

RES MEDICA

Journal of the Royal Medical Society



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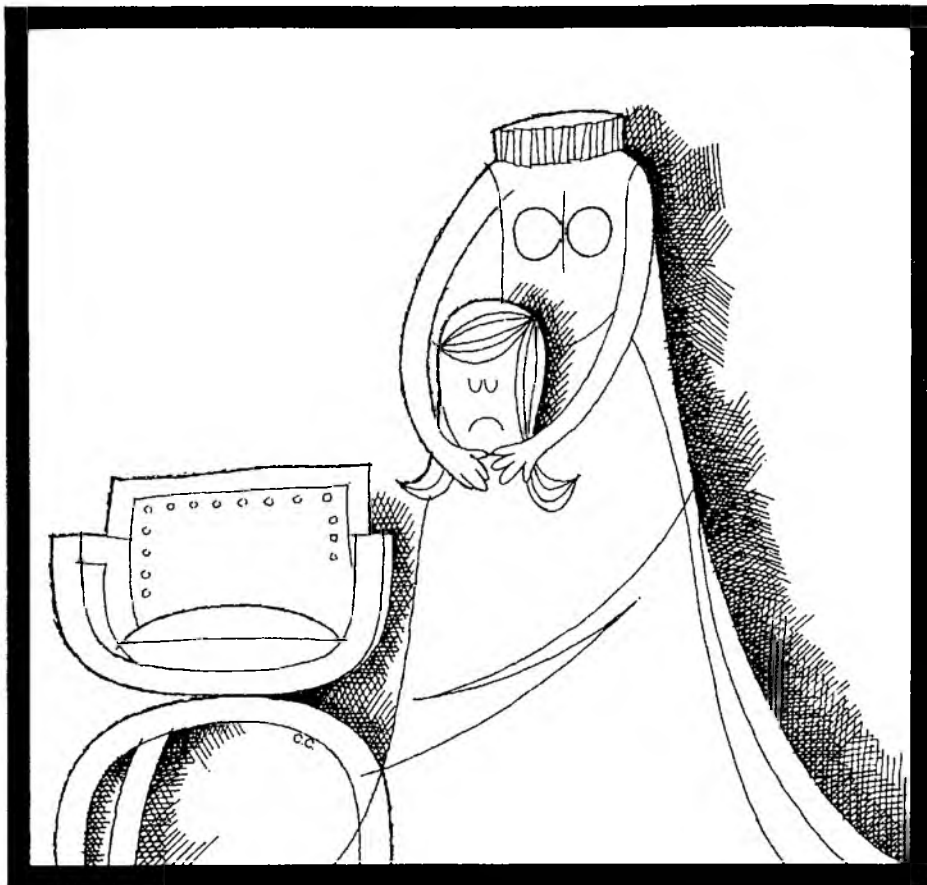
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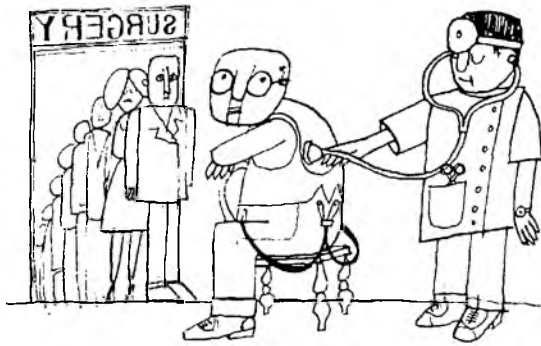
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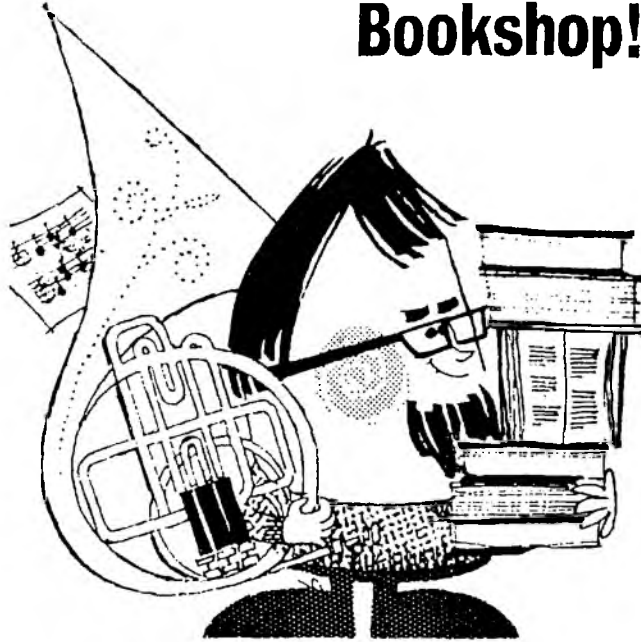
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SELF POISONING — A STUDY IN EDINBURGH

By Professor Neil Kessel, M.D., M.R.C.P., M.R.C.P.E., D.P.M.

