

RES MEDICA

Journal of the Royal Medical Society



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RES MEDICA

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PHYSICAL SIGNS IN THE CHEST

Part 1 of a Series of Two Articles

by PROFESSOR JOHN CROFTON, M.D., F.R.C.P., F.R.C.P.Ed., Department of
Respiratory Diseases and Tuberculosis, University of Edinburgh.

LIMITATIONS

This article is a personal one, based on my own practice and techniques. The evidence of the x-ray has taught consultants modesty in the evaluation of physical signs in the chest. In the good old days when the Chief said that there were dullness and diminished breath sounds in some area of the chest, the referee had spoken and there was no appeal. Nowadays he is liable to look rather silly if the x-ray is normal or the abnormality is found on the other side. He is likely, therefore, to be less dogmatic. We have also learnt, in the last few years, about "observer error". We know how differently even skilled observers may interpret the same phenomena and how even a skilled observer may fail to notice something which may be spotted immediately by one of his colleagues, or by himself on another occasion.

We must therefore approach the problem of physical signs in the chest with proper modesty, realising our limitations but attempting to limit these limitations as much as possible. We now know how extensive radiological shadows in the chest can be, in spite of the failure to elicit any abnormal physical signs, even *after* seeing the x-ray. The patient can have advanced pulmonary tuberculosis with no abnormal physical signs whatsoever. There can be a large peripheral tumour, or a large

cavity, without anything abnormal detectable on examination of the chest. It is in fact very rare, in the presence of a cavity on the x-ray, to find the classical physical signs of a cavity.

These discrepancies probably arise because there is normally aerated lung peripheral to the lesion. This protects it from discovery by methods of observation which inevitably have to be applied to the chest wall. Hence the value of x-rays.

Nevertheless the x-ray also has its limitations. In bronchitis or asthma the x-ray is very frequently normal, and is not uncommonly normal in a patient with bronchiectasis unless a bronchogram is done. In these instances the physical signs will be very helpful in diagnosis and in following the progress of the case. From an x-ray one gets relatively little help regarding what is going on inside the bronchus unless the bronchus is completely occluded.

Clinical medicine consists in weighing probabilities. No one finding from clinical or laboratory examination is absolute. Even a sputum reported as positive for tubercle bacilli may be due to an error in the laboratory; it could be someone else's sputum or occur because some other lesion in the chest happens to have eroded an old tuberculous focus. Therefore all clinical and laboratory findings must be measured against one an-

other to produce a total picture on which the probable diagnosis is based. Clinical signs are no exception to this rule. The clinician will first have taken a history and this will normally cause him to be seeking to exclude or confirm certain physical signs. Again the physical signs themselves must be weighed against one another. I would not put too much emphasis on an apparent deviation of the trachea to one side if this were not supported by other physical signs in the chest appropriate to any likely cause of deviation. When in doubt about any physical sign consider it in the light of all other information you have about the patient.

PRELIMINARIES TO EXAMINING THE CHEST

Although this article is primarily about the examination of the chest, one assumes that, before the chest is examined, certain observations will have been made. It will have been observed whether the patient is breathless or cyanosed, either when lying quietly on the bed or after taking off his clothes. The effort required to undress will often reveal a dyspnoea which was not obvious at rest. If the history suggests an acute illness, and if there is a history of chest pain, the physician will observe whether the alae nasi are moving with respiration, as is often the case in pneumonia. Whether there is any degree of wheeze will also have been noted. If the patient has a more chronic history, consistent with chronic bronchitis or emphysema, it will sometimes be noted that he breathes with "pursed lips" on expiration. It is thought that the pursed lips raise the pressure in the proximal bronchial tree on expiration and so help to keep open the small peripheral bronchioles which might otherwise be closed by air-trapping. It will also have been noted whether there is any finger clubbing, and the mouth, teeth and throat will have been examined.

ANTERIOR CHEST INSPECTION

Inspection of the chest may give useful information. Particularly when comparing the two sides of the chest it is desirable that the light should fall evenly on each side, so as to avoid misinterpretation. In most wards the bed is placed to one side of a window and it may be necessary to move the bed in order to obtain even illumination. It is often easiest

to appreciate the differences by looking at the patient from the end of the bed. However, these are nuances of technique which are more commonly performed in a class on Physical Signs than actually in clinical practice! On the whole, if the differences between the two sides are not reasonably obvious to the clinician standing beside the patient, they are not very important or are better elucidated by other methods.

SHAPE OF THE CHEST

There are three relatively common chest deformities:

1. *Harrison's sulcus*: This is a horizontal fixed in-drawing of ribs anteriorly, occurring on each side in the region of the 5th and 6th rib, forming a sort of transverse valley in the chest wall, sometimes giving an appearance of prominence to the costal margin. It is probably caused by repeated or continuous respiratory infections in childhood. The chest wall is sucked inwards on inspiration owing to obstruction of the bronchial tree by mucus or spasm. It was commoner at a time when many children were malnourished and treatment of respiratory infections was less effective, so that it is now more often seen in people who were children in the bad old days.
2. "Pigeon" chest: This is a narrow chest with prominent sternum and decreased transverse diameter, reminiscent of the bird's chest. It resembles not so much the feathered pigeon, with the rather broad appearance of the chest, but the pigeon awaiting carving! This also is more commonly seen in older people who are likely to have suffered malnutrition, particularly rickets, in childhood.
3. *Pectus excavatum*: This is a condition in which the sternum appears to be sunk into the chest, giving a vertical central sulcus. A little sinking of the lower part of the sternum is not uncommon but all degrees of the deformity can occur. It is congenital in origin.

Harrison's sulcus and pigeon chest are of no great clinical significance, except as indicators of rather impoverished childhood and perhaps less resistance to respiratory disease. The mildest degrees of *pectus excavatum* are unimportant but severe degrees may interfere with respiration and may even result in *cor pulmonale* later in life. The distortion of the heart may give rise to various murmurs and x-ray of the chest may be difficult to interpret unless the chest has first been inspected.

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The symmetry of the two sides of the chest is important to observe. Undue flattening or indrawing beneath one of the clavicles may indicate long-standing fibrosis on that side.

In chronic bronchitis, emphysema and asthma the chest is often "barrel-shaped". In these conditions the lungs are distended owing to the bronchial obstruction on expiration. This results in a more horizontal position of the ribs and a wider subcostal angle. There may be kyphosis of varying degree.

CHEST WALL

Various scars may be seen on the chest wall. The scar of a thoracotomy is important if the patient has failed to give a history of the previous operation, although this is unlikely. It is rather more common for a patient to forget about the drainage of an empyema in youth. The tell-tale scar, 4 to 6 cms. long with a more circular scar where the tube was inserted, often gives the first indication that he has had an empyema in childhood. This knowledge frequently helps in the interpretation of the x-ray. The fact of a mastectomy will usually have been elicited from the history. Again this is important in interpreting the x-ray; in the absence of this knowledge the film may be regarded as having an abnormal density on the side where the breast is present or an abnormal translucency on the side of the mastectomy. Occasionally a lipoma of the chest wall is large enough to produce some change in density on the x-ray and its presence should certainly be noted. Under-development, or absence, of the pectoral muscles is a rare congenital deformity which should be noted as it may, again, give rise to difficulty in interpreting the x-ray. The shrewd student will also notice prick marks in the chest indicating that attempts have been made to aspirate an effusion; but he must remember that these may have been unsuccessful!

RESPIRATION

The rate of respiration will be noted. The patient lying quietly at rest in bed should be breathing at the rate of 10-12 per minute. He will obviously breathe more rapidly if he has just been taking off his clothes. It will be noted whether he is using his accessory muscles of respiration. The patient with dry pleurisy may be breathing rapidly and shallowly. If asked to take a deep breath there will often be an abrupt cessation of inspiration as the

pain catches him. At this stage in acute pleurisy the patient may be unable to breathe deeply enough for the observer to hear a rub, so that this catch in inspiration is a very useful confirmation of the presence of dry pleurisy.

In advanced emphysema, when the diaphragm has become grossly flattened, there may be a paradoxical indrawing of the lower costal margin on inspiration. Contraction of the diaphragmatic muscle is no longer able to flatten the dome of the diaphragm, which is already flattened even in expiration, and results merely in the pulling of the ribs inwards. In such patients, and in asthmatics, the respiratory movement is often more in the upper than the lower part of the chest, in contradistinction to the normal.

It is important to observe differences between the two sides in the respiratory excursion. These differences are more easily observed on the front of the chest. The subclavicular area and the region of the lower axilla should be looked at separately. Any asymmetry should later be confirmed by palpation.

Finally, the apex beat should be sought by inspection. This is usually not feasible in women. In men it is sometimes possible to see the apex beat by inspection when it is not possible to palpate it. It is, of course, not always possible to see the pulsation owing to fat or to underlying emphysema. It is often easiest to see the apex beat if the light is falling obliquely on the patient's chest, preferably from the patient's left, and if the clinician bends down a little to look obliquely across the patient towards the light.

PALPATION

TRACHEA

Deviation of the trachea to one side is an important physical sign, but it is not very easy to elicit with certainty. If it is thought to be deviated it is wiser not to commit oneself until the examination of the chest has been completed. If the deviation fits in with the other physical signs then it is reasonable to accept it.

There are two main methods of determining deviation and it is wise to employ both.

(1) Insertion of the finger directly backwards in the suprasternal notch. The finger is inserted exactly in the centre of the notch and it is determined whether it touches the centre of the anterior surface of the trachea. If the

trachea is deviated the finger will touch it to one or other side of the centre.

(2) Insertion of the finger between the lower part of the trachea and the sternomastoid on each side. If the fossa appears narrower on one side, then the trachea is deviated to that side.

