PAPER

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Professor HT (Harry) Howat: prime leader in pancreatology development in the UK

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ABSTRACT Positioned in the posterior abdomen, the pancreas remained little observed until nineteenth century advances in physiology, followed later in the century by abdominal surgery, brought the organ into the clinical domain. The discovery of pancreatic stimulating hormones during the twentieth century culminated in the description of pancreozymin by Harper and Raper in Manchester in 1943. After World War II, Henry T Howat was appointed physician in that city and was able to analyse the results of hormonal stimulation in pancreatic disorders. He became the first doctor in Britain to specialise in pancreatology. His collaboration with colleagues in Britain and in Europe, through the evolution of specialist societies, encouraged the coordination of basic science, medicine, pathology, radiology and surgery, to further research in, and management of, pancreatic disease. Academic recognition by Manchester University resulted in his being appointed its first Professor of Gastroenterology and originator of a gastrointestinal research unit. As he pointed out, continuing scientific and technological advances influenced the concepts of disease, and moved the management of pancreatic disease from the general physician and surgeon to gastroenterologists. Howat's career illustrates the continuing specialisation witnessed in the latter half of the twentieth century.

KEYWORDS Pancreatology, Henry T Howat, scientific background, specialist societies

LIST OF ABBREVIATIONS cholecystokinin (CCK), computed tomography (CT), endoscopic retrograde cholangio-pancreatography (ERCP), John Rylands University Library (JRUL), pancreozymin (PZM), Royal Army Medical Corps (RAMC)

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INTRODUCTION

Specialisation in the clinical study of the pancreas was minimal in mid-twentieth century Britain. Thus, when Sir Francis Avery Jones produced his *Modern Trends in Gastroenterology* in 1952,[1] then the only textbook available for aspiring gastroenterologists, he called upon HT Howat in Manchester to write the chapter on pancreatitis.[2] In this paper, I seek to outline the influence Howat had on engendering interest in the pancreas, which in the early nineteenth century was considered an obscure abdominal organ, and Manchester an obscure city – for medical research if not for world industry. One hundred and fifty years later neither, Manchester nor the pancreas are so little recognised.

THE EARLIER YEARS

Until the late eighteenth century, the pancreas remained an organ of uncertain function lying in the posterior abdomen, inaccessible to examination. The pancreas was probably first described by Herophilus of Chalcedon, *circa* 300 BC, but was named pancreas (pan = all, kreas = flesh or meat) by Rufus of Ephesus *circa* AD 100. It was probably so named because it contained no tendon or bone and was considered a cushion on which the stomach rested.[3] The anatomy was defined in the seventeenth century by Wirsüng, Santorini and Vater, whilst Thomas Wharton of York noted the structural similarity to the salivary glands.[4] The development of gastrointestinal physiology in the late eighteenth and early nineteenth centuries through animal experimentation provided evidence that not only the stomach but also the pancreas had a digestive function. Analysis of pancreatic juice revealed that it contained carbohydrate-, fat- and protein-digesting compounds. This research was conducted by Claude Bernard in his small laboratory in Paris in the mid-nineteenth century analysing pancreatic function and its possible nervous control.[5] The latter half of the century was dominated by Ivan Pavlov and his co-workers, in the unusually large laboratory in St Petersburg,[6] studying the relationship between gastric acid and pancreatic secretion. They were, however, unable to define the perceived nervous stimulus of the pancreas

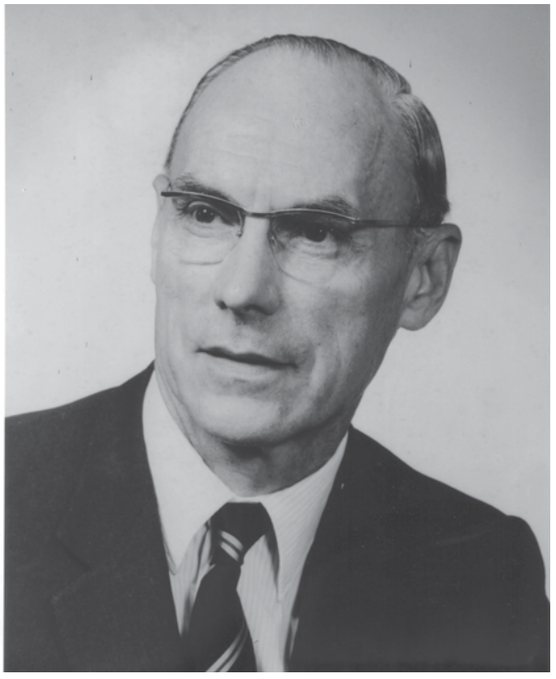

FIGURE 1 Professor HT Howat. Reproduced courtesy of Mr JMT Howat, MD FRCS.

produced by duodenal acidification,[7] which was to be unravelled in the early twentieth century.

