Association of
Respiratory
Technicians
&
Physiologists

ISSUE NO 8 DECEMBER 1978

BREATH

OFFICERS AND REGIONAL ORGANISERS

Inside Front Cover

SEASON'S GREETINGS
and
BEST WISHES
for 1979
TO ALL OUR READERS

CONTENTS

OFFICERS AND REGIONAL ORGANISERS

At the Annual General Meeting on Saturday, 7th October 1978, the following members were elected to the Executive Committee:

Chairman: Sally E. Gough
Respiratory Physiology Department
Papworth Hospital
Papworth Everard
CAMBRIDGE CB3 8RE
Tel: 048-088 541 Ext. 304

Secretary: Margaret Marples
Clinical Science Building
Hope Hospital
Eccles Old Road
SALFORD M6 8HD
Tel: 061-789 5252

Treasurer: Ann Watson
Royal Postgraduate Medical School
Department of Medicine
Ducane Road
LONDON W12
Tel: 01-743 2030 Ext. 209

Members

Derek Cramer
Lung Function Unit
Brompton Hospital
Fulham Road
London SW3 6AP

Gloria Gessey
Derbyshire Royal Infirmary
(Ward 21)
London Road
Derby DE1 2QT

Margaret Rusbridge
Chest Unit
King's College Hospital
Medical School
Denmark Hill
London SE5 8RX

Michael J. Saunders
MRC Pneumoconiosis Unit
Llandough Hospital
Penarth
South Glamorgan

The following Regions have Regional Organisers:

Region	*Name*
North West Thames	Ann Watson Royal Postgraduate Medical School Department of Medicine Ducane Road London W12
North East Thames	Jane Jones Chandler Department of Respiratory Medicine London Chest Hospital Bonner Road, London, E2
South East Thames	Margaret Rusbridge Chest Unit King's College Hospital Medical School Denmark Hill, London, SE5 8RX
South West Thames	Derek Cramer Lung Function Unit Brompton Hospital Fulham Road London SW3 6AP
East Anglia	Sally E. Gough Respiratory Physiology Department Papworth Hospital Papworth Everard Cambridge CB3 8RE
West Midlands	Lynne Clarke Respiratory Function Unit Walsgrave General Hospital Clifford Bridge Road Coventry, Warwickshire 0203 613232
Trent	Gloria Gessey Derbyshire Royal Infirmary (Ward 21) London Road Derby DE1 2QT
South Western	F. J. Chadd Pulmonary Function Unit R.D. and E. Wonford Hospital Barrack Road Exeter, Devon
North Western	Margaret Marples Clinical Science Building Hope Hospital Salford, M6 8HD
Wessex	Hazel Gimblett ECG/Respiratory Assessment St Martin's Hospital Midford Road Combe Down Bath, Somerset
Northern Ireland	Brian Buick Respiratory Investigation Centre Belfast City Hospital 93 Lisburn Road Belfast
Scotland	Patricia Reid Pulmonary Function Laboratory Department of Clinical Measurement Ninewells Hospital Dundee
Wales 1	Kelvin Houston Thoracic Outpatients Department Llandough Hospital Penarth South Glamorgan
Wales 2	Michael J Saunders MRC Pneumoconiosis Unit Llandough Hospital Penarth South Glamorgan

Yorkshire, Northern and *Mersey* have members but no Regional Organiser. It is hoped that sometime in the next few months members in these regions will get together and elect a Regional Organiser. The Secretary will supply a list of names and addresses of members in these Regions.

It is helpful to the running of the Association if there is a designated person in each Region for the Secretary or Chairman to contact so that information concerning the Association reaches members as soon as possible.

EDITORIAL

ON DEPHLOGISTICATED AIR

Joseph Priestley is usually given the credit, in this country at least, for the discovery of oxygen in 1774. He focussed the rays of the sun on some red oxide of mercury confined over water in a glass container; the oxide decomposed to liberate free oxygen and Priestley observed that the gas caused a candle to burn much more brightly than usual and that it could support normal respiration in a mouse. Actually Carl Scheele, a Swedish chemist, had done the same experiment three years previously, but failed to get his results published – which must be one of the larger bloomers in the history of science. Priestley spoiled his own story a little by calling the new gas 'dephlogisticated air' in line with the chemical theories of the time. His great contemporary, Antoine Lavoisier named the gas 'oxygen' and was the first to reach an understanding of the chemical processes and of the similarity between respiration and combustion, giving at the same time the death-blow to the phlogiston theory.

Priestley was by the way, a non-conformist minister and held views sympathetic to the ideals of the French Revolution; as a result a hostile Birmingham crowd set fire to his house and destroyed his laboratory, fortunately just after he and his family had made good their escape. Lavoisier went to the guillotine during that self-same revolution–tricky being a pioneer in those days.

Priestley can perhaps be regarded as one of the founders of the modern oxygen industry though the British Oxygen Company has worked out ways of producing it on a rather larger scale. He also noticed that carbon dioxide dissolved in water had a rather jolly taste, so we must suppose he founded the soft drinks industry as well.

A large number of devices are now available for the administration of oxygen, ranging from simple oxygen masks to a lunar life-support system. In hospital, oxygen can usually be piped direct to the patient from a central bank; the installation and maintenance of such systems is far from cheap, but so far as the patient is concerned, he or she seldom need worry where the next breath of oxygen is coming from. Many patients continue to need oxygen at home however, and in this respect their troubles begin on the happy day they are discharged from the hospital. Their oxygen needs may well increase as they now have to move about under their own steam and may indeed have to fend for themselves. *Heather Hunt* in this issue gives us a vivid account of what it is like to suffer from oxygen starvation. In this state she has to travel by bus to her doctor, receive a prescription for her rations, travel on to the one pharmacist in the district who will supply the goods, and then wait perhaps until next day for delivery of the many kilograms of base metal which enclose a little of the precious element.

We look forward to the time when the NHS and the oxygen industry can make some more convenient arrangements for their clients, who are hardly in a position to strike or to boycott the product. We take it for granted that oxygen can be supplied to a man standing on the moon – why not to a flat in South London? Perhaps it could be delivered with the morning milk – at present we might as well write a prescription for some red oxide of mercury and a burning glass.

EDITOR'S NOTES

Health and Safety at Work Act 1974

Under this Act, every employer has a legal requirement for ensuring the health, safety and welfare at work of all employees. Likewise all employees have a specific responsibility for carrying out their duties in a safe manner. The Health and Safety Commission set up under the Act is the body which will review health and safety practices.