*Professor of Psychiatry, Manchester University, formerly of the Department of Psychiatry,
Edinburgh University.*

Years ago the problem of self-poisoning was not recognised. People poisoned themselves, of course, but few survived.

The picture today is different. In Edinburgh more than a thousand adults are admitted to hospital each year after such an act. The great majority of those who poison themselves survive, and this fact goes far towards explaining why the practice has spread.

Poisoning used to be regarded as fatal. Instances of someone taking poisons deliberately to harm himself, but with the intention of surviving, are hard to find. Juliet did so, but Romeo had so little thought that she might not be dead that he killed himself in despair. He knew, as everyone knew, that if you took poison you died. This is not so today.

The growth of pharmaceutical products has brought about the change. The growth of self-poisoning has come about in the train of a rapid rise in number of highly dangerous preparations employed therapeutically, together with a great contemporaneous increase in prescribing. The way has thus been opened for self-poisoning to flourish, since few who practise it have their minds set on dying.

In Edinburgh the Royal Infirmary has had a ward for patients who require overlapping medical and psychiatric care, and it serves as a treatment centre of cases of poisoning occurring in the City of Edinburgh and the surrounding region. This study embraces the full range of survivors of deliberate self-poisoning acts

occurring in Edinburgh between June 1962 and June 1963. Social and clinical data were obtained from every patient while still in hospital, excepting the handful who died without regaining consciousness. If the patient and family are seen later at out-patient clinics often an identical, idealised and false picture is presented.

The injunction applies to 151 men and 314 women who were admitted to the ward. In these 465 people, 522 admissions were made, for some repeated the act.

Index of Endangering Life

Self-poisoning refers to the intention of taking too much of a poisonous substance, believing that it will be noxious. There are three essential components of the act; that it must be deliberate not accidental; that the quantity must be known to be excessive; and that it is realised that this may be harmful. Poisoned patients not satisfying these criteria were excluded. Assessment of the degree of danger to life that the patient exposed himself to is difficult. The quantity of poison, and the extent to which the action is concealed or disclosed, are of equal importance. If the patient took a fatal quantity of poison and took steps to avoid discovery, death is certain if not discovered. Smaller doses and/or taking steps to ensure quick discovery, put patients into a "death unlikely" or "certain to survive" category.

Table 1. — Index of Endangering Life

Predictable Outcome	Males	Females
of Act	(170)	(352)
Death	19%	19%
Death probable	11%	11%
Death unlikely	28%	21%
Certain to survive	40%	49%
Unclassified	2%	0

Social Findings

Individual self-poisoning rates for the 23 Wards of Edinburgh were calculated. Wards with the highest rates lie in the central areas, where overcrowding and slum conditions are most frequent. The lowest rates were found in the solid, respectable, predominantly middle class areas on the west of the City. Post-war housing estates also show high rates, such as Craigmillar, where those living in the worst of the central area were rehoused. However, Sighthill, a new housing estate, with a prosperous and secure working population, has a low rating. Significant associations were found with overcrowding, and those living in a non-family setting i.e. lodging houses and hostels (and including criminals). No significant correlation was found with single person households, as in suicide.

Table 2. — Mother or Father Absent During Childhood (For at Least Six Months, Due to Death, Hospitalization, or Separation Arising from Marital Disharmony). Based on Data for 441 Patients.

	Patient's Age when Separation Began		
	Under 5	Under 10	Under 15
Mother absent	13%	21%	28%
Father absent	25%	36%	43%
Both parents absent	10%	17%	21%

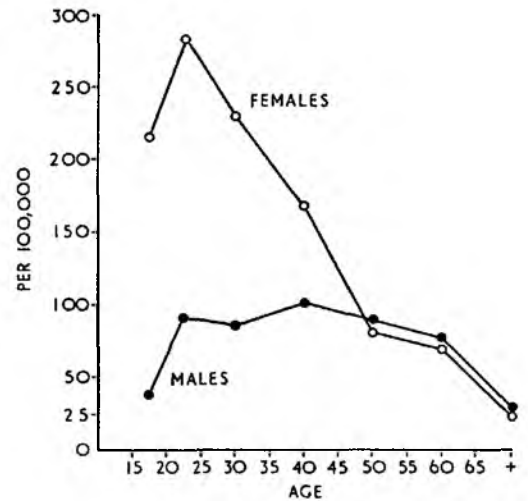
Table 3. — Major Precipitating Factors. Percentages of Approximately 165 Males and 350 Females (Except for Marital Disharmony and Forced Separation, which are Based on 68 Married Males and 147 Married Females)