At the end of the nineteenth century, due to the discovery of anaesthetics and observing aseptic techniques, abdominal surgery was no longer perceived too hazardous, and pancreatic disease became more evident. In 1886, Nicholas Senn in Chicago noted that 'the literature on the surgery of the pancreas is exceedingly scanty...'[8] It was Reginald Fitz in 1889 in Boston who provided, through autopsy findings and review of the literature, a clearer picture of the causes and effects of acute pancreatitis.[9] Yet, by 1902, the Leeds surgeons Mayo Robson and Berkeley Moynihan had published *Diseases of the pancreas and their surgical treatment*, the first surgical textbook on the pancreas.[10] They discussed the theory of Eugene Opie at Johns Hopkins Hospital,[11] that pancreatitis was associated with bile diversion into the pancreatic duct due to an obstructing gall stone in the ampulla of Vater, but pointed out that the single channel at the ampulla was not always present, and that pancreatitis occurred in the absence of gallstones.

During the twentieth century, it was appreciated that an alternative to surgical laparotomy would be helpful in the diagnosis of pancreatitis. The progress of laboratory medicine was illustrated by the ability to estimate blood amylase as a diagnostic aid reviewed by Elman in 1929[12] and subsequent analysis of lipase levels by Comfort in 1937.[13] Bockus and Raffensperger in 1948[14] pointed out that serum enzyme measurements in acute pancreatitis had reduced the need for emergency surgery, with a mortality of 50%, to conservative management and 7·5% mortality. Surprisingly, it was not until 1946 that the definition and description of chronic pancreatitis was recognised by Comfort, Gambill and Baggenstoss.[15]

THE PANCREAS AND MANCHESTER

Interest in the pancreas was first nurtured in Manchester by Professor William Roberts, physician to the Manchester Royal Infirmary from 1855 to 1883.[16] He experimented on the digestive ferments, repeating and extending the work of Willy Kühne in Heidelberg, who had introduced the term *enzym* to describe the fermenting substances, in particular trypsin, produced by the pancreas. Roberts suggested that the English term should be modified to *enzyme*, in his paper of 1881 describing a simpler method of estimating amylase.[17] He was also interested in the therapeutic use of pancreatic extract prepared by the local chemist M Benger, in aiding patients with digestive problems, which he enlarged on in his Lumleian Lectures at the Royal College of Physicians, London, in 1880.[18]

A young physiologist in Manchester from 1890–93, JS Edkins, extended Robert's work on the effects of pancreatic extract on milk protein.[19] Edkins moved to St Bartholomew's Hospital, London, where his research on gastric acid secretion in the dog led to his suggestion in 1905 that a substance *gastrin* was absorbed from the pyloric gland and travelled in the blood to stimulate gastric acid secretion.[20] This was the new hormone era in physiology initiated by William Bayliss and Ernest Starling in University College London in 1902 with the discovery of what they termed *secretin* stimulating pancreatic secretion;[21] this had eluded Ivan Pavlov, in St Petersburg, in his studies of nervous control during the latter half of the nineteenth century. Over the next forty years, the mechanism of pancreatic enzyme secretion ranged between nervous and hormonal control. Pure secretin had been produced by Hammersten in Sweden, Ivy in America, and John Mellanby in London, to study pancreatic juice volume and bicarbonate output.[22] In addition, Ivy had described, in 1928, gall bladder contractions induced by a hormone he called cholecystokinin. However, AA Harper and HS Raper in Manchester in 1943 discovered the enzyme secreting hormone PZM.[23] They subsequently were able to purify this to study the effect in humans.[24] This period in physiology research coincided with the appointment of HT Howat as physician in Manchester.

With the help of Harper, Howat utilised the knowledge of the physiological effects of secretin and pancreozymin to develop a way of diagnosing pancreatic disease. This was to lead to his becoming the foremost pancreatologist in the UK, and his Unit being the forerunner of academic gastroenterology in Manchester. At this juncture, I wish to enlarge on Howat and the Manchester scene.