APEX BEAT

If the apex beat has not been determined on inspection it is easiest to start by placing the flat of the hand on the chest wall in the region of the 5th and 6th intercostal spaces on the left side. The approximate site of the impulse can usually be felt and the precise site can be determined with the middle finger. The normal situation is approximately 9 cm. from the mid-line, or just inside the mid-clavicular line.

The appreciation of different types of apex beat, and the abnormal pulsations to the left of the sternum and in the epigastrium found in *cor pulmonale*, are not within the scope of the present article.

THE CHEST WALL AND LYMPH GLANDS

It is convenient, at this stage of the examination, to palpate for enlarged lymph glands. The neck is first palpated. The tonsillar glands are felt for on each side and then the anterior and posterior triangles and the retroclavicular area. It is wise to repeat this palpation later when the posterior chest is examined, as it is very much easier to palpate supraclavicular glands, and the important group lying behind the lower end of the sternomastoid, from behind, with the sternomastoid relaxed by turning the head to that side.

Both axillae are then palpated for glands. The left axilla is palpated by lifting the arm with the left hand and palpating upwards and towards the chest wall with the right. The right axilla is palpated with the clinician's left hand, the patient's arm being held with the right hand. The epitrochlear regions are then palpated.

Palpation of the chest wall is particularly important if the patient has complained of pain in the chest. This examination is too often omitted. The patient should be asked to indicate with one finger the precise site of the pain. The clinician should then palpate this site by pressing with his middle finger,

lightly at first in case there is acute tenderness. It may be possible to determine that the site of tenderness lies precisely over a rib, suggesting a fracture (perhaps due to coughing) or a secondary deposit. If the tenderness is over the intercostal muscles, it may indicate intercostal fibrositis, a condition of ill-defined aetiology. Nevertheless, tenderness is sometimes present over the site of pleurisy so that intercostal tenderness must be interpreted with caution and considered with the other physical signs.

It is well also, particularly if a neoplasm is suspected, to run the hand smoothly over the chest wall, as enlarged glands are sometimes palpable on the lateral chest wall, particularly if the wall or parietal pleura is invaded by the neoplasm.

In a woman the breasts should be palpated to exclude a neoplasm.

MOVEMENT

Differences in respiratory excursion between the two sides are most easily appreciated by palpation. The hands should first of all be placed symmetrically over the upper chest wall below the clavicle, with the fingers pointing upwards. It is usually relatively easy to determine whether one of the apices is moving less than the other.

The movement of the lower chest is best appreciated by firmly grasping the lower chest with both hands, the thumbs meeting in the centre over the sternum and the fingers grasping the patient's chest round the axillae. The patient is asked to take a big breath and the movement of the thumb from the midline on each side is noted. If one side of the chest is moving less well there will be less deviation of the thumb from the mid-line.

PERCUSSION

It is presumed that the student will have been taught how to percuss, using the left middle finger as a plectrum, and percussing on it vertically with the terminal phalanx of the right middle finger. When percussing the front of the chest the novice is likely to percuss too hard. Differences are much more readily appreciable if percussing is only just hard enough to elicit resonance. Relatively slight degrees of dullness are then readily appreciated, when a comparison is made between the normal and abnormal sides. If the patient is particularly obese, or when examining the back

where much greater thickness of muscle overlies the chest wall, percussion must be harder in order to elicit the normal resonance.

The clavicle should first be percussed lightly on each side. In this case the clavicle provides its own plectrum and the left middle finger need not be used. The enthusiast may percuss in both supraclavicular fossae, although this is often omitted and is probably not very helpful.

Percussion is then carried out in each successive interspace, comparing the interspaces on each side down the chest wall. It is particularly important to determine the upper level of *liver dullness*, which is most easily done in the midclavicular line on the right side. With quiet breathing and the patient lying in bed, liver dullness normally lies at the level of the 6th rib. Deviation of the liver dullness downwards is indicative of lung inflation, due to *emphysema* or the *diffuse bronchial obstruction* of asthma or bronchitis.

The percussion note in the upper and lower axillae on each side is then determined.

If emphysema is suspected it is worth while percussing the cardiac dullness, which normally extends downwards from the 3rd rib to the left of the sternum and from the left of the sternum out towards the apex beat. This dullness may also be diminished by lung inflation due to emphysema or diffuse bronchial obstruction.

VOCAL FREMITUS

In my opinion, vocal fremitus is only of real value when deciding the presence or absence of pleural effusion. In practice I only use this physical sign if percussion has shown dullness at one or other base. Vocal fremitus is frequently absent over an effusion whereas it is present or exaggerated over consolidation and may be either exaggerated or somewhat diminished over an area of collapse.

Vocal fremitus is usually of little help in women owing to the relatively slight resonance from their high-pitched voices. In my view it is more easily appreciated and localised by using the medial edge of the hand, with the hand held at right angles to the chest wall. Fremitus is tested for below both clavicles, in the lower anterior chest and in the upper and lower axillae.

AUSCULTATION

In my experience the best simple stethoscope for listening to respiratory sounds is the bell,

fitted with a rubber cap. A metal bell is often too cold for patients in winter, the bakelite often breaks against the side of the bed and its friction on the skin of the chest wall may simulate a pleural rub. The rubber cap prevents the stethoscope slipping on the skin, and thus simulating a rub; it is also more comfortable for the patient.

Auscultation is a very important part of the examination of the chest. Most physical signs which can be elicited by the methods already outlined give little information which cannot be as well or better obtained from an x-ray film. A number of the physical signs which may be elicited by auscultation give information about the underlying pathological condition which is not obtainable by an x-ray.

BREATH SOUNDS

The student should train himself to analyse the qualities of the breath sounds, in particular the *duration* of inspiration and expiration relative to one another, the *pitch* of inspiration and expiration relative to one another, and the general harshness, blowing quality or normal softness of the respiration.

In *normal vesicular breathing* the *quality* is soft, the *duration* of inspiration is longer than that of expiration, and the inspiratory sound is higher in *pitch* than that of expiration. The sound of inspiration tends to fade into that of expiration without any obvious gap, in contradistinction to bronchial breathing; this distinction between the two types of breathing has always seemed to me difficult to appreciate and unhelpful and I think it is of little use in practice.

In *bronchial breathing* the general *quality* of the sounds is harsh or blowing, the *duration* of expiration is as long or longer than that of the inspiratory sound and the *pitch* of the expiratory sound is as high or higher than that of inspiration.

Although always harsh or blowing, the general *quality* of bronchial breathing varies a good deal. Although the relative *pitch* of inspiration and expiration remains as stated, the *pitch* of the whole respiratory sound may be relatively high or relatively low. Over consolidation or a thin layer of fluid the *pitch* tends to be high. If the sound is resonating in a large intrapulmonary cavity, or occasionally if the bronchial sound is heard resonating through a pneumothorax, the *quality* is similar to that when one blows over the top of a bottle. Hippocrates

did not have bottles and so, in the days when classical studies were the background of every gentleman's culture, it was thought more respectable to refer to this type of breathing as *amphoric* after the Greek name for a jar. The significance of bronchial breathing is discussed below.

The student often has great difficulty in appreciating bronchial breathing. It is helpful for him to memorize a form of words describing bronchial breathing and to listen to the breathing with this in mind. Bronchial breathing is always to be heard over the trachea and it is useful for him to listen to these sounds and compare them with the definition given above. He should then ask himself the same questions about unusual sounds he hears in the patient's chest. Bronchial breathing may sometimes be heard in normal persons just to the right and left of the sternum in the region of the 2nd and 3rd interspaces and in these areas should not be regarded as definitely abnormal.

Whenever one is in doubt about the presence of bronchial breathing it is always wise to test for *whispering pectoriloquy* (see below) which is always present if there is bronchial breathing.

Bronchovesicular breathing is a sort of half way house between vesicular and bronchial breathing, when the quality of the whole breathing is more high-pitched and harsh, but where the breathing does not conform strictly to the definition of bronchial breathing. As with all compromises it is an indication of uncertainty and one should only regard it as a warning sign that there may be something abnormal about the area of the chest below the stethoscope. If possible the term is best avoided; one can usually make up one's mind whether the breathing one hears is bronchial or vesicular.

ADDED SOUNDS IN THE CHEST

There are three main types of added sounds in the chest, *crepitations*, *rhonchi* and the sound of a *pleural rub*. The terms "*râles*" is, very properly, not used in Edinburgh because it has been used in various senses elsewhere. The detection of rhonchi, crepitations and rubs is very important because they may give one information about the patient which is not obtainable from the x-ray. Fortunately, it is usually relatively easy to identify rhonchi and

crepitations, but the detection of a rub sometimes gives rise to difficulty.

Rhonchi are squeaky wheezy noises made by air passing through the moist tubes of abnormally narrow bronchi. As the bronchi are narrower on expiration than on inspiration, expiratory rhonchi are more common than inspiratory, although both may occur. Quite often there are slight differences between the rhonchi heard in different parts of the lung, indicating that the noises are derived from a large number of small bronchi, as in the case of bronchitis. Occasionally the rhonchi are heard only in one particular area of the lung, suggesting a locally narrowed bronchus, as may sometimes occur with a carcinoma. Sometimes the rhonchi heard throughout the lung are of exactly the same quality and one feels as if one is hearing "one" rhonchus. This is probably due to the diffusion of the sounds from narrowing, as by some sticky mucus, in the lumen of one rather large proximal bronchus.

Crepitations are discontinuous sounds, made either by the opening up of alveoli filled with exudate or by air bubbling through mucus in bronchi of various sizes. *Fine crepitations* are probably derived from the alveoli and sound like the noise one hears if one rubs a lock of hair between one's fingers. *Medium crepitations* are more bubbling in quality and probably derived from smaller bronchi. *Coarse crepitations* are also bubbling and are derived either from large bronchi or from bronchiectatic dilatations of more peripheral bronchi.

