetiology

As already stated the aetiology is varied but there is a large school of thought that puts forward pancreatic duct obstruction as the most important factor (Pollock, 1959; Bailie, 1962; Robbins, 1967). This has been shown in dogs but not sub-

stantiated in man. Obstruction may be produced by biliary calculi or by increased tone in the sphincter of Oddi as can be induced by opiate drugs or by alcohol. Other factors include pancreatic calculi, epithelial debris and pancreatic oedema. Alcohol intake has been often stated as a classical cause of acute pancreatitis but in a large series of cases in Los Angeles no such cause was found (Pollock, 1962). Theoretically alcohol induces pancreatitis by causing the stomach to produce secretin which promotes pancreatic activity and simultaneously directly increases sphincter tone. Infection of the gland is not essential but is an important factor, as shown experimentally by Banks (1971). He introduced E. coli into pancreatic ducts of germ free animals to cause experimental pancreatitis and also found that this organism was involved in cases of high small bowel obstruction.

In this series only one case was noted who admitted to a heavy alcohol intake. Several other cases were associated with gall-bladder disease as is often reported in the literature. In some cases a viral aetiology was suspected, especially in those cases occurring during the month of July as there was a peak incidence at this time. No cases were noted due to any of the other rarer causes suggested, such as an hereditary disposition which is associated with diabetes, pancreatic cysts and an increased tendancy to pancreatic carcinoma.

Pathology

During the course of the disease amylase and other enzymes are liberated into the circulation. The amylase level rises in the first twenty-four hours and usually settles by the fifth day and almost always by the tenth. This rise is paralleled by the urinary amylase (Edmondson, 1952). The serum lipase level also rises but its estimation is not accurate. The serum amylase level is the most accurate laboratory test but the level also rises in other disease processes, but not to the same extent. The associated shock in acute pancreatitis is said to be due to kallikrein. This substance is present in the plasma and in granulocytes and is maintained inactive by circulating inhibitors. On activation by the release of pancreatic enzymes kallikrein is converted to a decapeptide, kallidin 10, and thence to bradykinin. This acts as a histamine and causes peripheral arteriolar dilation and can result in a loss of thirty per cent of the circulating blood volume (Ganong, 1967; Havard, 1972).

Clinical

Acute pancreatitis is said to attack the over forty year old age group and mainly those between the ages of fifty and sixty years. One series in a large hospital found that the majority of cases were between ages of 60 and 70 years old (Pollock, 1959; Ogilvie, 1962). In this present series only two were under 40 years, two in the 40-50 age group and four were over 70 years old. The sex distribution has been reported as 70 per cent female and 30 per cent male and of the eleven cases now reported the split was 60: 40 female to male. The thin person is said to be more at risk as compared to the fat as in the case of gall-bladder disease (Bailie, 1962). This is disputed by other authors who point out the strong association with gall-bladder disease in females (Pollock, 1959). In the study group there were

seven female and four male patients with an age distribution of 35-78 years. The range for males was 36-73 years and 35-78 for females. Of these, two males were over 60 years old and three females were over 70 years of age.

During the year a total of 793 acute abdominal emergency cases were admitted to the unit and comprised all forms of acute surgical conditions of the abdomen. Of the 793 cases 91 had gall-bladder disease which was a slightly lower incidence than the 101 cases of gall-bladder disease noted in the same year in another regional hospital.

Epigastric pain and vomiting were the most common presenting symptoms as confirmed by other reports (Trapnell, 1968). Of the eleven cases nine had epigastric pain and of these only one had pain which radiated through to the back and which was eased by sitting up as in the classical description. Seven of the nine cases had associated vomiting. None presented or developed any of the more uncommon signs or symptoms of acute pancreatitis. As with previous accounts the diagnosis was most often confused with duodenal ulceration, gall-bladder disease and with myocardial infarction. With regard to the obesity of the patient only two of the eleven cases were described as fat. Shock was not a prominent feature and was found in only one case. In ten cases intravenous fluids were used as part of the initial treatment and thus may have prevented its onset.

As a diagnostic aid the serum amylase was most useful. Early radiology was of very limited value, its use being limited to the exclusion of other pathology. Radiology was of more value in the later stages of the disease in determining gall-bladder disease in four cases. Barium meal investigation was used to exclude peptic ulceration and also in one case to define pancreatic pseudocyst. The literature confirms the serum amylase as the most useful test (Gurd, 1970; Banks, 1971), and also states that the renal clearance of amylase correlated with the renal creatinine clearance may be a most accurate test and would compensate for the effects of renal disease if the urinary amylase alone were measured (Edmondson, 1952; Gurd, 1970; Banks, 1971). One can also carry out more exotic tests, e.g. methaemoglobin estimations, but these are of no real value. Serum calcium levels may be of use in the 5 per cent that develop tetany and in these cases the disease is usually fatal. Of the eleven cases in this series the serum amylase was positive in eight, negative in one and not estimated in another two.

On looking at the spread of cases throughout the year no cases were found in the first two or the last three months of the year. There were two cases early in the year, one in March and one in April. The next six cases were all in the month of July followed by one case in August and two others in September. The sudden peak in July suggested the possibility of a common factor and this was thought to be viral. Serological studies were made, and of the six July cases three had slight elevation of mumps antibody and the case in April had a slight rise in antibody to Coxackie B_4 virus. No other common factor was found. In the literature it was noted that mumps can cause a slight elevation of the serum amylase. In three cases the amylase was elevated from the normal range of 18-30 S.C. units to four times this level and in one case to 1300 S.C. units.

Treatment

In this series conservative treatment was by naso-gastric suction, intravenous fluids, antibiotics, antispasmodics and by analgesics. Treatment included Trasylol in six and only one died. This was a 76 year old female who died within the first twenty-four hours and her amylase level was 1080 S.C. units. Of the five cases not treated with Trasylol two died, one at 24 hours and one after a week. One was 78 years old and the other had a laparotomy. Of those that did not receive Trasylol only one had an amylase level of over 200 units, and of those that did only one member had a level below 200 units. One had a level of over 800 units and two of more than 1,000 units. In acute pancreatitis there is a low incidence of hyperlipidaemia and a risk of fat embolism (Edmondson, 1952). In this uncommon situation it would appear that Trasylol may be of use as a prophylaxis as it has been shown to be of value in established fat embolism following trauma (Chapman, 1959). Trasylol is very good experimentally in the treatment of acute pancreatitis but less so clinically. This may be due to the delay in starting treatment as the patient rarely presents within the first 24 hours of onset of symptoms. In dogs an 8 hour delay, and a 20 hour delay in man, lowers the effectiveness of the treatment (Trapnell, 1968; Banks, 1971). Trasylol also is said to block kallidin 10 formation and thus prevent shock. It has been suggested that a similar agent to inhibit elamase may be of more use but this has been less widely tried (Banks, 1971). Steroids are also recommended to counter shock (Cook, 1959; Trapnell, 1968).

All are in agreement that intravenous fluids are most important and that intestinal rest is beneficial. There is divergence of opinion as to the value of antibiotics and antispasmodics although it is recognised that antibiotics do help to reduce infection as a complication (Pollock, 1959; Trapnell, 1968). There is also agreement that gall-bladder investigation and follow-up cholecystectomy, if required, is an important procedure. The recommended time for operation being one month after the initial symptoms have settled. In the present series three had a laparotomy as an aid to diagnosis and one a cholecystectomy one week after admission. All told, five cases had a follow-up cholecystectomy. In only one case was there any long term complication requiring surgical intervention. This was the development of a pancreatic pseudocyst that had to be drained some months after the original admission.

The length of stay in hospital varied from one to nine weeks. This was measured by the total number of days of inpatient treatment required and not including time between admissions. Two patients died within the first 24 hours and one in the first week. Two were allowed home after one week, two at the end of the second week, two at three weeks and two after a stay of four weeks. When taking subsequent treatment into account one was in hospital for 9 weeks, three for 4 weeks, two for two weeks and two for only 1 week.

Prognosis

It is expected that the elderly would have a higher mortality due to their inability to withstand shock and to other pathology. It is also expected that the

more serious the disease the worse the outlook. Those who died were all over 70 years old. Acute pancreatitis is reported to have a 26 per cent mortality (Trapnell, 1968) and it has been put as high as 50 per cent in the haemorrhagic variety and as low as 13 per cent in other forms (Banks, 1971). The onset of complications has a serious prognostic significance especially in those with a serum calcium level of below 5.6 mg. 100 ml. in which there is almost a hundred per cent mortality (Banks, 1971). When associated with trauma acute pancreatitis is 80 per cent fatal. Those that do not develop complications settle within the first week in almost all cases.

Conclusions

In conclusion acute pancreatitis is difficult to diagnose, especially for the general practitioner and for the junior hospital doctor. At a more senior level six cases were correctly diagnosed and five were not. Of these two had pain in the left iliac fossa and one died shortly after admission. The clinical picture plus a serum amylase estimation on arrival in hospital gives an accurate diagnosis in 80 per cent of cases. The series illustrates the association with gall-bladder disease and it is noted that in these cases cholecystectomy should be carried out at a later date. Intravenous fluids are very important and additional support by other measures of some use.

Summary

A series of eleven cases of acute pancreatitis in a peripheral hospital during a one year period have been reported. The difficulty in diagnosis, the value of initial laboratory investigation and the current clinical treatment have been illustrated.

I am grateful to Mr. J. Balmer, Mr. W. Graham and Mr. P. Allen, Consultant Surgeons of the Craigavon Area Hospital for allowing access to their clinical material, and to the Staff of the Records Department for their assistance.

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THE TREATMENT OF UNCOMPLICATED GUN-SHOT WOUNDS

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THE TREATMENT of gun-shot wounds constitutes a significant part of the work of an accident and emergency department in this area. A common problem is the through and through wound, which does not involve damage to vital structures, such as nerves or blood vessels. The purpose of this paper is to attempt to rationalise the treatment of such injuries, and to present a series of such cases treated by the same standard technique.

Method of Treatment

As with all serious injuries, the first priority is resuscitation. When a patient is admitted with a gun-shot wound, any obvious external bleeding should be attended to, and an intra-venous infusion set up in an uninjured limb. Where necessary analgesics should be given. When the patient's condition is stable, the extent of the injury should be assessed. In cases involving injuries to limbs, these should be examined for evidence of vascular or neurological damage, and X-rays should be taken to exclude damage to underlying bones. When all of these have been excluded, the injury should then be treated as an uncomplicated gun-shot wound.

Twenty-three such wounds were treated by the technique described below. Fifteen of these wounds involved the leg, six involved the arm, and two were shoulder injuries. Thirteen were believed to be high velocity injuries, and ten were thought to be low velocity. In all of these cases, movement, sensation, and peripheral pulses were intact, and there was no evidence of bone damage on X-ray. Under general anaesthesia, the damaged skin edges were excised and the defect in the deep fascia was extended to provide adequate decompression of the underlying muscle. Any obvious necrotic tissue was excised. This was done for both entry and exit wounds, and the wounds were dressed with vaseline gauze. The area was dressed with gauze and an elastic bandage, pressure being exerted according to the amount of oozing from the wounds. The peripheral pulses were observed at the end of the operation, and were checked post-operatively, in addition to routine post-operative observations. Prophylactic antibiotics were administered.