All Departments should by now have drawn up a Code of Practice and have submitted it to their local Health and Safety at Work Committee. The Editor would be glad to hear of any points members wish to raise on this subject.

BTA SURVEY ON ALPHA$_1$–ANTITRYPSIN DEFICIENCY

The Editor in one of his many disguises is conducting a survey of emphysema associated with alpha$_1$–antitrypsin deficiency on behalf of the British Thoracic Association and would like to express his thanks to all technical staff in respiratory function units for their helpful co-operation in this project.

FORTHCOMING EVENTS

BREATHING CLUB

1 Saturday, 14 January 1979. 9.30 am.
Research in Progress
Cardio-thoracic Institute, Brompton Hospital.

2 Wednesday, 14 February 1979
'The interpretation of multiple measurements'
(The afternoon session has been allocated to the statisticians)

3 Saturday, 7 April 1979
Lung mechanics (Research in progress)
Cardio-thoracic Institute, Brompton Hospital.

4 Friday, 11 May 1979
'Gas exchange in the lung'
Joint meeting with the Brompton Association

5 pm. The Brompton Lecture *by John West.*

LEN SMITH

by a Correspondent

Len Smith, who over the last three years has given much of his time to the Association, retired as Chairman at the Annual General Meeting. I would like to take this opportunity to thank him both on behalf of myself and members of the Association for all the hard work he put in, along with other members of the Steering Committee, into forming the ARTP.

I attended the initial meeting of Respiratory Technicians at King's College Hospital on 6th December 1975 and the fact that most of us were present on that day was due to the industrious endeavours of Len who had contacted technicians all over the British Isles. Many of the technicians present on that day were only aware of their immediate colleagues and the unobtainable in the London teaching hospitals, but here at last, thanks to Len, they were gathered under one roof. After spending ten years in Respiratory Physiology here were technicians who felt the same as I did, the need for an Association; but only one of them, Len, instead of just thinking about an Association had the impetus to do something about it, and a Steering Committee was formed with Len as one of its most active members. After many months of hard work a Constitution was devised and at the inaugural meeting on 12th June 1976 at the Brompton Hospital this was accepted by interested Respiratory Technicians and the Association of Respiratory Technicians and Physiologists was formed.

During the intervening months between the initial meeting of technicians and the forming of the Association, Len had also attended as an observer, the early FAMT Meetings and as soon as the ARTP was formed and the Constitution accepted by its members, the Association was accepted as a founder member of FAMT. Len and Jim Reed then attended FAMT meetings as official representatives of the ARTP and are now co-editors of the FAMT News Bulletin.

The Association has grown in stature and numbers over the last three years and is, on occasions, asked by various bodies for its opinion on training, education and matters dealing with Respiratory Physiology. Much of this has been due to the hard work of members of the Executive Committee but it is mostly due to Len who encouraged the Committee, cajoled members and generally kept the interest going in the initial months of the running of the Association.

I for one have enjoyed being a member of the Association. I have made new friends, know where to seek advice when in difficulty with equipment and techniques, and have attended interesting and lively meetings.

So thanks, Len, from myself and all members for giving us an Association.

To: Sally Gough and Len Smith

Dear Sally and Len,

Due to the rather abrupt end to the Annual General Meeting, the members of the Association were unable to express their grateful thanks for the time and hard work you have both given to the Association.

Therefore, on behalf of the members I would like to thank, first of all Len who as our first Chairman has done a marvellous job in helping to get the Association "off the ground", and has set a high standard for future Chairmen.

Secondly thanks to Sally, who as Secretary, has had to keep the Association organised, a task extremely difficult with our members spread nationwide, and I am sure we all agree that she will take over the role of Chairwoman with equal ability.

With best wishes,

MARGARET MARPLES
Secretary
Department of Anaesthetics
Hope Hospital
Eccles Old Road
Salford M6 8HD

AN ASTHMATIC SAGA

A Patient's View

by Heather Hunt

My dictionary defines asthma as a disorder characterised by paroxysms of difficult breathing; but to a chronic asthmatic such as myself and countless others, it involves so much more than occasional difficulty in breathing and can have a profound and crippling effect upon ones whole life. It can, in fact, impose such severe limitations upon ordinary everyday activities as to make life, on occasions, barely tolerable.

I think that most asthmatics would agree that asthma is a revolting and anti-social complaint; wheezing, gasping, coughing, spluttering and bringing up phlegm cannot endear one to other people and can be embarrassing, particularly in public, both to the asthmatic and to the onlookers. I have noticed in works of fiction that the writer often depicts unsavoury or slightly ludicrous characters as being asthmatical – never heroes or heroines!

A full-time invalid

My asthma began in early adolescence but upon reaching middle-age it has worsened to such an extent that I have now become virtually a full-time invalid. I am frequently admitted into hospital with acute attacks and, during the past three years, have, in fact, spent more time in hospital than at home! When at home, I find I am able to do less and less and even walking very short distances is now becoming a problem. Because of my asthma I have had to give up an interesting, responsible and lucrative career and am now registered as permanently disabled, on a small pension and virtually housebound. I find this demoralizing and sometimes cannot help feeling that I have landed on the rubbish heap and am no further use to society. I have tried to think of ways in which I could work from home but, as I am only there for very short periods (between stays in hospital), this would not be practicable. Being an independent person, loath to ask help from anyone, I find now, particularly as I live alone, that the simple tasks of sweeping, dusting and bed-making have become increasingly difficult as I get so short of breath upon the slightest exertion: *how much longer can I manage without help?* Shopping is now out of the question as, apart from the difficulty of walking and carrying a full shopping basket, the shops are, nearly always, overheated and make me wheezy and very breathless after only a few minutes inside, so that I have to leave. Cooking over a hot stove can bring on an attack, as can eating and drinking, particularly tea; all these factors combine to make life less tolerable.

The doctors baffled again

Unfortunately the doctors have been unable to find out what causes my asthma. If I knew of specific things to avoid, I would feel there was something to work on and could, perhaps, help to lessen the frequency of attacks. As it is, anything and everything seems to set me off wheezing and gasping for breath! Any exertion; variations in weather or temperature; talking; laughter; hiccups and even sneezing; eating and drinking; central heating and electric fires; a room temperature anywhere more than about 15°C; heavily scented flowers; hairdressers' salons; aerosol sprays; detergents; dust; paint; winds and, of course, tobacco or cigarette smoke – all give me asthma: the list is endless! Emotion is, I know, supposed to play an important part but I have never been able to link my attacks with this particular cause. Events in my life and my state of mind, whatever it is, don't appear to affect my asthma in any noticeable way–it just continues, regardless! Tiredness, I know only too well can be an aggravating factor but asthma is such an exhausting condition anyway, and many asthmatics have disturbed nights with little sleep. Extreme tiredness is always with us and is unavoidable: so this is a vicious circle.