Pleural rubs usually give the student a good deal more trouble. If the patient has pleuritic pain he may be unable to breathe deeply enough for a rub to be detected. However, the tell-tale sharp catch in his breathing, when asked to take a deep breath, is indication enough of the pleuritic type of pain whether or not a rub is heard. When listening for a rub the patient should be asked to place one finger exactly on the site of maximum pain. It is in this area that the rub should be carefully sought.

Rubs are of very variable quality. Early in pleurisy, when the patient still has acute pain, the rub is often heard at the extreme end of inspiration and is very similar to fine crepitations. Apart from the guide given by the patient's pain, the best way to differentiate a rub from crepitations is to ask the patient to cough. Crepitations normally increase or decrease, whereas a rub will remain unchanged. A second type of rub is more like the creaking

of leather. This type is often heard both in inspiration and expiration. The rub may be even coarser, sounding like two bits of sandpaper rubbed together. The latter two types of rub are usually quite readily detected, provided that the observer, because of his history-taking, is actively listening for them. If he is not, it is surprising what gross rubs can be missed.

VOCAL RESONANCE

Vocal resonance is the noise heard through the stethoscope when the patient is asked to say "ninety nine" or (a significant scientific advance made by the most up to date physicians!) "one—one—one". Although vocal resonance is increased, that is to say the voice comes through more loudly, in conditions such as consolidation, in practice this is not very helpful. The only helpful change in vocal resonance is the presence of *aegophony*, when the normal deep resonant note of the male is heard, through the stethoscope, as a bleating sound. As Hippocrates was well acquainted with goats, the term "*aegophony*" which means "the voice of the goat" was considered appropriate. Because of their naturally high-pitched voices *aegophony* is not a valuable physical sign in women. In practice, when *aegophony* is present whispering pectoriloquy is always present. Whispering pectoriloquy is as readily detected in women as in men and is easily identified; for this reason *aegophony* is not a very valuable physical sign, but is classical and unfortunately the student has to know about it.

Whispering pectoriloquy is a valuable physical sign for confirming the presence of

bronchial breathing. If the patient is asked to whisper "ninety nine" or "one-one-one", normally this is heard through the stethoscope merely as a distant rustling sound. If whispering pectoriloquy is present the whisper appears to be heard immediately under the stethoscope and the actual words can almost be identified. This physical sign is a valuable one and is always present when there is bronchial breathing.

POSTERIOR CHEST

The methods of examination are similar to those described for the anterior chest, but one or two special points should be mentioned.

Palpation: The neck should be carefully palpated for *enlarged lymph glands* as described on p.13. It is easier to feel glands behind the lower portion of the sternomastoid, or in the supraclavicular fossa, by palpation from behind.

When assessing movement of the lower part of the chest posteriorly the *sides* of the thorax should be firmly clasped with the fingers. The thumbs will not normally meet in the mid-line, but the relative movements of both thumbs can be readily appreciated.

Percussion: Because of the thick muscle-layers percussion over the back must be heavier than over the front of the chest in order to elicit the normal resonance. The upper level of the liver dullness is less readily compared with the normal, because of the greater difficulty in feeling and enumerating the ribs. Again because of the thick muscle-layers dullness at the apices should only be asserted if the difference between the two sides is clear-cut.

Part II. in our next issue will deal with the Interpretation of Signs.

Some Aspects of Pyelonephritis

by J. McC. MURDOCH, F.R.C.P.E., M.R.C.P.Glas.,

Consultant Physician, City Hospital, Edinburgh;

Honorary Senior Lecturer in Medicine, University of Edinburgh.

In a short article it is only possible to outline the important advances in our knowledge of the serious and often fatal disease—pyelonephritis. This pathological entity has been well recognised since the nineteenth century but interest in its clinical aspects has only been aroused since the end of the second world war. Prior to this little attention was paid to pyelonephritis by clinical workers until the classical paper of Longcope (1937). The disease is very protean in its presentation which makes a clear definition of the term pyelonephritis difficult. Acute or chronic pyelonephritis may arise in normal kidneys by infection with micro-organisms or in kidneys structurally altered by prior disease processes or congenital malformations.

PATHOLOGY

An admirable review of the high incidence of pyelonephritis found post-mortem, undiagnosed in life in most cases and the direct cause of death in some, has recently been published (Kleeman *et al*, 1960). Further, Danish statistics demonstrate that the mortality in females from pyelonephritis has shown a steep apparent increase since 1935 (Mosbech, 1960). Gram-negative infection of the female urinary tract is notoriously common and acute disease caused by such infection may have been controlled to some extent by the introduction of sulphamide and subsequent antibiotic therapy. Latent infection, however, may either have gone untreated or the treatment was only partially effective, leading to chronic inflammatory renal

disease and ultimate death in many cases. When there is any form of obstruction to the urine outflow tract there is a much increased tendency to the development of pyelonephritis. Discussion of the disease process in the elderly male with prostatic hypertrophy is not intended here.

Acute pyelonephritis is characterised by minute scattered areas of acute polymorphic exudate in the intertubular interstitial spaces, few in number in the early case but steadily increasing with recurrent attacks of infection. If the disease progresses towards chronicity there is a steady diminution in glomerular tissue with marked renal fibrosis, atrophy and dilatation of the tubules as seen in Figure 1. Pyelonephritis is usually bilateral with one kidney more grossly affected than the other.

ETIOLOGY

Text-book descriptions of the etiology of urinary tract infection and subsequent pyelonephritis suggest three theories: the carriage of organisms by the blood stream from the colon to the renal substance; ascending infection from the bladder mucosa by the peri-urteric lymphatics; or direct spread of organisms from the bladder via the ureteral lumen to the renal calyces. Experimental work has attempted to reproduce the disease in animals by similar routes (Vivaldi *et al*, 1960) and the bulk of evidence suggests that the third contention of direct spread of infection from the bladder via the ureters to the kidney is the commonest route of infection. In human females the

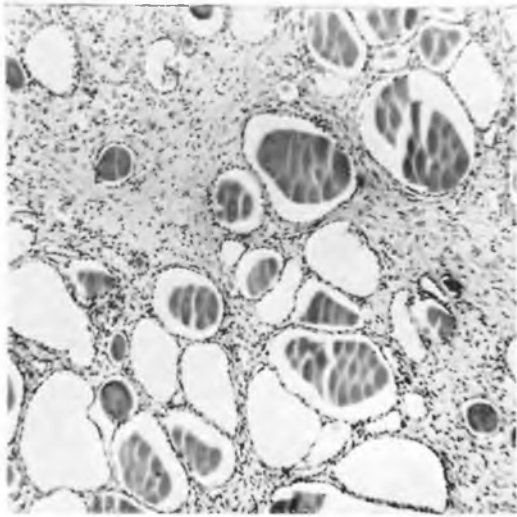


Figure 1.

Section of kidney removed from a 42-year-old multiparous female with a history of recurrent attacks of so-called pyelitis dating from her first pregnancy 19 years previously. This shows total absence of glomerular tissue and marked intertubular fibrosis with chronic inflammatory exudate throughout the field. There is striking dilatation of the tubules with atrophic epithelium. Colloid is seen in the tubular lumen — the so-called thyroid-like appearance characteristic of chronic pyelonephritis.

anterior urethra is normally colonised by gram-negative micro-organisms. Should these gain access to the bladder the urine is an excellent nidus for their rapid multiplication. If vesico-ureteric reflux mechanisms co-exist, and it is known that they are common from birth onwards, the organisms will be rapidly forced up one or both ureters to the kidneys themselves. Gross disturbance of vesico-ureteric function occurs in pregnancy, a fact known for almost thirty years (Baird, 1936).

Escherichia coli is by far the commonest single infecting organism, being present alone in about 80 per cent of most published series. Other infecting species are proteus, pyocyanea, enterococci and *staphylococcus aureus*, which are not usually found in the urinary tract in the absence of a history of bladder instrumentation. The urethral catheter was frequently passed during labour and in the puerperium until recent times. It can now be stated that catheterisation is neither necessary nor desirable for

the purpose of obtaining urine for bacteriology. Catheterisation for therapeutic reasons must be carried out with scrupulous antiseptic techniques to reduce the incidence of bladder infection to a minimum (Gillespie *et al.*, 1962). There is a correlation between urinary tract infection and the subsequent development of pyelonephritis, depending upon age and sex with young females predominating (Burke, 1961); with the development of active sexual life and particularly with pregnancy; with other disease processes, especially diabetes mellitus (Kalliomake and Kasanen, 1960); and with congenital malformations—most commonly found in the genito-urinary tract. All patients developing a urinary tract infection will not necessarily go on to develop chronic pyelonephritis. At present, however, it cannot be prognosed as to which individual will do so, since the immune mechanisms of pyelonephritis are very imperfectly understood (Beeson, 1955; Guze, 1961). In Edinburgh a large scale investigation of pregnant women has been undertaken in the past three years. Significant urinary tract infection has been found in seven per cent, of primiparous women rising to over 20 per cent, in multipara. These findings correlate closely with the work of Kass in the United States (Kass, 1959). In schoolchildren the incidence of urinary tract infection is much higher in females than in males (Kumin *et al.*, 1962; Kumin and Halmagyi, 1962). Despite these findings, however, pyelonephritis is not invariably detectable in such patients. Indeed, the true incidence of urinary tract infections in the community as a whole is at present unknown but there is no doubt that they are common and not infrequently associated with renal disease. Long-term prospective studies must continue for many years to come if the problem of pyelonephritis is to be elucidated.

CLINICAL FEATURES

The classical features of acute and chronic urinary tract infections are well known and will not be described further. As with so many other disease syndromes these probably account for only a minority of patients with infection of the urinary tract. For example, it is already known that pregnant women with significant bacteriuria are asymptomatic or have mild urinary symptoms wrongly attributed to the effect of the pregnancy. Some of these women will develop classical so-called acute pyelitis of pregnancy but by no means all will do so. About half of the infected pregnant women will still show evidence of persistent infection without

symptoms after delivery. For these reasons the concept of screening urine for asymptomatic infection during pregnancy as a routine measure is becoming acceptable and it might be forecast that this will become just as much a routine examination as the chest radiograph or Rhesus factor estimation at the present time.