	Males	Females
Marital disharmony	68%	60%
Drinking a problem	51%	16%
Financial difficulties	44%	31%
Unemployment	34%	18%
Kin disharmony	28%	30%
Isolation	15%	
Crime	15%	
Housing difficulties	14%	19%
Difficulties at work	14%	
Love affairs going badly		16%
Forced separation	12%	

More than one factor might be present. Factors occurring in less than 10% of cases have been omitted. They included bereavement, gambling, and sexual problems.

Age

There is a difference between the sexes. Male rates for 20 - 64 years remain fairly constant. The female rate is much higher but shows a gradual fall with years until at age 45 there is little difference between the sexes. In female teenagers aged 15 - 19, 1 in every 500 Edinburgh girls poisoned herself. Newly married women, even though in a normal home-setting, are emotionally isolated, having changed from an active social life to one of domesticity; thus they may have no-one to share feelings with or give expression to. Unhappiness may therefore explode at a moment of crisis.



Self-poisoning: 1 year admission rates per 100,000 by age and sex. (From Kessel, B.M.J. 1965, 1259)

Marital Status

In those patients who had been married, 30% of the male cases, and 26% of the female had been either separated or divorced, often in the month prior to the self-poisoning act. (Nearly half had ended 5 years before the act.) But of those that remained marital relations were nearly always bad. Unfaithfulness, jealousy, grumbling, and above all, excessive drinking, were often encountered.

Nearly every patient had a bad relationship with a key individual; spouse, relative, or friend. Absence and disharmony also occurred with high incidence in the parents of patients.

Table 4. — Marital Relations (Percentages of Married Patients)

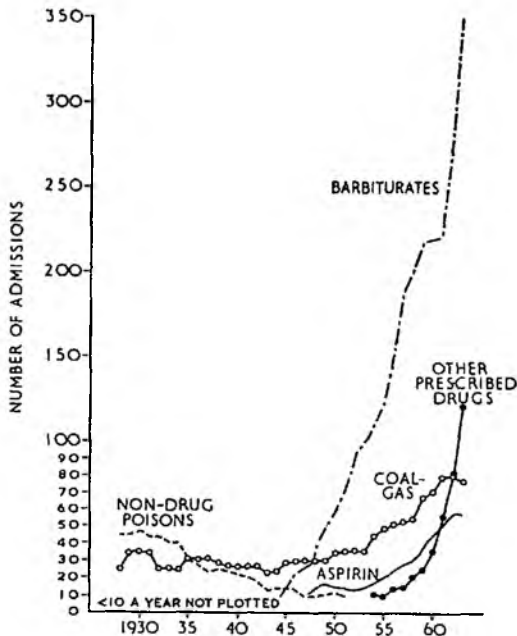
	Males	Females
Frequent hostility disclosed	85%	68%
Clinical assessment:		
Poor	14% 57%	14% 43%
Bad	43%	29%
Desire to end marriage:		
By patient only	8%	11%
By spouse only	17%	8%
By both	2%	4%

Means Adopted

Just over half the acts involved barbiturates. Most drugs were obtained legally or on prescription (but always written for the patient). Drugs used were often for illness's which occurred some time before.

Thirty-five years ago non-drug poisons (lysol, etc.) together with coal gas, accounted for nearly all the cases.

Barbiturates have thus become the new means of self-poisoning, and doctors seem only too ready to prescribe them. Drugs for psychiatric disorders are also on the increase (chlorpromazine).



Yearly admissions of poison patients 1928-1963 showing method used.
(From Kessel, B.M.J. 1965, 1259)

People of different ages employ differing methods. The percentage using barbiturates and coal gas rises with age. Those using salicylates falls. Insomnia occurs as age increases and can perhaps explain this rise. Young people have easier access to salicylates than to sleeping tablets. Older people may also have carried the tradition of coal gas poisoning with them from their earlier years.

Table 5. — Method of Self-poisoning in 522 Cases.

Barbiturate	284 (55%)
Aspirin	64 (12%)
Other drug	119 (23%)
Non-drug poison	6 (1%)
Coal-gas	49 (9%)

Diagnosis

Conventional psychiatric nomenclature is ill suited to describing self-poisoning patients. The decision is often based between depressive illness or intolerable living conditions. Men suffered more from personality abnormality; women from depressive illness.