HOWAT AND MANCHESTER

Henry ('Harry') Taylor Howat (see Figure 1) was born in Fife on 16 May 1911; he studied medicine at St Andrew's University, qualifying MB BS in 1933, with the highest marks of the year in medicine. After House Officer posts in Dundee and Resident Medical Officer at the City Fever Hospital in Edinburgh, he moved south in 1935 to Manchester Royal Infirmary taking up the post of Resident Clinical Pathologist.[25] He then continued training in medicine as Chief Assistant to Dr Hillyard Holmes at Manchester Royal Infirmary, and he was then appointed to the post of Resident Medical Officer. With the outbreak of World War II, he assisted with organising the hospital for war until May 1940 when his duties were interrupted by war service in the RAMC from 1940–45 in the Middle East, France and Germany. In 1944, he gave a series of lectures on recent advances in medicine in Louvain, and was then appointed Honorary Alumna, and awarded a medal of Doctor of Medicine of Louvain University, Belgium. He returned to Manchester in December 1945, and was appointed Honorary Physician at Ancoats Hospital in August 1946 and started a private consultant physician practice in St John Street, Manchester.[26] Howat also wished to carry out research, and sought the advice of Professor Schlapp, Head of the University Department of Physiology, Manchester.[27] He was appointed Associate Lecturer in Physiology from 1946–1948 and Professor Schlapp allocated him £20 to study gastric acid secretion in cats.[28] This entailed noting the effect of enterogastrone and urogastrone on suppression of gastric acid stimulation and the potential for use in peptic ulcer treatment. Interest in enterogastrone had been shown by Schlapp's ex-colleague RKS Lim in the 1920s, and was being actively researched by Ivy in America.[29] This work in Manchester would no doubt be supervised by Harper who also introduced Howat to the department's work on gastric acid production and also pancreatic stimulation.[30]

In 1948, he was appointed Honorary Assistant Physician to Manchester Royal Infirmary and, later that year, he became Lecturer in the Department of Medicine, so he relinquished his post in the Physiology Department. In his application for the post at Manchester Royal Infirmary, he stated that he had a special interest in gastroenterology and nutrition. This no doubt reflected his expertise acquired in the RAMC dealing with troops suffering from chronic dysentery, steatorrhoea and poor nutrition.[31] He was also developing his research on pancreatic disease in humans, as noted by Dr Peter Duncan, who worked with him at this time at Ancoats Hospital and also, later in the 1950s, at Manchester Royal Infirmary.[32]

APPLIED PHYSIOLOGY

Pancreozymin/Cholecystokinin

As already noted, Harper, in association with Dr Joan Crick, had been purifying the preparation of PZM.[24] The hormone was derived from extracts of animal intestines which had to be collected and transported in ice from the local abattoir to the Physiology Department where the mucosa was stripped off the intestine for providing the hormone. This 'purified' preparation was then used for intravenous injection and juice secreted from the pancreas collected for analysis. Howat supervised the early experiments on humans at the Manchester Royal Infirmary. Volunteers had two tubes passed orally, one into the duodenum to collect pancreatic juice, and the other into the stomach to prevent gastric juice and saliva entering the duodenum and stimulating the pancreas. No doubt Howat would have been aware of the work of Professor Schlapp and RKS Lim in Shafer's laboratory in Edinburgh in 1923, who were early workers in the UK to collect juice from the human stomach and duodenum.[33] After intravenous injection of secretin and pancreozymin, samples of duodenal contents were aspirated for analysis of bicarbonate and enzyme levels. The estimation of tryptic activity was by a modification of a method described by Dr Alan Gowenlock[34] during his attachment to the department, later becoming Honorary Consultant in Chemical Pathology, United Manchester Hospital,[35] and author of a review *Tests Of Exocrine Pancreatic Function*.[36] Unfortunately it was not unusual for this early preparation of injected PZM to produce marked venous reaction and complication,[37] as one of the volunteers, Dr JAC Wilson, later Consultant Gastroenterologist, Hope Hospital, Salford, recalled.

As discussed earlier, the first pancreatic hormone discovered, secretin, predominantly produced bicarbonate-rich fluid. In America, extensive work on the secretin test was reported by Diamond[38] and later by Dreiling[39] noting the limitation of differentiating pancreatic disorders. This improved, following Howat and his co-workers' demonstration that PZM stimulated enzyme secretion in man.[40] They were fortunate to be associated with the Manchester physiology department where the only source of pancreozymin was available. This provided a unique opportunity to initiate the study of pancreatic stimulation in humans and provide clinical analysis in pancreatic disease at a time when no other method existed.