The dressings were left in position until the fourth or fifth day, and the wounds were then inspected. At this stage, in most cases, healthy granulation tissue had filled in the bullet track, and had extended up to the level of the deep fascia. If this stage had not been reached, a similar dressing was reapplied, and the wound inspected every few days, until the defect in the deep fascia had closed. Delayed primary suture of the skin was then performed, usually under local anaesthesia.

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If closure of the wound cannot be achieved without tension at the appropriate time, no advantage is gained by further delay, and a split skin graft should then be applied to the defect.

Of the cases in the series, two minor complications occurred following delayed primary suture. In one case mild inflammation was noted in the wound 2 days after suturing, but this settled spontaneously. A second wound was slow to heal, probably due to tension at the suture line. However this wound was satisfactorily healed 3 weeks after delayed primary suture, and all other wounds healed by first intention, without complications.

Discussion

In mediaeval times, the effects of wounds resulting from the discharge of gunpowder were so serious that a specific poison was postulated as the cause, and treatment with cautery or with boiling oil was used, in an attempt to combat this. In 1560 Botallo was the first to suggest that the trouble was caused by retained foreign bodies and dead tissue (Watts, 1960). With through and through bullet wounds, the retention of foreign bodies is usually not a problem although the removal of particles of clothing is of considerable importance. More important is the retention of dead tissue in the wound.

Hopkinson and Marshall (1967) have shown that the damage caused by a bullet is due to the direct lacerating effect, and also to the pulsating temporary cavity which is formed. Amato et al (1971) and DeMuth (1969) have shown that the amount of damage caused by the cavitation is proportional to the velocity of the missile. The damage is also related to the density and elasticity of the tissue involved (DeMuth 1969).

The amount of damaged tissue is impossible to assess during initial treatment. Hopkinson and Watts (1963) have demonstrated, using perfusion and histological techniques, that further tissue necrosis occurs for about 3 days following injury. Lawson et al (1971) have shown that the levels of creatinine phosphokinase and lactic dehydrogenase in the blood are raised following missile injuries, and remain high until the fifth day, suggesting continuing tissue necrosis during this period. Because of this Burkhalter et al (1968) have recommended initial debridement followed by delayed primary suture. In large series, Watts (1960) reports a primary healing rate of 97%, and Churchill (1944) a rate of 95% using this technique. Lowry and Curtis (1950) have shown that the best results are obtained if the suturing is carried out between the fourth and sixth days after debridement. At this stage, the tissues are still pliable and closure is relatively easy. Lowry and Curtis (1949) have drawn attention to the fact that the wounds are usually contaminated, and that the best way to combat infection following initial debridement is to leave the original dressings intact until delayed primary suturing is carried out. Berman et al (1943) have demonstrated that this is due to the development of tissue immunity to infecting organisms. They have shown that wounds are susceptible to infection with *Staph. aureus* in the first 24 hours. Immunity developes over the next few days, and is complete by the fourth or fifth day. If the wound is traumatised during this period, and this includes trauma caused by changing dressings, the immunity is much slower to develop.

Debridement, followed by delayed primary suture has always been popular in war-time. Surgeons in every military campaign this century have learnt from bitter experience the advantages of this technique (Dudley 1973). It was thought that this was a necessary expedient in the conditions, but not applicable to peacetime practice. Taking into account both theoretical and practical considerations this form of treatment would appear to be the most effective.

Summary

A method of treating soft tissue gun-shot wounds is described. Account is taken of both theoretical and practical considerations in evaluating this procedure.

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ALLERGENS IDENTIFIED BY PATCH-TESTING IN THE CRAIGAVON AREA 1972-73

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JADASSOHN OF BRESLAU has been hailed as the originator of the patch-test (Jadassohn, 1896). But it is largely due to the work of Bonnevie (1939) in Copenhagen that the patch-test, particularly when exhibited in battery form, has come to hold its present important place in modern dermatology. Bonnevie also established a tradition for excellence in the technique of patch-testing throughout Scandinavia which has been maintained to the present day.

A number of investigations employing batteries of patch-tests has now been reported, but the largest of these studies was one carried out by ten European dermatologists and involved applying a battery of twenty common allergens to more than four thousand patients referred for a variety of reasons to dermatology clinics in Denmark, England, Germany, Holland, Italy and Sweden between March 1967 and June 1968. The results of this investigation were analysed and published by Fregert and colleagues (1969). For convenience this work will hereafter be referred to as the European study.

We felt it would be of value and interest to record the contact allergens currently prevalent in this area. Accordingly arrangements were made to patch-test all patients referred to our clinics over a period of time whom we clinically suspected to be suffering from contact dermatitis. Exactly the same standard battery was employed as had been used in the European study, but with additional patch-tests when it was considered these were indicated.

Material

The investigation ran from 1st January, 1972, until 30th April, 1973. In this period we saw 136 patients clinically suspected to be suffering from contact dermatitis. There were 60 males and 76 females of whom 58 males and 71 females were patch-tested with the standard battery, either with or without additional tests. In the remaining 2 male and 5 female patients only a number of additional patch-tests was possible. The mean age of the male patients was 44 (SD $\pm$ 19) years and of the female patients 39 (SD $\pm$ 18) years.

Method

The usual closed patch-test and, when indicated, the photo-patch-test, were performed in accordance with the principles at present accepted as standard (Hjorth and Fregert, 1968). The substances exhibited in the tests were applied on a 2 cm square fabric patch in the centre of a 4 cm square waterproof microporous plastic wound dressing (BPC) supplied as Airstrip Elastoplast by Smith and Nephew Pharmaceuticals Limited. In retrospect a 1 cm square fabric patch would probably be large enough to allow a satisfactory reading and would reduce the

risk of active sensitization. Controls were applied as necessary. The closed patch-tests (hereafter referred to simply as patch-tests) were removed and read at 48 hours, and as far as possible again at 72 hours. Photo-patch-tests were removed at 24 hours and the sites irradiated with a sub-erythema dose of light either as ultraviolet light from a mercury vapour arc lamp, or as natural sunlight. The photo-patch-tests were read at 24, 48 and 72 hours as far as was practicable. Twenty-four out of the 1,260 patch-tests (2 per cent) read at 72 hours were then positive, though they had been negative at 48 hours. Similarly 9 (0.7 per cent) of the tests read at 72 hours were then considered definitely negative though they had been graded as doubtful at 48 hours.

In order to increase certainty in interpretation of the tests, and precision in diagnosis, testing was carried out, as far as was possible, with single allergens. Some tests were carried out with complex materials, such as samples of proprietary applications and rubber gloves, but since interpretation of such tests is empirical and often uncertain we have confined our attention in this article to tests performed with what were, for practical purposes, single identifiable allergens.

Results

Standard Battery

Table I sets out the allergens which constituted our standard battery, together with their concentrations, vehicles, usual sources and percentage of positive results by sex. In the Craigavon area 41 per cent of males and 42 per cent of females gave no positive results with the standard battery. Corresponding figures in the European study were approximately 60 per cent for each sex. The higher incidence of positive results in the Craigavon study is probably due to the fact that this was limited to patients who clinically were suspected to be suffering from a contact dermatitis, a constraint which did not apply so strictly in the European study.

Table II sets out the allergens by ranking order of positive results in both the Craigavon and European studies. While at first glance there appears to be little concordance, on closer inspection a tendency to a common pattern becomes apparent. Metals, balsams and tars are high in ranking order in both sexes in both studies. In the European study, however, chromium sensitivity was much commoner than nickel sensitivity in males, while in females this order was reversed. Sensitivity to balsams and tars probably represents a wide range of cross sensitizing allergens, including perfumes, essential oils, flavouring agents and medicaments (Hjorth 1961; Fregert and Hjorth, 1968). The total number of patch-tests carried out by means of the standard battery in the Craigavon area was 2,580 and of these 165 (6 per cent) were positive, the corresponding figure in the European study was 4 per cent.

We agree with Fregert and associates (1969) that the degree of relevance attributed to a positive result depends to a large extent on the subjective opinion of the attending clinician. Accepting that this is so, it is considered that approximately half (84) of the positive results obtained with the standard battery in the Craigavon area were relevant to the patients' disease. Positive results with neomycin,

TABLE I

Allergens exhibited as a patch-test battery in respect of fifty-eight male and seventy-one female patients

Allergen	*Usual Sources*	*Positive results (per cent*)*	
		Male	*Female*
Potassium dichromate 0.5%	Builder's cement	9	8
Cobalt chloride 1%	Cross reactions with chromates and nickel, possibly builder's cement	5	13
Nickel sulphate 2.5%	Nickel plated objects	9	11
Formaldehyde (in water) 2%	Plastics, textiles, medicaments, preservatives, etc.	3	3
p-Phenylenediamine 2%	Dyes	0	7
Mercaptobenzthiazole 1%	Rubber chemical	3	4
Tetramethylthiuramdisulphide 1%	Rubber chemical	7	7
Phenylcyclohexyl-p-phenylene-diamine 1%	Rubber chemical	0	3
Diphenyl-p-phenylenediamine 1%	Rubber chemical	2	1
Balsam of Peru 25%	Cross reactions with related cmpds., balsams, perfumes, medicaments, etc.	7	17
Turpentine peroxides (in olive oil) 0.3%	Paints, polishes, liniments	3	0
Neomycin sulphate 20%	Medicaments	5	7
Benzocaine 5%	Medicaments	0	6
Chinoform 5%	Medicaments	2	7
Chlorquinaldol 5%	Medicaments	3	6
Wool alcohols 30%	Topical applications (lanolin)	7	13
Parabens (methyl-, ethyl-, propyl-, butyl-, benzyl-) 3% each	Preservative in topical applications	9	10
Coal Tar 5%	Tar products, medicaments	9	8
Wood tars (pine, beech, juniper, birch) 3% each	Tar products, medicaments	10	13
Colophony 20%	Adhesive tape. Polishes	9	6

The allergens, dispersed in petroleum Ph.Nord.63 except where indicated, were supplied by Trolab, Denmark.

* Percentages based on totals for each sex independently.

