ASSOCIATION OF RESPIRATORY TECHNICIANS AND PHYSIOLOGISTS

VOLUME NO 29 DECEMBER 1986

BREATH

CONTENTS

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July 1987

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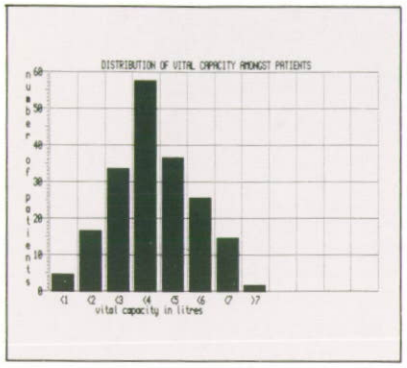

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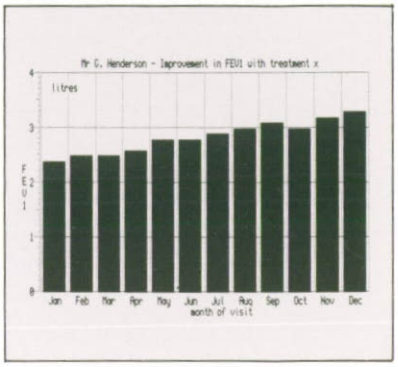

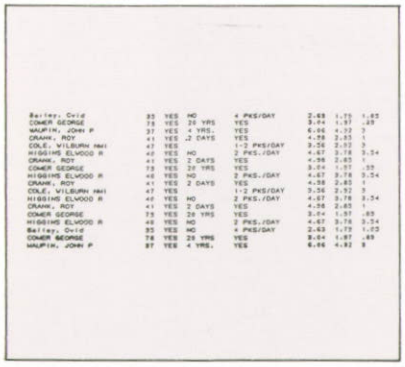

Bailey, Ovid	85	YES	NO	4 PKS/DAY	2.63	1.73	1.52
COMER GEORGE	78	YES	20 YRS	YES	3.04	1.97	.69
MAUPIN, JOHN P	87	YES	4 YRS.	YES	6.66	4.32	3
CRANK, ROY	41	YES	2 DAYS	YES	4.56	2.65	1
COLE, WILBURN HAI	47	YES		1-2 PKS/DAY	3.56	2.52	3
HIGGINS ELWOOD R	40	YES	NO	2 PKS./DAY	4.67	3.78	3.54
CRANK, ROY	41	YES	2 DAYS	YES	4.56	2.65	1
COMER GEORGE	78	YES	20 YRS	YES	3.04	1.97	.69
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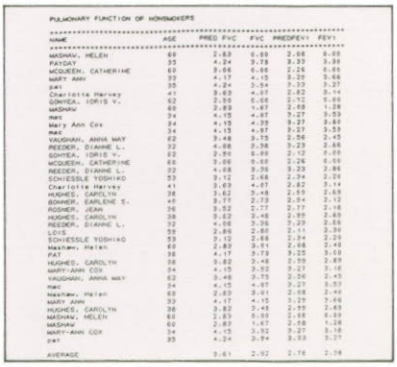

PULMONARY FUNCTION OF NONSMOKERS

NAME	AGE	PRED FVC	FVC	PREDFEV1	FEV1
MASHAW, HELEN	69	2.63	0.89	2.68	0.00
PAYDAY	85	4.24	9.78	3.33	3.98
MCQUEEN, CATHERINE	60	3.06	0.00	2.26	0.00
MARY ANN	33	4.17	4.15	3.29	3.66
pat	35	4.24	3.84	3.33	3.27
Charlotte Harvey	41	3.63	4.07	2.82	3.14
GOMEZ, IDRIS V.	62	3.00	0.00	2.12	0.00
MASHAW	69	2.63	0.89	2.68	1.28
mac	34	4.15	4.97	3.27	3.59
Mary Ann Cox	34	4.15	4.39	3.27	3.60
mac	34	4.15	4.97	3.27	3.53
VAUGHAN, ANNA MAY	62	3.48	3.73	2.56	2.43
REEDER, DIANNE L.	32	4.66	3.36	3.23	2.66
GOMEZ, IDRIS V.	62	3.00	0.00	2.12	0.00
MCQUEEN, CATHERINE	60	3.06	0.00	2.26	0.00
REEDER, DIANNE L.	32	4.66	3.36	3.23	2.66
SCHIESSLE YOSHIKO	53	3.12	2.66	2.34	2.26
Charlotte Harvey	41	3.63	4.07	2.82	3.14
HUGHES, CAROLYN	38	3.82	3.48	2.69	2.65
BOMER, EARLENE S.	45	3.77	2.73	2.54	2.12
REDNER, JEAN	36	3.82	3.77	2.77	2.16
HUGHES, CAROLYN	38	3.82	3.48	2.69	2.65
REEDER, DIANNE L.	32	4.66	3.36	3.23	2.66
LOIS	50	4.66	2.80	3.11	2.36
SCHIESSLE YOSHIKO	53	3.12	2.66	2.34	2.26
Mashaw, Helen	69	2.63	0.91	2.68	2.40
PAT	36	4.17	3.74	3.29	3.06
HUGHES, CAROLYN	38	3.82	3.48	2.69	2.65
MARY-ANN COX	34	4.15	3.92	3.27	3.16
VAUGHAN, ANNA MAY	62	3.48	3.73	2.56	2.43
mac	34	4.15	4.97	3.27	3.53
Mashaw, Helen	69	2.63	0.91	2.68	2.40
MARY ANN	33	4.17	4.15	3.29	3.66
HUGHES, CAROLYN	38	3.82	3.48	2.69	2.65
MASHAW, HELEN	69	2.63	0.89	2.68	0.00
MASHAW	69	2.63	0.91	2.68	2.38
MARY-ANN COX	34	4.15	3.92	3.27	3.16
pat	35	4.24	3.84	3.33	3.27
AVERAGE		3.61	2.92	2.78	2.28

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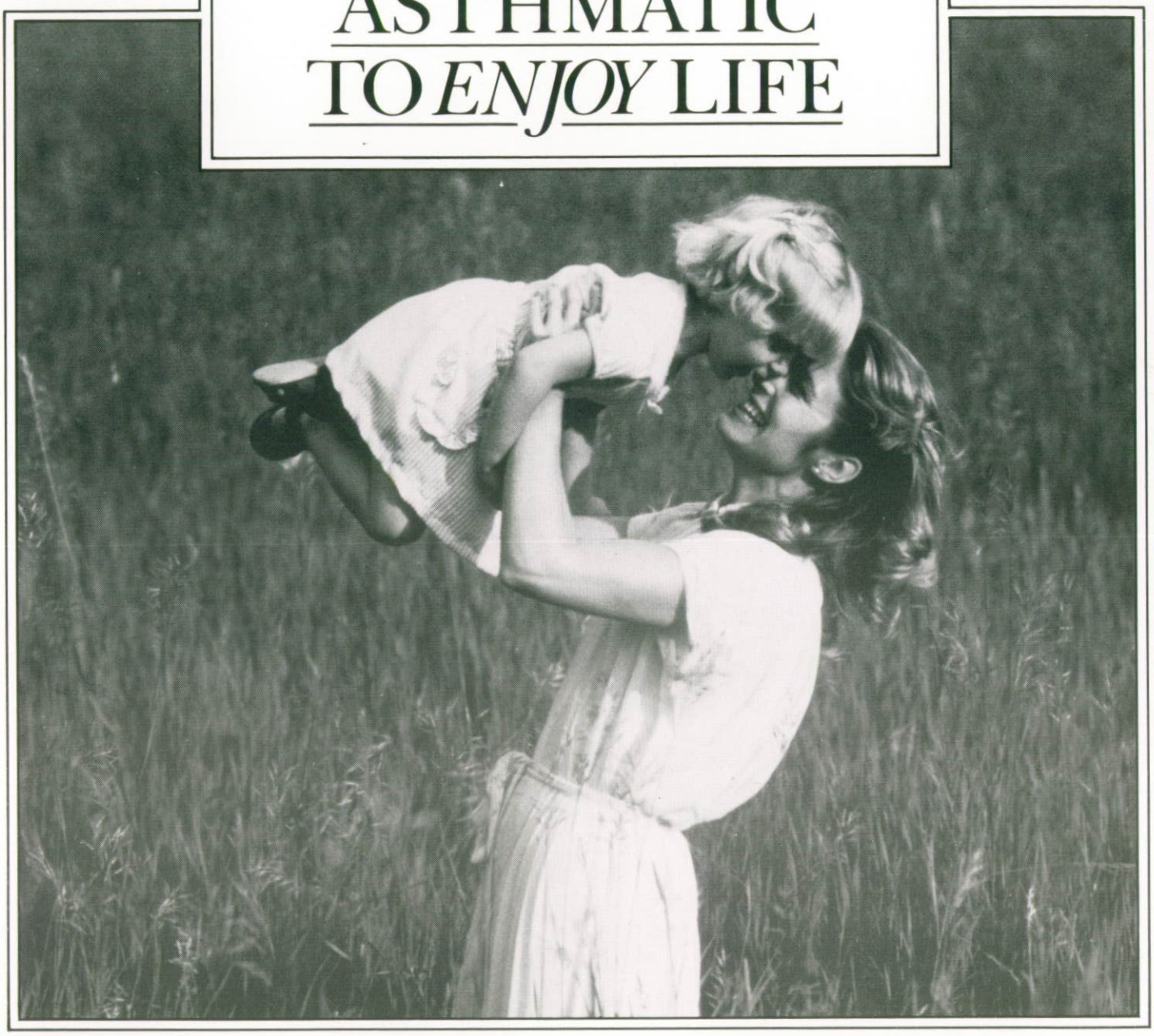