Female infants who show failure to thrive with episodes of unexplained fever, irritability, vomiting or diarrhoea should have the urine adequately cultured for evidence of infection. In the author's own experience approximately 50 such infants per year are referred to hospital with various diagnostic labels such as feeding upset, pyrexia of unknown origin or gastroenteritis. Unexplained hypertension in middle-aged women should lead to investigation of the renal tract for evidence of pyelonephritis and latent infection. The urine should be regularly cultured as a routine measure in female diabetics. Chronic renal infection should be suspected in post-menopausal women with apparently unexplained refractory anaemia which has failed to respond to iron. Such anaemias are not necessarily associated with uraemia even when chronic pyelonephritis is moderately or well advanced. The one important symptom which can be looked upon as highly suspicious of chronic renal tract infection is nocturia. Impairment of tubular function leads to failure in the concentrating power of the kidneys and it is already known that many women, especially multipara, come to accept recurrent nocturia as their norm. This symptom will not be revealed, therefore, unless the patient is questioned directly. As a result of the nocturia continuous interruption of normal sleep will lead to general vague symptoms of daily tiredness, irritability and lassitude which may be wrongly attributed to other causes such as the menopause or domestic anxiety. The eradication of infection in such women often leads to reduction or abolition of night rising and so to prolonged sound sleep with great improvement in general health.

The clinician must be aware of the common occurrence of chronic urinary tract infection in females at all ages with minimal symptomatology easily attributable to other processes and he should not diagnose "menopausal neurosis" or idiopathic insomnia before he has excluded this important infection.

DIAGNOSIS

The diagnosis of obvious acute urinary tract infections will be confirmed by the finding of pus and bacteria in freshly voided specimens of

urine (Murdoch *et al.* 1959). This will be cultured within 20 minutes of voiding or the urine should be refrigerated at 4°C until it is sent to the laboratory. There is controversy as to whether it is necessary to count the numbers of bacteria in the urine. This is a convenient measurement when the numbers exceed 100,000 per ml. which is regarded as significant of infection, while those below this figure merely indicate contamination (Kass, 1957). The presence or absence of pus cells need not necessarily influence this diagnostic criterion. If bacteria are absent some authorities advocate the estimation of white cell excretion rates in urine (Houghton and Pears, 1957; De Wardener, 1960). This tedious and time-consuming procedure is of doubtful value in the diagnosis of chronic pyelonephritis whether or not steroid



Figure 2

Intravenous pyelogram in a female aged 22 years found during her second pregnancy to have asymptomatic bacteriuria. This shows gross distortion of all calyces with characteristic "clubbing". There is marked reduction and shrinkage of the right renal cortex. The left kidney is partially hypertrophied but also shows thinning of the renal cortex in its upper pole. The appearances are typical of advanced bilateral chronic pyelonephritis.

provocation is employed and it is not advocated as a routine measure (Kennedy et al, 1963a).

When chronic pyelonephritis exists without bacteriuria radiology is valuable in establishing the diagnosis when the disease is moderately or well advanced. Figure 2 illustrates the classical radiological features of advanced bilateral pyelonephritis in a young woman. Retrograde cystoscopy and pyelography may be necessary when calculus formation or other gross surgical defects are present or suspected. Voiding cystometrograms will demonstrate vesicoureteric reflux (Hodson and Edwards, 1960) and aortography may occasionally be an added refinement to demonstrate vascular anomalies such as renal artery stenosis. Standard tests of renal function will usually be undertaken but these will have to be supplemented by more refined techniques when unilateral or bilateral surgery is contemplated. In large medical centres I^{131} -labelled Hippuran excretion is being used to estimate individual kidney function more accurately. These refinements should not usually be necessary in the early case without obvious disease of the renal cortex and this is when the clinician would prefer to diagnose pyelonephritis in order to obtain full clinical and bacteriological cure. Because the disease is so patchy percutaneous renal biopsy is unlikely to be successful in diagnosing pyelonephritis. The ideal time for diagnosis is in the early stage of renal infection long before impairment of renal function can be detected by the crude techniques at present available. The clinician must learn to suspect the presence of a urinary tract infection in young women or children with vague ill-health. This will lead to urine culture which is almost invariably positive in the early stages of the disease. The differential diagnosis should not be difficult but if the urine is sterile renal tuberculosis must be excluded by appropriate culture. Other inflammatory renal diseases presenting with pyuria or haematuria should be readily excluded by other methods. Pyelonephritis is the commonest renal disease encountered in European and North American women.

TREATMENT

The treatment of urinary tract infections must be considered in two groups: first, the acute infection, and second, the chronic relapsing case.

The acute infection will most frequently be encountered in general practice where facilities for accurate diagnostic bacteriology will not

always be readily available. The clinician can reasonably assume that the infecting organism will be *E. coli* in over 80 per cent of his patients. At the same time it is important for him to realise that these micro-organisms, even in general practice, will not invariably be sensitive to the sulphonamides. Recent studies in Edinburgh have shown that about 25 per cent of strains of *E. coli* from general practice sources are sulphonamide-resistant. Despite this many practitioners still elect to use a sulphonamide for the first acute infection even although there is a 25 per cent. chance that this treatment will be unsuccessful. Further objections to using the sulphonamides as drugs of first choice in this field are that they are bacteriostatic, acetylated in the liver, protein-bound and do not appear in urine in high concentration, especially if this is diluted by "forcing fluids" during treatment. There is the added risk of marrow toxicity, especially if long-acting sulphonamides are given for prolonged periods. Chloramphenicol has obvious disadvantages and should not be used at all. The tetracyclines are bacteriostatic and many *E. coli* strains are tetracycline-resistant in the general population. During the past year it has been shown that the tetracyclines cross the placental barrier readily and are deposited throughout the foetal skeleton. Thus it would seem unwise to give tetracyclines for urinary tract infections in pregnancy. The novobiocin and tetracycline combination is even more toxic and should not be used. Streptomycin is bactericidal for many *E. coli* strains but it must be given in the presence of a continuously alkaline urine—this is almost impossible to achieve in general practice. Nitrofurantoin has enjoyed a popular reputation but it is interesting to speculate as to how many patients genuinely take this drug because of its capacity to produce heartburn and nausea even in moderate therapeutic doses. Recent reviews now indicate that more serious neurotoxicity and marrow toxicity can be produced by nitrofurantoin, especially if it is given for prolonged periods. The ideal drug for the acute infection should be one which is bactericidal, uniformly absorbed from the gut after oral administration, giving high tissue and urine concentrations without toxicity. Such a drug does not exist but cycloserine comes nearest to these theoretical requirements. A dose of 250 mg. twice daily for 14 days will eradicate 95 per cent. of *E. coli* infections provided renal function and structure are normal (Syme et al, 1961). Cycloserine is toxic to the nervous system, producing drowsiness, psychosis and even epileptiform convul-

sions if high blood and tissue levels arise as a result of impaired renal function. This is unlikely in the acute uncomplicated case but the drug should be withdrawn at the first sign of drowsiness—a toxic effect which is more easy to detect than, for example, bone marrow depression. Furthermore, cycloserine toxicity is completely reversible upon withdrawal of the drug. In summary it would seem that the general practitioner will use a sulphonamide as the drug of first choice but if this drug fails to eradicate the infection cycloserine should be considered as the drug of second choice for acute *E. coli* infections.

The refractory or relapsing case presents an entirely different problem and it is important to ensure that the renal tract is fully investigated to exclude calculus, obstruction or serious renal damage before administering any drug. Accurate bacteriology, of course, must supplement these investigations. Table 1 shows the antibiotic susceptibility of a large number of *E. coli* and other common urinary pathogens in the Edinburgh area studied over the past

mined by such factors individually. Newer antibacterial drugs are now available for the eradication of most pathogens encountered in the renal tract. Cycloserine is suitable for 95 per cent. of *E. coli* strains. 250 mg. twice daily will eradicate the organism and after 14 days the dose can be reduced to 250 mg. on alternate evenings for indefinite periods of time, depending upon the presence of radiological pyelonephritis or, for example, vesico-urteric reflux. Some patients in Edinburgh have been taking suppressive cycloserine for up to three years with excellent bacteriological results. The relapse rate in a large series of patients is only five per cent. This compares very favourably with relapse rates of around 30 per cent. in other series treated with sulphonamides, nitrofurantoin or mandelic acid. Cycloserine can also be given during pregnancy either for short courses or throughout the pregnancy. Studies of foetal cord blood and amniotic fluid after delivery in patients treated with this drug show that very little of the antibiotic crosses the placental barrier. Cycloserine seems to be the

Organism	No. of Isolates	% strains RESISTANT <i>in vitro</i> to:					
		Su.	S	C	T	Novo. + T	NitroF.
<i>E. coli</i>	495	66	32	8	89	98	4
<i>Proteus</i> spp.	71	88	29	15	100	100	74
<i>Klebsiella</i>	30	67	27	10	73	—	17
<i>Ps. pyocyaneus</i>	30	100	100	90	93	—	100

Antibiotic sensitivity of urinary tract pathogens (Disk-Diffusion Method).

three years. In hospital, to which the refractory case eventually comes, the older and more traditional drugs do not show *in vitro* effectiveness except in a small number of the isolates. The treatment of such cases is not simply the administration of an antibacterial drug based on *in vitro* susceptibilities. Drainage defects must be corrected surgically, calculi must be removed where possible and nephrectomy, partial nephrectomy or bilateral partial nephrectomy may be required to remove non-functioning areas of renal tissue before any drug can be expected to eradicate the infection. The management of each case will be deter-

mined by such factors individually. Newer antibacterial drugs are now available for the eradication of most pathogens encountered in the renal tract. Cycloserine is suitable for 95 per cent. of *E. coli* strains. 250 mg. twice daily will eradicate the organism and after 14 days the dose can be reduced to 250 mg. on alternate evenings for indefinite periods of time, depending upon the presence of radiological pyelonephritis or, for example, vesico-urteric reflux. At present it is impossible to say for how long the drug should be given but it would appear indicated until such time as the reflux has disappeared or indefinitely to patients who have only very little functioning renal tissue.