TABLE II

Ranking order of positive reactions from standard battery in males and females

	MALES		FEMALES	
	European Study	*Craigavon*	*European Study*	*Craigavon*
1	Chromate	Wood tars	Nickel	Balsam of Peru
2	Wood tars	Chromate, nickel, parabens, colophony, coal tar	Wood tars	Cobalt, wood tar, wool alcohols
3	Cobalt	TMTD, balsam of Peru, wool alcohols	Balsam of Peru	Nickel
4	PPD	Cobalt, neomycin	Cobalt	Parabens
5	Turpentine	Formaldehyde, MBT, chlorquinaldol, turpentine	Turpentine	Chromate, coal tar
6	Balsam of Peru	Diphenyl—PPD, chinoform	Benzocaine	PPD, TMTD, neomycin, chinoform
7	Neomycin	PPD, benzocaine, phenylcyclohexyl—PPD	PPD	Benzocaine, chlorquinaldol, colophony
8	Coal tar		Formaldehyde	MBT
9	Benzocaine		Neomycin	Formaldehyde, phenylcyclohexyl—PPD
10	Formaldehyde		Chromate	Diphenyl—PPD
11	Colophony		Colophony	Turpentine
12	Wool alcohols		Coal tar	
13	Nickel		Wool alcohols	
14	Phenylcyclohexyl—PPD		TMTD	
15	MBT		Parabens	
16	TMTD		MBT	
17	Chinoform		Chinoform	
18	Parabens		Phenylcyclohexyl—PPD	
19	Diphenyl—PPD		Chlorquinaldol	
20	Chlorquinaldol		Diphenyl—PPD	

Abbreviations: Mercaptobenzthiazole (MBT)
Paraphenylenediamine (PPD)
Tetramethylthiuramdisulphide (TMTD)

parabens (esters of p-hydroxybenzoic acid), lanolin (wool alcohols) or rubber chemicals are thought particularly likely to be relevant. In the European study the positive results most often considered relevant were those obtained with chromium, lanolin (wool alcohols), neomycin, nickel, parabens esters and rubber chemicals.

Additional Allergens

An additional 142 tests were carried out on 43 patients. These tests were performed in the light of patients' individual histories and clinical findings. Table III sets out the positive results which were obtained with the additional tests together with an indication of the suspected source. The positive results obtained with these allergens were found to have a high degree of relevance, 36 out of the total of 40 positive results (90 per cent) being considered relevant to the aetiology of the skin disease under investigation.

The large number of positive results (26) obtained with quindoxin (Grofas) made this the most frequently diagnosed sensitivity in the entire investigation. Quindoxin has been widely added to animal feeds in the order of 20 to 50 mg per kg as a growth stimulant. Attention has previously been drawn to the fact that quindoxin is a potent photosensitizer and individuals who are allergic to it develop a

TABLE III

Allergens additional to those in the battery with which positive results were obtained

Allergen	*Usual Sources*	*Positive results*	
		Male	*Female*
Epoxy resin 1%	Adhesive	2	1
Triethylenetetramine 0.5%	Epoxy curing agent	1	0
Tetramethylthiurammono-sulphide 1%	Rubber chemical	1	1
1, 3–diphenylguanidine 1%	Rubber chemical	1	0
Cinchocaine chloride 1%	Medicament	0	1
Amethocaine 1%	Medicament	0	2
Cyclomethycaine chloride 1%	Medicament	0	1
Gentamicin 1%	Medicament	0	1
Butyl parabens 3%	Preservative in topical applications	1	0
Quindoxin 0.1% (photo-allergen)	Growth stimulant in animal feeds	13	13
Chrysanthemum leaf	Plant	1	0

The allergens listed from epoxy resin to cyclomethycaine inclusively were obtained from Trolab, Denmark, dispersed in petrolatum Ph. Nord. 63. The remainder were prepared in yellow soft paraffin (BP) apart from the chrysanthemum leaf. Samples of gentamicin, parabens, and quindoxin were obtained by courtesy of Roussel Laboratories Ltd., Upjohn Ltd., and Imperial Chemical Industries Ltd. respectively.

photocontact dermatitis on coming into skin contact with animal feeds in which it has been incorporated (Dawson and Scott, 1972; Scott and Dawson, 1973). It is hoped that quindoxin dermatitis will now cease to be a problem in the agricultural community as there has been an announcement in the press that Imperial Chemical Industries Limited, who manufactured it, have withdrawn it from the market as they have reason to suspect it can be carcinogenic in experimental animals when fed to them in high dosage.

Contact allergy to gentamicin is usually considered to be uncommon so that our one patient found to have this sensitivity is perhaps worthy of special mention.

The patient with the contact sensitivity to butyl parabens had previously shown a positive reaction to the parabens mixture in the standard battery. He had used a single preparation for many years in the treatment of regional eczema, and it was known that this contained butyl and methyl parabens only as preservatives. On testing with each type of parabens individually it was interesting to find that a positive result developed with butyl parabens only.

Discussion

As there is no instrument which can read a patch-test, any reaction which develops must be interpreted by the clinician either as a direct irritant effect, a true contact allergy, or possibly a combination of both. The relevance of a positive result to the patient's disease is also a matter of clinical judgement, for by no means all the contact allergies an individual may have are necessarily relevant in respect of a contact eczema from which he may be suffering. The hazards and possible sources of error inherent in the exhibition and interpretation of the patch-test have been well reviewed by Hjorth and Fregert (1968). Among these the possibility of actually inducing sensitization, and the difficulty posed by false negative results are particularly important.

In spite of the difficulties, labour and hazard associated with patch-testing, it remains a most powerful tool with which to investigate cases of contact dermatitis; without its use many misdiagnoses might be made and even injustice in the medico-legal sense perpetrated. Nevertheless the diagnosis must ultimately rest on clinical observation, with the patch-test acting as an ancillary aid. We subscribe to the belief which has previously been so eloquently expressed in these pages, that the school of Cnidus still yields the palm to the school of Cos (Biggart, 1971).

Finally, in view of the number of cases in which sensitivity to medicaments was detected, both in the Craigavon and European studies, and the possibility that the patch-test may itself sensitize, it seems not inappropriate to end by recalling that noble exhortation handed down to us from the Father of the Art: "primum non nocere."

Summary

Patients seen at dermatology clinics in the Craigavon area 1972-73 who were clinically suffering from contact dermatitis were patch-tested with a standard battery of twenty common allergens and in selected cases also with additional allergens. The results of this investigation are presented and compared with those reported from other European clinics.

In general, experience with the standard battery in the Craigavon area was similar to that obtained elsewhere in Europe. Positive results with the standard battery were most often found with balsams, esters of p-hydroxybenzoic acid, metals, tars and wool alcohols (lanolin). The sensitivities demonstrated by the standard battery considered to have greatest relevance were due to esters of p-hydroxybenzoic acid, neomycin, rubber chemicals and wool alcohols (lanolin).

The most frequently diagnosed sensitivity in the entire series however was due to quindoxin (Grofas) which was included among the additional allergens. Twenty-six patients were found to have a photosensitivity in respect of this substance which has been used in agriculture as a growth stimulant incorporated in animal feeds. The manufacturers have now announced withdrawal of quindoxin from the market on the grounds that they suspect it may be a carcinogen and it is therefore hoped no further case of photosensitivity from this source will arise.

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PRIMARY SKIN ACTINOMYCOSIS OF THE CHEST WALL

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ALTHOUGH actinomycosis is believed to be a rare disease, an increasing number of case reports suggest that this may not be so. Many cases may not be recognised, because of their abortion by the widespread use of antibiotics. Another pitfall in the diagnosis is the failure to obtain anaerobic cultures in suspected cases (Shah 1971).

A presentation with some unusual features is described and some points emerging from recent literature are discussed.

Case Report

The patient, an eleven-year-old schoolboy, was admitted on 8th March 1973 to the Route Hospital, Ballymoney, with a large painful swelling on the right lower chest posterolaterally. Previously, on 15th September 1972, he had had an appendicectomy for acute appendicitis. The appendix was reported as normal on microscopic examination.

On examination, he looked unwell, but his temperature was normal. There was a tender swelling over the ninth and tenth ribs; this was red and fluctuant. Auscultation of the chest was clear and both abdominal and rectal examination revealed nothing abnormal. A provisional diagnosis of pointing sub-diaphragmatic abscess or empyema necessitans was made. An x-ray of the chest and ribs, together with screening of the diaphragm, was carried out. This showed a soft tissue swelling on the right lateral chest wall. There was periosteal reaction on the inner aspect of the right eighth and ninth ribs in the axilla. There was slight elevation of the right diaphragm, which showed very little movement on inspiration. There was no sub-diaphragmatic fluid level. The blood picture revealed leukocytosis (haemoglobin 11.5 g/100 ml.), white cell count 11,500 (neutrophils 66, lymphocytes 24, monocytes 10). The ESR was 110 mm/hr. His weight was 4 st. 5 lb.

On 9th March 1973, the track was explored from the anterior end of the ninth rib to the posterior angle of the same rib on the right side. It was found to run deep to the external oblique muscle but did not penetrate the chest wall. At the posterior end of the wound pus extruded. This was greenish-yellow and contained beads.

The laboratory was informed of the suspicion of actinomycosis and a specimen of pus was submitted. This confirmed the presence of actinomycosis. The following day the patient commenced a course of Dalacin C 150 mg three times daily orally and procaine penicillin 0.25 mega twice daily intramuscularly.

There was a steady regression of signs and symptoms over the next week. On 15th March 1973 the haemoglobin was 10.8 g/100 ml., white cell count 9,800 and ESR 63 mm/hour. The patient was discharged on 19th March 1973, by which time he had been apyrexial for six days. He continued to improve. On 29th March 1973 he was afebrile, his weight was 4 st. 12 lb., white cell count 7,800, haemoglobin 12.7 g/100 ml., ESR 43 mm/hour. At follow-up on the 13th April 1973 the treatment schedule was changed because the patient complained of headaches, dizziness, nausea and some vomiting: it was thought that this might have been a side effect of Dalacin C. Treatment was continued with procaine penicillin 0.25 mega twice daily intramuscularly, and the symptoms settled. By 17th May 1973 his weight was 5 st. 5 lb., haemoglobin 13.6 g/100 ml., white cell count 5,100, ESR 8 mm/hour and temperature 98.6°F. The wound had healed. Treatment was then stopped.

Discussion

Actinomycosis is a fungal, granulomatous disease, caused in humans by *Actinomyces israeli*, and in animals by *Actinomyces bovis*. It is a chronic suppurative infection. It is characterised by its disregard for anatomical boundaries (Foley et al., 1971). The disease may occur at any age, but most frequently between 30 and 40 years. In most series, it affects males more than females (Glahn 1959). It may affect any race, and occurs in persons of all occupations (Sochocky 1972).

The epidemiology of actinomycosis is that of an endogenous infection. This was shown by Wolff and Israel (1891) and by Wright (1905). *A. israelis* is a normal commensal of the mouth and is found particularly in carious teeth, gums and tonsils. It is not clear which local conditions must be fulfilled before the organisms invade tissues and set up the characteristic diffuse, progressive inflammatory reaction (Shah 1971). The organisms have a tendency to duplicate in tissue their in vitro colonial growth by the formation of granules (Shah 1971).