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EDITORIAL

Plagues Ancient and Modern

Epidemic diseases of one kind or another have afflicted the human race since ancient times, though startling changes have taken place in their incidence and in their effects during the present century. Epidemics of plague, cholera and typhus are no longer seen in this country, but the influenza virus remains a potential hazard and has been responsible for at least two major epidemics within living memory. The so-called "Spanish flu" epidemic which followed immediately after the 1914-18 War was responsible for the death of millions and more recently we experienced the less devastating, but nevertheless very serious "Asian flu" outbreak. The influenza virus has proved particularly difficult to control due to its ability to undergo spontaneous mutation, a strategem which renders ineffective any previously developed vaccine.

Smallpox, at one time, accounted for no less than one in twelve of all deaths in England and Wales and in the year 1840 the government of the day was forced to bring in the Vaccination Act which was effective in controlling the disease. The smallpox virus, unlike the 'flu' virus, did not undergo spontaneous mutation and thanks to the massive vaccination campaign conducted by the World Health Organisation the disease has, we believe, now been totally eliminated.

After this undoubted triumph, it was with considerable dismay that epidemic-watchers viewed the emergence of an apparently new disease, the first case of which was reported on the West Coast of the United States in 1981; not long afterwards, the first cases in this country were identified. This is, of course, the 'acquired immune deficiency syndrome', the notorious AIDS, which has now spread world-wide in an alarming fashion; by August, 1986, 23,000 cases had been recorded in the United States and 340 in Britain. At the present rate of progress, in fact, it has been estimated that no less than 180,000 Americans could die of it in the next five years, if no effective treatment is forthcoming.

The disorder is now known to be due to a virus isolated in France and in the USA at about the same time. It was known for a while as the 'human T-cell lymphocyte virus type III' (HTLV-III) but has been re-named 'human immunodeficiency virus' or HIV. This virus targets on the T-helper group of lymphocytes, replicates within them and can thus bring about severe damage to the host's immune system. Persons who have been infected can be identified by the specific HIV antibody test, though a positive test does not indicate the presence or future development of the full-blown AIDS syndrome.

From the clinical point of view, the virus appears to affect the human subject in three main ways. The majority seem to be asymptomatic carriers, though they are presumably capable of transmitting the organism to others. A certain proportion develop a minor illness with fever and enlarged lymph nodes, 'persistent generalised lymphadenopathy' or PGL and a minority are unfortunate enough to develop AIDS itself.

The clinical features of AIDS are manifold. The patients may have a number of non-specific features such as general malaise, weight loss, night sweats, a rash, diarrhoea or enlarged lymph glands. Respiratory effects include cough and shortness of breath and over half of the patients develop pneumonia due to the organism Pneumocystis Carinii, the presence of which carries a severe prognosis. The alimentary tract and central nervous system are commonly affected. Malignant tumours of lymph glands or of the skin ('Kaposi's sarcoma') may arise. Altogether this constitutes a very severe disorder with a mortality of over 50% on our present figures.

The risk factors are now well known. Over 70% of the AIDS cases have been reported in male homosexuals and the bulk of the remainder are intravenous drug abusers of either sex. A number of patients (haemophiliacs and others) have become infected through blood products, derived from blood donors who were also carriers of the virus. Female contacts of affected males are now being seen in increasing numbers. It has become clear that the disease is in all probability transmitted only by sexual contact or from infected blood and there is no evidence so far that it can be spread by ordinary social contact, in airborne droplets from cough or sneezing or by shared washing or eating facilities.

All health care professionals need to know whether they themselves have any risk of acquiring the disease from their patients. Those handling blood samples have a particular need to protect themselves and infection with Hepatitis B virus has long been recognised as a hazard of needle-stick injury. Fortunately, HIV seems much less readily transmitted by this method, though one such case has now been recorded in a nurse in this country. In the USA, 33 needle-stick injuries involving samples from AIDS patients have been documented, though none of the individuals concerned subsequently developed specific antibodies in their blood. This is reassuring up to a point but there is no escape from the general guidelines which are already well known. All blood samples should be treated as potentially hazardous, and those handling them should use gloves and disposable aprons or gowns. Above all, needles must be treated with the greatest of care, if one is to avoid becoming the next statistic.

Britain lags some four years behind the United States in terms of the spread of the disease and we are now having to come to terms with the human and economic demands which it will make upon our already stretched health resources. Many AIDS sufferers require in-patient treatment, possibly for many weeks; admission to an intensive care unit or special investigations, such as bronchoscopy, may on occasion be needed. There will be an increasingly large demand for HIV antibody tests by contacts or others who believe themselves to be at risk, with a corresponding increase in technical and scientific staff to provide this service. It may well become necessary to provide for special wards (with medical and nursing staff) to be set aside for the treatment of AIDS patients and provision for terminal care and support is particularly needed in view of the relatively young age of many of those affected. Finally, an effective health education programme should be put into effect (and there are signs that this is happening), to alert potential contacts and to allay the fear and prejudice which has occurred in relation to this disease, as it has so often to the plagues of the past. Perhaps its still not too late!

LONG-TERM DOMICILIARY OXYGEN THERAPY

*A C Davidson**
London Chest Hospital, London E2.

Oxygen may be supplied to the patient in the home either for symptomatic reasons or in the belief that long-term benefit will be obtained; this article is concerned with the second aspect. In the past, less than 5% of patients receiving oxygen in the home used it for more than 2 hours per day. One of the main problems, which acted as a disincentive to prescribing, was the problem involved in providing oxygen from cylinders; thus for a patient using oxygen for 15 hours per day, a supply of 10 to 12 cylinders each week is required. This is expensive and the patients find it inconvenient. The situation changed in December 1985 when oxygen concentrators (Fig 1) were introduced onto the Drug Tariff. The political background to this policy change by the DHSS is as interesting as the medical justification for long-term therapy and the impetus for this change was the development of reliable oxygen concentrators.

The Oxygen Concentrator

Zeolite, a naturally occurring material, has a unique microcrystalline structure which entraps nitrogen molecules while allowing oxygen (and argon) to pass unimpeded. The oxygen concentrator (Fig 2) makes use of this by compressing filtered air through a zeolite column. Regeneration of the column involves release of the entrapped nitrogen on decompression. By using two columns of zeolite and an alternating cycle of compression and decompression, a continuous flow of oxygen is produced which is again compressed and delivered to the patient by way of a reduction valve and a flow-rate valve. Since argon is also concentrated the gas mixture produced cannot be greater than 95% pure oxygen. At high flow rates, the efficiency is reduced although an oxygen content of about 75% is still achieved at 4 litres per minute.