I have now reached the stage where I am never free, day or night, from wheeziness, breathlessness and tightness in my chest, in varying degrees of severity. I think that if I were to take to my bed permanently–which heaven forbid–or spend all my days in a chair, in a sealed air-conditioned room, doing absolutely nothing, this wouldn't make the slightest difference. Who could live like that or would want to anyway? Not me!

Isolation

As you might imagine, to be permanently in such a condition imposes severe limitations upon normal activities; I am no longer able to travel any distance or to visit any place where smoking is permitted or where the atmosphere is stuffy. This precludes cinemas, theatres, shops and restaurants – anywhere, in fact where people gather. Even to visit relatives and friends or to have them visit me usually ends in an attack; off-putting, to say the least, embarrassing and worrying for all concerned. Over the years, social get-togethers have gradually declined until now they are practically out for me. This does make for a very solitary existence and the telephone is now my only link with friends – even then too long a conversation brings on coughing and breathlessness.

I cannot have holidays, for several reasons. I would not know when or where to go. Different areas affect asthmatics; I have been warned against going anywhere further west than Sussex because the air would be too relaxing; Kent and the East Coast would, apparently be equally disastrous as too bracing and windy and the North and Scotland are too cold! This doesn't leave much choice in this country and I would not risk travelling abroad in case I needed emergency hospital admission in a strange country with all the expense involved. Another reason for staying at home is the daily need for oxygen. Imagine me transporting a supply of heavy cylinders and arranging with local doctors and chemists for replacements, even if hotels were willing to co-operate! This frequent need for oxygen is another reason for not travelling any distance to visit

friends or relatives.

The struggle for air

People ask me sometimes, to explain what an asthma attack is like and if it is very frightening. I would think that for children it must, indeed, be quite terrifying. Although I have had many, many, attacks and know what to expect and that it will ease eventually, I still feel anxious, wondering how to get my breath. There is an overwhelming sensation of suffocation and of all ones airways closing in; the chest tightens and feels as if a 20 stone man were sitting on it! Every breath is laboured and tremendous effort is required but no strength is left in the body to supply this effort. It is only possible to take in very short shallow breaths and breathing out is extremely difficult and prolonged. Before a breath is fully exhaled I have to take in another gulp of air and this leads to a build-up in the chest so that it feels as if it were about to burst. If one had time to think, this alone would be frightening, but total concentration has to be given to just breathing– *there is no time to be frightened!*

Spasms of choking, unproductive coughing that tear one apart and yet bring no relief don't help matters and are terribly exhausting. The ribs ache with the effort of coughing, also the muscles in the throat and abdomen. There is a splitting headache all the time as if it were being hit with a sledge hammer. I can feel my blood pounding in my veins and my pulses racing. In bad attacks I have no breath left for talking and can only whisper in monosyllables. It is impossible to eat or drink without vomiting as there seems to be no room in the body for both air and food. It is also very difficult to swallow whilst one is gasping for breath. My arms and legs don't seem to belong to me and every movement is a slow concentrated effort. Automatic things such as yawning, blowing the nose and even passing urine become impossible – anything requiring the slightest physical effort is beyond me.

The primary concern of an asthmatic during an attack is to get air at all costs, even if this means sitting outside or by a wide open window in the depths of winter. All the great effort involved makes one feel terribly hot which adds to the general distress. The weight of clothes, however light, becomes unbearable. Various positions help different individuals; some are helped by hunching forward over a table but, in my case, I have to lean backwards and grip something, such as the bedrail, with both hands high above my head. Having too many people round me during an attack adds to the discomfort–plenty of space, quiet and air without having to talk, this is what is needed above all else. Sleep is an impossibility during an attack except in very short snatches and as an attack can last for hours or even days, I am soon exhausted to a point where I cannot think clearly or co-ordinate brain and body. I just feel completely drained of everything and battered.

Oh the bliss, once the attack is over and I can breathe, eat, drink and sleep once more–sheer heaven! My trouble is that these periods of relative normality don't last very long and I know I will shortly have to cope with yet another bout.

The prime dilemma – when to give in

As I am never completely free of asthma this makes it difficult for me to judge when it is bad enough to warrant admission to hospital. It is part of an asthmatic's daily life not to be able to breathe well, and to cough and wheeze, and one comes to expect it. If I were to call my doctor or the hospital every time my asthma got bad I would be doing it practically all the time! One can only soldier on from day to day hoping that tomorrow or the next day will see a slight improvement–sometimes it does, sometimes it doesn't –you just cannot know. The fluctuation in the condition of an asthmatic from day to day, or even from hour to hour, adds to the problem.

If doctors could give one a guide line by which one can judge when it is essential to come into hospital this would be a great help, and relieve a lot of anxiety and indecision. Most other asthmatics I know feel the same way as I do and are constantly being told that they leave it too late before coming into hospital. They also feel the need to keep going at home for as long as they possibly can. We all experience this slightly guilty feeling of having to give in and of letting the doctors down once again, after all their treatment on the previous occasion!

For me the worst time is the two or three weeks immediately prior to admission to hospital. I feel very unwell but still wonder whether I am justified in seeking intensive medical care or if I would be giving in and making a fuss. Often the day before I am due to attend the out-patient clinic I am so bad that I doubt whether I can even make it to the hospital. Yet, the next day when I see the doctor, the asthma has temporarily eased so that I feel a fraud for wasting his time! By the time I reach home again or by next day the asthma can be as bad as ever. It is all very difficult and trying!