Howat continued his work on pancreatic function studies, in view of its potential in differentiating acute from chronic pancreatitis, and chronic pancreatitis from cancer of the pancreas, the results of which culminated in the publication in 1960.[41] This work was also submitted by Howat for his MD at St Andrew's University in 1960[41a] for which he was awarded a gold medal and honours.

In this early work with pancreozymin, Howat noted that it produced not only pancreatic secretion but also contraction of the gall bladder.[42] By the time the detailed work on the gall bladder was complete, it had become apparent that pancreozymin and the compound causing gall bladder contraction, cholecystokinin, were one and

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the same chemical composition, in future to be called CCK.[43] (Harper objected strenuously to this decision, pointing out that not every animal species had a gall bladder, but all had a pancreas!)[44]

Gastrin

Although Howat no longer held a formal post in the University Physiology Department following his appointment as Physician to the Manchester Royal Infirmary, he nevertheless continued working in the department, performing experiments on cats in relation not only to pancreatic but also gastric secretion. Despite Harper having left Manchester for Newcastle in 1949, collaboration was maintained in this experimental physiological study with the help of Schofield who was a co-worker between 1948 and 1954, first with Howat and then Harper in Newcastle. Harper had been attempting to isolate gastrin and provided samples for Gregory, but the purer preparation of gastrin and its effects on gastric secretion were described by Gregory and Tracy in 1962.[45] Dr J Morley at ICI Pharmaceuticals in Macclesfield, produced synthetic gastrin and also modified its formula to produce analogues, one of which, pentagastrin, was later marketed to allow gastric stimulation in patients to assess their gastric acid output.[46] Also, research had shown that the terminal five peptides of the molecular chain were the same in gastrin, pancreozymin, CCK and caerulin, and the latter compound could be modified in the constituents of the terminal peptides in the ICI laboratory. Howat's team tested the action of caerulin on pancreatic and gastric function in cats, showing that modification of the peptide resulted in loss of action.[47] The physiological research in the 1960s concentrated on the effect of the gastrin analogues on pepsin secretions in cats, since Howat was able to gain unique access to supplies from Dr Morley. They showed that infusion of gastrin and analogues increased acid output, but had little effect on pepsin production until secretin or caerulin was added to the infusion. It was concluded that this was due to increased gastric blood flow produced by the secretin rather than a direct stimulant effect. They had previously compared the response of cats to infusion of different preparations of secretin, and concluded that Boots secretin increased pepsin output, but did not contain gastrin, pancreozymin, glucagon, insulin or cholic acid and the nature of the stimulant remained unidentified, but considered it produced a vasodilatation of the splanchnic blood vessels, similar to caerulin.

AN EMERGING ACADEMIC UNIT

Howat continued to supervise research in the clinical and basic science in the evolving unit. Although he had relinquished his appointment in the University Physiology Department in 1948, he continued research with the assistance of Dr FB Beswick, who anaesthetised and operated on the cats in preparation for the experiments. Beswick had qualified MB ChB Manchester in 1948 and was then House Surgeon at Ancoats Hospital. From 1951, he had worked in the Department of Physiology at Manchester University. In 1963, he became Executive Dean of the Medical School and Honorary Lecturer in Physiology until 1980, when he was appointed Bursar of the Manchester University.[47a]

Dr Al Morris was able to research in the Physiology Department the effects of gastrin analogues on gastric and pancreatic secretion in cats for his MSc Thesis in 1967.[48] He was subsequently appointed Consultant Physician and Gastroenterologist at the Walton Hospital, Liverpool[49] and more recently was awarded a professorship.