As will be seen from Table 1 proteus and klebsiella strains are resistant to standard forms of treatment. For fulminating infections with these organisms, with or without septicaemia, the antibiotic of first choice is kanamycin

sulphate given in a dose of 0.25 G. 6-hourly intra-muscularly for 14 days (Murdoch *et al*, 1962). The indications and contra-indications for the use of kanamycin sulphate have been fully reviewed recently (Murdoch, 1962). *Proteus mirabilis* strains are not infrequently fully sensitive to the action of ampicillin which is, therefore, suitable for the treatment of acute infections with this organism in a dose of 500 mg. 6-hourly for 14 days. Prolonged suppressive treatment with this antibiotic can be given in a dose of 250 mg. on alternate days (Kennedy *et al*, 1963b). Despite its early promise (Brumfitt *et al*, 1962) ampicillin has been disappointing in the treatment of *E. coli* and most other gram-negative urinary tract infections. *Pseudomonas pyocyanea* infections of the urinary tract are fortunately uncommon as they were in the past resistant to almost all forms of treatment (see Table 1). A close chemical relative of polymyxin B which is less neurotoxic—colistin methanesulphonate—is highly effective both *in vitro* and *in vivo* against pyocyanea infections and this antibiotic should be given in a minimum dose of 1.5 million units 8-hourly for 14 days when it will usually eradicate the infection completely (Carroll and Malette, 1961; Courtieu *et al*, 1961). A note of caution is, however, necessary when using either kanamycin or colistin in the presence of impaired renal function. Dangerously high blood levels may then occur, giving rise to ototoxicity with kanamycin and peripheral paraesthesiae or even chemical encephalitis in the case of colistin. These antibiotics should only be given in the presence of uraemia where facilities are available for monitoring the blood levels of the antibiotics daily. Blood levels of kanamycin sulphate should not be allowed to rise above 30mcg/ml. and of colistin above 64 mcg/ml. if neurotoxicity is to be avoided.

CONCLUSIONS

In recent years there has been an increasing awareness of the serious import of gram-negative infection of the urinary tract, especially in young and middle-aged females (Murdoch, 1963). In the past a casual attitude towards these infections has led to indifferent standards by which therapy has been judged. The emergence of drug-resistant pathogens has inevitably occurred, especially in hospital practice, and inadequate standards of bacteriological cure have been adopted. Symptomatic cure of so-called cystitis is easy to achieve while bacteriological cure is much more difficult. This is especially the case when infection has become

established in the renal parenchyma itself. In the future it is to be hoped that treatment will be judged by adequate long-term evidence of bacteriological cure for the acute and apparently uncomplicated case while in the patient with established pyelonephritis long-term suppressive therapy will be adopted and controlled by adequate bacteriology. In essence the prevention of pyelonephritis is a theoretical possibility while in practice it is very difficult to achieve. This should not deter the clinician of the future from ensuring that apparently trivial infections of the urinary tract are rigorously eradicated with modern bactericidal drugs and any evidence of relapse or reinfection will lead to full investigation of the renal tract to exclude "surgical" disease. If such steps are taken in the future the trend toward increasing morbidity and mortality from pyelonephritis will be reversed.

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RES MEDICA

"AMERICA"

Why should a serious journal be set in such sombre style that it requires real effort to take it up and open it? Is it not possible to produce an attractive, lively appearance which stimulates rather than deadens the reader?

With such questions in mind, a committee sat down to talk over the future of Res Medica last summer. We hope that the answers are evident in this issue. You will have noticed first that the cover has been completely re-designed and we trust that this serves to set the new 'image' of our journal. The new format allows us to use double columns which we prefer for both aesthetic and technical reasons.

Change for the sake of change is almost certain to be worthless, it is only justified if there is a good reason. Change is taking place throughout the Royal Medical Society, and the new laws mentioned on this page of our last issue are now in effect for a trial period. So far they have proved that streamlining of society procedure does not mean that business is neglected, but on the contrary, they have shown that greater efficiency leaves more time for the real business of the society, the discussion of medical topics.

There is only one tradition in the Royal Medical Society, that tradition is high quality. Such a tradition is vital, and without it we would have faded out of existence long ago. Medicine is the constant search to aid the vital force. It is only by similar constant effort that the vital force of R.M.S. can be maintained. As the Society, so the journal is created in a holistic manner. We rely on all who write, and all who read, to make of this something more than the sum of the parts.

Although most medical students return from the U.S.A. thanking God (and the late Mr. Bevin) for the National Health Service, one has to admit to the many attractions of practising medicine in that country. Not all of them are merely financial. To many newly qualified Americans general practice still presents itself as an attractive career. This can hardly be said in our own country, and the difference lies mainly in the G.P.'s position in the hospitals—a position which is almost non-existent in Britain. Here our G.P.s. have traditionally lost control of their patients as soon as they need hospital care. This worked well in the old days when admission to hospital was virtually a death sentence, but at the present time G.P.s. are increasingly frustrated and humiliated by surrendering patients whom they could well treat themselves under hospital conditions. For example, experience in the U.S.A. has shown that most patients with C.V.A. or coronaries—a sizeable proportion of admissions—are ideally cared for by their own doctors in hospitals. In the U.S.A., G.P.s. do a round of these patients once or twice daily, if necessary carrying out minor diagnostic and surgical procedures under the auspices of the hospital. They also meet regularly for discussions which do much to keep them up to date—and make malpractice almost impossible.

General practice has always been the heart of British medicine, and this heart is beating with less and less enthusiasm. The present day G.P. would argue that a sure way to kill general practice would be to increase the already excessive work load with hospital attendances. However the increasing scarcity of G.P.s. is mainly due to the failure of this branch of medicine to increase as rapidly as the others—and a consequent failure to attract new men. If general practice is to survive, something must be done to save it. Such a system as is practised in the U.S.A. would attract many new men who would otherwise specialize or even emigrate.

If G.P.s. are to be saved from the fate of minor diagnosticians, form-fillers and general dogsbodies, and can again be allowed the satisfaction of practising good medicine, then general practice will survive. The American system provides some of the answers.

SOME THOUGHTS ON THE NATIONAL HEALTH SERVICE

President's Valedictory Address by J. Calvert

Since its inception the National Health Service has provided a controversial topic for discussion. The vigour of its opponents is equalled only by the enthusiasm of its supporters. Opinions however, are not always well founded for factual information about the Service receives little publicity, and the statistics presented in the Minister of Health's annual report reach a very limited public. Yet it is only when facts and figures such as those shown in table 1 are examined that a true picture of the health scheme emerges.

The object of this paper is to see how successfully the health service has tackled the problem which faced it 15 years ago: to see if a glance at the figures will lend weight to the criticisms commonly levelled against the Service: and to see if any other criticisms may be made of the Service on the basis of the statistics themselves.

Some common criticisms of the Health Service

One of the most frequent complaints levelled at the Service is that it has created a vast and cumbersome administrative machine, resulting in a great deal of waste and extravagance. A consideration of expenditure in Scottish hospitals (table 2), taken as an example, will show how far this is justified.

Administration is seen to absorb about 5% of total expenditure—a figure which is roughly similar to the cost of administering other enterprises of comparable magnitude. Even if very large cuts were made in the cost of administration, the effect on overall expenditure would be only of the order of 1%. To give worthwhile savings, cuts must be made in the spheres where expenditure is large, the obvious target being the salaries of non-professional staff, which absorb nearly one quarter of total hospital expenditure.

Who are these people, classified as "Domestic and Catering Staff?" In England and Wales in 1961 there were 153,000 of them in full-time employment, in comparison with 163,000 full-time nurses. The group includes, for example, 3,072 members of the "Ornamental Gardening Staff", 8,408 of them are simply listed as "others". This last total compares with a figure of only 7,426 for the entire Consultant staff. At first glance, therefore, this whole group appears ripe for pruning, but a little reflection shows that this may not be the case.

It has been wisely said that over half the people admitted to hospital simply need looking after—perhaps 50% would do equally well with just the help of the domestic and catering staff. Add the skilled care of the nursing staff and 80% would be catered for adequately. The medical staff have a contribution to make in only some 20% of cases. Perhaps, therefore, the wisest way to effect economy would be to let the axe fall amongst the consultants rather than the domestic staff!

Table 2 also throws light on another common criticism of the Service—that of lavish expenditure on drugs. In fact the entire medical supplies for the Hospital Service cost only 1/5d in the pound—about the same amount as is spent on food. Drugs do not figure largely on the expense sheet. Savings could be made, but if a major economy is to be effected it can only be done in a sphere where a large proportion of the total expenditure is incurred.

Consideration of the facts lead to the conclusion that the conventional criticisms of the Health Service are not really justifiable. There is no doubt room for improvement. For example, it was pointed out recently in the House of Lords, that for every 20 doctors prescribing drugs a full-time clerk was employed analysing the prescriptions. In reply

Table 1.

TOTAL COST 1960-61 AND SOURCES OF FINANCE

(Figures in brackets are those of the financial year ended 31st March, 1960.)