Determination of psychiatric illness in the Edinburgh department depends on clinical history. If this is negative then there are no grounds for concluding the patient is psychiatrically ill. Distress is not the exclusive province of the mentally ill. However, those with no psychiatric illness tended to be younger, and also to indulge in less life-endangering acts (use of salicylates).

The combination of depression and psychopathy often occurred, personality disorder occurring in 41% of men and 27% of women.

Associated factors included alcoholism, drug addiction, epilepsy and subnormality. The dominant factor in men was alcoholism (37% were alcoholics). 56% of men and 23% of women had been drinking before the act took place. Of the 6 patients (4 : 2) who killed themselves within 1 year of discharge, 5 were alcoholics.

Distress

Moving now to those aspects of the personal situation of the people involved — is there a unifying basis to self-poisoning acts?

Distress drives people to self-poisoning acts. It may arise from within (the person with depressive illness), or it may be generated from outside, from the intolerable, yet insoluble social situation in which he is caught; that is

why so many patients cannot be classed as ill. Nobody takes poison, a little or a lot, to hurt or to die, unless at that moment he is distressed beyond what he can bear, and so desperate he cannot see a more rational solution. The suicide says, in effect, "There is no way out"; the self-poisoner, "I cannot see a way out". They find themselves trapped; they are desperate; and their distress drives them to an action that is both stupid, and the same time, a blow for liberation.

Case. A married woman of 27 whose husband was threatening to leave her, took 50 aspirins. "I didn't think they'd kill me. I thought they might. I hoped they wouldn't. I thought of my father and mother. I couldn't let them be hurt. I hoped really it would bring John back. If it didn't I might as well die." — Senseless and purposeful — it is a paradox we have to accept.

Motive

The sorts of predicament which cause people such distress are legion. Some thought that their feelings about the world were faulty (not always with self-blame); others explicitly incriminated bad relationships with someone else, generally the spouse. Not many mentioned material circumstances — debt or unemployment for instance, and very few held them to be the only factors at work. Physical ill health was rarely mentioned, though such a handicap probably contributed to the patient's state of mind. The immediate spark to many acts was a quarrel; and where the relationship is bad taking poison is often the impetuous result.

Impulsiveness

Two-thirds of all acts were impulsive. Five minutes, sometimes one minute, before the act took place, the idea of taking poison was not in the person's mind. He may, however, have thought about doing it in the past. Hours of rumination may have preceded the determination which was formed in a single moment. But in the event, a feeling of despair arose, often suddenly from a trivial cause, and was as suddenly acted upon. "Why did you do it?" the patients are asked. "I don't know. It just came over me", they reply. And they do not know. It is not that they have forgotten. They are not prevaricating — they never worked it out. It just came over them.

Men and women acted impulsively in equal proportions. Impulsive acts were *not* related to alcoholism, being no more common among the

incubated than among the others.

Impulsiveness was more common than premeditation, at all ages, though its incidence was rather less in women of 55 and over, due to an increase in depressive illness in this group. Patients with former psychiatric illnesses premeditated self-poisoning more often than did others, but even among these impulsiveness characterised over half the acts. Impulsive acts were less life-endangering than premeditated ones. Still 16% had a predictable outcome of death.

People who act impulsively have a chance to seek aid immediately afterwards. Premeditation, on the other hand, carries with it the opportunity to warn someone in advance. A young woman who took aspirins told her husband that she was thinking of taking her life. He did not take her seriously. Unfortunately, that is commonly the case.

Such warnings are part of the "appeal" quality of self-poisoning acts. Stengel (1958) urged that the appeal is usually unconscious. Among our patients, it was common to find it was quite conscious.

Case

A rigid, respectable, intolerant, middle-aged man, whose wife had left him suddenly, a month earlier, took about 25 aspirin tablets. "To tell you the truth, it was exhibitionism, really. I thought it might arouse her sympathy. I'd tried everything — letters, flowers, nylons, the minister, a lawyer — so I thought I'd try this. To be very truthful, I made enquiries as to the fatal dose. Of course I didn't do so directly. I went to the chemist and said "We've been arguing in the canteen about the number of aspirin you'd need." He said that about 40 would probably be fatal. So I took between 25 and 30." I asked him why he had not taken 40, and the answer was immediate: "Self-preservation. Lives too sweet."

Case

Such patients are often condemned as frankly manipulative, and therefore somehow undeserving. When the purpose is so apparent, the distress and despair are less obvious. Admission to the ward, having poisoned oneself, can be, for instance, a powerful weapon in bringing back errant boyfriends. The girls who resort to it are, all the same, very much distressed; in their despair they do something stupid and senseless, and it works. Should we judge them harshly on that score?