Political Aspects

In April 1981 the DHSS initiated a feasibility study in which sixty oxygen concentrators were allocated to four different District Hospitals in the North West of England, for the treatment of patients with hypoxaemic respiratory failure. The DHSS report (1), published in December 1983, pointed out the considerable advantages of these machines and in particular the financial savings when compared with cylinder supply. For instance, it was estimated that a saving of around two million pounds could be expected from an annual cost of around nine million for providing all domiciliary oxygen.

Having previously championed the cause of the patient with renal failure, Mr Lewis Carter-Jones, MP for Eccles, then took up the cause of the patient with hypoxaemic respiratory disease. An adjournment debate was won in March 1984 and soon afterwards the issues involved were discussed in the national press. At the same time the British Oxygen Company, no doubt regretting its mistake in not developing the oxygen concentrator at a much earlier stage, made an offer to the DHSS for the provision of oxygen concentrators as part of their normal service, the offer being conditional on the company being able to retain their monopoly on oxygen supplies.

An alternative scheme was adopted, however. England and Wales (the provision in Scotland has yet to be decided) were divided into a number of regions based upon the Family Practitioner Committees' regional arrangements, and three-year contracts for the provision of oxygen concentrators within each region were put out to tender. Contracts were then awarded to three companies (Draeger Medical: North and South London, S. Yorks and Humberside and the Eastern region; Rimer-Alco: Northern region; and DeVilbiss: the remaining regions), the oxygen concentrators being made available through the auspices of the Family Practitioner Committees. Accordingly, since December 1985, a general practitioner may write a prescription for an oxygen concentrator which will then be installed by the medical company concerned.

The companies have a responsibility for servicing, for reimbursment to the patient of the cost of electricity

Fig 1: *The Mini DeVO$_2$ oxygen concentrator (by courtesy of DeVilbiss Health Care UK Ltd).*

*Present address: Medical Unit, St. Thomas's Hospital, London, SE1.

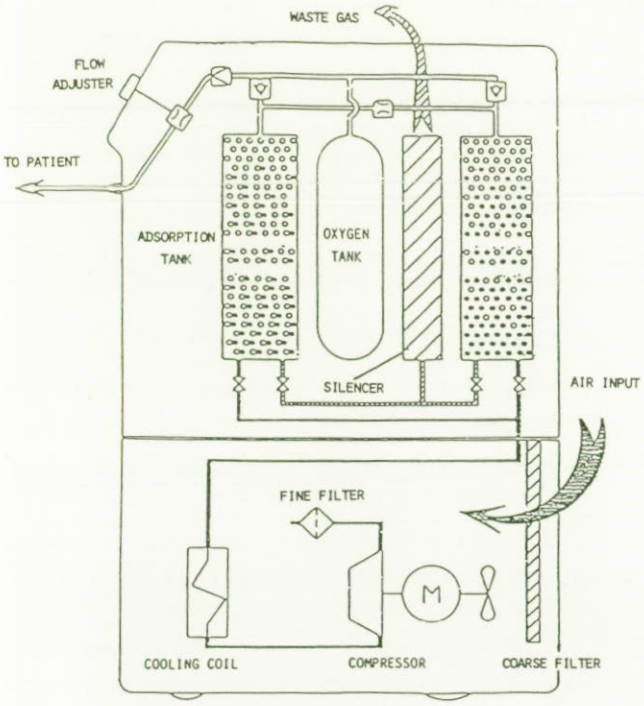

Fig 2: Schematic diagram of Permox oxygen concentrator. Compressed filtered air is delivered to the zeolite adsorption tanks. Waste gas is vented via the silencer on decompression of the adsorption tank (by courtesy of Draeger Medical).

consumed and for the provision of an emergency back-up. In addition, there is a statutory requirement that the use of the machine is recorded, a timing device being located on the rear of the machine. This allows comparison to be made of the use made of the oxygen concentrator by the patient with that prescribed. The annual cost to the DHSS for the hire of the concentrators varies but is about £800 with an initial installation charge. This therefore costs considerably less than using oxygen cylinders (£3500 per year at 16 hours per day excluding delivery charges). Indeed, the break point for cost benefit only amounts to 10 days at 16 hours per day or one month at 6 hours per day.

Medical Background

The prognosis in patients with chronic bronchitis and emphysema is variable. Once oedema formation has complicated an infective exacerbation, the survival rate at three years is only 20 to 30% (2). The main determinants (which are inter-related) of this poor survival are the age of the patient (3), the severity of air flow obstruction (4), the degree of hypoxaemia (5) and of pulmonary hypertension (3). Oedema formation is important since it is the clinical correlate of the development of cor pulmonale, i.e. hypertrophy of the right side of the heart with associated pulmonary hypertension secondary to respiratory disease. While the cause is usually chronic bronchitis and emphysema, it may also occur in such diseases as cystic fibrosis and bronchiectasis, fibrotic lung disease and diseases associated with neuromuscular impairment of ventilation such as severe kyphoscoliosis.

In the 1960s and early 1970s, it was demonstrated that continuous oxygen over a number of weeks would cause a lowering of the pulmonary artery pressure in patients with hypoxaemic respiratory failure (6). This led in the late 1970s to two major trials to assess the survival advantage of long-term oxygen therapy. The first of these (7) was run by the Medical Research Council in the UK and involved 87 patients who had been randomised to treatment with oxygen for at least 15 hours per day over a 5-year period. The mortality in the treated group was two thirds of the mortality in the untreated group. The other study was carried out in the United States (8) and involved a total of 203 patients randomised to receive either almost continuous oxygen or oxygen for only 12 hours of the day, the majority of which was in fact given during sleep. It was found that the annual mortality in the continuously treated group was 11.9% compared with 20.6% in the nocturnally treated group and there appeared, therefore, to be a definite advantage with long-term oxygen therapy (LT-O_2).

There are a number of problems with these studies however. In neither study was it possible to predict which patients would benefit and which would not, although it was clear that only a proportion of patients did benefit from the treatment. Furthermore, any beneficial effect of giving up smoking coincident with receiving oxygen therapy is not known. There was also a sex difference in the MRC study, such that benefit appeared to be immediate in women but was delayed for 500 days in the male patients. This finding has yet to be adequately explained, but may relate to the early death of the most severely affected individuals in whom the disease was too advanced for benefit to result from oxygen therapy.

The Practicalities of LT-O_2

Reference has been made to the difficulty of patient selection in recommending LT-O_2. The DHSS guidelines suggest that all patients with severe air-flow obstruction in the presence of hypoxaemia and hypercapnia and with a previous history of oedema formation should be treated. In addition the less severely affected individual who shows hypoxaemia but normocapnia (and resembles the patient studied in the American trial) is expected to benefit. Other possible candidates are patients with fibrosing alveolitis, cystic fibrosis, kyphoscoliosis, etc. The number of patients who would fulfil these criteria for receiving LT-O_2 is unknown, although an attempt has been made to estimate this in a population study centred in Sheffield (9). Extrapolating from this study, it is predicted that as many as 60,000 patients in England and Wales might justify treatment.

The DHSS has recommended that patients should use 15 hours of oxygen per day in order to obtain benefit. Just as the exact mechanism by which oxygen improves survival is not known, so also the critical number of hours per day over which oxygen needs to be administered is unclear. From the MRC study it would appear that some oxygen is better than none, and from the American study that 12 hours' oxygen is not as good as continuous therapy. Certainly sleep is a time when severe hypoxaemia may occur (10) and it is generally accepted that this is the most important time in the 24-hour period that oxygen should be provided.

Even if patients are instructed to use oxygen for as much as 15 hours a day, will they do so? Good compliance was found in the pilot study performed by the DHSS (1) in which on average the oxygen concentrators were turned on for around 14 hours per day, but in a less highly motivated group of patients, who do not form part of a particular study, lower usage would be likely. It remains to be seen whether a reduction in usage would reduce the effectiveness of treatment. Certainly, in one study involving only a small number of patients, no advantage occurred when oxygen was provided for only 10 hours in each 24 hours (11).