Chemists' delight

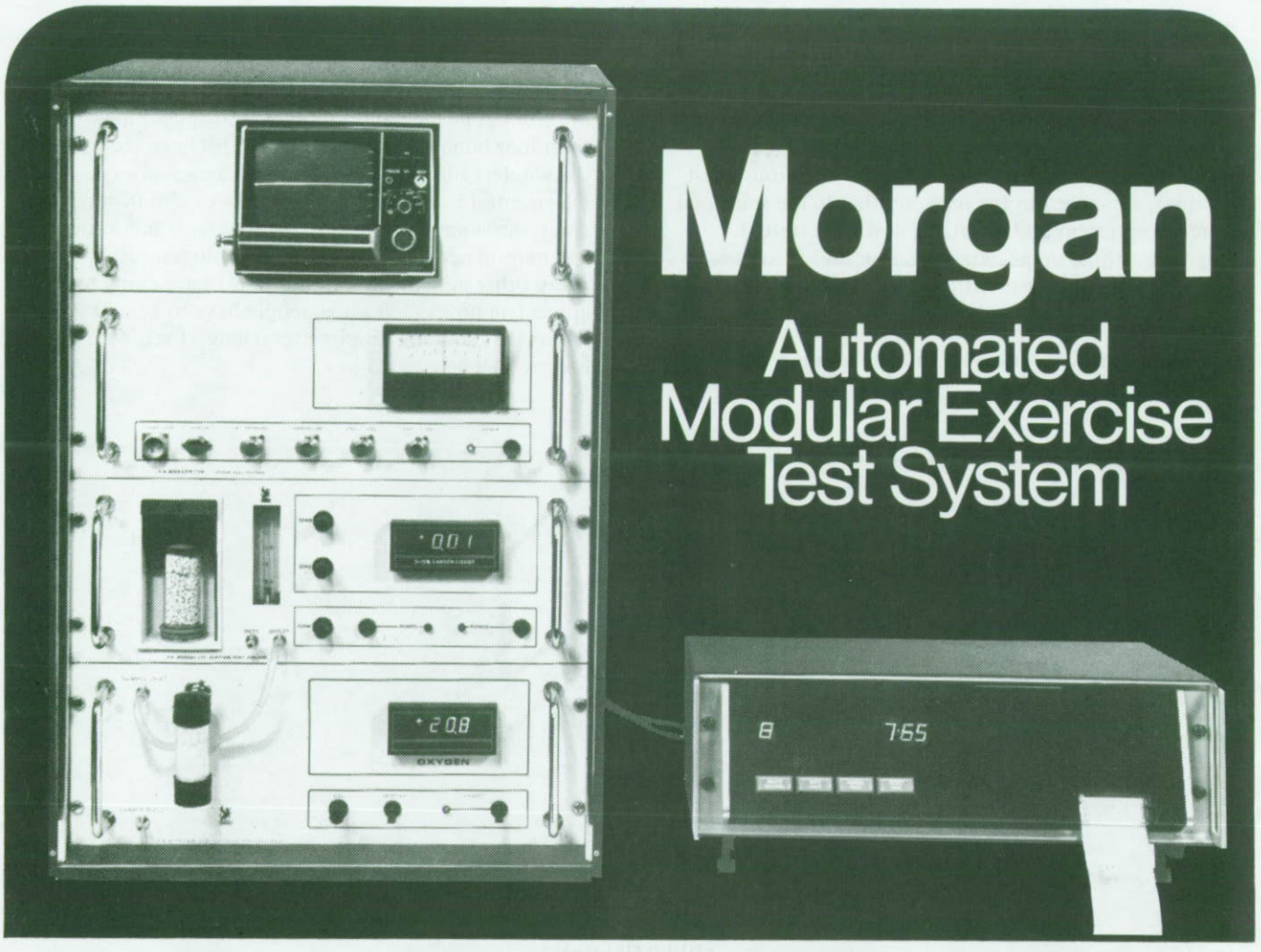
My present life revolves around home and hospital; postal deliveries, gas men, window cleaners, opticians and dentists have to coincide with my infrequent and short periods at home, preferably immediately following my discharge from hospital and before the asthma worsens again. It is one long race against time.

Whilst at home I do, of course, have medical treatment. I use a mini-nebuliser five times a day, various inhalers and drugs including large doses of steroids – and oxygen. All these help initially but, as my condition slowly worsens with each passing day, they become ineffective.
Maintaining a sufficient supply of oxygen at home is one long headache involving frequent journeys to my doctor for prescriptions (expensive this, too!) as I am allowed only four cylinders at a time. There is the problem of finding a chemist to supply them – and the anxious wait at home until they can be delivered. Sometimes the cylinders are only partially filled and, as I can use a full one in two days, this presents additional problems particularly over weekends or public holidays. I now have the loan of a compressor for use with the mini-nebuliser which has helped to relieve the oxygen problem but I still have to ration myself carefully.

The prolonged use of large doses of steroids has serious side effects. My weight has escalated at an alarming rate and I suffer very bad and persistent cramp in legs and feet, swollen ankles and deteriorating vision. My increased susceptibility to infection has resulted in numerous chest infections, an abscess in the lung, another in the spine and a dose of septicaemia! On cutting down the steroid dosage my asthma immediately worsens and I have to increase it again and bear with the resultant problems. One can only hope for the best.

All in all, asthma is a miserable and frustrating condition.

I am sure that other asthmatics must share with me moments of utter despair and despondency. However, life still has its pleasanter moments for me. I have plenty of indoor hobbies, I play the piano, listen to records and the wireless and read a great deal. There is always television. I have a nice home with a garden in which to enjoy the summers, two cats for company and a friendly and helpful neighbour. It is only through meeting so many other patients in hospital that I have come to appreciate how much some people have to bear and how fortunate I still am, despite everything. Even with asthma, life can still be good!



For the measurement and computation of stress testing data, the system is used in the investigation of athletic ability, cardio pulmonary performance etc. The data recorder processes the information rendering in correct STPD and BTPS terms. Using the corrected information it calculates the oxygen uptake, respiratory quotient and tidal volume etc.

This photograph shows an exercise testing system used in conjunction with a Morgan Motorised Treadmill

P.K. Morgan Ltd
10, Manor Road, Chatham,
Kent, ME4 6AL England
Tel: Medway 44384/47949
Telex: Diftest. Chatham.
Kent.

MORGAN

RESPIRATORY PHYSIOLOGY TODAY

by Mike Saunders

PNEUMOCONIOSIS RESEARCH UNIT
LLANDOUGH HOSPITAL
PENARTH
GLAMORGAN

Based on a paper given at the first annual general meeting of the Federated Associations of Medical Technology

Technicians and Scientists in Respiratory Physiology today need to cover a very wide field and it is impossible in a few words to mention more than a few of its aspects. Experimental respiratory physiology is in fact an ancient craft; Erasistratus studying in Alexandria in about 280 BC and Galen in Rome (131–201 AD) demonstrated the role of the diaphragm as a muscle of respiration and the functions of the phrenic nerve and of the intercostal and accessory muscles. Galen also recognised the need for fresh air and believed that it reacted with the blood in the left heart and arteries to produce the 'Vital Spirit'. The Vital Spirit is in another sense, still with us almost 2000 years later but it comes now from that dedicated band of technicians, research workers and clinicians who carry out the physiological studies of the present day.

A list of the great names in this field would be a very long one. We have come some way since Galen's day but few of us when measuring lung volume by gas dilution, remember that this procedure was first carried out by Sir Humphrey Davy in the year 1800.