Statement of Intention

Once they had recovered, 60% of the patients claimed that they were intending to die, while a quarter said categorically that this was not their purpose. The rest either did not know, or were evasive. Little credence can be placed on these statements. The intention is not usually worked out at all, let alone with such precision in terms of living and dying. Between those who said that they had intended to die, and those who had said that they had not, there was some, but little, difference in the degree to which they had endangered their lives. We find it more profitable to emphasize with the patient any constructive purpose there may have been in his act, than to stress the destructive element, which in any case is evanescent. Very few patients, and they were almost all severely depressed, said after physical recovery, that they still wished to take their lives.

Prevention

Since the outcome of self-poisoning acts is often beneficial, ought we to try to prevent them? Such an argument cannot be countered. It is not the result of the self-poisoning which produces the benefit, but the disclosure and solution of the underlying problem, and there are certainly better ways to bring these problems to light. Self-poisoning is a dangerous practice.

The lessening of the disturbed backgrounds from which patients come; the parental separation; the bad social circumstances, require political action rather than medical. All we may do is to add the knowledge that these conditions generate self-poisoning. But as the majority of self-poisoning acts arise from strains within the family setting, then the person to shoulder the responsibility is the general practitioner in his chosen role of family doctor.

Prescribing

Certain preventive measures are suggested by our study of the means adopted, bearing in mind that two-thirds of the acts were impulsive. Consider first the sale of salicylates. No-one would wish to see aspirin available only on prescription, but it is not necessary for it to be sold in lethal quantities without any check on the reason why it is being purchased. However, it is only a small part of the problem. The majority of poisons taken were obtained on prescription. That this arose soon after the beginning of the National Health Service may

be no more than coincidence. But certainly, in the matter of methods, the physician leads, the layman follows.

To anyone who works in a centre for the treatment of poisoning, the conclusion is inescapable that dangerous substances are prescribed unnecessarily often and in excessive quantities. Several of our patients recounted their surprise that sleeping tablets were prescribed so readily. The growing frequency of self-poisoning makes it imperative to use the utmost circumspection in the prescribing of barbiturates. The average number of tablets on a single prescription in 1959 (Brooke and Glett, 1964), was:— Phenobarbitone—60, Soneryl—44, Amytal—49, Nembutal—40, Drinamyl—48. It is difficult to credence that all this barbiturate was really necessary.

Considerable quantities of drugs for the mental state are prescribed to just those patients who are liable to indulge in overdosage. After an episode of illness, supplies of every kind of tablet commonly remain in the house; in a moment of crisis they are there, an irresistible temptation. The greatest single public health measure to reduce the extent of self-poisoning in Britain would be the removal of these stocks of drugs.

But cut off from a supply of drugs, would the patients resort to more dangerous means? — slashing wrists — jumping from heights? I do not think this likely. Few self-poisoning patients want to damage themselves irreparably. They would probably seek a more healthy way of obtaining the help they desperately claim.

Alcoholism

One of the commonest clinical characteristics, certainly of male patients is alcoholism. Alcoholics take poison because they are depressed, and cut off from care and support. If proper treatment for alcoholism were provided, fewer might be driven to self-poisoning, and indeed to suicide.

Management

Prevention is best. But cases will continue to arrive in large numbers at our hospitals, and we have to deal with them. The necessary medical care and prompt and thorough psychiatric assessment required, must be carried out. At present it still goes by default in many hospitals. The management of the patient by administering a massive dose of psychiatric treatment quickly, should form an integral part of every unit for the treatment of poisoning.

TABLE 6.
Index of Endangering Life, and Disposal

	Death	Predictable Outcome		Certain to Survive
		Death Probable	Death Unlikely	
In-patient psychiatric care (131)	40%	23%	22%	23%
Out-patient psychiatric care (190)	30%	45%	40%	39%
No further psychiatric care (179)	30%	32%	38%	38%

$\chi^2 = 12.05$ 6 degrees of freedom $P > 0.05$

Discussion

I have throughout used the wording "self-poisoning" rather than "attempted suicide", for I consider the latter term to be both clinically inappropriate, and misleading. It is true that in the popular mind deliberate self-poisoning is linked, linked indeed romantically, with the idea of suicide. It is true that some of our patients had done all they could to encompass their deaths; that minority can be said to have failed at suicide. But for four-fifths of the patients the concept of attempting suicide is wide of the mark. They performed their acts in the belief that they were comparatively safe — aware, even in the heat of the moment, that they would survive their overdosage and be able to disclose what they had done in good time to ensure their rescue. What they were attempting was not suicide. Moreover, what they were attempting they commonly achieved. To that end the simulation of death, consciously or not, the hint of suicide, heightened its effectiveness. But the act was not attempted suicide. Doctors do not have to be deceived by their simulation; the drama was enacted for their own circle only.