Although the service is to be administered by the Family Practitioner Committee and GPs will be the initiators of the request for an oxygen concentrator, it is advisable for respiratory physicians to be consulted. This is partly because of the availability of blood gas and lung function testing, and partly because of the appreciable under-treatment in some patients that was identified in the previous studies. For instance, only one in five patients considered for the American study was ultimately suitable, many improving with more intensive bronchodilator therapy for example.

Another requirement is the need to be sure of the safety of oxygen in these patients, many of whom have CO_2 retention. However, at least when the patient is in a stable condition, PCO_2 increases little on breathing oxygen and any increase during sleep occurs early at night and is not progressive (12). Fears that patients may have associated sleep apnoea (in whom oxygen therapy might be considered dangerous) are probably unfounded since this appears to be uncommon in non-obese patients (13). It should, however, be suspected if the degree of pulmonary hypertension or of secondary polycythaemia is out of proportion to the air flow obstruction, or if there is a complaint of excessive somnolence or of loud snoring at night.

A further safety aspect concerns the danger of smoking in a high-oxygen environment. Despite the severity of their disease, it is unfortunate that many patients do continue to smoke although the dangers of this surprisingly do not appear to be significant. However, the benefit resulting from oxygen therapy appears to be cancelled out if the patient continues to smoke. Calverley and colleagues found that the improvement in pulmonary haemodynamics and the decrease in red cell mass (reflecting the degree of secondary polycythaemia) occurring with LT-O_2 was prevented if the patient continued to smoke (14).

As yet little attention has been directed at the possible advantages and disadvantages in terms of the quality of life that LT-O_2 might produce. Certainly many patients, when oxygen therapy is suggested, fear that a marked deterioration in the quality of their lives will occur, and that they may become prisoners in their own homes and dependant upon oxygen. Nevertheless, such aspects of living as sleep, appetite, sense of well-being, mobility and ability to perform daily chores might all be expected to improve over the months following the initiation of LT-O_2 (1). Generally patients find the reliability of the machines high, express considerable faith in them and do not find the noise level unacceptable (1). Indeed the compactness of the concentrator means that it is portable and continuation of therapy whilst on holiday is quite feasible. Disappointingly, the frequency of infective exacerbations and of hospital admissions does not appear to be decreased by LT-O_2 (7).

The Future

In the initial few months, oxygen concentrators will be provided to patients who are already receiving LT-O_2 via cylinders. There is then likely to be a large expansion of the service to patients who are hypoxaemic as a result of respiratory disease. Some of these patients may currently be relatively active and possibly in employment. This type of patient has previously not been treated and yet a survival advantage might be expected. The ultimate cost of such provision is likely to be much greater than the current spending on oxygen which is generally provided for symptomatic relief only.

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IN-SERVICE TRAINING: PRACTICAL ASSESSMENT OF MEDICAL PHYSICS AND PHYSIOLOGICAL MEASUREMENT TECHNICIANS

S E Gough
Honorary Secretary, FAMT

Background

During the late 1970s it was recognised that student technicians in medical physics and physiological measurement should undertake a course of academic studies and that the in-service training of all groups should be organised along similar lines within a national structure. In 1979 the Orange and Green reports on Training of Medical Physics and Physiological Measurement Technicians within the TEC system were published.

Initially discussion had centred on incorporating the students' practical training into their academic studies and of expanding the OTEC certificate into a diploma. The colleges were unhappy to take on practical training and a meeting in Harrogate in August 1981 was called by the DHSS to discuss future requirements. Interested personnel including training officers, clinicians and senior technicians were invited to attend. It was decided that the representatives of the professions through the Federated Associations of Medical Technology (FAMT) together with interested training officers would produce a training manual for all disciplines.

Within a year the clinically based disciplines, Audiology, Cardiology, Neurophysiology, Perfusion and Respiratory Physiology had each produced a training manual for use at student level with an introductory foundation course and a course of basic training. The DHSS covered the cost of printing and circulation of the Physiological Measurement Training Manuals and a second meeting was held in Harrogate in June 1982 to launch the Training Manuals. A working party was formed to monitor their introduction and to study future requirements for technician training. The working party became known as the 'MPPM National Steering Committee for MP and PM Training' and consisted of FAMT representatives for each profession, training officers and a member from NHSTA; other interested bodies may contribute as required.

Towards the Future

It was apparent from the beginning that a further step was required, namely the *assessment* of the practical in-service training programme to ensure that national standards were maintained at the highest possible level since diagnosis and treatment are often based on physiological measurement. The students' future careers, furthermore, may be determined by their initial training. Three disciplines, Audiology, Cardiology and Neurophysiology, already have professional examinations for assessing practical training and the first assessments in Respiratory Physiology took place this summer.

In-service training can be monitored by continuous assessment, by a final examination or by a combination of the two, and the general format of the assessment has been agreed by the professions. Students will follow their specialised disciplines within the appropriate training manual and continuous supervision and assessment will be undertaken by a senior technical member of the department (and by a training officer where possible) with a final assessment by the professional bodies at the end of the training period.

The following paper, *National Assessment of Practical In-service Training by the Professional Bodies*, is concerned with areas of common structure within the assessment and has been agreed by all bodies. Differences between disciplines occur, so guidelines for students, supervisors, examiners, for the procedures and for the venue of assessment are individual to each discipline. Final assessment of practical in-service training will take place at a nationally recognised level in Audiology, Cardiology, Neurophysiology, Perfusion and Respiratory Physiology in the summer of 1988.

It is therefore important that the implications of the following document are discussed with training officers, so that the appropriate steps can be taken to advise, train and supervise the 1986 intake of students.

NATIONAL ASSESSMENT OF PRACTICAL IN-SERVICE TRAINING BY THE PROFESSIONAL BODIES

National Assessment of practical in-service training provided by the Training Manuals was introduced in 1982 for Audiology, Cardiology, Neurophysiology, Perfusion and Respiratory Physiology. Students applying for assessment are not required to be members of the Professional Bodies.

1. Registration and Application

All students will register for Assessment of In-service Training by 31 January in the year that the Assessment is to take place. Registration shows the intent to take the Assessment. A common Registration Form will be used by all disciplines. All students will apply to sit the Assessment three months prior to Assessment at which time the Assessment fee will be sent to the appropriate body. Application forms will be individual to the body and students may be asked to enclose passport-size photographs.

2. Fees

A common fee will be payable to the relevant professional body by the student. The fee for assessment in 1988 will be £50.00. Fees will be reviewed annually from this date and jointly agreed by all professional bodies. All fees incurred will cover only the cost of administration of the assessment by the professional body. Fees for re-take of assessment will be left to the discretion of the individual professional bodies.

3. Venue for Assessment

The individual professional bodies will make their own arrangements for venue but will ensure that the depart-

ments chosen are inspected for suitability. It is also the responsibility of the individual professional body to inform and seek consent from the local authority that assessments are taking place.

4. General Format of Assessments

Each individual body will conduct the Assessment under three headings: Written Paper, Practical Examination and Oral Session.

Written Paper

	Group	*Time*	*Paper*
	Audiology	2 × 3 hrs	Short answers Long essays
Existing	Cardiology	2 hrs	Multi-choice 3 papers
	Neurophysiology	2 hrs	Multi-choice
From September 1986	Perfusion	3 hrs	Multi-choice
	Respiratory Physiology	2½ hrs	Multi-choice Short answers

Practical Examination

	Audiology	2½ — 3 hrs
Existing	Cardiology	3 hrs
	Neurophysiology	2 hrs
From September 1986	Perfusion	up to 5 hrs
	Respiratory Physiology	2½ — 3 hrs

Oral Session

	Audiology	15 mins
Existing	Cardiology	20 mins
	Neurophysiology	20 mins (part of practical)
From September 1986	Perfusion	20 mins
	Respiratory Physiology	15 mins

5. Date of Assessment

Assessments for all groups will take place in the summer, if possible in late June or early July.

6. Guidelines

a) Training Manual

The student will bring on the day of examination the Training Manual completed with reference to their specialty and the foundation units of other specialties.