Standing beside every physiologist is a technician since today more than ever, ours is a team effort. The possibility of such team work reflects the high standard of technicians and physiologists. Respiratory technicians must also have some of the abilities of a good salesman. With every test that is done on patients or healthy subjects, technicians have to sell themselves and their tests to that individual who must be led to understand why the test is necessary and must have absolute trust and confidence in the person carrying it out. Ours is one of the few fields where patients have to be persuaded to push themselves to the maximum in tests like the FEV_1 or an exhausting exercise procedure. Every test requires a patient's full co-operation and to obtain this and thus to produce satisfactory results is the technician's primary task.

Why do we need to carry out these tests?

The main reasons can be grouped together under five headings:

1 *Medical Diagnosis*
   - a To aid clinical diagnosis
   - b Assessment of the effect of the disease on pulmonary function; following the course of the disease.
   - c To evaluate clinical features such as dyspnoea, wheeze, cough, pain, cyanosis, clubbing, polycythemia and X-ray or ECG abnormalities.
   - d Physical fitness selection or evaluation.

2 *Surgical Diagnosis*
   - a Pre-operative assessment for anaesthesia and surgery.
   - b Post-operative evaluation of thoracic surgical procedures.

3 *Disability Evaluation*
   - a Rehabilitation
   - b Insurance
   - c Legal

4 *Public Health*
   Epidemiology

5 *Research*

What tests do we do?

Sometime ago many of the respiratory laboratories in this country were sent a questionnaire to find out what measurements were being made. Most laboratories it seems, have a core of tests which they use in their routine work though laboratories carrying out research had other equipment appropriate to the projects in hand.

Questionnaire Results

Total returned: 44

MOST POPULAR TESTS	NO OF LABORATORIES
FEV_1	44
Lung Vols (gas dilution)	40
Transfer factor	40
Peak expiratory flow rate	39
Alveolar-arterial CO_2 and O_2 gradients	20
Thoracic gas volume and airways resistance	20
Flow-volume curves	17

OTHER TESTS

Exercise
Gas distribution: mass spectrometer or radio-active tracer
Cardiac output
Pulmonary artery pressure
Bronchoscopy
Ventilation-perfusion inequality
Static compliance
Portable oxygen assessment

No enquiries about the details of exercise testing were made in this survey but a number of laboratories measure oxygen uptake, minute ventilation and cardiac frequency under exercise conditions. Steady state or progressive exercise tests are carried out with cycle-ergometer or treadmill and may be carried to submaximal or maximal levels. Many of these tests have been developed in this country and I am fortunate in coming from a unit where much time has been

spent on developing and improving tests and standardising methods; results are thus comparable not only in each laboratory but between laboratories in this country and abroad.

Computers and data-processing

In recent years we have seen a dramatic increase in the number of out-patients being referred to thoracic departments. This has put an increased load onto the staff and it is often necessary to produce the results of any tests before the patient has left the department. Simple tests like FEV_1 enable an immediate answer to be given while transfer factor or exercise tests require a more extensive mathematical treatment. To do this desk top calculators or mini-computers have been installed in many laboratories and this has provided yet another field in which the respiratory technician has become involved. The programming and running of these computers is a very interesting side of our work.

Having obtained a computer it is a natural extension to put the computer on-line to the equipment being used so that the measurements being made are under the control of the computer, yielding instant results and enabling repeat measurements to be made if necessary. This in no way suggests that the technician is being demoted to a mere 'patient minder'; his job now becomes more skilled in that he now has to control a far more complex piece of equipment as well as look after the patient.

He now has to set up, check, calibrate, use, service and when necessary repair his own equipment. Commercial manufacturers are naturally only too pleased to service equipment which they have supplied, but the technician who is able to carry out some of the routine servicing can save his department much time and money as well as giving himself a far greater interest in the job.

Some of the tests carried out require very close co-operation between the physician and the technical staff. Measurements of cardiac output where dye is injected into an arm vein and its appearance sampled in a systemic artery, or of pulmonary artery pressure through a float catheter, are potentially hazardous procedures and require a well trained and efficient team to carry them out successfully.

Survey Work

In this type of work we have to check, pack, despatch, unpack, set up, recheck and use the equipment many miles away from the home base and at the end of the survey to repeat the whole procedure in reverse. Conditions on survey may be far from ideal and one of my most uncomfortable surveys entailed spending six hours a day for five days a week in a gas mask and protective clothing inside a gas chamber at Porton Down making measurements of respiratory function. Also on survey the chance of obtaining spares should a breakdown occur may be remote but the inability to effect the necessary repairs may mean that important measurements cannot be made, with the possible waste of many thousands of pounds. In a six months survey on a tiny volcanic island off the mainland of New Guinea, most of my subjects had never seen a bicycle so that persuading them to carry out exercise tests was a difficult problem. *Figures 1 and 2.* We have also made measurements in Jamaica, India, Trinidad not to mention more exotic places like Plymouth, Rosyth, Leeds and North Wales.

What of the future?

The appearance of the micro-processor which is in essence a tiny computer is going to play a significant part in our work in the next few years. These will appear in almost every piece of equipment that we use and will enable the characteristics of each machine to be continuously checked as well as giving instant answers to many of the tests. This will, one hopes take some of the pressure off the technicians and may even give us a little time to read some of the masses of papers published each year on our subject.