If the term "attempted suicide" were just meaningless it could be tolerated, but it is positively wrong, and should be discarded. The motives of our patients clearly proclaim this. In the first place the majority of acts were impulsive. Then, too, they were stupid and senseless, and the patients themselves acknowledge this. Not thus does a man drive himself to suicide. Also they demonstrated some purposefulness; but this purpose was to alter their life situation, not to die.

These patients were not attempting suicide. That term leads to errors of judgment. The chief of these is to measure the need for psychiatric treatment by the yardstick of the physical state of the patient. If he has taken only a small quantity of drugs then he was not really attempting suicide, so the argument time and again runs, he was just making a suicidal gesture which need not be taken seriously. Whether or not the patient receives psychiatric help must not depend upon whether the doctor

in the out-patient department thinks the patient is *physically* ill enough to need admission. This doctor will be more impressed by the dozen tablets that the patient has taken than by the threescore that he was prevented from swallowing. The extent of physical damage is no criterion either of the seriousness of psychiatric illness or of the need for psychiatric care. The index of endangering life — our measure of the seriousness of the act — is not correlated with the need for psychiatric treatment.

Mistakes occur and result in many tragedies because doctors cling to the notion of attempted suicide. Attempted suicide is not a diagnosis. It is not even a description of behaviour. It is an interpretation of the motives for the act of self-poisoning — an unnecessary and usually a wrong interpretation. The alternative is simple. Everybody who has poisoned himself warrants psychiatric examination.

The fashion of self-poisoning will almost certainly be with us and continue to grow for years to come. We cannot afford to miss the point of it by calling it something else.

Conclusion

Deliberate self-poisoning is becoming more and more common and a matter of public health concern. Its management, other than resuscitation, is best achieved by psychiatric methods. The means of self-poisoning are usually provided by physicians, and it is as a general medical problem that the poisoned patient first presents.

I have attempted to illuminate each of these aspects by a clinical and epidemiological study of one year's cases in Edinburgh. This has led to an explanation of the recent rapid rise in incidence and to suggestions for prevention and for management. An understanding of all aspects is necessary to the proper appreciation, both of individual patients and collectively, of an important medical problem.

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ON THE MODE IN WHICH EXTERNAL APPLICATIONS ACT ON INTERNAL PARTS

FROM A DISSERTATION BY

JOSEPH LISTER

Lister joined the Royal Medical Society in 1854 and delivered this dissertation to the Society on 21st December 1855. In this dissertation he propounds the idea that there is "sympathy" between external and internal parts such that treatment of internal disease can be adequately treated by applications to the skin such as leeching, cautery and blistering. He illustrates conditions which may be treated by external applications, and attempts to describe the physiological basis of the treatment.

Many local therapeutic means are employed for the sake of a beneficial influence supposed to be exerted by them upon an organ or tissue placed at a greater or less depth below the surface to which they are applied; as when blood is taken by cupping from the integuments of the chest in pneumonia or when the precordial region is blistered in cases of pericarditic effusion. In these days of theory, all are deeply impressed with the very just sentiment expressed by Virgil "*Felix sui potuit rerum cognoscere causas!*" We are no longer

content with the suspicion which satisfied our ancestors but desire to know the *modus operandi* of the remedies we use. And so far is this feeling carried that many are ready to give up without hesitation the most time honoured methods of treatment if they appear irreconcilable with our present knowledge of Anatomy and Physiology, while they are apt to look somewhat slightly at the experience by which such practice is supported.

Now it is by no means obvious how external applications act upon deeply seated parts: thus

in the former of the instances above named it is generally believed that the benefit derived from the local blood letting is greater than could be obtained by venesection of the same amount, which seems to imply that the blood is withdrawn in much larger proportion from the lung than from other parts of the body; yet it is manifestly preposterous to suppose that cupping glasses, applied over the integuments of the chest supplied by the intercostal and internal mammary arteries, branches of the aorta, can draw blood directly from the engorged ramifications of the pulmonary artery, connected with the other side of the heart. Accordingly some physicians have been led to doubt the special efficacy of local blood letting in inflammation of deep seated organs. Again in the latter instance, that of blistering the precordial region, none would nowadays be found to believe that the serum effused under the cuticle had before formed part of the pericardial accumulation, and it is generally supposed that the blistering, besides causing inflammation of the skin "excites the vessels" of the pericardium "to increased absorption" as it is said.