In clinical research, a major contributor on the effects of pancreatic hormones on pancreatic secretions from the 1960s, was Dr Kenneth Wormsley who had held an MRC Research Fellowship at Guy's Hospital, London, before joining Howat in 1960. His research skills were enhanced by his working with Morton Grossman in Los Angeles in 1963 on a post doctorate research fellowship.[49a]

Following this stimulating experience, Wormsley returned to Manchester as Research Fellow in 1965, to continue studies that enabled him to work out the dose of gastrin and analogue pentagastrin required to produce maximal gastric acid secretion in humans. He also studied the effect of gastric acid secretion, stimulated by gastrin and analogues, on pancreatic enzyme output, concluding that it had little effect in contrast to that noted in animals.[50] This suggested differing species responses to the hormone terminal peptides. He later demonstrated a greater pancreatic bicarbonate secretion on acidification of the jejunum than the duodenum.[51] His research showing that the pancreas was under both hormonal and neural control, continued in Dundee as Consultant Physician and Gastroenterologist.[52]

With Wormsley's departure from Manchester in 1968, research in human pancreatic physiology diminished, but work in cats in the University Physiology Department continued with the arrival in 1969 of a new Research Fellow, Dr Joan Braganza, who had qualified in Bombay and then moved to England.[53] Research gradually became more clinically orientated, especially in the study of chronic pancreatitis, which Dr Braganza continued on succeeding Howat in 1976.

EMERGING PANCREATOLOGY

Increasing interest in the pancreas was reflected in a symposium held at Marseille in 1963[54] at which Howat presented the findings in a personal series of 44 cases in which only two were due to alcohol abuse. In discussing epidemiology, he noted that Britain, Switzerland and Czechoslovakia had a low incidence of alcohol abuse in contrast to countries such as

France, Australia, South Africa and the US where it was more prevalent.

At a postgraduate gastroenterology course for consultants held in York in 1968,[54a] Howat presented his enlarged series of 54 cases in which 11 were associated with alcohol abuse, and this led him to comment that alcohol abuse was becoming more prevalent in the North West of England. In contrast, AV Pollock, consultant surgeon in Scarborough, discussed a personal series of 55 cases in which none was due to alcohol, reflecting local variations in incident. Howat was also invited to lecture on pancreatitis at the Royal College of Physicians of London's, second symposium on advanced medicine in 1966[55] and the Royal College of Surgeons of Edinburgh, in 1969.[56]

Howat's pre-eminence in pancreatic disease in Britain was reflected in his being the first author of a new series of books published quarterly on specialised subjects in gastroenterology by Baillière and Tyndall in 1972. He explained why he considered this had taken place in his Forward;[57]

> 'It is no accident that the first volume of this new series deals with the exocrine pancreas. Pancreatic disease is not common, but it strikes the individual with shattering consequences. For long inaccessible to clinical and laboratory probing, new more exact knowledge of the fundamental functions of the pancreas have stimulated much work both in animals and in man. The contributors to this issue are all members of the European Pancreatic Club formed in 1965 by workers from all disciplines to exchange ideas. Not least of their objectives has been to classify, standardise and correlate the techniques variously used by research works and clinicians in the study of pancreatic disease.'

The culmination of his study of the pancreas and the sign of his close co-operation with European clinician–scientists through the European Pancreatic Club was the textbook *The Exocrine Pancreas* he and Henri Sarles of Marseilles produced and edited in 1979. In the preface they wrote:[58]

> 'This book, largely but not exclusively Franco–British in conception and execution, is the product of a close relationship and interchange of ideas, which have developed over the past 20 years, fostered by frequent informal meetings, and more formally at the regular periodic meetings of the European Pancreatic Club.'

Simultaneous editions were published in French and English.

Advances in imaging the pancreas were made possible by the British invention of computed tomography by Hounsfield, for which he was awarded a Nobel Prize.

FIGURE 2 European Pancreatic Club, Göttingen 1969. Professor Howat, Professor Sarles, France, Professor Creutzfeld, Germany, Professor Edlung, Sweden and Professor Herfort, Czechoslovakia. Reproduced by courtesy of the University Librarian and Director, The John Rylands University Library, The University of Manchester.

Professor Ian Isherwood, Professor of Diagnostic Radiology and Consultant Radiologist at Manchester Royal Infirmary, had reviewed his initial experience and the basic principles of CT in 1976.[59] In the chapter on CT in Howat and Sarles textbook in 1979, he explained the appearance of a normal and then abnormal pancreas permitting reliable demonstration of pancreatic morphology, and having the advantage over ultrasound that it is not affected by the presence of intestinal gas. Ultrasound however, provided better imaging in thin patients, which had been noted by the Manchester team in 1978 in comparing the two techniques.[60] From now on, improved imaging of the pancreas would increase accuracy of diagnosis. With the advent of ERCP from 1970 onwards and its subsequent therapeutic potential, the pancreas was no longer that deep impenetrable organ lying at the back of the abdomen.