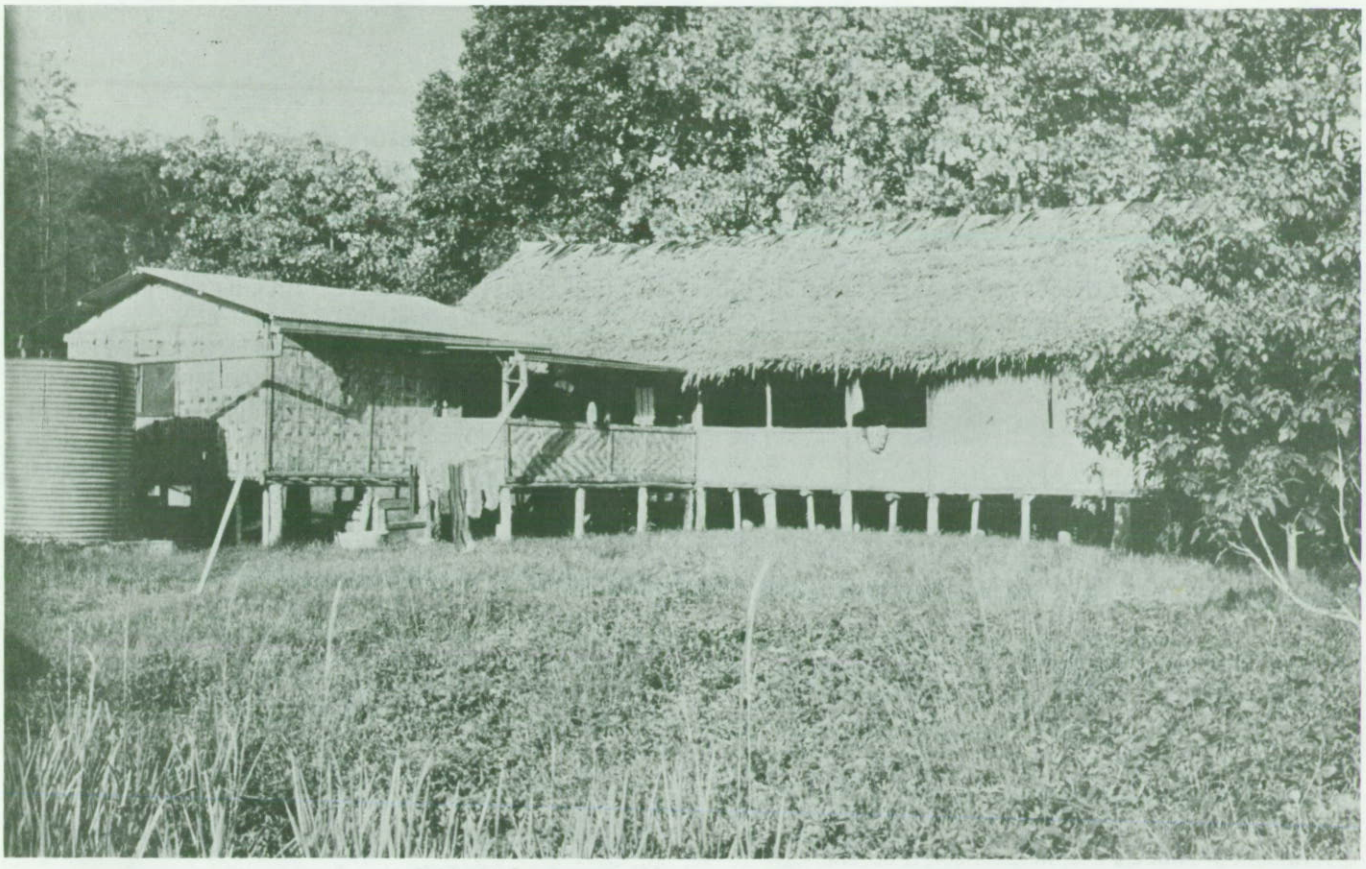


FIG 1. MIKE'S COUNTRY MANSION, KARKAR ISLAND, NEW GUINEA

FIG 2. TRANSFER FACTOR LABORATORY, KARKAR ISLAND
(Blurring due to earthquake tremor, no doubt)

CORRESPONDENCE TO THE EDITOR

STATE REGISTRATION

At the Annual General Meeting the question of State Registration of Respiratory Technicians was brought up. This is being discussed by the FAMT and fairly soon the ARTP will be asked for the views of its members. I myself know very little about State Registration but intend to acquaint myself with such facts as are available.

I would like to hear the views of Association members on State Registration of Technicians and any information will be gratefully received.

Members will be kept informed on this issue.

SALLY GOUGH
(CHAIRMAN, ARTP)

Respiratory Physiology Department
Papworth Hospital
Papworth Everard
Cambridge CB3 8RE

Further to the discussion on State Registration at the AGM on Saturday, 7 October 1978, I think it is important to bear in mind the reason for this, as it was first introduced.

State Registration was introduced as means of controlling the quality of nurses employed in many different types of hospital and nursing home, long before even local government provided a hospital service. It became respected because of the high standards maintained, not only in the professional devotion of those on the register but in the academic requirements of the qualifying examinations. The State Registration examinations are still the standard qualification for nurses, and State Enrolment exams are accepted at a lower grade.

In professions in which other nationally recognised qualifications are accepted as requirements for employment and grading, there is no need for State Registration examinations and thus no need for a State Register. The employing authority is the same throughout the country and experience gained in one part of the country can be checked on easily when an employee transfers to another part. Once employed, the safeguards for both the employee and the patient are underwritten by the NHS just the same whether there is State Registration or not.

Therefore I urge your readers to resist State Registration as unnecessary legislation and belittling to professional qualifications.

P LOCKWOOD MSc MIBiol
Physiologist
Respiratory Physiology Department
Harefield Hospital
Harefield
Uxbridge
Middlesex UB9 6JH

EDITOR'S NOTE

Mixtures for Lung Diffusion Tests

No adverse comments have been received from ARTP members about the suggestion from Mr Emslie, the BOC Product Manager, published in the last issue. There seems no reason why BOC should not produce a standard mixture of 0.28% CO; 14% Helium; balance air. This mixture would be suitable for Single Breath tests only.

Please address correspondence to The Editor:
DR D C S HUTCHISON
Chest Unit
King's College Hospital
London SE5 8RX

IN BRIEF

Education and Training

Jim Reed reports that the Working Party set up by the DHSS has completed its deliberations on Physiological Measurement Technicians (see 'Breath' July 1978). Jim is now off the Working Party to which he had been co-opted; in-service modules have been forwarded to Regional Scientific Officers and Colleges of Further Education and their comments are eagerly awaited.

Federated Associations of Medical Technology
(ARTP representatives: Jim Reed and Len Smith)

The first General Meeting of the Federation was held on 24 June 1978 in the tower block at Guy's Hospital.

Papers were read by representatives of the ARTP and EPTA about the work of their Associations. Mike Saunders spoke on behalf of the ARTP and an account of his talk appears elsewhere in this issue.

Mr Gregory, the Deputy Chief Scientist spoke on progress in developing the TEC system for Medical Physics and Physiological Measurement Technicians.

During the business meeting, the FAMT Secretary drew attention to the lack of communication between member associations and it was suggested that joint scientific meetings could be organised which all members of the FAMT could attend.

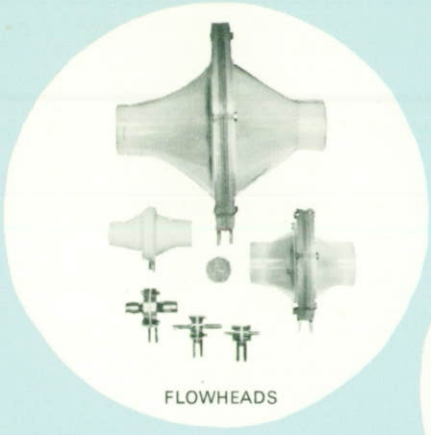
Points from FAMT Executive Meetings

Insurance: The question of insurance for FAMT members is under discussion; this is important in relation to the new Health and Safety regulations.