But the depth of the pericardium below the surface and the well known superficial action of cantharides forbid the supposition that the inflammation excited in the skin is in any measure or degree propagated by continuity of tissues to the membrane in question. Similar arguments apply to the case of pleuritic effusion, and an eminent London physician of my acquaintance, influenced I suspect by such considerations, questions the advantage of blistering in either affection. Such doubts cannot be regarded with indifference; if they be well founded it is most important for us to know them well and to do our part in relieving suffering humanity and charitable medical institutions from the useless annoyance and expense of leeches, blisters, etc. in cases of deep seated disease. If on the other hand leeching, blistering and other external means are really as valuable in these cases as our predecessors believed them, then truly it is of the utmost consequence that we should be aware of the fact both that our patients may have the benefit of their employment and that we ourselves instead of giving ourselves up to the spirit of scepticism which at present too generally pervades the study of our profession may have our tottering faith in medicine strengthened and our respect increased from the hard earned fruits of the labours of our ancestor. The latter is, I believe, the true state of the case; and the

many facts that bear upon this important question only need to be placed in a somewhat clearer light in order that we may all be convinced that it is so. The following paper has been written with the view of promoting, however imperfectly, this most desirable object.

The local means employed by the Physician in the treatment of deep seated inflammation are the same that all surgeons use with undoubting confidence in affections of parts more superficially placed, e.g. local blood letting, not to mention blistering and issues.

In the cases in which these modes of treatment are adopted by the surgeon, the parts affected are commonly within reach of sight or manipulation, and he is therefore able to trace their effects with precision. Hence the reason for the confidence with which these remedies are regarded in surgical complaints, while at the same time the proximity of the organ affected to the surface acted upon prevents the risk of the theoretical objection that may be raised against the use of the same means for disease of more deeply seated organs. Yet when these surgical cases are more strictly scrutinized we shall find that similar difficulties present themselves in explaining the *modus operandi* of local treatment, even when the affected organs are comparatively superficial. Thus when the testicle is fomented in cases of acute orchitis it appears at first sight as if the application were made directly to the affected organ. Yet on reflection it will appear that it is not the testicle itself that is warmed and moistened with a hot and wet flannel but only the superficial part of the integument. The cuticle no doubt has its temperature raised on each fresh application of the fomentation and also imbibes moisture and becomes swollen and opaque in doing so, but the free circulation of blood through the rich capillary network of the dermis must keep the most superficial parts of the cuticle at a temperature scarcely higher than that of the blood and also constantly rectify any material differences of chemical composition which the absorption of water into the intercapillary spaces would tend to produce. Still less can we suppose the subcutaneous tissue to be directly altered in temperature or humidity under the circumstances in question. Hence even in this apparent example of immediate application of fomentation to the affected part we see that its direct action upon the organ inflamed is out of the question and the very same difficulty meets us in the explaining of its mode of action as if the testicle had been placed some inches below the surface of the

body — and yet no practical surgeon will be found to question the beneficial influence of fomentation in orchitis. Again when a blister is applied on the knee in dropsy of the joint or chronic sinovitis we have no reason to suppose that the inflammation excited by it extends to the sinovial membrane. We know that if a blister is applied in the same situation for the remedy of enlarged bursa, the knee joint remains so far as can be judged quite unaffected, as inflammation even to a small degree excited in the synovial membrane would manifest itself by effusion into the joint which is not observed in these cases. Wherever a blister is applied upon the integument then this appears as a general rule the only part affected by it; the subcutaneous tissue retaining its usual lax character so that the skin can be moved freely backwards and forwards upon subjacent parts; still less reason is there for supposing that the inflammation excited by the blister passes still more deeply through the dense fibrous tissues intervening between the superficial fascia and the synovial membrane.

Here then the difficulty of explaining the absorption of the fluid in the joint under the influence of the blister is of exactly the same nature as that which should have alluded in the case of precorditic effusion. Yet nothing can be more certain than the fact that the absorption is so induced in the former case. A patient with "Hydrops articuli" may have been confined to bed for weeks with the part carefully bandaged without any diminution in the bulk of the fluid. In such a case the surgeon orders a blister with almost absolute certainty that the speedy removal of the liquid will be the result.

In this case as in that of the fomented testicle the surgeon has the affected part immediately under observation and no theoretical difficulties in explaining the *modus operandi* can possibly shake his faith in the efficacy of these means in such cases.