All aspects of national assessment will refer only to the objectives as set out in the Training Manual for the specialty completed by the student.

b) Log-Book

It will be recommended that each student keep a log-book but this will not be nationally assessed but used as a reference for the students' supervisors and local training officers to appraise the level of training undertaken.

c) Guidelines for Students

d) Guidelines for Supervisors

e) Guidelines for Examiners

f) Guidelines for format of Examination Procedure

Individual guidelines for c), d), e) and f) will be identified by the professional bodies.

CORRESPONDENCE

Accuracy of Gas Analysis

My colleagues and I recently reported to the Association (Leeds: Spring Meeting, April 1985) and in Thorax (1) the results of a survey on accuracy of gas analysis in pulmonary function laboratories. This showed that only a minority of laboratories achieve the 1% level of accuracy which is recommended as standard in our speciality (2) and which is readily attainable with the equipment now in use. The commonest fault is neglect of a procedure for regular three-point calibration by appropriate means. As a result, quality control in the analysis of oxygen and carbon dioxide is worse now than in 1962 when a similar study was undertaken (3).

We should be very concerned by this result which reflects badly on our professional competence and suggests that we only pay lip service to accuracy, which gets several mentions in the Physiological Measurement Technician's in-service training programme. As an Association we need to effect an improvement before others do so by what might be unacceptable means. The first step would seem to be the preparation of a pamphlet on quality control for routine lung function tests; this would be used for instructing personnel and for ensuring that essential equipment for calibration was available in all laboratories. Additional items of equipment might be purchased by the Association for issue on loan to members.

Table 1 gives an outline of what the pamphlet might contain; I invite comments.

J E Cotes
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Table 1
Calibration procedures in lung function laboratories

Equipment	Attribute	Procedure
Volumetric spirometer	volume	*gas syringe
	leaks	weight
Dynamic spirometer	time	sine wave
	volume/time	*orifice and weight (for McDermott spirometer)
		†MEFV simulator (Pedersen (4))
Flow transducers (and recorder)	dv/dt	rotameter
	v/t	*spirometer, rotameter, etc.
	resistance	static tube
Pressure transducers (and recorder)	linearity	*column of water or mercury
	response time	stopcock and pressure reservoir
	frequency response	sinusoidal wave generator
Gas analysers	linearity	*3 known gas mixtures (prepared in appropriate way)
	response time	†stopcock and gas reservoir
Oximeter	linearity	†arterial blood analysis
Cycle ergometer	power consumption	dynamo
Treadmill	incline	tape measure
	speed	stopwatch
ECG monitor	frequency	simulator

*daily †monthly or when possible

ANNUAL GENERAL MEETING

The Annual General Meeting of the Association took place at York District Hospital on 31st October and 1st November 1986. We owe grateful thanks to Donald McDonald for organising the meeting, to the firms who provided sponsorship and to the speakers for their interesting papers.

Scientific Programme

Mechanics of Nebulisation and Delivery of Aerosols. *Medic-Aid Ltd.*
Jet Nebulisers: What Goes in and What Comes Out. *R G Taylor, Castle Hill Hospital, Cottingham.*
The 'Nebicheck' — A Dosimeter for Bronchoprovocation Testing. *R Carter, R J Mills, Glasgow Royal Infirmary.*
Nebulisers in Question. *Allen & Hanburys Ltd.*
A Domiciliary Double-Blind Cross-Over Study of High Dose Terbutaline by Nebuliser and by Cone-Shaper in Patients with Severe Chronic Asthma. *A H Kendrick, J F O'Reilly, G Laszlo, Bristol Royal Infirmary.*
How Should Response to Bronchodilators be Defined? *P M Tweeddale, G T R McHardy, Edinburgh City Hospital.*
New Developments in the Measurement of Effective Oxygen. *Scientific and Medical Products Ltd.*
Spectralab 11 — A Respiratory Gas Analyser. *VG Medical Systems.*

Our grateful thanks are owed to the following exhibitors:

Collingwood Measurements Ltd.
Scientific and Medical Products Ltd.
Intersurgical Ltd.
Medic-Aid Ltd.
Puritan-Bennett International Corp.
VG Gas Analysis
Vitalograph Ltd.
Vickers Medical
Micro Medical Ltd.
Gould Electronics Ltd.
Cardiokinetics
Mercury
PK Morgan Ltd.
Erich Jaeger Ltd.

Abstracts

The 'Nebicheck': A Dosimeter for Bronchoprovocation testing.

R Carter, R J Mills, G Connell, F Newby, Department of Respiratory Medicine, Glasgow Royal Infirmary, and P K Morgan Ltd., Gillingham, Kent.

Bronchoprovocation testing is defined as the administration of a "non-specific" pharmacological agent such as histamine or methacholine or of a "specific" antigen to which a patient may be sensitive, and the measuring of the resulting bronchospasm. The increasing use of bronchial challenges as a method for studying asthma and for the detection of predisposed subjects requires that a simple, precise and easily managed apparatus be available for performing these tests. This paper gives a technical description of an apparatus known as the 'Nebicheck' (P K MORGAN LTD) together with the practical application of it in clinical use.

The aerosol solution used is only delivered during the inhalation phase of a breath through the use of a thermistor-timer relay system which when activated opens a solenoid valve thus enabling oxygen to flow through a nebuliser for a predetermined time and at a predetermined pressure for a set number of inhalations. An exact determination of the quantity delivered and therefore the dose administered is possible thus facilitating the standardisation of provocation tests.

The histamine challenge method described by Cockcroft et al is widely used and well standardised but it has the disadvantage of being relatively slow. In this study we have assessed a method using the Nebicheck and comparing this with the Cockcroft method. Thirty adult patients referred for histamine provocation were tested with each method in random order. No significant differences were found in the levels of reactivity assessed by the 2 methods ($r = 0.94$, SE 1.08, 95% range for a single measurement ±2.11 doubling concentrations). However, the Nebicheck method took under 25 minutes to complete, compared with 45 minutes for the Cockcroft technique suggesting that it is a faster and viable alternative.

Jet Nebulisers: What Goes In and What Comes Out

R G Taylor, Senior Registrar, Medical Chest Unit, Castle Hill Hospital, Cottingham, Hull, Humberside

Different types of jet nebuliser vary considerably in their output characteristics (rate of aerosol generation, size of particles generated, dead volume), largely according to the volume with which the nebuliser is filled, and the flow of gas by which it is driven (which also influences particle size); cooling reduces nebuliser output. One survey found a 5-fold variation in the salbutamol dose, a 20-fold variation in the diluent volume, and a 10-fold variation in the driving gas flow; the combined effect was an 11-fold variation in the estimated dose of drug that left the nebuliser.

Increasing the flow of driving gas increases the rate of aerosol generation, reduces particle size, and may reduce dead volume; it therefore increases both the amount of drug leaving the nebuliser, and the amount deposited in the lungs. Aerosols of small particle size may benefit the small airways, but are more likely to be absorbed and cause unwanted systemic effects.

Increasing the volume fill increases the proportion of the solution turned into aerosol, but prolongs nebulisation time. A nebuliser driven by dry gas tends to generate an aerosol of water rather than drug solution. Solutions of antibiotic are more viscous than those of bronchodilator, and they take longer to nebulise and give rise to larger particles.

How Should Response to Bronchodilators be Defined?

P M Tweeddale, G J R McHardy, Lothian Area Respiratory Function Service, Edinburgh

In choosing the criterion to define a response to bronchodilator it is important to distinguish between response and natural variability. Short-term variability in FEV_1 was recorded in normal subjects and patients with obstructive and restrictive ventilatory defects. No significant difference was found in natural variability between the groups. 150 patients with obstructive ventilatory defects attending the laboratory for routine assessment of response to bronchodilator, had FEV_1 recorded before and 20 minutes after receiving 2 puffs of a beta-sympathomimetic drug. Response was defined using an absolute change in FEV_1 of more than 175 ml (criterion based on natural variability) or a percentage change of 10 or 15%. The apparent number of patients defined as responders differed according to the criterion used. In those defined as

responders using the absolute criterion, the magnitude of the increase in FEV_1 observed was similar at all levels of FEV_1. The criterion used to define patients' response to bronchodilator on any given occasion may therefore affect not only selection of patients for clinical trials but also the possible outcome of such trials.