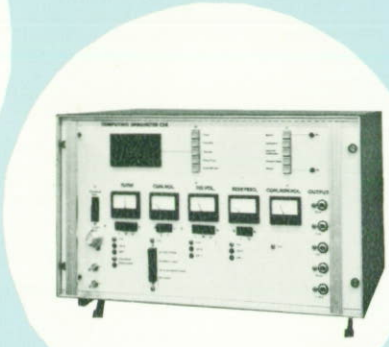
One teaching hospital is reported to have stated that it will take no responsibility for negligence by technical staff.

In-service training: The FAMT have asked for a number of centres to be designated for in-service training; travel expenses and subsistence should be provided.

Short Form Catalogue



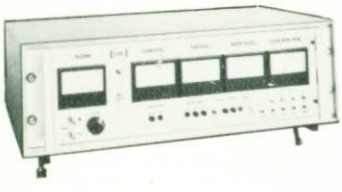
FLOWHEADS



CS7

M10

M8

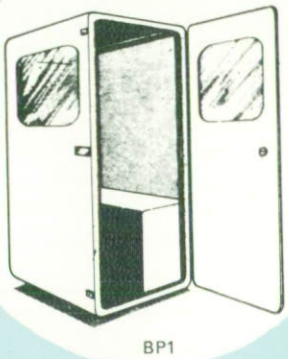


CS6

LA1

NR1

CS5



BP1

mercury
electronics (scotland) ltd.

Electronic Pressure Transducers

The Mercury Transducers which are described below are robust, sensitive, self-contained units each of which can be fitted with any one of six interchangeable capsules, to enable them to measure gas pressures from 1 to 3000 mm H_2O (see below). They use the patented defocussing type of transducer and come complete with power supplies, amplifiers and output displays. The unique features of each instrument are listed below:—

M8 General Purpose Manometer :

This instrument is mains or battery powered, has three ranges of meter sensitivity and is easily portable. It gives the option of switching in electronic damping to remove pressure transients if required and has a manual set zero control.

M10 Auto Zero Manometer :

Four important features have been added to the well-proven virtues of M8 to make M10 an outstanding instrument. An exclusive (and patented) auto-zero circuit ensures that even if the M10 is left unattended for hours or weeks zero drift will never exceed 1%—a quick acting cut-out protects the unit against accidental pressure input overload—a calibration factor system allows the rapid interchange of capsules—remote indication of the range in use is provided when coupled to a pen recorder or external meter.

Capsules : The pressure sensing part of each manometer is its capsule. These are interchangeable and six different ratings are available to cover ranges of ± 10, 30, 100, 300, 1000 and 3000 mm H_2O gas pressure. Additional capsules are available at any time on quoting the instrument serial number and although damage is rare because of generous overload characteristics they can be replaced for a modest sum without the necessity of returning the instrument to the factory.

Additional Facilities : A number of additional facilities can be added to M10 (or in some cases M8) to extend its operation. These include a SQUARE ROOT EXTRACTOR for use with a Pitot tube, a LEVEL SWITCHING CIRCUIT for control purposes and a MULTI-CHANNEL SEQUENTIAL SWITCHING UNIT to allow one instrument to scan a number of pressure points.

Electronic Spirometers

The following units vary very widely in application but all have one thing in common—they require no setting up. In each case it is enough to switch on and let the 'AUTO-ZERO' do the rest. Such controls as exist are there to allow the user to select a sensitivity suitable to his purpose. While the most common application of these units is in the study of respiration of humans and animals they are also suitable for monitoring inanimate objects such as pumps or internal combustion engines. Any of the range of six pneumotachographs which are described below can be used with our spirometers to enable flows from 100 ml/min to 3000 l/min to be measured.

CS5 Compact Electrospirometer :

As more and more people realise the advantages of electrospirometers a need has arisen for a unit which is simple to use and is keenly priced. The wide popularity that this recently introduced unit has already won suggests that it meets this need and by offering it with plug-in accessories such as the CT2 control unit (see below) price has been kept to a minimum. The instrument measures flow in conjunction with one of our six pneumotachographs and this is then integrated to give either the volume of each inspiration (expiration) or alternatively the cumulative volume over a period.

CT2 Control Unit : This unit plugs into the back of CS5 and allows the cumulative integrator to:

1. Integrate for 60 seconds and then hold its reading.
2. Integrate for 60 seconds, reset, and then start integrating again.
3. Integrate until a preset volume is reached, reset, and then start integrating again.

CS6
Comprehensive Electrospirometer :

This spirometer can provide simultaneous read-outs of flow, tidal and cumulative volumes together with respiratory frequency. It also computes minute volume breath by breath. An electronic calibrator is incorporated and there are sample and hold circuits which, at the end of each breath, store the tidal and frequency outputs to facilitate direct reading from the inbuilt meters.

CS7 Digital Spirometer :

CS7 measures the same parameters as CS6 but has in addition range switching on tidal, cumulative and respiratory frequency circuits. These range switches when used in conjunction with the inbuilt signal high/low indicators allow the unit to measure with high accuracy unusual respiratory patterns. The cumulative integrator has three modes of operation and the digital panel meter can be called to look at any of the five parameters measured. It automatically displays in real units the signals called on to it thus releasing the user from the need for chain calculations associated with multiple range switching.

Pneumotachographs (Flowheads) :

The Mercury range of flowheads have been designed to cover all the respiratory flow measurement requirements from mice to horses. Six units cover the range 1–3000 l/min. Each of these when used within its rated flow level has linearity better than 5% (typically 2½%). They are robustly constructed, easily cleaned and have low thermal inertia.

Specialised Clinical and Research Respiratory Units

Lung Function Analysers :

Over the past few years the need to make mass respiratory function tests to detect defects such as bronchitis and pneumoconiosis has become apparent. For this purpose much useful information can be obtained by measuring a single forced exhalation and the "LA" range of units are designed to extract this information. Up to four parameters can be read directly (PEF, VC, FEV and FEV%) at the conclusion of a rapid simple test. An expiration timer can be fitted and an XY recorder connected to allow flow/volume loop recording.