The actinomycotic lesion starts as an acute suppurative inflammation with a marked tendency to form abscesses and sinus tracts. The condition progresses to intractable chronicity. The spread of actinomycotic infection is by direct extension, involving all adjacent tissue, including bone (Shah 1971). Lymphatic spread has not been reported. Blood borne spread is important, and may set up secondary actinomycotic abscesses anywhere in the body, the most common sites involved being the liver and brain (Shah 1971). Death in actinomycosis may be due to involvement of vital structures, to generalised pyaemia, or to amyloid disease (Illingworth and Dick 1968).

Diagnosis is relatively simple in advanced cases with multiple discharging sinuses; examination of the pus should yield the typical sulphur granules. When Actinomyces infection is suspected, the laboratory must be notified, because most clinical laboratories do not routinely look for anaerobic actinomycetes (Foley et al., 1971). In the acute inflammatory stage, when an abscess has formed, the diagnosis can be made reasonably easily on microscopy and culture. When a chronic inflammatory response follows without abscess formation, the diagnosis may be difficult (Shah 1971). In obscure swellings of the neck, actinomycosis must be considered in the differential diagnosis (Shah 1971).

The pathological reaction in response to infection by Actinomyces demonstrates features which emphasise two general principles of treatment – (1) intensive and prolonged antimicrobial treatment, and (2) surgical excision of the involved tissue.

Although this organism is usually sensitive to penicillin in vitro, it is often difficult for an antibiotic to reach it on account of the densely scarred avascular areas in which the organisms flourish. Wide surgical excision of the infected tissue is recommended (Eastridge et al. 1972). In lesions involving superficial structures as in this case, the wound should be packed open, and allowed to heal by secondary intention or by skin grafting at a later date (Eastridge et al. 1972). Eradication of the infection and healing of the wound will be satisfactory if excision of the involved tissue has been adequate.

Radiation, iodine, thymol, autogenous vaccines and copper sulphate were used before the advent of antibiotics (Shah 1971) which have superseded them. Yet somehow the idea persists that iodides are useful as an adjunct to penicillin or used alone in the penicillin-resistant cases (Bailey and Love 1968). There is no sound basis for the use of iodides. They were initially used because of the mistaken identity between *A. bovis* and actinobacillus of cattle and pigs, causing lumpy jaws. Suter and Vaughan (1955) have confirmed in in vitro studies that actinomycosis can grow luxuriantly in culture media containing two per cent iodides. Sulphonamides were found to be relatively inefficient and were largely replaced by penicillin, which remains the drug of choice to-day (Shah 1971).

The duration, severity, extension and involvement of various structures of the body by actinomyces should be guidelines to the amount and duration of treatment with penicillin. The value of such agents as tetracycline (Seligman 1954), lincomycin (Mohr et al., 1970) and erythromycin (Herrell et al., 1955) has been reported. Lincomycin may be advantageous, especially if there is bony involvement, because of the rapid appearance of this antibiotic in effective concentrations within bone. According to some authors (Sochocky 1972) penicillin should be given in large doses, between 10-20 million units daily for at least three months. However, several authors recommend longer treatment, lasting up to one year. Others recommend penicillin G, up to five mega units daily for four to eight weeks (Sochocky 1972). A feature of the treatment that cannot be overstated is the necessity to continue the therapy for long periods after clinical extirpation of the infection. In this case therapy was given for *68 days*, that is, 30 days after the symptoms and signs and other observations had returned to normal.

It is of interest that primary skin actinomycosis is not generally recognised. Hildick-Smith et al (1964), in their modern textbook of mycotic disease, do not mention this form and take the skin symptoms to be secondary ones. Schwarz and Baum (1955) developed principal criteria for diagnosing primary skin mycoses, including actinomycosis. According to them, one should be able to distinguish clinically primary skin symptoms from secondary ones. The latter are usually multiple and at different stages of development. These secondary skin lesions have a greater tendency to progress. Lymphangitis and lymphadenitis are usually not present unless secondary infection takes place.

Most cases of primary skin actinomycosis described in the literature had, in their previous history, a traumatic incident (biting by man, fist blow in the mouth region), or else the patients were agricultural workers. Cope (1915), McWilliams (1917) and Burrows (1944), described independently three cases of primary skin actinomycosis of the hand, following a blow with the fist to the mouth region. In this case, no traumatic incident was reported to have preceded the first symptoms of the disease.

Summary

A boy aged 11 years developed a superficial Actinomycotic infection of the chest wall. This has been regarded as a case of primary skin actinomycosis. The chronic history of ill health, investigation and treatment are discussed. In particular the removal of devitalised tissue and the necessity for a prolonged course of chemotherapy are stressed.

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A STUDY OF THE MICROBIOLOGICAL ENVIRONMENT OF THE RESPIRATORY INTENSIVE CARE UNIT, THE ROYAL VICTORIA HOSPITAL

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THE Respiratory Intensive Care Unit (R.I.C.U.) admits post operative patients from neuro-surgery and thoracic surgery. It also admits severely traumatised patients, and those suffering from fat embolism or tetanus who require assisted respiration in the form of increased oxygen tension or ventilation.

The Unit consists of seven cubicles and seven beds in an open ward. Each cubicle has a sink and also a "clean" and a "dirty" cupboard which communicate with the corridor. Most severely ill patients and those with infection are nursed in cubicles with a nurse in constant attendance. In the main ward severely ill patients also have a gowned and masked nurse in constant attendance, others, not so ill, share nurses.

Patients with tracheostomies are particularly liable to infection and this is usually treated prophylactically with antibiotics. *Pseudomonas aeruginosa* presents a particular problem in these circumstances since it is a free-living organism. It exists in a damp environment, can multiply at room temperature and is a common contaminant of ventilators, humidifiers and sinks. Attempts were made to isolate organisms from possible links in a cross infection route and from places which may harbour pseudomonas.

Results

The taps and bowls of four sinks in the main ward yielded coliform organisms and coagulase negative staphylococci only from the bowl of one. Pseudomonas was isolated from the drains of two and coliform organisms from the other, and organisms persisted in all four after cleaning. Six of twelve stethoscopes from individual beds of the unit yielded staphylococci, and from the staff of the casualty unit only one was sterile, three yielded staphylococci and two coliform organisms. After cleaning with 70 per cent isopropyl alcohol (Mediswab) only one yielded staphylococci. Two buckets and two mops examined before, during and after use yielded pseudomonas on five occasions and other organisms on six. The hands of two medical staff yielded staphylococci and five were sterile. One of two cleaners and one of two maintenance men had staphylococci on their hands.

Two cubicles were studied. In one where the patient had pseudomonas in his nose and tracheostomy tube the organism was found in the sink area and on the cuff of his sphygmomanometer. In another, vacated by a patient with pseudomonas in his tracheostomy tube, no organisms were recovered before, during or after fumigation and washing of the walls.

From an x-ray machine, dressing trolley, damp-dusting trolley, bed-pans, cleaned urinals and from screens no pathogens were isolated and only a few organisms were recovered mainly from the wheels. Individual tracheostomy toilet catheters stored in Savlon were sterile.

During the study no patients carried nasal or rectal pseudomonas on admission. Two patients, A and B, had pseudomonas infections at the start of the study which continued until they left the unit. One patient, C, two days after admission and tracheostomy was found to have pseudomonas in his nose, and two days later his tracheostomy was infected. On the last day of the study, another patient, D, was found to have pseudomonas in his nose fourteen days after admission and tracheostomy.

Samples of the *Pseudomonas aeruginosa* isolated were kept. At the end of the study period an attempt was made to type these by the method of Govan and Gilles (1969). This was not successful, probably due to the fact that during storage the main infecting strain was overgrown by other strains. Sensitivities were established for twelve antibiotics (Oxoid Multodisk), these showed seven patterns. One pattern was common to patients A and C but this pattern was not found in the mops and buckets.

Discussion

It appears from this study as from previous studies (Dexter 1971, Phillips et al 1971) that pseudomonas can exist in the environment and infect patients, particularly those who are severely ill and have tracheostomies, whereas less severely ill patients who might be exposed to the same organism do not succumb to the infection. Though pathogens were isolated from patients difficulty was experienced in determining the degree of infection. The usual indications of infection, pyrexia, tachycardia and leucocytosis, were frequently modified by the treatment of the patient, for example, induced hypothermia, morphine and blood transfusions.

The environment in the R.I.C.U. carries very few pathogens with the important exceptions of sinks, buckets and mops. Sinks are a well recognised source of the pathogens (Makela et al., 1972) and the only effective method of cleaning them is claimed to be a heated element in the drain. Rinsing with 1 per cent hypochlorite, a method recently introduced in the hospital, was not used in the unit at the time of study. A method of thoroughly drying mops and buckets should be found.

It was not possible to demonstrate the route of cross infection, although the antibiotic sensitivity patterns of the stains of pseudomonas found in the mops and buckets were those of multiple resistance. These could have included the more sensitive strains infecting patients A and C. The study also shows that stethoscopes (Gerken 1972) and sphygmomanometer cuffs could transmit organisms if they were not cleaned.

Summary

The Respiratory Intensive Care Unit was examined microbiologically. *Pseudomonas aeruginosa* was found in sinks and buckets, on mops and on a sphygmomanometer cuff of a heavily infected patient. Pyocine typing was unsuccessful in comparing these strains with those isolated from patients.

We wish to thank Dr. R. C. Gray, Dr. J. M. Dunbar, Dr. W. Shepherd, Sister P. H. Symmons, Mr. J. Rodgers and the staff of the Microbiology Laboratories of the Royal Victoria Hospital and the Belfast City Hospital for their help and encouragement.

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BOOK REVIEW

AN INTRODUCTION TO MEDICAL GENETICS by J. A. Fraser Roberts. Sixth Edition. (Pp. xvi+310, figures 132, £3.50). London: Oxford University Press, 1973.

DR. FRASER ROBERTS' book needs no introduction to medical geneticists or interested clinicians. Since the first edition appeared over thirty years ago, *An Introduction to Medical Genetics* has remained by far the best first textbook on its subject and the sixth edition suggests that it still has no peer. It is hard to find the backbone of medical genetics more carefully and less pretentiously presented. As there are many books devoted to the molecular bases of heredity, molecular genetics is dealt with in the barest detail. The chapters on dominant, recessive, X-linked and intermediate inheritance are models of clarity and the chapter on linkage is an admirable introduction to this complex subject. The role of somatic cell genetics in establishing linkage in man is also briefly mentioned. Clinical aspects of chromosome abnormalities has been brought up-to-date and includes references to such new staining techniques as quinacrine mustard fluorescence and Giesma staining, which allow the precise identification of individual chromosomes. Inherited disorders and congenital malformations with a multifactorial basis will undoubtedly present one of the major challenges in human genetics in the next few decades. The section on multifactorial inheritance has been considerably expanded. The discussion on genetic counselling reflects the humane wisdom of a veteran practitioner in this increasingly important activity of medical geneticists. The place of transabdominal amniocentesis in the detection of genetic defects in the fetus *in utero* and in genetic counselling is also reviewed.