A Domiciliary Double-Blind Cross-Over Study of High-Dose Terbutaline by Nebuliser and by Cone Spacer in Patients with Severe Chronic Asthma

A H Kendrick, J F O'Reilly, G Laszlo, Respiratory Department, Bristol Royal Infirmary, Bristol

Terbutaline given in high doses from a metered dose inhaler (MDI) with a cone spacer (MDI + S) device results in a greater bronchodilator response than when administered as a nebuliser solution (NS) (Cushley MJ et al, Thorax 38, 908-913, 1983) in patients with severe chronic asthma.

Twelve patients with severe chronic asthma (mean FEV_1 = 0.76, range 0.35 to 1.91 litres), who were already using nebulised bronchodilators, took part in the study. Patients were given a nebuliser and a metered dose inhaler with cone spacer attachment to use at home for 4 weeks, taking 5 mg tds terbutaline each day. They took active NS + Placebo MDI + S for one period of two weeks, and Placebo NS + Active MDI + S for the other two weeks, in a random order. Patients were unaware of which device contained the active drug. For each two-week period, patients kept a diary card, recording three times daily the severity of their asthma on a 10 cm visual analogue scale (VAS), their symptom score (SS), and measuring Peak Flow Rate (PEF) using a coded peak flow meter (Richardson RB et al, Clin Phys Physiol Meas 5, 201-206, 1984) to prevent knowledge of their lung function from influencing the VAS and SS results.

Seven patients completed the study; 3 failed to provide complete records and 2 became ill. All patients expressed a preference for the nebuliser rather than the spacer. The PEF in the morning, at mid-day and in the evening was significantly higher ($P<0.05$) on MDI + S than on NS. Visual analogue and symptom scores were not significantly different.

We conclude that 1) the cone spacer, delivering 5 mg terbutaline tds improved PEF significantly and 2) VAS and SS did not reveal any systematic preference for either active treatment.

CHAIRMAN'S REPORT

Miss S. L. Hill
Birmingham General Hospital

The last year has been in many ways one of progress and development for the Association, but to begin with I would like to thank Donald McDonald for his hospitality in providing the venue for this year's AGM here in historic York. Unfortunately the agenda has not allowed time for sightseeing and perhaps in future when visiting such beautiful cities we should consider guided tours under the disguise of an education update! May I also extend the Association's grateful thanks to the hospital for the use of the postgraduate centre and to the catering staff for the excellent display of their culinary talents.

The Spring meeting of the Association was held at Frenchay Hospital in Bristol and we are very grateful to Sonia Jackson for organising and holding the meeting at such short notice. It was, as I hope many of you who attended will agree, a very successful meeting and has been reported in full in the July issue of Breath.

We are always extremely grateful to the commercial organisations who have contributed generously towards the cost of both the Spring Meeting and the AGM. This year has seen us timetable the commercial exhibition on our agenda which has been enthusiastically received by our sponsors. We hope that this has provided a more leisurely approach to discussing your service requirements and needs. In addition the agenda of this meeting has included presentations from the companies giving them the opportunity to talk to us all about new product developments and the theoretical basis for their designs, and at the same time providing a platform for group discussion. We hope this is useful for both the suppliers and the users and may I thank those companies who have presented at this meeting.

This last year has seen what I consider an important change in the format of our meetings with the majority of presentations coming from the Association's membership. Abstracts have been submitted prior to the meetings for consideration for inclusion. Following this an "abstract booklet" has been produced for the meeting which we hope you find useful and the abstracts will appear in the next issue of Breath for circulation to all the membership. This is a similar format to many established medical and scientific societies and it is a format I would like to see continued in this Association. I encourage you all actively to participate; its not as daunting as it may appear. I would like to thank all the speakers who have presented at both of the Association meetings this year for their contribution, their support and for sharing their interest and work with us all.

I am pleased to announce that the Spring meeting of the Association is going north of the Border to Edinburgh. In recent years we have had a significant increase in our membership numbers in Scotland and we felt it would be an appropriate gesture to hold an Association meeting there. Dr. Patricia Tweeddale, a member of the ARTP's Education Committee has kindly offered the City Hospital in Edinburgh for the venue for which we are most grateful. In view of the travelling involved for many of us we plan to put together an interesting and comprehensive programme over 1½ – 2 days including such important topics as a computer software seminar and laboratory standardisation and quality control. We look forward to your support of this meeting together with any suggestions you may have for the format of the programme.

The most important step over the last year has been in our communications with the British Thoracic Society. On looking back through the past AGM minutes before putting together this report I noted that this item has been reported on not only by myself at each AGM that I have been in the chair but also by my predecessors. I am therefore very pleased to announce that the first meeting between representatives of the BTS council and the ARTP took place on Friday 7th February. At this meeting we discussed items which were of mutual interest and benefit to both parties and included the background of the ARTP and its objectives, education and training of technicians in respiratory physiology and laboratory standardisation and quality control.

We were encouraged that our views and policies were sympathetically received and that it was felt that a closer relationship between the ARTP and BTS was desirable. Many of the points raised provided us with an agenda for the second meeting which took place on Friday 3rd October. This meeting concentrated mainly on education and training and how the ARTP could successfully bring the training manual and assessment to the attention of our clinical colleagues for support. We discussed the possibility of circulating all clinicians identified as providing a respiratory physiology service with a copy of a training manual and information regarding assessment. A suggestion by the ARTP for a stand at a BTS meeting to publicise the Association and its objectives has since been approved by BTS Council for the forthcoming BTS meeting in London in December. This may provide a national forum for discussion and feedback with interested clinicians.

We additionally discussed again the problems of laboratory standardisation and quality control particularly in the light of a letter the ARTP received from Dr Cotes whose recent gas analysis survey suggested that there is a lot of room for improvement, as did his previous survey some 20 years ago. The planned session at the Spring 1987 meeting was enthusiastically received and it was suggested that a meeting notice should be included in the BTS mailing circulation. We received support for all of our attempts in this area and it was agreed that a joint letter should be compiled and sent to the editors of the two British Chest journals requesting more information in the methods section of technical papers, since in some circumstances methods cannot be repeated in other laboratories.

We have agreed to continue to meet with the BTS at least once a year with extra meetings arranged should the need arise to discuss specific topics. I hope you agree that these talks represent a great stride forward by the ARTP. May we look forward to the continuation and progression of the relationship with the BTS in the future.

The other major item I wish to report is the adoption of a totally revised constitution in August following a postal ballot of the voting membership. You will recall that the majority of these changes were proposed at last year's AGM following our newly acquired charitable status in which

members of the Executive Committee became trustees of the charity and as such personally liable for breaches of trust. It was therefore necessary radically to revise the administration of the Association as well as to restructure the Executive Committee and how members are elected. This has seen the Council being disbanded and the voting membership nominating the Executive Committee. At this AGM members will for the first time be voting on Executive Committee nominations. We hope that this system will eventually enable interested persons to serve on the Executive Committee irrespective of which region they are in.

The last year has also meant radical changes in our accounting system so that income and expenditure can be identified in specific detail. This has represented a major change in the role of the Treasurer. In view of the time required to carry out these changes Gloria Holbrook our Treasurer for several years felt that she would no longer be able to continue due to increased personal commitments. Since the implementation of the restructure of the accounts was planned to coincide with the start of the new financial year it seemed appropriate to change personnel at this time and Angela Macleod already a member of the Executive Committee kindly agreed to take on the Treasurer's role with help and support from Gloria. I thank Angela for taking on this task and wish her every success in keeping us on the financial straight and narrow. I would like to take this opportunity to thank Gloria for all the hard work and effort she had put into the Association over the past years in her role as Treasurer and in particular her persistence in helping to obtain Charitable status and exemption from Corporation Tax. Gloria's invaluable contribution will not be forgotten.