£ Million	COST OF SERVICES	%	%	SOURCES OF FINANCE	£ Million
(415) 455	Hospital and Specialist	56½			
			69	Exchequer	559 (495)
(66) 90	General Medical	11			
(76) 84	Pharmaceutical	10½	8½	Partly exchequer and partly rates	67 (42)
(50) 53	General Dental	6½	12½	National Health Service contributions	102 (99)
(15) 16	Supplementary Ophthalmic	2			
(68) 72	Local Health Authority	9	5½	Superannuation contributions ...	44 (35)
(36) 39	All other	4½	4½	Payment by persons using the service	36 (34)
	(Doctor's compensation Superannuation payments, Central supplies, ex-Ministry of Pensions services, &c.)			Other income less than ¼%	1 (1)
(726) 809					809 (726)

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it was stated that nevertheless clerical charges accounted for a mere 1% of expenditure on drugs. This bears out the conclusion that although there are obvious flaws in the system, they do not contribute significantly to the cost of the Service.

We may exonerate the Service from the common charges of waste and administrative madness. The facts do not bear them out.

Criticisms less often heard

The criticisms discussed above have been criticisms of the efficiency of the Health Service as a machine. A complaint which is far less frequently heard, but far more serious, remains to be considered. This was aptly put in a recent leading article in *The Lancet*:

"Apart from the political fact of the National Health Service, have we so very much to be complacent about? What advances have we made in the last fifteen years in the way in which medical care is organised and purveyed to the consumer?"

The answer to this question contains the major indictment of the Service: we have made no significant advance at all in the last fifteen years. In 1947 the Ministry of Health took over a hotch-potch of unco-ordinated services. It set out to provide one unified health system. This it has in no way attempted to do. The Service has simply continued to run the same old institutions in the same old way. The intention was that the National Health Service should improve health, prevent disease, and—lastly—provide facilities for diagnosis and treatment. All that has been achieved is an insurance scheme whereby the previously existing facilities for diagnosis and treatment have become available without charge. The Health Service has failed to meet the challenge of its inception, and the extent of this failure can be seen in each of the three major spheres: the hospital service, general medical services, and public health.

The Hospital Service

The hospital services today remain almost identical to those available before the health service started. The figures speak for themselves. In 1950 there were 33,739 general medical beds in England and Wales. In 1960 there were 33,403. For general surgical beds the corresponding figures were 32,332 in 1950 and 33,493 in 1960. Even the new £70 million rebuilding scheme will still leave major hospitals, such as Peel Hospital, unchanged by 1970.

Not only has the number of beds remained stationary, but the distribution of beds has failed to respond to the demands being made on the Service. Even in 1947 there was urgent need for more geriatric and long-term accommodation. So far from being satisfied, the need is now even more acute. In recent years the system of classifying beds for old people has changed, but in broad terms the number of geriatric beds increased between 1950 and 1960 at a rate of only 1% per annum. Even in financial terms this is folly, as the cost of maintaining old people in acute medical beds is more than twice that of looking after them in geriatric beds. Whilst the pressure of the "bulge" has led to a dramatic increase in our educational facilities, the pressure of the ageing population has not led to any significant increase in hospital accommodation for old people.

This short discussion has left aside the problem of urgently needed out-patient accommodation; and the squalor of many even of our major hospitals. In 1947 the country needed more beds, better beds, and better allocation of beds to meet the needs of the different branches of medicine. After 15 years of the Health Service, the position is worse instead of better.

The General Medical Services

The pattern of general practice has changed considerably within recent years. After the war about 70% of doctors were in single-handed practice. Now about 70% are in partnerships. This is largely the result of Health Service policy, and has been brought about by making partnership practice financially attractive. This is an example of the power which the Service possesses to mould the shape of British medicine. The facilities available for the new group practices, however, have advanced little if at all. Ventures such as the Family Doctor Centre in Edinburgh, remain few and far between, and where such experiments exist they depend largely on the initiative of the charitable foundations rather than the Ministry of Health. Secretarial and other ancillary services are as essential to the modern practitioner as his motor car, yet there is no evidence of an effective policy to provide them.

The Public Health Service

In any attempt to introduce a policy designed to promote health and prevent disease, the public health services would have a major part

Table 2.

HOW THE HOSPITAL £ IS SPENT

11d.	—	Administrative Costs of Hospital Boards.	} All other Expenditure 7/5
11d.	—	Fuel, light and power.	
1/2	—	Maintenance and repairs.	
1/4	—	Ancillary services and Miscellaneous Expenditure.	
1/5	—	Drugs, Dressings and instruments, X-Ray and Laboratory supplies.	
1/8	—	Food, for patients and staff.	
<hr style="border-top: 1px dashed black;"/>			
2/9	—	Medical Salaries.	} Total Salaries and Wages 12/7
4/8	—	Domestic, Catering and other salaries and wages.	
5/2	—	Nursing salaries.	

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to play. The facilities provided by the public health services remain, however, substantially unchanged since pre-Health Service days. The home help service made substantial headway in Scotland in the decade up to 1960, but progress in other fields was modest indeed.

Medicine today is concerned more and more with the care of the elderly. The saving in money which would result from the accommodation of old people in geriatric rather than acute medical beds has been mentioned above. Similarly, many old people now in hospital could be managed far more successfully at home, if the facilities for community care were put on a much broader basis.

The Profession and Politicians

The major obstacle in the path towards a more comprehensive health service is financial, and the problem is therefore, a political one. More money is required on two counts. Firstly, any worthwhile improvement will require considerable capital investment. Large-scale spending was already necessary when the Health Service started, and little or no capital spending has taken place in the last fifteen years. Secondly, more money will inevitably be required year by year to cover increases in the cost of running the National Health Service. The cost of maintaining water supplies, refuse disposal, and similar community services may reasonably be expected to remain constant, as the service required is the same year by year. Medicine, however, is making continual progress, and each advance is accompanied by fresh expense.

It is indeed the province of the politicians to decide how much of our national resources should be devoted to health expenditure, not the province of the medical profession. Similarly, responsibility for production of atomic weapons rests with the politician rather than the nuclear physicist. However, the physicist with his specialised knowledge has a clear duty to warn the public of the consequences of his work. The doctor has the same responsibility to warn the public of the consequences of National Health Service policy.

Recent financial policy must give rise to the gravest disquiet. Expenditure on the Health

Service has been tending to grow at the rate of about 9% per annum. This increase has not resulted from any planned extension of facilities, but has come about haphazardly as practitioners have availed themselves of each new advance in medical science. The cost of the scheme has also been swollen yearly by the forces of inflation. Present policy is that the growth of expenditure must be limited to 2½% per annum. As certain services are to be expanded at a greater rate than this, expenditure in the hospital service is limited to an increase of only 2% per annum.

This figure is palpably inadequate even to contain inflationary rises in costs, far less to provide money to enable new techniques to be introduced into the hospitals as progress takes place. The authorities are, in fact, planning for an actual contraction in the hospital service. The effect of this policy was seen only too clearly earlier this year in the Royal Infirmary of Edinburgh, when a new isolation unit could not be staffed, and certain other wards were actually closed down. It is the plain duty of the medical profession to ensure that the public realises the effect of present policy. Not only are urgent reforms being denied; existing services are being curtailed.

The usual criticism levelled at the Health Service is that its machinery runs inefficiently. The early part of this paper has attempted to show that the facts do not support this contention. The real charge against the Service is that, whilst it was set up to provide a co-ordinated health scheme suited to the country's needs, it has done no more than run the same old institutions in the same old ways. Indeed, with the present policy even the existing institutions are being undermined. It is the responsibility of the medical profession to ensure that the public appreciates the extent to which the National Health Service has fallen short of its ideals.

The Health Service was brought in against the almost unanimous opposition of the profession. Despite the inadequacies of the Service, doctors are now almost unanimous in its support. In 1948 the profession was agreed about the health scheme, and it was wrong. In 1963 the profession must again speak with one voice—and be right!

THE COMMON COLD

by N. Wright, B.Sc.

One of the prize-winning essays for the Lewis Cameron Undergraduate Prize 1962.

"A family unit is composed not only of children but also of men, women, an occasional animal and the common cold" (Ogden Nash).

The common cold is ubiquitous. It affects all races and occurs in all climates. It is not a killing disease, but figures suggest that colds cause a loss of several million man working hours each year. One estimate put the figure at forty million,¹ another at eighty million: in either case the figure is large. Lindwell and Williams report in an investigation carried out on four groups of office workers, three in London and one in Newcastle, that 10.3% of all colds lead to an absence from work, on an average, of 2.6 days duration. It has been suggested that the common cold should be treated as a quarantable disease but it is obvious that if everybody spent an extra of 2.6 days, or longer, away from work twice a year the economic results would be devastating.

HISTORY

Many suggestions have been made as to the aetiology of the disease. In particular various bacteria such as H. Influenzae, and Strep. haemolyticus have been suggested. But it was not until Kruse³ who had been sceptical of the bacterial hypothesis following his failure to isolate any such organisms from the initial nasal discharge of the common cold, showed that the infecting agent was filter passing and therefore a virus. Efforts have been made to cultivate the virus but until recently practically all these failed.

DEFINITION OF THE COMMON COLD

In popular parlance the term "common cold" refers to any minor infection of the respiratory tract. Bacteriologists and virologists have found it

difficult to be any more precise, and just where to draw the line between a severe cold and a mild attack of influenza is not very clear. In fact it is well known that a mild attack of influenza A virus can give a clinical picture very similar to that of the common cold.

The common cold is now defined according to the clinical picture of what is thought to be its commonest form. The clinical course lasts eight or nine days and has been carefully defined by Rodens⁴. The first phase, or prodromal phase, starts within twenty four hours, usually around eighteen hours of inoculation with infected nasal droppings. A slight soreness of the throat together with a sense of dryness develops; thirty-six hours after inoculation there is an increase in nasal discharge and a feeling of malaise. Slight nasal obstruction and a slight cough becomes apparent but usually the patient remains afebrile though a number get headaches. The second phase usually starts three or four days after inoculation with secondary bacterial invasion, probably from the saprophytic naso-pharyngeal flora, leading to a greater sensation of discomfort, a mucopurulent discharge and obstruction of the passages. These latter changes take a variable time to clear up but if the prodromal symptoms occur alone the condition lasts eight or nine days.