The book is admirably illustrated with photographs of a high quality. Unfortunately, the cost of the paper back production has risen from £1.75 to £3.50.

N.C.N.

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N.C.N.

POSTGRADUATE MEDICAL EDUCATION CENTRES IN NORTHERN IRELAND

by

SIR JOHN HENRY BIGGART, C.B.E., LL.D., D.Sc., M.D., F.R.C.P., F.R.C.P.I., F.R.C.Path., F.R.C.G.P.

and

R. J. KERNOHAN, M.D., F.R.C.P., F.R.C.P.I., D.P.H., D.C.H.,

Northern Ireland Council for Postgraduate Medical Education

PROFESSIONAL training, with its ever-spreading ripples from undergraduate to postgraduate to continuing education of family doctors and consultants, has come to be recognised as the essential core of good medicine. Sir George Godber, who retired at the end of November 1973 from his appointment as Chief Medical Officer of the Department of Health and Social Security, has stated that the postgraduate medical education development in regional hospitals in England and Wales has been the most significant advance in medical practice over the past two decades. The hospital and general practitioner commitment to the public and optimal postgraduate education and training are completely interdependent and cannot be considered in isolation. The accreditation of posts considered as suitable for general professional training for three years following the mandatory pre-registration year and for vocational professional training for the succeeding four years emanating from appropriate professional bodies – amended where necessary to the local scene – reflects the current trend in the interdependence between postgraduate medical education and training and the Health Service commitments to the public.

Adequate library facilities are a pre-requisite of a Postgraduate Medical Education Centre. There are libraries at the Postgraduate Medical Education Centres at Altnagelvin, Ballymena and Craigavon. These libraries were established by means of a grant of £15,000 payable over a period of five years, received by one of us (J.H.B.) from the Nuffield Provincial Hospitals Trust. The last part of this grant was paid in September 1972. The library for the Belfast Postgraduate Medical Education Centre has been amalgamated with the adjacent library at the Medical Biology Centre of Queen's University. In future, these Postgraduate Medical Education Centre libraries will be funded by the Department of Health and Social Services (N.I.) and the development and administration will be undertaken by the Medical Library at the Institute of Clinical Science of Queen's University of Belfast. The libraries contain current text books, a selection of British and foreign professional journals and provide a photostat copy service. The annual expenditure on text books and journals in each of the Postgraduate Medical Education Centres is approximately £1,000 per annum. Because of limited accommodation, at present it is necessary to restrict the library facilities to medical and dental graduates. Hospital medical staff and general practitioners take full advantage of this valuable

service and have ready access to the library during the day and in the evenings. The Postgraduate Medical Education Centre libraries operate under the control of Miss Webster, the Medical Librarian of Queen's University. The administrative secretary of the clinical tutor at each centre is responsible for the day-to-day management of the library facilities.

There are four Postgraduate Medical Education Centres located in Ballymena, Belfast, Craigavon and Londonderry. These Centres are within the precincts of the area hospitals in the four areas controlled by the four Boards for Health and Social Services in Northern Ireland. They provide educational facilities for all hospital medical staff, general practitioners and dentists in the area and are under the direction of clinical tutors who are appointed by the Northern Ireland Council for Postgraduate Medical Education. In addition to those in charge of Postgraduate Medical Education Centres, clinical tutors have been appointed to the Mater Infirmorum Hospital, Royal Victoria Hospital and the Ulster Hospital.

Clinical tutors may receive an honorarium of up to £400 per annum. The token honorarium is not related to the work done and does not threaten the independence of the clinical tutor. Much of the work of the clinical tutor involves the willing collaboration of colleagues interested in postgraduate medical education. It is to the general advantage that clinical tutors should experiment and to some extent impose a personal stamp on the pattern of postgraduate medical education at their own Centres, without being too vulnerable to direction from above. Specialist tutors in general practice have also been appointed in each of the Centres. They do not receive an honorarium.

The members of the Ballymena and Belfast Postgraduate Medical Education Centres elect annually a Committee of Postgraduate Medical Education representing general practitioners, hospital medical staff and physicians in community medicine. This facilitates communications and encourages all doctors in the area to participate actively in postgraduate medical activities in the Centre. This Committee also arranges social functions for members of the Postgraduate Medical Education Centre.

The clinical tutor has the responsibility for the promulgation and direction of postgraduate medical education in his Centre. He co-ordinates postgraduate medical study and training arrangements for hospital medical staff and general practitioners. He is concerned with the postgraduate needs and interests of doctors in all specialities.

It is essential that the clinical tutor actively participates in postgraduate teaching. He must encourage and stimulate his colleagues to collaborate. He arranges lectures, clinico-pathological conferences, discussion groups, audio-visual presentation of illustrated tapes and selected medical films.

Four or five meetings sponsored by pharmaceutical firms are held each year in most Postgraduate Medical Education Centres. Arrangements for all sponsored meetings are made through the clinical tutor. Some vetting of lecture material and films is necessary. It is important that the clinical tutor arranges that an independent

opinion by a sufficiently experienced doctor on the topic should be available at such meetings. The acceptability or otherwise of a meeting to discuss a single product or group of products is at the discretion of the clinical tutor with the advice of the local Postgraduate Medical Education Committee. It is important to ensure that special attention be given to dissemination of knowledge about drugs. The Department of Therapeutics and Pharmacology of Queen's University has been very co-operative with the clinical tutors in facilitating all doctors who use drugs to have access to knowledge about the drugs they prescribe.

The clinical tutor also arranges refresher courses for general practitioners in co-operation with the Adviser in General Practice to the Northern Ireland Council for Postgraduate Medical Education. These courses may take the form of a one-day symposium on a suitable topic or an extended course of weekly lectures over a period of six to eight weeks.

Participation is the best method of learning and is the cornerstone of postgraduate medical education and training. The clinical tutor must therefore encourage junior hospital medical staff, registrars, consultants and general practitioners to take an active part at meetings held in the Postgraduate Medical Education Centre. It is very encouraging that many general practitioners are now prepared to present clinical cases and participate in meetings arranged by general practitioners for colleagues in general practice. Speciality tutors in general practice in the Postgraduate Medical Education Centres have played an important role in encouraging active participation by general practitioners. Participation is the best way to "ensure that learners learn".

Postgraduate Clinical Tutors for 1973/74

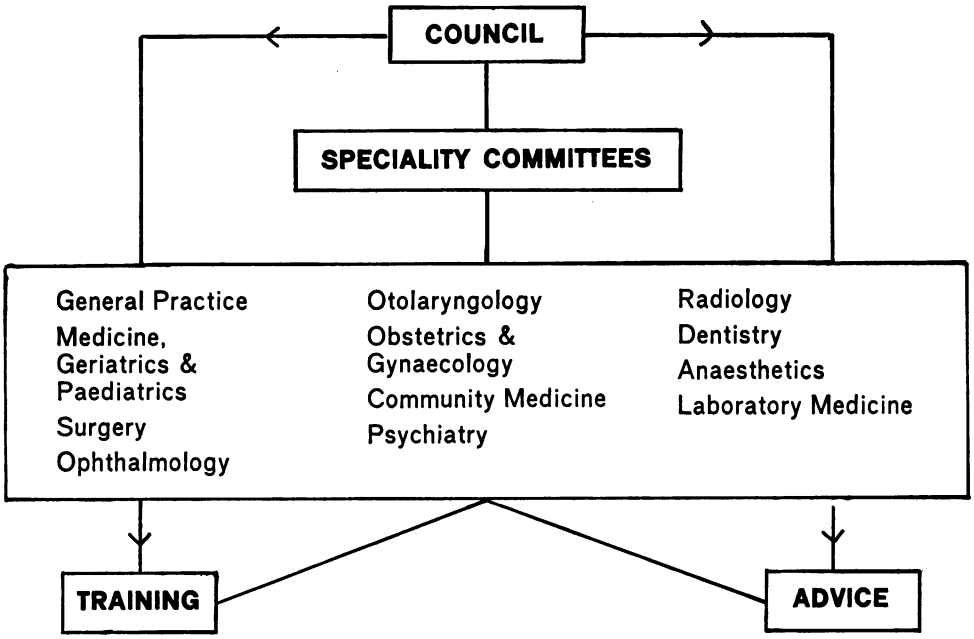
ALTNAGELVIN HOSPITAL	Mr. R. D. W. McLean
BELFAST CITY HOSPITAL	Mr. W. A. Hanna
CRAIGAVON HOSPITAL	Dr. A. W. Dickie
ROYAL VICTORIA HOSPITAL	Mr. G. W. Johnston
ULSTER HOSPITAL	Dr. J. K. Nelson
WAVENEY HOSPITAL	Dr. R. J. Kernohan
MATER HOSPITAL	Dr. J. C. Cooper

THE NORTHERN IRELAND COUNCIL FOR POSTGRADUATE MEDICAL EDUCATION

THE last account of Council's activities appeared in the Summer 1972 number of the Ulster Medical Journal and since then much has been achieved in spite of the constraints imposed by the political situation in Northern Ireland.

Council has two main functions: an advisory one as a Council and an executive one as a Regional Postgraduate Committee. The implementation of training programmes leading to accreditation in the various specialities, changing patterns of continuing education for medical and dental practitioners and the growth of the scheme for vocational training for general practice have placed fresh burdens on Council's secretariat and speciality committees in their executive role. At the same time the re-structuring of the Health Services has imposed new duties on Council in its advisory capacity. More staff, new offices and an increased financial grant, all of which are necessary if Council is to function efficiently, have been the subject of prolonged but successful talks with Government.

Council has now formalised its administrative structure, which is portrayed in the following diagram: —



1. Training Courses and Rotations for Junior Hospital Staff
2. Vocational Training and Continuing Education for General Medical and Dental Practitioners
3. Postgraduate Centres, supervised by Postgraduate Clinical Tutors
4. Administration of Pre-Registration Year on behalf of Queen's University

1. Advice to Government on the Organisation, Finance and Facilities for Postgraduate Medical and Dental Training
2. Careers Information and Advice for Junior Medical and Dental Staff
3. Advice to Married Women Doctors

Future Membership of Council

At present Council is essentially a consortium of doctors and dentists interested in postgraduate medical and dental education and training who have been nominated by Queen's University, the National Health Service, and the Colleges, Faculties and other professional bodies. Many can speak for more than one interest.

It has been found impracticable to fill satisfactorily vacancies caused by retirement and resignations and Council has itself proposed that it should become a Council of representatives, each member being nominated directly by an interested organisation. This proposal is being considered at present by the Department of Health and Social Services (N.I.).

Postgraduate Programme

During the present academic year the postgraduate programme for junior hospital staff includes for the first time courses in otolaryngology, ophthalmology, laboratory medicine and dental anatomy. In an effort to co-ordinate courses and save valuable teaching time the possibility of organising a 'Common Ground' clinical course similar to the 'Common Ground' basic medical sciences course is being investigated.