The other major event of last year has been in our education and training programme and the first of the ARTP's National Assessments in Respiratory Physiology has taken place. A full report will be given in the Education Chairman's report and certificates will be presented at the end of this afternoon's business. I hope you will all agree that this represents a great step forward for the Association considering we had no previous experience in setting and running professional examinations. To launch these assessments has required an enormous amount of hard work, and sheer determination by members of the Education Committee whose efforts should be commended. Gillian Manning has done a sterling job as Chairman of this committee as well as being Examination Secretary and a few more things besides. I would like to thank Gill for all the time and energy she has put not only into the last year but into many others as well. Her efforts are and have been greatly appreciated. In particular Gill has often been working under adverse conditions due to the "imminent arrival" of a new addition (make and model not known at the time of writing). Because of this Gillian is uncertain about her future working arrangements and possible ARTP commitments. We hope however not to lose her totally and I am sure we will be able to find her something to do!

I am pleased to report that our Public Relations Officer, Mrs. Penny Wright took delivery of a healthy baby boy earlier this year and has recently resumed at full strength her activities for the Association. The Editorial Board of Duncan Hutchison and Adrian Kendrick have maintained the usual high standard we all expect in the production of Breath. Several new changes have been introduced and we have seen many varied and interesting articles.

Finally, I would like to finish by thanking all members of the Executive Committee for their hard work and collective efforts over the year. I know the task becomes more arduous as the years go on but rest assured your efforts are greatly appreciated.

TREASURER'S REPORT

Mrs A. MacLeod

I am very grateful to Mrs Holbrook, our previous Treasurer, who helped me set up the accounts for the start of the new financial year in April. We have decided to reassess how we were investing and using the Association's money, and a major restructuring of our accounts was necessary. We decided to continue banking with the Nat West Bank as they had been very helpful to us in the past. We itemized each of our income and expenditure categories and decided that now was the time to open some new accounts.

We have maintained our current and deposit accounts to deal with the day-to-day running of the Association. The major income into these accounts is from membership fees, fees for Spring and AGM meetings and Breath advertising. The major outgoings are for publishing Breath 3 times a year, financing Spring and AGM meetings, and travel expenses for Executive, FAMT, and Education committee meetings.

As we have now started our ARTP examination assessments we felt that we should try to make it a self-financing project. We set up a new account (No. 2 account) into which we put £195.00. This has been added to by the exam fees received and the outgoings have been for the printing of certificates and examiners' travel expenses.

We seemed to be on an even keel with expenses matching income so we decided to invest a lump sum (£2750.00) in a high-interest account, from which we have already seen a growing return. No decision has yet been made on what we should do with this additional income. The views of Association members are welcome.

Not only does the Treasurer have to deal with the accounts of the Association but also with the ordering and invoicing of any articles required by the membership. To help keep our records in order we had printed some official "order" and "invoice" books. This has made the accounting system a lot easier.

Other items of news include our VAT exemption due to us now having charitable status, and some of our bank charges are waived for the same reason.

Income and Expenditure

1st April 1985 — 31st March 1986

Mrs G. B. Holbrook

Income		**Expenditure**	
Members' Subscriptions		Travel	2,098.71
Full	1,356.66	Catering	1,236.84
Junior & Associate	100.00	Postage and Stationery	948.31
Donations	1,598.00	Breath	2,654.95
Breath	3,863.80	Printing	516.17
Miscellaneous	147.00	Miscellaneous	315.91
Deposit Account Interest	67.72		
	£7,133.18		£7,770.89
Excess **Expenditure** over **Income**	£637.71		
Current Assets			
Cash at Bank			
Current Account	3,812.73		
Deposit Account	813.22		
	£4,625.95		
Balance Brought Forward	5,263.66		
Less excess Expenditure over Income	637.71		
	£4,625.95		

EDUCATION COMMITTEE REPORT

Mrs. G. Manning

Chairman

The Education Committee has been involved in the following areas of work over the last year:

1. National Assessment in Respiratory Physiology

The first National Assessments in Respiratory Physiology were held in August/September 1986. The assessment was as follows: Practical, Oral and Written (Multiple Choice and Short Answer questions).

This was a major task for the Education Committee, and involved compiling Guidance Documents for students, supervisors and examiners, setting up a marking scheme and producing written papers. Eight students took the examination, the successful students being presented with their certificates today; a pass list will also be published in the November issue of 'Breath'.

The first year highlighted areas which needed more work, which will be carried out for the examinations in 1987. Students enrolling for 1987 should obtain an application form from myself and return it by 31st December, 1986. Anyone requiring further details on training or assessment should contact either myself or Miss S. Hill.

2. Information Leaflets

Over the last year significant progress has been made on the information leaflets written to accompany the Training Manual. The Education Committee is currently investigating various methods of printing these leaflets, the first of which should be available early next year.

3. BTec/BTec Higher in Medical Physics and Physiological Measurement

The Education Committee has been reviewing the Respiratory Physiology content of both these courses with a view to standardising the Respiratory Physiology section. This work has been hampered by new regulations from BTec concerning the language in which the syllabi are written. Topic areas for each course have been agreed and it is hoped that this work will also be completed next year.

4. Standardisation of Respiratory Physiology Testing

The response to the questionnaire on the standardisation of Respiratory Physiology Testing has been good, although it is not too late for any laboratory not having completed the questionnaire to do so. Analysis of the results has been started by Mr. R. Gooch (Birmingham). This item will be considered in more detail over the next year.

5. Training Manual

The opportunity has arisen for minor revisions to the Training Manual. This work needs to be completed by the end of 1986. Any member wishing to contribute to the revision should contact Miss S. Hill, Chairman of the Association, preferably in writing as soon as possible.

In the future, standardised education and training for Medical Physics and Physiological Measurement Technicians continues to be the goal. All professions are working towards this as detailed in the FAMT Report. One way to achieve this is to implement the Training Manual in your department and put forward students for National Assessment.

The next logical step forward, being considered by other groups, is Basic Grade training and work will be commencing on a Basic Grade Training Manual. Anyone who wishes to contribute to this work should contact either myself or Miss Hill, in writing. Work will not be commencing in this area until next year.

In conclusion, I am sure the way to improve the service we provide to our patients is by continuing to seek to improve the training of the technical staff carrying out these investigations. Over the last five years this training has stepped forward and will continue to do so with your support and interest.

PUBLIC RELATIONS OFFICER'S REPORT

Penny Wright

I should like to thank Sonia Jackson and her colleagues for organising the Spring Meeting at Bristol. I should also like to thank all the speakers and the catering staff for helping to make the meeting run smoothly and successfully. Grateful thanks should also be extended to the commercial organisations who, as usual, have contributed generously towards the meeting.

Despite having to introduce a registration fee for meetings, the Spring Meeting was very well attended, and from the response for the AGM it appears that members felt the registration fee was money well spent. I should also like to thank Donald McDonald for holding the AGM at York and for providing an interesting programme, not forgetting the catering staff who have provided two excellent buffets.

I should like to ask all members here to inform me of any departments they may know of which do not have ARTP members, as it would be pleasing to be able to reach even more people and to inform them of our aims and activities.

MEMBERSHIP SECRETARY'S REPORT

Sonia Jackson

To date I have received 222 membership forms. We now have 189 full members, 15 student members, 12 associate and 6 affiliated. 38 members have not renewed membership this year. After sending two reminders they have now been taken off the computer.

Could I ask once again members renewing membership who wish for correspondence to be sent to their home address, to send also their business address as sometimes members move and do not notify me. If members change hospitals please could they also notify me as I sometimes get mail returned from their last place of employment. It is nice to see we have a large number of Scottish members who have joined this year.

FAMT REPORT

Sally Gough, Secretary FAMT

In November 1985 two representatives from the Central Council of the FAMT were in Edinburgh at the Scottish Home and Health Department. Members of the SHHD and the professions in Scotland had formed a working party and produced a draft document on technician training in Scotland. Mrs Battye and myself were, on behalf of the FAMT, invited to the last meeting of the working party to comment on relevant points within the draft document and the outcome is that Scotland will adopt the training manuals for in-service training and some regions are now holding seminars for trainers.