Pathologically the condition is characterised by thickened oedematous nasal mucosa. The mucosa is red or grey depending on the degree of hyperaemia, and is covered by a thin watery discharge. The nasal cavities are narrowed and the turbinates enlarged. Histologically there is extreme oedema of the subepithelial connective tissue and sparse acute inflammatory cell infiltration. Secondary bacterial invasion leads to mucopurulent discharge, hyperplasia of the mucous secreting cells, and in severe infection ulceration of the ciliated cells occurs.

OCCURRENCE AND CULTIVATION

The common cold affects all races and occurs in all climates. Early research was directed towards finding suitable laboratory animals that could be infected. Docher reported that chimpanzees could be infected with the common cold virus. He also showed that chimpanzees could be infected with bacteria free nasal washings from people suffering from mild respiratory symptoms⁵. However this was not a step forward as chimpanzees are particularly expensive and difficult animals to deal with. Since then other animals such as rabbits, guinea pigs, rats, mice, cotton rats, voles, grey squirrels etc. have been tried with inoculations given intramuscularly, intranasally and intravenously. All these failed⁶.

Efforts, especially after the progress made by Embers next turned to cultivation in tissue cultures and we will now consider each virus for which claims have been made as a causative organism of the common cold.

ECHO 28

Two viruses were isolated from the nasal secretions of children aged between five and fifteen, student nurses and medical students suffering from minor respiratory conditions. These viruses, which were provisionally called J.H. and 2060, were cultivated in monkey kidney tissue cells maintained in Parkers mixture 199 with 2% horse serum added. The cultures were maintained at 37°C. Cytopathic changes, which consisted of enlargement, rounding and pyknotic changes of the nuclei together with loosening of a few cells from the glass container, were observed in the tissue culture cells^{7,8}. These viruses are similar in their antigenic constitution and general behaviour but are distinguishable. Further tests, in view of their possible relationship to the common cold were carried out⁹. The virus was inoculated into 58 volunteers. Eleven became infected as judged by the recovery of the virus from nasal washings and six colds occurred, four in volunteers infected with J.H. virus and two in volunteers who failed to give a culturable virus. Attempts to isolate a similar entity in England have failed but serological evidence suggests that it may occur, though uncommonly, in this country. More recently the J.H. virus has been included in the ECHO group as it shows their characteristics e.g. ether resistant, complement fixing antigens and approximately 25 m u in size.

COE VIRUS

The Coe virus was originally described by Lennett¹⁰ and identified with an organism isolated by Pereira¹¹. It was found to be resistant to 20% ether but not culturable on monkey tissue cells, it could be grown on HeLa cells which showed cytopathic changes. It was finally placed in the Coxsackie group number 28.

Of 11 volunteers inoculated with the virus all 11 gave common cold symptoms though fever occurred more often than in the typical infection. Immunological tests do not show it to be very common in Britain¹².

RESPIRATORY SYNCYTIAL VIRUS

This virus was originally isolated by Morris from a group of chimpanzees suffering from coryza. At the same time it was noticed that a person dealing with the animals, suffered from a minor respiratory complaint¹³. Later it was shown that this virus, which could be cultivated on monkey kidney cells could infect man. Sixteen per cent of a population of infants suffering from mild respiratory complaints and 32 per cent suffering from lower respiratory complaints such as bronchiolitis were infected with the R.S. virus. The condition that this virus gives rise to is more severe than the normal "common cold"¹⁴.

ECHO 11.

A virus was isolated by Phillips and Wessler¹⁵ from a person suffering from a mild respiratory complaint. It has been shown to grow on monkey kidney tissue cells, to appear in faeces of infected persons and to be approximately 27 m u in size. It is, therefore, included in the ECHO sub group of enteroviruses.

Experiments at Salisbury¹⁶ have shown that this virus gives rise to atypical common colds accompanied by abdominal symptoms.

ECHO 20.

Rosen et al.¹⁷ reported the isolation and cultivation on monkey tissue cells of a virus obtained from children living in a residential home in U.S.A. The virus was originally called junior village virus but, fortunately, it was designated to the ECHO group after its isolation from faeces and the cytopathic changes in the tissue culture cells as well as other properties were observed and renamed ECHO 20.

Again the Salisbury Common Cold research unit found that it gave rise to atypical symp-

toms such as aching limbs and fever when experimentally inoculated into volunteers¹⁶.

PARA INFLUENZA 1 AND 3

This virus was first isolated by Chanock¹⁸ and was grown on monkey kidney cells. Its presence could be detected by cytopathic changes and also agglutination of guinea pig erythrocytes. These viruses are serologically distinct, and larger than influenza viruses. Similar organisms have been found in Britain, France and Denmark, and they cause typical common colds. However it was found that only 54 out of 1738 infants suffering from the common cold were infected with these organisms and hence it is a relatively uncommon causative agent¹⁹.

RHINO VIRUSES

One of the original aims of the Common Cold Research Unit at Salisbury was to find some means of culturing the causative virus other than in man or the chimpanzee. We have seen that efforts to infect laboratory animals were unsuccessful so tissue cultures were tried. In 1949 it was shown that the virus remained in human embryonic lung tissue cultures but propagation was not demonstrated²⁰. In 1953 successful cultivation using this type of culture cells seemed to have been attained²¹. The tenth subculture showed infectivity. Unfortunately these results have never been reproduced even though variations in the tissue culture technique have been tried, and what the transmitted agent was still remains a mystery.

While varying the tissue culture technique it became apparent that transmission probably took place through one subculture if incubation took place at 33°C using human embryonic kidney cells rather than embryonic lung. Immediately a search was made for a means whereby an infected tissue culture could be recognised without using human volunteers²². No cytological abnormalities were observed but it was noticed that cells supposedly infected with common cold virus could not support the growth of parainfluenza 1 virus. The presence of this virus could be tested for by haemagglutination. The agent causing inhibition was, itself, inhibited by heating to 56°C and by a pH₂, thus ruling out the activity of interferon. This inhibition of the challenge virus was used to test the sensitivity of cultures to the common cold virus. Finally optimum conditions for growth were found to be incubation at 33°C in 199 medium enriched with glucose and bovine plasma albumin.

Then one of those "fortunate" disasters occurred. A new batch of medium 199 was found to be toxic for the cultures and, at first, a repeat of the 1953 set back seemed imminent. In desperation various different batches of medium 199 were obtained from different centres. It was noticed that the cells grown in one of the new batches of medium showed definite cytopathic effects after common cold inoculation. An analysis it was shown that the medium contained less sodium bicarbonate than usual (.03% instead of .16%).

Following these successes it was possible to determine some of the properties of the virus. It was not destroyed by 20% ether but is by heating to 56°C for thirty minutes, and by a pH₂. The size of the virus was found to be approximately 40 m u and was not neutralised by Coe or ECHO 28 antisera. It was soon found that the cultural strains could be subdivided into two groups: those that would grow on human embryonic kidney culture cells alone (H strains) and those that would grow on monkey kidney cells as well (M strains)²³. Preliminary serological studies have already differentiated six different strains.

These viruses present a problem as far as classification is concerned. In that they are small and ether resistant they resemble the enteroviruses, but they have not been cultivated from faeces and their cultivating characteristics are atypical. For the time being they have been assigned to a new group: the rhino-viruses²⁴.

From studies made on viruses obtained from nasal swabs throughout the country it has been estimated that the new rhino-viruses are responsible for between 25 and 50% of common colds in this country. Studies in Chicago give a rather lower figure (16%)²⁶.

CORYZAVIRUS

Just lately an organism has been isolated from 15% of a population of 110 cases of mild respiratory infection in both adults and children. This, together with a rise in antibodies during convalescence suggests an aetiological role. It has been cultivated on foetal lung tissue but not monkey kidney cells and gives rise to cytopathic changes. Serologically it is distinct from at least 2 rhino-viruses, ECHO 11 20 and 28, the Coe and Respiratory syncytial viruses. It is ether resistant, contains R.N.A. and has been estimated to be 17 - 18 m u in size²⁷. Its importance as an aetiological agent of the common cold is not yet certain.

FACTORS PREDISPOSING TO INFECTION

It is an everyday assumption that cold weather, the winter, and damp conditions predispose to infection. Experiments have shown that one means of spread of the common cold is contact between the sufferer and a person of low resistance though the rate of cross-infection is low. Jackson puts the figure at 10%²⁸. Heusman¹⁹ suggests that infection becomes higher with the number of people infected in the household. Children seem to be considerably more effective transmitters of infection than adults.

Experimental colds are most easily produced by intranasal inoculation. Inoculation on the conjunctiva produces no conjunctivitis and similarly no cold was produced by inoculation on the throat. In a number of experiments it has been noticed that in a few cases the virus exist in volunteers without clinical symptoms appearing. Certain epidemiological findings support the hypothesis of carriers but their importance has not been carefully assessed.

Efforts were made, under laboratory conditions to increase the proportion inoculated with live virus strains to develop clinical symptoms. Nasal washings were at their greatest infectivity if they were taken 36 hours after inoculation. Chilling the volunteer by giving a hot bath and then making him stand in a draughty corridor did not increase the proportion of clinical colds. Also the workers at Salisbury did not find that either smoking or tonsilectomy increased the incidence of colds³⁰. On the other hand Brown³¹ found the opposite.

People with a history of allergy appear to be more susceptible to colds than the normal. Similarly women in the third week of their period³² and also emotionally disturbed people³³ seem to be more susceptible. It has been suggested that the common factor in all these conditions is that the nasal mucosa is more congested than in the normal person and this is an aid to infection. Hope-Simpson³⁴ reported that in studies made on 350 people in Cirencester he was able to correlate the number of colds with the difference between the indoor and outdoor humidity. This suggests that the change in humidity when passing from indoors to outdoors gives rise to circulatory changes in the nasal epithelium.