Nasal Resistance Meter :

This unit measures two parameters continuously—nasal flow and pharyngeal pressure. The clinician can decide to do a simple automatic measurement of nasal resistance by dialing in a flow level, asking the subject to breathe into the mask and then from the instrument he can read off the pressure which produced that flow. By dividing that pressure by the preset flow an index of resistance is obtained. This provides objective assessment of clinical improvement following surgical or other therapy: it is also valuable in allergic investigation. The alternative mode of operation is to plot on a suitable XY recorder flow against pressure and derive resistance from this.

Whole Body Plethysmograph :

The Mercury 'Body Box' is primarily designed to make three standard tests—the measurement of thoracic gas volume, airway resistance and lung compliance. Particular attention has been paid to the design and layout of the cabinet to ensure that it is acceptable to those asked to sit in it while measurements are being made. As one of the few plethysmograph manufacturers who are also transducer manufacturers, we are well placed to optimise our design so that we can offer, at a very competitive price, equipment which is purpose built for reliability and ease of operation.

Manufactured under one or more of the following patents UK: 971521, 1182137, 1202911, 1202912. USA.: 3509767, 3593576.

MERCURY ELECTRONICS (SCOTLAND) LTD., POLLOK CASTLE ESTATE, NEWTON MEARNS, GLASGOW G77 6NU. Tel.: 041 639 4944

ANNUAL GENERAL MEETING OF THE ASSOCIATION

The Annual General Meeting of the Association took place on Saturday, 7 October 1978 at the Charing Cross Hospital, Fulham, London W6.

We are indebted to Keith Minty for organising the meeting and laying on a varied programme. We owe grateful thanks to the speakers for their interesting papers and particularly to Professor Guz who also took the chair for the scientific session.

We are most grateful to Instrumentation Laboratories Limited who put on a demonstration of their equipment and contributed to the costs of the meeting. The management of Charing Cross Hospital provided tea and coffee.

Four scientific papers were given during the morning session:

1 Control of Breathing
Professor A Guz

Professor Guz gave us an interesting account of the very complicated neural and chemical mechanisms for the maintenance of gas tensions in the body. The technician must come to an understanding of this difficult subject in view of the severe clinical states resulting from abnormalities in the control of breathing.

2 Use of computers in the cardio-pulmonary laboratory
Kevin Murphy

The computer revolution is upon us and it is an esoteric subject to say the least. At the Charing Cross Hospital cardio-pulmonary data is entered into a computer by paper tape and stored on disc; reports are then fired at the unsuspecting clinicians who some day are expected to be able to understand them.

3 The setting up of a blood gas quality control scheme
Margaret Solomon

Blood gas analysis, apparently so simple nowadays presents many traps for the unwary. It was clear from the careful work presented in this paper that we will have to pay increasing attention to quality control. It came as no surprise to learn that the technicians obtained more consistent results than the doctors.

4 Smoking Profiles
Roger Rawbone

The wide diversity of smoking habits has been a source of considerable difficulty to investigators. Dr Rawbone has studied the engagingly termed 'puff parameters' (the depth and frequency of puffing) and related this to the absorption of carbon monoxide and nicotine from cigarettes of different tar content. One particular point should make us sit up and think: the tar content in any brand of cigarette is roughly proportional to the nicotine content. On switching from middle tar to low tar cigarettes the subjects over-smoke to compensate for the lower nicotine content!

BUSINESS MEETING

Role of the Council

Some dissatisfaction on the role of the Council had been expressed at the 1977 Annual General Meeting. A number of related amendments to the constitution were put forward on this subject, proposing that the powers of the Council should largely be transferred to the Executive Committee.

The Council had originally been set up in order to provide a forum in which members from all parts of the country could play their part, in order that the Association should not simply be a London-based organisation. The members felt that it was really too early in the life of the Association for such sweeping changes and after some 'lively discussion' the amendments on this subject were defeated by a large majority. There was general agreement however, that the role of the Council should be re-examined.

Other amendments proposed and carried:

1 For Wales the representatives shall be elected from any of the eight Area Health Authorities responsible to the Welsh Office.

2 Council members cannot stand for election to the Executive Committee if they are executive officers of other Associations or Societies of the Federated Associations of Medical Technology.

The meeting was led through this constitutional mine-field by Len Smith in his last session as Chairman of the Association; he skillfully avoided getting a vote of thanks from the members (but see Correspondence Column and elsewhere).

Vacancy

LANCASHIRE AREA HEALTH AUTHORITY
BLACKPOOL HEALTH DISTRICT

VICTORIA HOSPITAL

SENIOR PHYSIOLOGICAL MEASUREMENT TECHNICIAN (PULMONARY)

A vacancy is expected to arise in February 1979, for a Senior Pulmonary Function Technician to be based at Victoria Hospital, Blackpool, a busy and expanding General Hospital of 762 beds, which is a Regional Sub-Centre for Cardio-Thoracic Surgery. The Department provides a complete service for the District General Hospital and in addition takes Out-Patients and In-Patients from the Preston and Chorley areas. This is an interesting post which offers experience over a wide range of tests, including work in paediatrics, thoracic surgery and some research into gas exposures.

Applications may be considered from Basic Grade Technicians who have less than two years experience and who would therefore be paid as a Basic Grade Technician until the appropriate date. Salary and Terms and Conditions of Service in accordance with the Whitley Council regulations.

Temporary single accommodation may be available to the successful applicant.

Informal enquiries are welcome; please telephone Mrs Irene Houghton, Senior Technician, Blackpool 34111, Ext. 418. Applications, in writing, giving details of age, experience, and quoting the names and addresses of two referees should be sent to the Sector Administrator, Victoria Hospital, Whinney Heys Road, Blackpool, as soon as possible.

Vacancy

SALFORD AREA HEALTH AUTHORITY (TEACHING)
(University of Manchester School of Medicine)
HOPE HOSPITAL
Eccles Old Road
Salford M6 8HD

SENIOR PHYSIOLOGICAL MEASUREMENT TECHNICIAN

(Cardiology and Respiratory Function)

We are looking for a suitable qualified Senior Physiological Measurement Technician to fill a vacancy in this Teaching Area.

It is intended that the successful candidate will be responsible to the Chief Technician for a Department in one of four hospitals in Salford. The duties of this post include a wide range of techniques including cardiac catheterisation, echo cardiography, computerised ECG Analysis, exercise tolerance testing and pulmonary function tests including lung volumes and carbon monoxide uptake. If required, training will be given in the specialised techniques.

Applicants should have at least three years technician experience and preferably an ONC in Physiological Measurement or equivalent.

Application forms and job descriptions available from the Sector Administrator at the above address, *telephone:* 106-789 7373, Ext. 202. Completed forms should be returned by January 19th 1979.