In general practitioner education considerable interest has been aroused by the introduction of the Modified Essay Question learning technique. The M.E.Q., as it is known, is designed to assess the attitudes, skills in defining and solving problems and factual recall of candidates sitting for the Membership examination of the Royal College of General Practitioners.

In Northern Ireland the M.E.Q. has been developed as a teaching/learning method both in vocational training and in the continuing education of established practitioners. It is based on a continuing clinical problem met with in general practice and leads the practitioner step by step through the problem, asking him to indicate his course of action at intervals. It has three main advantages over the traditional didactic lecture. It forces practitioners to participate actively in a learning situation; it enables them to share their experience with others in small groups and it saves teaching time – an increasingly important consideration today in Northern Ireland.

The undergraduate dental curriculum, unlike the medical curriculum, is still designed to produce a 'safe' dentist. Nevertheless Council's Dental Committee feels there is a case for some degree of vocational training for newly qualified dentists and hopes to arrange a course of this kind.

Careers Information and Advice

Council has continued to develop its careers information and advisory service. A booklet entitled Career Guidance 1973 was published in the autumn. This booklet, based largely on a similar publication by Scottish Council, is intended to provide a simple compendium of basic information for senior medical students and recent graduates who are considering their future careers. It describes the kind of training needed for each field of medical practice and the examination requirements

and future prospects and competition for each speciality. It was distributed to all undergraduate students at Queen's and to all doctors and dentists in Northern Ireland and was well received. It was introduced at a Careers Fair held in Erskine House, Belfast City Hospital, which was attended by some 350 undergraduates and junior hospital staff. The Fair created much interest and in spite of some adverse criticism, was judged generally to have been worthwhile. Council would like to take this opportunity of thanking all who participated in its organisation and especially the staff of the Department of Medical Illustration and Photography, Royal Victoria Hospital.

Council has accepted vicarious responsibility for the administration of the pre-registration year at the request of Queen's University, the statutory licensing body, which will continue to approve pre-registration posts. It has continued to operate the careers information and advisory service for pre-registration house officers.

The specialty committees have interested themselves in greater depth in the provision of suitable training rotations for junior hospital staff and through Council have advised Government and the Central Services Agency about new appointment and posting procedures for hospital medical and dental staff in the senior registrar, registrar and senior house officer grades. This advice has been largely accepted. They hope to play a more prominent and active role than in the past and to enable them to offer appropriate advice about individuals to appointment and posting panels, Council intends to establish a comprehensive system for recording the career intentions, training programmes, posting preferences, progress reports, etc., of all medical and dental staff in training. This is a formidable but necessary administrative undertaking designed solely to help junior doctors and dentists to achieve career posts. Council also hopes to play a useful role in the Northern Ireland Central Manpower Committee to be established early in 1974 by the Department of Health and Social Services (N.I.).

Training Standards and College Visitors

The various Royal Colleges, Faculties and professional bodies have set out detailed requirements for vocational training for all specialties and have already recognised or are in the process of recognising appropriate hospital posts for training in each specialty. Most think that some experience outside the particular specialty concerned is desirable. If present trends continue newly registered doctors will be able to undertake a training programme in the specialty of their choice. This programme will normally lead to the award of a professional diploma, such as the MRCP or FRCS and thereafter acceptance for higher professional training, leading to accreditation and probably to a consultant appointment; similarly, those training for general practice will enter practice after completing a recognised training programme and many will wish to sit for the MRCGP as well.

Hospital posts, including those in rotational training programmes and general practice training programmes, will be inspected by the various academic bodies to ensure that there is a proper balance between training and service needs and that essential facilities for postgraduate training (e.g. radiological and laboratory

services, libraries, postgraduate medical centres, etc.) are available. Posts will be assessed by College visitors after personal visits and scrutiny of background hospital information and reports. It should be stressed that approval or recognition of posts as suitable for training will be granted solely by individual colleges or faculties and that Council and its specialty committees have no responsibility for these decisions.

Council's Offices

Council hopes to move into new offices at 5 Annadale Avenue, Belfast 7, during the next year.

The Biggart Trophy

The former Belfast Hospital Management Committee kindly presented Council with a silver trophy in honour of Sir John Biggart. This trophy will be awarded to the winning team at the Clinico-Pathological Conference organised annually by the Northern Ireland Faculty of the Royal College of General Practitioners. It was won for the first time on 6 December 1973 by a team from the Belfast division of the British Medical Association (N.I. Branch).

J.E.McK.

SURGICAL TRAINING COMMITTEE

The members of the committee are: —Professor A. D. Roy (Chairman); Mr. T. G. Parks (Secretary); Mr. J. H. Balmer, Craigavon Area Hospital; Mr. R. C. Curry, Belfast City Hospital; Mr. C. Gilligan, Mater Infirmorum Hospital; Mr. G. W. V. Greig, Lagan Valley Hospital; Mr. N. C. Hughes, Plastic Surgery; Mr. G. W. Johnston, Royal Victoria Hospital and N.I. Council for Postgraduate Medical Education; Mr. T. L. Kennedy, Royal Victoria Hospital and Representative of The Royal Colleges on Specialist Advisory Committee for Higher Surgical Training in General Surgery; Mr. A. McCalister, Ulster Hospital; Dr. J. McKnight, N.I. Council for Postgraduate Medical Education; Mr. N. McLeod, Northern Ireland Orthopaedic Service; Mr. H. M. Stevenson, Thoracic Surgery; Mr. R. I. Wilson, Northern Ireland Orthopaedic Service.

The committee is responsible for advising on the overall training in general surgery and the surgical specialties. It is also responsible for the rotation of trainees through the various surgical posts during the pre-fellowship and post-fellowship periods of training. Members of the committee make themselves available so that those in training have the opportunity to make known their individual interests and requirements. Trainees at senior house officer, registrar or senior registrar level are encouraged to discuss informally any problem relating to their surgical career and training.

As in previous years, the Department of Surgery in conjunction with the Northern Ireland Council for Postgraduate Medical Education arranged regular surgical lectures and seminars, surgical pathology tutorials, radiology classes and ward rounds. In addition to general surgery, the programme was designed to cover the various surgical specialties as widely as feasible. The results in the postgraduate examinations clearly indicate the immense benefit that trainees have derived from rotational training and organised teaching programmes in surgery.

A new feature during the year was the introduction of "One-day Symposia" for surgeons of all grades throughout the province. Participants included not only those from the surgical specialties but also those from other disciplines, e.g. medicine, pathology, radiology and radiotherapy.

T.G.P.

COMMUNITY MEDICINE COMMITTEE

The Royal Commission on Medical Education (Todd) used the term "community medicine" to describe the specialty practised by administrators of medical services, by epidemiologists and by doctors working in community clinical services. Community medicine is concerned with broad questions of health and disease in particular geographical and occupational sections of the community and in the community at large. This latter function entails detailed examination of specific health problems with recommendations for their effective amelioration or cure, i.e. programmes of care.

In accordance with the aims clearly expressed in the Todd and Hunter Reports it is aimed that doctors who are trained, who obtain the appropriate qualification M.F.C.M. and who practise in this speciality will enjoy terms and conditions of service and career prospects clearly as good as those of consultants in other specialties. These principles are already embodied in the latest Review Body Report which recommends consultant salary scales for certain administrative medical officers and community physicians.

Specialist Training

The need for adequate systems of specialist training for new recruits to this discipline, after they have gained suitable clinical experience, is stressed by the Royal Commission. There is an urgent need for employing authorities to establish adequate training posts to enable recruits to take full advantage of academic and service education in preparation for specialist qualification. Under the guidance of the Community Medicine Committee of the Northern Ireland Council for Postgraduate Medical Education three doctors are already in training and all four Health and Social Services Boards will make training posts available and participate in training programmes. Training posts will be subject to approval by the Faculty of Community Medicine.

In the Faculty's memorandum on training in community medicine reference is made to approval of the following three types of post and it is envisaged that these

will all be made available by Area Health Boards to suitable candidates in Northern Ireland.

1. *Clinical Posts*: These would form part of general professional training and be graded as Senior House Officer posts. The candidates would engage in work suitable as preparation for the specialty, e.g. paediatrics, epidemiology, general practice, etc.

2. *Training Posts or Fellowships*: It is anticipated that there would be a variety of these posts of registrar status. During the tenure of the posts, in preparation for Part I of the M.F.C.M., candidates would attend either full-time or part-time academic centres; full-time for one academic year at an English or Scottish University leading to a Diploma in Social Medicine (or comparable qualification), or part-time over a period of two years attending 3 week modular academic courses in Britain, alternating with in-service training in the field gaining practical experience in community medicine.

3. *Higher Training Posts*: These posts (equivalent to Senior Registrar) would provide the opportunity for those in training to undertake work of increasing responsibility in various aspects of community medicine and in research. These posts could also be made available to those working in the academic field.

In addition to the above posts it is important that training and experience should be made available for those wishing to specialise in medical administration, epidemiology, research and intelligence, environmental medicine and other allied specialties.

The above posts will be subject to approval as "supervising body" by the Faculty of Community Medicine. The Community Medicine Committee of Council will be responsible for the supervision of training programmes of trainees.

Examination for the Diploma M.F.C.M.

The examination will be in two parts. Part I is designed to test the candidate's knowledge of epidemiology, statistics, social sciences, principles of administration and management in relation to health and social services. Part II is designed to test the candidate's ability to apply the content of basic subjects to one or more aspects of community medicine approved by the examiners. Written material will normally take the form of an original project and the examination will include an oral test on the subject of the material and related subjects. Part II must be entered within 3 years of passing Part I other than in exceptional circumstances approved by the Faculty.

During the past year the Community Medicine Committee has defined its ideas on training posts in the specialty and on future training requirements and career prospects in the re-structured health service. Its Careers Advisory Service has given advice and guidance to postgraduate students and participation in the Council's Careers Fair has provided an opportunity for graduates and undergraduates to learn more about this field in medicine where in its contribution to the common

good greater emphasis is placed on the importance of prevention, environment and the social aspects of health and disease.

The Chairman of the Community Medicine Committee, Dr. J. McA. Taggart, is available (Phone Belfast 44611) to advise undergraduate and postgraduate students on Regulations for the M.F.C.M. and on matters concerning career prospects in Community Medicine. J.McA.T.

LABORATORY MEDICINE COMMITTEE

During the year, the Committee gave consideration to the requirements for training in laboratory medicine and in particular to the inter-departmental rotation which is necessary for candidates preparing for the Primary Examination for Membership of the Royal College of Pathologists. This problem is still unresolved.

It was felt that some steps should be taken to try to establish a pattern of lectures in the different laboratory disciplines which would be suitable for candidates preparing for the Primary Examination and to this end a lecture series has been established in morbid anatomy and histopathology, medical microbiology, haematology, and chemical pathology. The lectures are normally held as lunch-time sessions and when the series has ended an assessment will be made as to its effectiveness and of the lessons which have been learned which can lead to the presentation of a more complete course in the next academic year.