As I commented earlier, Howat was joined by Dr Joan Braganza who, besides her University appointment as senior lecturer in medicine in 1974, later reader, became consultant gastroenterologist at Manchester Royal Infirmary from 1978, until she took early retirement in 1998. She carried on the research in the department, in particular seeking the basic cause of pancreatitis. She considered that exposure to certain toxic chemicals in the working environment might be a cause.[61] The idea of anti-oxidants producing damage to cells and the therapeutic potential to correct this by dietary supplements of certain vitamins and especially methionine, which was involved in the metabolic pathway

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in the acinar cells of the pancreas, became a major area of research in the 1980s.[62] Lowered trace metal selenium levels were more pronounced in patients with painful chronic pancreatitis and further research showed that this was another vital ingredient in the phosphate–pentose shunt involving glucose-6-phosphate dehydrogenase enzyme action in acinar cell function.[63] Subsequent longterm follow-up by Dr Braganza of her patients at Manchester Royal Infirmary confirmed the benefit of supplementing patients with vitamins A and C, plus methionine and selenium in reducing attacks and the severity of pancreatitis. In 1995, she was awarded DSc Manchester for her research work in pancreatitis. She summarised her views of causes of chronicity in pancreatitis in 1996.[64] At a symposium she co-ordinated in 1990, she reviewed the continuing discussion:[65]

> 'The lack of progress in treating acute and chronic pancreatitis by traditional methods, when each disease has been on the clinical map for over a hundred years, questions the primacy of "auto digestion" and "ductal obstruction" in pathogenesis. In addition the overlapping clinico-pathological features of these conditions and cystic fibrosis, kwashiorkor and the metal storage diseases questions the dogma that the last three conditions should be disregarded in discussion of pancreatitis. Instead these areas of overlap have for long suggested that the basic mechanism of tissue damage may be the same.'

Overall, the symposium considered that the various exocrine pancreatic diseases indeed form part of a spectrum, with damage to the acinar cells as the common denominator and intraductal protein or mucus plugs as the main pathological variable with potential to modify in the future. This provided support for the earlier prediction by Howat that:[66]

> 'apart from pancreatic transplantation, surgery may play little part in the management of pancreatic disease in 20 years time. I suggest that will happen before the turn of the Century.'

PANCREATIC SOCIETIES EVOLUTION

The clinical information accumulating from biochemical tests and improved imaging techniques was accompanied by increasing research in basic science. Clinicians, pathologists and biochemists working in the pancreatic field, were wishing to find outlets for discussing their findings since mainstream gastroenterology societies at this stage were not receptive. At the suggestion of HD Janowitz of Mount Sinai Hospital, New York,[67] a *Symposium on the exocrine pancreas,* organised by the CIBA Foundation, had been held in London in 1961 under the expert chairmanship of Professor (later Dame) Sheila Sherlock, Harper and Howat being two of the twenty-eight international specialists attending. The meeting discussed the pathology, physiology and function of the pancreas, including more on electron microscopy to study secretory processes by George Palade of the Rockefeller Institute, New York, for which he won the Nobel Prize in 1974.[68] A meeting on clinical problems of the pancreas organised by Henri Sarles was held by European specialists in Marseilles in 1963, when 23 participants, of whom Howat was the sole British representative, had agreed a clinical classification of pancreatitis.[69]

Howat was pursuing his interest in the pancreas and was instrumental in bringing together fellow European workers in both the clinical and research fields for a symposium chaired by him, held in London in 1965 for the first European Pancreatic Club meeting which was sponsored by the CIBA Foundation.[70] Twenty-five scientists and clinicians attended the two-day symposium at which discussion centred round pancreatic enzymes. In 1965, Sarles had described their findings from studies on patients with pancreatitis and considered how to approach the subject in future. In 1966, Howat published this suggested classification of chronic pancreatitis to help clinicians define the condition more accurately and scientists clarify their research work[71] The next meeting was held in 1967 in Marseilles under the Chairmanship of Howat's friend H Sarles. The club continued to flourish and held annual meetings after 1967, the meeting being held in different eastern and western European cities. (See Figure 2) The twenty-first was held in Glasgow in 1989, presided over by the local surgeon CW Imrie, and the thirty-second, in Graz, Austria in 2005. At the 1968 meeting in Prague, Howat was elected JE Purkyut Medallist of the Czechoslovak Medical Society and Diploma and Medallist Hungarian Gastroenterological Society for his work in furthering co-operation between scientists in the European countries.[72]

Increasing interest in the pancreas in the UK was reflected in the founding of the Pancreatic Society of Great Britain and Ireland, with Howat playing a prominent role. The inaugural meeting was held at the Royal College of Surgeons of London, in June 1975 when Sir Rodney Smith was elected President. The Glasgow surgeon, Mr Imrie, gave the presentation. Howat was elected President in 1978 and the society has continued to flourish since. This society helped to foster interest and research in pancreatic disease in Britain just as the societies had in Europe and America.