The excursion to Edinburgh marked the end of Dorothy Battye's contribution to the Federation; after ten years of continual struggle on many issues, much of it with success, she has returned to the relative peace of her own department at the Maudsley Hospital and to spend more time with her family. I would like to wish Dorothy all the best for the future.

From a rather dull start 1986 has become more exciting, particularly with reference to education, training and the Federation. In early April, Neville Martin and myself represented the FAMT at an informal meeting at NALGO House, with Elaine Harrison (Staff-Side Secretary) to discuss training and education. Although approaches to this differ, there is common ground particularly in the need for practical training.

It was also apparent at this time that direction has been lost over the means of assessing practical in-service training. It was agreed that a discussion paper should be produced by the FAMT and circulated widely to refocus on this issue.

Members of the Central Council and of the professions' education committees met and a paper was agreed setting out the principles of practical assessment in Audiology, Cardiology, Neurophysiology and Respiratory Physiology (see *Breath* — this volume). The discussion paper was sent to the DHSS, NHSTA, the unions, Scotland, Ireland and the Professional and Technical Trainers Group. Response from some areas was very positive and a meeting has taken place with Dr Woodford, Chief Scientific Officer and Mr Godfrey from the DHSS. There has been communication with the NHSTA which will hopefully lead to a tripartite meeting between representatives of the DHSS, NHSTA and FAMT. (The feedback on the draft paper from one of the unions has not been so encouraging.)

1986 has also seen the retirement from the NHS of Norma Millar, Assistant RETO in the North Western Region. Norma, who came up through the technician grade and developed a strong interest in training, was a driving force behind the Training Manuals. I would like to take this opportunity of saying 'thank you' to Norma for her support and enthusiasm for technician training over the years.

In 1987 I hope we will see the national assessment scheme for PMTs approved and recognised by all relevant parties. Personally I feel that the time is now right for the Federation to look closely at the mechanism for acting as one body on behalf of technicians in clinical measurement rather than as a platform for separate voices from each discipline. The way forward is through an integrated body, noting, discussing and formulating views and policies that reflect the needs of the service rather than the individual professions.

EDITOR'S REPORT

Duncan Hutchison

Breath continues to appear three times yearly and contains, as usual, a mixture of original articles, reviews, correspondence, comments on current affairs and reports on ARTP meetings and other activities. We welcome contributions from all, whether ARTP members or not. Original articles on new advances in respiratory medicine or technology are particularly welcomed; we have noted an increasing interest in standardization of lung function tests and in the applications of computers in our field.

Adrian Kendrick has now taken over the post of Assistant Editor from Jane Jones and I am most grateful to him for his hard work and support. I am also extremely grateful to Penny Wright, who has taken over the exacting task of advertising recruitment and thus plays an important part in keeping Breath solvent.

I am grateful also to Mr. Boughton, Mr. Moss and the staff at Stevens Brothers our printer for their valuable help and advice and for their usual high production standards, to our advertisers a number of whom have supported us for many years and last, but not least, to our contributors without whom there would be no journal.

National Assessment in Respiratory Physiology (1986)

The following candidates have passed the above examination:

Nicola Cross	Derbyshire Royal Infirmary
Sharon Eaglen	Derbyshire Royal Infirmary
Jane Foster	Doncaster Royal Infirmary
Vanessa Hurt	Derbyshire Royal Infirmary
Sarah Rocke	The General Hospital, Birmingham
Elaine Scott	The General Hospital, Birmingham
Alison-Grace Taylor	Churchill Hospital, Oxford

Congratulations to all!

BOOK REVIEW

HANDBOOK OF PHYSIOLOGY
Section 3 The Respiratory System

Volume 1 Circulation and Non-Respiratory Functions

Ed A P Fishman

American Physiological Society, 1985.

572 pages

ISBN 0-683-03244-5. Price $150.00 (hard-back)

In 1964/5, the American Physiological Society published a two-volume section on respiration as part of the Handbook of Physiology series. This monumental reference work provided the "state of the art" of respiratory physiology. Despite its age, it has remained one of the most important reference books for the early history and physiology of the respiratory system.

Now, twenty years on, the American Physiological society has begun to publish a new series on respiratory physiology. Now entitled "The Respiratory System", it marks the rise of aspects of respiration. Whereas the previous edition dealt in detail with organ physiology and individual topics such as diffusion of gases and lung volumes, the new series will in addition cover many other aspects of respiratory biology.

Volume 1 — Circulation and Non-Respiratory Functions — covers areas previously without equivalent sections in the previous edition, and represents the bringing together of biochemists, anatomists, pharmacologists, morphologists and pathologists. The contributers are all leading experts within the respective fields.

Chapters 1 and 2 cover the development and growth of the lung and lung cell biology, and indicate clearly the need for physiologists to work closely with morphologists and anatomists. Chapter 1 covers development and growth of the lung, from the early embryological stages, birth and onwards to adulthood. It also details the development of the pulmonary surfactant system.

Chapters 3 and 4 follow on, covering the pulmonary circulation, interstitial spaces and the lymphatics. The chapter on circulation is extensive (and the longest!) and deals with every aspect of the pulmonary circulation including flow, pressure, pressure-volume and pressure-flow relationships, bronchial circulation and finishing with a section on the interesting problem of pulmonary hypertension. Chapter 4 on the lymphatics explains the structure and function of the lymphatic system and presents the problems and possible solutions to the mechanism of pulmonary oedema.

Chapters 5-12 deal with aspects of ultrastructure and biochemistry. Chapters 5-7 describe oxygen utilization and toxicity, intermediate metabolism and protein synthesis by the lungs. Chapters 8-12 deal with specific metabolic functions of the lungs — surfactant turnover, handling of biologically active amines and peptides, and the involvement of the lungs in processing prostaglandins and lipoproteins. It is evident from these chapters that without the presence of the metabolically active pulmonary capillary endothelium, many organs (liver, brain) would be seriously impaired if various noxious substances were allowed to enter the systemic circulation. Thus the pulmonary circulation has a very important biochemical rôle to play.

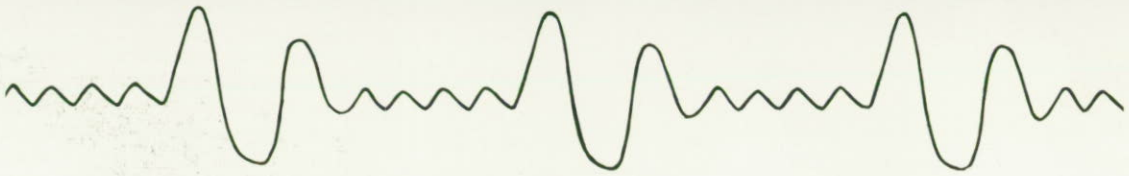
The final 5 chapters concern themselves with pulmonary defence mechanisms — secretions, the action of cilia in the conducting airways and macrophages in the respiratory tract. Chapters 16 and 17 deal with events in the blood system.

This volume is a monumental work — 17 chapters, 572 pages and over 4500 references. As with its predecessor, the book is written in a very clear and concise form. The illustrations are liberally interspersed throughout the text, the photomicrographs often being the most startling. This is an essential reference text for a respiratory department, despite its price.

I look forward to the three other volumes on Mechanics, Control of Breathing and Gas Exchange.

Adrian Kendrick

Out.
In-out.
In-out in-out.



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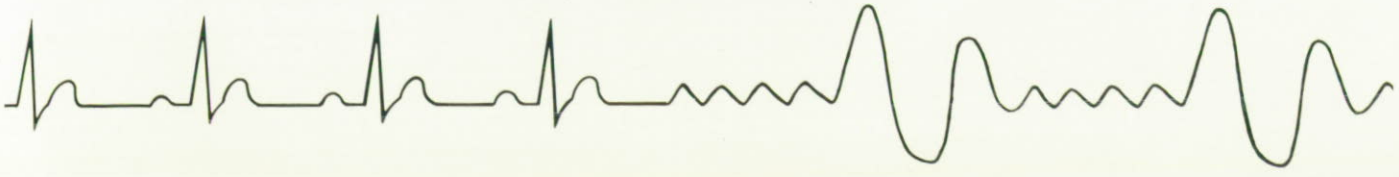

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