The Committee noted with some disquiet the very considerable disparity between the allocation of registrar and senior registrar posts in the Royal Victoria Hospital as compared with the Belfast City Hospital. A meeting was held with representatives of the Authority before its demise and a case was made for a phased increase in the registrar and senior registrar establishments in the Belfast City Hospital. No action has yet been taken by the Eastern Area Board on this. D.W.N.

OBSTETRICS & GYNAECOLOGY COMMITTEE

The Obstetrics and Gynaecology Committee wishes to congratulate the following doctors who have obtained the M.R.C.O.G.:

Dr. T. Anderson	Dr. H. A. M. Makhlouf	Dr. W. E. Hunter
Dr. D. D. Boyle	Dr. A. Roberts	Dr. J. S. Robinson
Dr. C. M. Greeves	Dr. J. S. Bingham	

Dr. Jeffrey Robinson, a Queen's graduate, who is presently working in the Nuffield Institute for Medical Research, Oxford, came first in the examination and was awarded the Council's Gold Medal. He is the first Irishman to achieve this distinction. H.L.

OTOLARYNGOLOGY COMMITTEE

The committee, set up in 1972, has supported the previously existing education programme and research facilities for senior house officers and registrars working in otolaryngology departments of Northern Ireland hospitals.

The committee which consists of:

Mr. J. H. A. Black	Mr. G. D. L. Smyth	Mr. R. S. McCrea
Mr. A. G. Kerr	Mr. R. Harvey	

has advised the Northern Ireland Hospitals Authority, the Northern Ireland Council for Postgraduate Medical Education and the Faculty of Medicine, Queen's University, on the future organisation of training programmes and the developmental requirements of the Department of Otorhinolaryngology during the next decade. Rotational training now exists between the Eye and Ear Clinic, Royal Victoria Hospital and the ENT Departments of the Belfast City, Tyrone County and Altnagelvin hospitals. Advanced lectures in para-otological subjects, lectures and demonstrations in micro-anatomy of the temporal bone. intensive small group tuition preparatory to the final ENT FRCS and a Journal Club are held weekly in the Eye and Ear Clinic, Royal Victoria Hospital. Junior staff have been active in research and have co-authored contributions on otologic research to the Journal Club of the Radcliffe Infirmary, Oxford, March 1973, the ENT Research Club of Guy's Hospital, London, March 1973, the International Symposium in Chronic Ear Surgery, Gummersbach, West Germany, May 1973, the 4th International Congress of Otorhinolaryngology at Venice in June 1973, the International Symposium of Neuro-otological Surgery in Valencia in June 1973, the Annual Meeting of the Canadian Society of Otorhinolaryngology in Toronto, July 1973, the Tennessee ENT Society in Memphis, Tennessee, September 1973, the American Academy of Ophthalmology and Otolaryngology in Dallas, Texas, September 1973. In addition, Dr. Kathleen Law gave a paper to the Annual Meeting of the Irish Ear, Nose and Throat Society in Cork in October 1973 and Mr. Michael Cinnamond read a paper to the Royal Society of Medicine entitled Impedance Audiometry in Meniere's Disease in November 1973.

Negotiations regarding the expansion of activities of the Department of Otorhinolaryngology with continued development of the work of the research laboratories and augmentation of our audio-visual facilities are in hand.

G.D.L.S.

BOOK REVIEWS

HUMAN GROWTH AFTER BIRTH. By David Sinclair. (Pp. x + 212; 68 figures. £2.00). London: Oxford University Press, 1973.

'GROWTH' is a notion, at once commonplace, complicated and impossible to define rigorously, for it covers, or at least touches, such a wide variety of phenomena. Professor Sinclair has taken a broad view: for him growth includes all the *progressive changes* in an organism from fertilization until death—not only changes in size and shape, but in structural complexity, chemical composition and behaviour as well. Maintenance, repair, regeneration, malignancy and senescence are likewise regarded as growth processes. The author points out in his preface that these matters are treated descriptively for the most part, because so little is known of the basic mechanisms, but wherever possible an attempt has been made to give a general idea of the principles involved.

The scope of the book is well illustrated by the chapter headings: nature of growth, growth in height and weight, growth of tissues, growth of systems, indices of maturity, changes in shape and posture, factors influencing growth and maturation, growth and repair, disturbances of growth, and old age.

'Growth' is a subject to whose importance medical men and biologists pay lip service, but rarely bother to study, because the information is buried in so many disparate articles and journals, and is so difficult to evaluate when it is disinterred, particularly when it is couched in forbidding mathematical language. Professor Sinclair has synthetized his material so well and has written so clearly, that the reader could fall into the trap of thinking that growth was a straightforward matter with few problems left to solve—but this is simply a measure of his grasp of the subject, and of his skill in exposition. The book is modestly intended for preclinical medical students and students of human biology, but in fact there can be few professional biologists who would not find something to their advantage in its pages, while for the undergraduate student it is an ideal introduction to a most characteristic and fascinating feature of living organisms. The book is, moreover, clinically orientated throughout, with repeated insights into the problems of human disease and disability. The first edition of "Human Growth after Birth" was a great success, and this new and improved edition should do equally well.

J.P.

AN INTRODUCTION TO HUMAN PHYSIOLOGY. By David F. Horrobin. (Pp. 176. Illustrated. Paper £2.20, Boards £4.50). Lancaster. Medical and Technical Publishing, 1973.

THIS book was designed as an introductory text for medical students and as a complete text for students in ancillary subjects such as physiotherapy. It is an abbreviated form of the author's earlier and larger text for medical students and many of the original figures have been used in the shorter version. The author feels that many medical students are confused by the amount of detail in the larger textbooks of physiology and would benefit by reading first a short book on the subject. I suspect that this is true though I do not know any evidence to support it. It may be that students do not appreciate synopses of a subject until they have struggled for a while with its details.

However, if the thesis is true, this text provides a suitable outline of physiology written in a clear and simple style. It assumes little prior knowledge and complex scientific phenomena are described as far as possible in simple language.

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ANTIBIOTIC AND CHEMOTHERAPY. By L. P. Garrod, H. P. Lambert and F. O'Grady. (Pp. ix + 546; figs 49. £4.50). Edinburgh and London: Churchill-Livingston, 1973.

THIS is the fourth edition of what is by far the best short textbook in English on this subject, both for the student or young doctor learning his trade and for the more experienced who wishes to keep up to date. Clearly set out and simply written it nevertheless contains all the available information necessary. It has, of course, grown with the years (Pp. 350 in 1963) and has acquired a third author since the third edition. The current edition contains an excellent new chapter on the mode of action of antibiotics (information which is now omitted from the sections on the individual drugs) and a greatly enlarged chapter on laboratory methods. Otherwise, it differs little from previous editions apart from including the latest information about drugs new and old.

The weakest section of the book, inevitably, is Part II which deals in turn with clinical groups of infections. It is perhaps the more unfortunate that this is the part of the book which will have most influence on the prescribing of antibiotics. Much space is devoted to inconclusive clinical evidence as to the best method of treating such conditions as bacterial endocarditis, urinary infections and breast abscesses followed by advice which, though conventional, does not always appear to be based on the evidence quoted. For instance, on p. 387 erythromycin is described as the only antibiotic tested to eliminate the *Bordetella pertussis* in whooping cough rapidly but a few lines below ampicillin is recommended for moderately severe and chloramphenicol for very severe illnesses. I hope that before the next edition this part of the book will be pruned and the extent to which current antibiotic practice is irrational will be laid bare.

P.C.E.

ANATOMY OF THE HEAD AND NECK. By George H. Paff. (Pp. 235; 360 figures. £5.10). London: W. B. Saunders, 1973.

THE appearance of a new book in a competitive field arouses curiosity. New volumes covering scientific advances have at least the intrinsic merit of combining the latest available information on particular topics. The success or otherwise of new volumes covering familiar areas depends almost entirely on presentation. In anatomy, an essentially visual subject, presentation of the illustrations plays a major supporting role. An initial survey of Dr. Paff's book reveals that all illustrations are black and white diagrams. The absence of the artistry of many recent anatomical texts, the lack of the use of colour or even a photograph seem, at first sight, to place the book at a serious disadvantage. It suggests that the author and publishers are gambling upon the scope of the book and its text to distinguish it as a worthy addition.

The scope of any textbook depends upon the intended readership. Unfortunately this is something which the author does not define for the reader (and for himself?) though the preface suggests that the lectures upon which the book is based were mainly for post-graduates interested in E.E.N.T. and oral surgery. Even if this assumption is true, there are some questionable omissions. Chapters on the osteology and embryology (and possibly one on the C.N.S.) would broaden the appeal of the book to all students of these specialities and perhaps include the wider (undergraduate) market of dental students. It may seem easy to be critical of a new book simply by noting its omissions. However for those who recommend and those who buy, the single text book which offers a more complete approach is often the best economic proposition; unfortunately nowadays a not unimportant consideration. In Dr. Puff's case the omissions are all the more regrettable as the remainder of the coverage is very good.

The style of the text is perhaps the best selling feature of the book. The author has obviously attempted to transfer his teaching style to paper, no doubt because the suggestion that he should write the book stems from his students. The style is therefore often conversational and has more immediate reader appeal than the weighty volumes with which

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anatomy is encumbered. The author is obviously aware of the reader at all times, interrupting the text with recall questions, aide-memoires (even mnemonics) humour, analogies and occasional etymological explanations. Clinical considerations are frequently mentioned, the usual tedious and verbose descriptions of relations skilfully avoided and functions emphasised in a logical manner. Advice is given even on the construction of a model larynx!

While the text relies heavily on the accompanying diagrams, Dr. Paff realises that anatomy cannot be learned from books alone. The reader is frequently referred to the examination of a skull, to self-examination or to a presumably available dissection. Purists will argue over some of the details, e.g. the use of pterygo-mandibular "ligament" and "raphe" interchangeably, and grammerians might wonder at the choice of adjectives in the advice that it would be a "pious idea" to refer to a skull. However, the same purists will delight in the frequent use of eponyms.

The overall result of the author's fresh approach is a very readable and easily remembered text. The diagrams which complement it are plentiful and generally well drawn. It is unfortunate that the first two are rather inferior, giving an initially poor impression, and that fig. 35 requires a headstand to understand its orientation. Greater use of figure titles and orientation would facilitate the reader, though mention must be made of the large and often excellent diagrams which help to make the chapters on the eye and ear among the best in the book.

Dr. Paff's refreshing style make the omissions mentioned doubly unfortunate, but postgraduate students may, nevertheless, welcome the valuable tuition offered. Naturally it is to be hoped that in future editions the author will extend his coverage, where his obvious teaching expertise and his enthusiasm for his subject would be welcomed.

A successful teacher does not always make a successful author (or vice versa) but, on the whole, Dr. Paff has succeeded in making the conversion to add a promising newcomer to text books on head and neck anatomy.