Apparently the cold virus is very susceptible to drying and this, probably, is the most effective way of stopping spread.

IMMUNITY

A few people appear to be completely immune to colds. The reason for this is uncertain but it is known that the conditions in the nose varies from person to person. Perhaps these people have an unfavourable nasal environment for invasion by cold viruses.

Initially it was thought that immunity to colds following infection fell quickly. However when it became possible to isolate single strains, Jackson and Dowling³⁵ were able to show that immunity to that particular strain lasted over a year. A neutralising factor in the gamma globulin fraction was found and the level of this factor was found to correlate significantly with the degree of immunity.

EPIDEMIOLOGY

A number of small isolated communities have been studied. For example in Longyear city Spitzbergen the distribution of colds throughout the year was studied. Each year an epidemic of colds starts on the 25th May rising to a peak by the 31st and then gradually tailing off. The start coincides with the arrival of the supply boat³⁶. Heirbecken reports that when isolated communities mix an epidemic of colds occur³⁷. These findings suggest that a greater degree of immunity is acquired by the population and it is only when it is confronted with a new strain that epidemics occur. J. J. Van Loghem³⁸ collected records in Holland and then analysed them for seven different regions. In each region the separate curves of morbidity were similar in shape and time. These findings certainly do not resemble the normal epidemic or endemic picture and suggests that other factors come into play in large communities.

PROPHYLAXIS

Numerous efforts of a very variable nature have been tried to prevent common cold infection. For example treatment with ascorbic acid has been suggested but evidence of improvement is inconclusive. Another suggestion has been the use of antihistamines³⁹. This treatment probably arose from confusion between hay fever and a cold.

Vaccines have been prepared from the cultured bacterial flora of the volunteers nose. This has apparently given quite good results⁴⁰. Another approach to the problem was the eradication of the unpleasant effects of secondary infection by antibiotics. However it is now

considered malpractice to give antibiotics for the prevention of such a minor condition as the common cold.

In neither of these two attempts was there any attempt to get at the root cause of the condition. Attempts, in particular by Price⁴², to produce an antiviral vaccine were made, but as would be expected from the multiplicity of causative agents this attempt failed.

It has not yet been possible to produce interferon in quantity so it is not known whether this substance would be effective in the control of the common cold.

SUMMARY

We have seen that the common cold causes great economic loss to the country. Some, though not all, of the causative viruses have been isolated and cultured. In particular the rhino and Coe viruses have been shown to cause typical common colds. ECHO 28 and parainfluenza 1 and 3 have been shown to be uncommon aetiological agents and ECHO 20, 11 and R.S. virus cause atypical colds. Immunity develops but the multiplicity of infecting agents precludes the possibility of developing a vaccine. Two epidemiological patterns are found, in isolated communities the typical picture of an organism entering a community of low resistance, in large communities the pattern of incidence does not resemble that of an infective agent and quite what determines the incidence is unknown. No satisfactory prophylactic measures have yet been found though autogenous vaccines against secondary bacterial

invasion gives protection against these secondary symptoms. It is hoped that an antiviral substance may provide the answer.

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READERS' VIEWS

Before making the changes in this journal, we were able to obtain the views of many members, fellows, and others. Most people we talked to shared our opinion that the journal could be improved. We welcome readers' letters, to find if there is a general opinion that such an improvement has indeed taken place.

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This year E. & S. Livingstone celebrates the centenary of the founding of their firm. A firm which began as a small "new and second-hand bookseller" and is now one of the best known medical publishing concerns in Great Britain. Their books reach the far corners of the world and are published in such languages as Chinese, Dutch, Greek, Portuguese and many others. The way in which E. & S. Livingstone have always tried to satisfy as well as serve the medical profession has to a great extent helped to build the firm up to its present day high reputation.

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A.M.D.

BOOK REVIEWS

PRACTICAL BIOCHEMISTRY. Seventh Edition.
H. Zwarenstein and V. E. van der Schyff.
Pp. 106 + x. Edinburgh and London. E. and
S. Livingstone Ltd. 1963. Price 15s.

This book sets out to provide, in compact form, an aid to biochemical laboratory work: evidently, it is intended for use in conjunction with a larger text and theoretical aspects are therefore cut to a minimum.

The book is fairly comprehensive, constructed as it is to cover the course for both Medical and first year Science students of Cape Town University.

In the foreword, A. W. Sloan, Professor of Physiology of the University of Cape Town remarks that, ' . . . The time has now come in the book's evolution when . . . it should be made available to a wider public than had access to previous editions.' In this connection it is tempting to quote the old adage concerning the leading of the horse to water: indeed, it is difficult to foresee any very bright future for the book in this city, since the Edinburgh Department of Biochemistry presently produces very excellent sets of practical notes exactly applicable to the courses of instruction offered. Under these circumstances, no book, no matter how good, can hope to compete.

To any student less fortunate than we in Edinburgh, however, this book may be recommended as an elegantly produced, if somewhat terse, guide to the subject, available at very reasonable cost.

R.B.L.E.

PSYCHOLOGY IN RELATION TO MEDICINE
by R. M. Mowbray, Senior Lecturer in Clinical Psychology, University of Glasgow, and T. Ferguson Rodger, Professor of Psychological Medicine, University of Glasgow. E. & S. Livingstone Ltd., 1963. Pp. 399. Illustrated. Price 36s.

Few books are arranged in such a way as to help the student to remember what he has read, or to aid the process of learning. We have all been told that the best method is to survey material, read the detail, and then summarise the main points. Here at last is a book set out in such a way. The material included is that taught to Glasgow students in their third pre-clinical year, and seems to be more comprehensive than the parallel course in Edinburgh. As psychological medicine gains increasing emphasis in the medical course, it seems most appropriate that a book such as this should be available for the pre-clinical and clinical student alike. Just as physiology is essential to the understanding of medicine, so psychology may be regarded as essential to the understanding of clinical psychological medicine—this is the argument of the authors, and its seems quite true.

The price is the only drawback, 36s. being for more than the average student can afford for this type of book. However, most will find that they wish to read, and some are sure to be so captivated that they will be prepared to pay this sum in order to own such a pleasing book.

R.H.

Wheeler & Jack's HANDBOOK OF MEDICINE.

Revised by Robert Coope and C. A. Clarke.
12th Edition. Edinburgh: E. & S. Livingstone.
22s 6d.

The authors purport no more than a desire to provide the clinical fledgling with a "preliminary sketching of a background to his experiences" and not to consider the alterations of pathological aetiology. The former claim was felt to be fully justified in view of the wide field of interests covered and the succinct manner with which each is analysed in terms of the rationality of the aetiology, diagnosis and prognosis. However, the latter claim is somewhat modest because certain sections do in fact consider at some length those diseases whose aetiology is still moot, e.g. sarcoidosis. Worthy of note are the sections dealing with the principles of electrocardiography and the anatomy and physiology of the C.N.S. The comprehensive nature, the easy literary style, the convenient size and the low cost should make the book attractive to medical students of all years.

B. Hawley

A SYNOPSIS OF SURGICAL ANATOMY. A. Lee
McGregor. Bristol: John Wright. £1 15s.

True to its original purpose, this book has been the standby of Fellowship candidates and surgeons for many years. The 1963 Edition continues this tradition. Much new material has been added and the entire text has been extensively revised, resulting in a noticeably thicker volume. There are new chapters on the pulmonary and cardiovascular systems in keeping with their greater surgical importance. Certain anatomical facts which are no longer of practical significance have been deleted.

Part I: Anatomy of the Normal gives a concise account of most of the anatomical structure of surgical importance. By omitting the detailed description of less important things the simply stated facts about the structures that really matter are more easily remembered and the practical application of this anatomical knowledge leaps to the surface. Frequently, as students, when presented with a mass of dry anatomical facts, we may have asked what their significance could possibly be. Lee McGregor makes the answer so obvious that one

is almost ashamed to have raised the question. Part II: Anatomy of the Abnormal is of even greater practical value. It contains so much clinically useful information that this section alone is worth more than the cost of the book.

The language employed by the author might be open to some criticism. It would seem he has failed to keep abreast of recent changes in anatomical nomenclature. His purpose however, is not to teach but to relate anatomical knowledge to the practice of surgery. Rightly or wrongly, most surgeons of today still use the old names they were taught as students years ago. For one who has some knowledge of anatomy this book can be most useful in making the surgeon's language intelligible. Many surgeons are fond of eponyms and expect their students to know them. Very few are taught by Anatomists. This book with its old terminology and inclusion of eponyms with the conventional name quite successfully eliminates the language barrier between the Anatomist and the Surgeon.

D. A. RANNEY, B.A., D.M.

ELECTROCARDIOGRAPHY by R. W. D. Turner,
O.B.E., M.D., F.R.C.P., F.R.C.P.Ed. Edinburgh:
E. & S. Livingstone Ltd., 1963. Pp. 155.
Illustrated. Price 20s.

This attractive small book is based on a series of articles published in "The Practitioner" during 1962. Though primarily intended for general practitioners, it is of very great interest to both undergraduate and postgraduate students. There are many illustrations conveniently arranged to demonstrate all the common findings, and the effects of some common errors are also shown. In all, it a most satisfyingly 'down to earth' guide to the fundamentals of what often seems a highly complex specialist investigation. The author points out that the value of electrocardiography is in proportion to the experience of the interpreter, and surely this may be said of almost any clinical sign or test. This book forms an excellent basis for the gaining of experience by presenting the simple facts in a clear and concise manner. The price 20s., may be more than the casual reader would wish to pay, but taking the large number of illustrations into account, makes the book extremely good value.

R.H.

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