Academic recognition by the University of Manchester came in 1972 when Howat became the first Professor of Gastroenterology at Manchester University. The first

professor in gastroenterology in the country was a personal chair awarded to TL Hardy, a founder member of the British Society of Gastroenterology, by Birmingham University in 1948. Even after retirement in 1976, Howat continued to give support to pancreatology, speaking at the twentieth Pancreatic Club Meeting in Budapest in 1988 and supporting the symposium on pancreatitis organised by Dr Joan Braganza in Manchester in 1990, for which he wrote the preface of the subsequent publication.

His organisational skills were not confined to his research activities or production of books, where, as editor, he brought the various authors together so effectively but, also in management inside the NHS at the Central Manchester Hospitals. Here he was a member of the Board of Governors from 1966–74 as well as Chairman of the Medical Executive Committee from 1968–73 for which he was awarded the CBE.

He published his thoughts on management in Manchester[73] and commented on the reorganisation of the National Health Service, pointing out that for this reorganisation to succeed, the District unit organisation had to work to make it possible. He considered further innovation and change would be needed to further the service effectively in the future. As he also wrote in 1972:[74]

> 'The pressures which govern the development and growth of a specialty in clinical medicine are largely determined by the sophistication of the scientific techniques available for the study of problem in this field. Gastroenterology has for long relied on standard radiological techniques, but the introduction of new methods from physics and chemistry, in radiology, in cytology, in endoscopy and in clinical measurement has in the past two decades tended to remove gastroenterology from the realms of the general physicians and surgeons into the province of the Specialist ...Equally important is the influence of modern developments on our concepts of the disease process and how they effect our clinical judgement.'

A fitting short tribute to Howat and his work came in the *Biographical Sketches of President of the BSG* published to celebrate the Golden Jubilee of the Society in 1987:[75]

> 'He became a distinguished Mancunian by adoption, being elected Manchester Man of the Year in 1973, yet never deserted his native Fife. He made important and original observations on gut hormones and demonstrated that a new H1 receptor-blocker drug actually potentiated acid secretion. Pentagastrin was studied first in his unit. His main interest for more than 30 years had been the pancreas... he was, for years, the only Pancreatologist in Britain, and one of the few in the world, and in 1965 presided at the first meeting of the European Pancreatic Club. He and Sarles edited *The Exocrine Pancreas* (1979) and formulated the *Marseilles classification of pancreatitis* in 1963. A dedicated, serious and laconic physician, administrator and clinical scientist, an achiever in all his endeavours, Harry Howat will be permanently remembered for awakening interest in the exocrine pancreas.'

Professor Howat died from cancer of the stomach in 1998 at the age of 87.

CONCLUSION

The progressive research in physiology during the latter half of the nineteenth and early twentieth centuries coincided with the advances in abdominal surgery bringing the pancreas out of obscurity. Technology in the form of X-rays and endoscopy pushed forward the frontiers of investigation, but physiology held the key to investigating functional control. Howat had been in the right place at the right time to respond to the physiology research in gastrointestinal hormones in Manchester and translate this to the clinical domain. He responded to the challenge of promoting the study of the pancreas, both in the UK and Europe, placing it on a firm foundation and developing pancreatology as a specialty. This was at a time when Sir Francis Avery Jones co-ordinated gastroenterology with the help of Howat's contempories Dame Sheila Sherlock in hepatology and Sir Christopher Booth in small bowel disease in London, Dr Sidney Truelove in inflammatory bowel disease in Oxford and Dr Wilfred Sircus in peptic ulcer disease in Edinburgh.

Although the use of pancreatic function tests in diagnosis receded as ultrasonography and CT scanning evolved and endoscopic techniques had moved from diagnostic to therapeutic potential, the continuing scientific research as well as heightened clinical interest have all been helped by the establishment of the specialty and its specialist Societies, of which Howat was a founding member.

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