P.D.A.O.

INTERVIEWING THE PATIENT. By G. L. Engel and W. L. Morgan. (Pp. 148. Illustrated. £1.50). London: W. B. Saunders, 1973.

THIS short book is an admirable attempt to improve a poorly practised art—that of history taking. It sets out clearly and concisely the means of creating an effective relationship between the student and the patient—a relationship which should not only provide clinically relevant information but also be of therapeutic value.

There are three sections in the book. The first is an almost philosophic discussion of the student's role in relation to the patient, the patient's visitors and the medical staff. Some of the factors which will influence his attitude to the patient, e.g. his insecurity in his new role, his lack of experience and his own personal psychological problems, are described. In this chapter may physicians will be reminded of their first hesitant involvement with sick people.

The second section deals with the concepts underlying the diagnostic process. It is written in general terms and certainly for the introductory student is of less practical value than the rest of the book.

The third section is outstanding. It describes in detail how the interview should be conducted and provides a reference framework which with appropriate modifications is applicable to most clinical situations.

History taking is probably the least well taught part of the medical curriculum largely because most teaching groups are too large, thus creating a difficulty in involving all the students in the history taking process. It also receives much less emphasis throughout the medical course than teaching on physical examination, diagnosis and treatment. It may be that the situation could be improved by providing video-recording facilities which would

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allow student/patient interviews to be taped for later play-back so that individual student performances could be monitored.

However in the meantime, students and doctors could do no better than read this book. If I have a reservation about it, it is that it preaches a counsel of perfection in enjoining us to spend upwards of an hour in history taking with each patient. While this has great value for the student it is doubtful if many practising doctors have the time to afford themselves this luxury.

J.J.C.

THE MANAGEMENT OF COMMON SKIN DISEASES. By C. P. A. Dupont. (Pp. 86. £1.25). London: Henry Kimpton, 1973.

THIS little paperback concerns itself exclusively with management and treatment. There is no discussion of any kind on diagnosis, causation, etc. It is written with short, staccato statements and might be useful for a family doctor presented at a busy surgery with a skin problem where the diagnosis is known but he is uncertain about treatment.

There are no photographs nor references. Because of the absence of discussion of diagnosis, etc. the book cannot be recommended to medical students.

J.M.B.

CARDIOLOGY. By D. G. Julian, M.A., M.D., F.R.C.P.(Ed.), F.R.C.P., F.R.A.C.P. Second Edition. (Pp. ix + 341; Figs. 112. £2.20). London: Baillière Tindall.

ONE of a series of 'Concise Medical Textbooks', this book is intended primarily for students but also as a handbook for physicians and nurses. The whole field of cardiology is covered with clarity and brevity, yet for the interested student there is a surprising amount of relevant detail. A multitude of diagrams illustrate the text and often throw into sharp contrast items which might otherwise be difficult to distinguish.

Worth special mention is a chapter devoted to radiology of the heart and cardiac investigation where the techniques, risks and rationale for the procedures are well presented, excessive detail being, as elsewhere, avoided. The chapter on congenital heart disease includes a section on neonatal cardiology, a topic of increasing importance.

The reader may justifiably criticise the section dealing with acute myocardial infarction. Patients dying soon after the onset of the attack are written off as unsalvageable and insufficient emphasis is given to the importance of autonomic disturbances and their correction in the pre-hospital phase. An important flaw elsewhere in the book is that the suggested dose of one preparation of Quinidine is only one half of that conventionally used.

This is, by and large, an excellent and common-sense book which will be of considerable value to those for whom it is intended.

J.S.G.

FUNDAMENTALS OF CHEMOTHERAPY. By William B. Pratt. (Pp. xiii + 332. £3.00). London: Oxford Medical Publications, 1973.

THIS text "is meant primarily for medical students and graduate students taking a pharmacology course. It is also meant for physicians ..... who would like to have a brief and up-to-date reference on chemotherapy." Let me warn the potential readers that the students of pharmacology in New Haven, Connecticut must be well grounded in biochemistry and molecular biology. The text describes in technical detail the ways in which the various antibiotics and chemotherapeutic agents interfere with both the invading and the host cell. It contains a great deal of fascinating information. Brief references to the clinical use of the drugs are included and these often consist of tables reproduced from the "Medical Letter" (the American precursor of the Drugs and Therapeutics Bulletin). The clinical comments are so brief that although they may be appropriate to the American

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THIS little paperback concerns itself exclusively with management and treatment. There is no discussion of any kind on diagnosis, causation, etc. It is written with short, staccato statements and might be useful for a family doctor presented at a busy surgery with a skin problem where the diagnosis is known but he is uncertain about treatment.

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J.M.B.

CARDIOLOGY. By D. G. Julian, M.A., M.D., F.R.C.P.(Ed.), F.R.C.P., F.R.A.C.P. Second Edition. (Pp. ix + 341; Figs. 112. £2.20). London: Baillière Tindall.

ONE of a series of 'Concise Medical Textbooks', this book is intended primarily for students but also as a handbook for physicians and nurses. The whole field of cardiology is covered with clarity and brevity, yet for the interested student there is a surprising amount of relevant detail. A multitude of diagrams illustrate the text and often throw into sharp contrast items which might otherwise be difficult to distinguish.

Worth special mention is a chapter devoted to radiology of the heart and cardiac investigation where the techniques, risks and rationale for the procedures are well presented, excessive detail being, as elsewhere, avoided. The chapter on congenital heart disease includes a section on neonatal cardiology, a topic of increasing importance.

The reader may justifiably criticise the section dealing with acute myocardial infarction. Patients dying soon after the onset of the attack are written off as unsalvageable and insufficient emphasis is given to the importance of autonomic disturbances and their correction in the pre-hospital phase. An important flaw elsewhere in the book is that the suggested dose of one preparation of Quinidine is only one half of that conventionally used.

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As a parent, I found the book contained a fair measure of common sense although the author's style owes a lot to the Patience Strong school which I would find irritating at 3 a.m. while trying to soothe a wailing infant.

From the point of view of a paediatrician, I found quite a lot to disagree with, e.g. schedule feeding, but perhaps in some cases I am as much a victim of fashion as Dr. Turtle.

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Dr. Apley draws upon his wide experience as a children's physician and in discussing the various system disorders one can feel the enthusiasm and personality of the author coming through. Throughout he remains conscious of his readers and as well as imparting knowledge, gives valuable advice as to how students may best elicit the physical signs. Resident pupils would find this useful. As far as treatment is concerned, emphasis is placed on management, rather than on ever changing chemotherapy.

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STRUCTURE OF THE HUMAN BODY. By Weston D. Gardner, M.D., and William A. Osburn, M.M.A. Second Edition. (Pp. 516, figs. 939. £5.10). London: W. B. Saunders, 1973.

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All the systems of the body are described with particular emphasis on fibrous, skeletal, muscular and nervous systems. There are full descriptions of the bones and joints. In dealing with the muscles of the body, these are described in relation to their role in movement and many useful tables of muscle origin, insertion and of functional movements have been worked out. Throughout the chapters, descriptions of ultra-structural features are correlated with light microscopical appearances and in turn the functioning of tissues related to gross anatomical features. An account of human development is given and in the subsequent chapters reference to prenatal events is frequently made.

The text is well written and numerous illustrations are incorporated into the flow of information. The illustrations are uncluttered by unnecessary detail and aim to re-emphasise points made in the text. In addition, 16 colour plates have been added to the second edition.

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Clinical medicine, Morrison thinks, concentrates too much effort on solving puzzles rather than problems. Problem orientated medicine includes social and behavioural factors, prevention and after care. Morrison sees great opportunities in the future for the development of this wider approach based on the integration of preventive, family and hospital services and hopes to see clinicians using their knowledge and prestige in promoting the much neglected preventive activity of health education.

This is a stimulating and readable book which will be enjoyed by every doctor and senior medical student who is interested in the development of medicine over the next ten years.

J.B.

EPIDEMIOLOGY: A GUIDE TO TEACHING METHODS. Edited for the International Epidemiological Association by C. R. Lowe and J. Kostrzewski. (Pp. xiv + 266. £3.00). Edinburgh and London: Churchill-Livingston, 1973.

THIS book "is designed to help teachers of epidemiology; it is not a textbook of epidemiology . . . it represents the experience of teachers of epidemiology from countries with very different health problems . . . and it provides . . . with practical examples . . . teaching methods used by them". It is published for the International Epidemiological Association (IEA) which in less than twenty years has progressed from a modest "corresponding club" to an organisation to which many leading epidemiologists throughout the world belong. A global perspective is the watchword of the Association well exemplified by the nationalities (17) of the 26 contributors.

The book is in two parts: Part I comprises twelve chapters written anonymously, each dealing with an applied aspect of teaching ("Teaching in the Classroom", "Teaching in the Hospital", etc.) and since they total less than 70 pages the treatment is clearly brief but unfortunately superficial rather than succinct, e.g. "Evaluation of Performance", a major contemporary academic "global" problem, is discussed under 7 headings in just over 4 pages, "Short answer questions", which could deserve a separate chapter, being dealt with in 3½ lines! It is not clear for what audience Part I is written, but the substance will be of negligible value in "western" medical schools. Part II comprises 8 Annexes—ranging from a modest 12-item "Further Reading on Planning an Educational Programme" to nearly 30 pages of examples of various types of examination questions—most of which are examples of exercises, curricula, or training programmes (under- and postgraduate) from the departments of the 26 contributors. This is the more interesting part of the book, but the value to a teacher or practitioner of epidemiology is limited, and furthermore, one must question whether promulgating teaching methods, curricula etc.—some of them of very modest merit—through an (expensive) hard-back book is appropriate. The compilers consider this book has some use for medical schools in developing countries. This reviewer has not the experience of such schools to dissent, but he cannot see any worthwhile purpose being served by recommending it for, specifically, a United Kingdom or Irish medical school. The production is always adequate and frequently good; the editing and sub-editing is efficient. There is no index. The authorship of Chapters I—XII is not divulged. The preface indicates a committee involvement and this would lend weight to the adage that a camel is a horse made by a committee. There are formidable problems in advancing the teaching and practice of epidemiology on a world basis where standards and resources, and local diseases are highly disparate. If books of this type are to be produced and adjudged helpful towards a solution this reviewer hopes that authors will distinguish between simplification and debasement: the former enhances understanding; the latter devalues the coin used.

P.F.

Clinical medicine, Morrison thinks, concentrates too much effort on solving puzzles rather than problems. Problem orientated medicine includes social and behavioural factors, prevention and after care. Morrison sees great opportunities in the future for the development of this wider approach based on the integration of preventive, family and hospital services and hopes to see clinicians using their knowledge and prestige in promoting the much neglected preventive activity of health education.

This is a stimulating and readable book which will be enjoyed by every doctor and senior medical student who is interested in the development of medicine over the next ten years.

J.B.

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