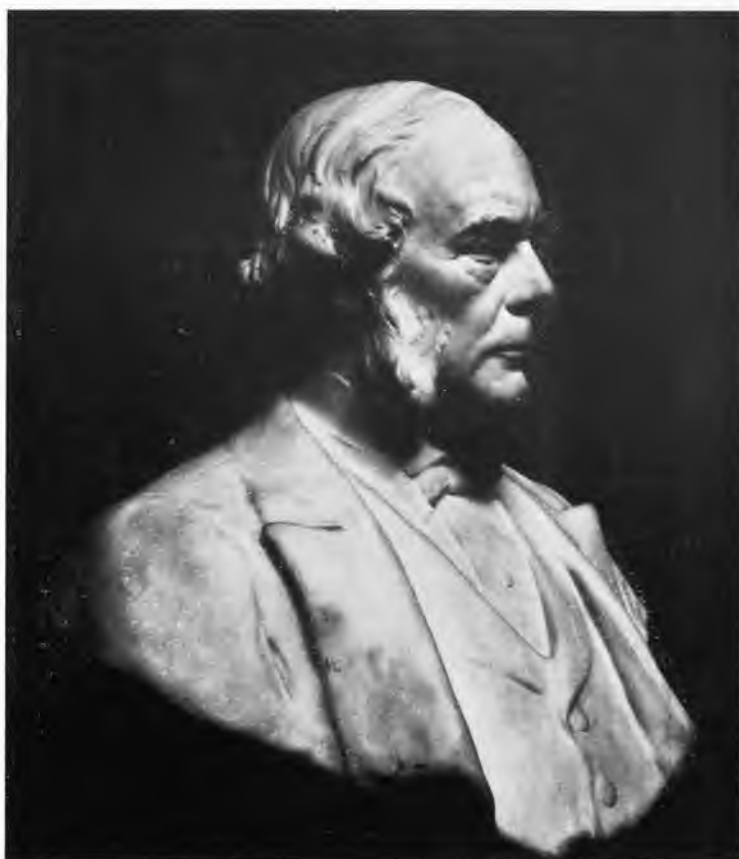
But the surgeon too has not infrequently to deal with disease more deeply seated, and therefore, no less than in the cases just mentioned, occasionally meets with facts quite conclusive in proof of the efficacy of local means. Few surgeons, I imagine, will doubt the beneficial influence so produced upon acute iritis by cupping the temples; yet the idea of direct withdrawal of blood from the inflamed organ as a mechanical consequence of the action of cupping glasses upon the integument is scarcely as absurd than in the case of pneumonia; the eye-ball, with the exception of the ocular con-

junctiva, being supplied by the ophthalmic artery a branch of the internal carotid, while the skin of the face receives its blood from branches of the external carotid. As this is a very illustrative case of local blood letting I may mention a striking example of it which on a patient under my own observation — a man of syphilitic diatheses under the care of Dr. Walsh of University College Hospital, London, imprudently left his bed in a season day similar to the present to look out of his window at a game of snowballing that was going on in the street, and in the course of a few hours the left eye was affected with severe inflammation. The iris became discoloured, greatly contracted and irregular; lymph appeared at the pupillary margin, the sclerotic was the seat of intense pink infection, the vision of that eye became misty and he experienced severe pain in the parts of the face surrounding the orbit. It fell to my lot as Dr. Walsh's assistant to deal with this very serious attack. As the man's general health was rather low I omitted general blood letting and proceeded to cup the temple. No sooner had the first glass been applied and had drawn up the yet unscarified integument as a red hemi-spherical mass, than the patient to my surprise exclaimed that his vision was much clearer and that his pain was greatly diminished; and though I could hardly believe my eyes the sclerotic infection appeared decidedly less. I proceeded to take a few ounces of blood as I had intended and from this time forth the inflammation which had before been so rapidly advancing steadily abated and in the course of the same afternoon the pupil became much larger and more regular. The patient also took calomel and opium to which the favourable progress of the case must still in part be attributed; but in the unequivocal effects of the first cupping glass in the deep parts of the eye we have an extremely striking instance of the beneficial influence of this method on the acute stage of inflammation in a part almost wholly unconnected as regards direct vascular communication with the integuments to which it was applied. The blood was drawn up in abundance into the soft parts included in the cupping glass; at the same time the sclerotic vessels grew comparatively pale, in other words came to contain less blood but, as before observed, anatomy forbids us to suppose that the blood was drawn mechanically from the sclerotic in so great a proportion as from any part supplied by the external carotid. There again the superior opportunities of the surgeon in having to deal with a disease which he could

see enabled him to combine objective with subjective symptoms as to exclude all doubt regarding the fact of the benefit derived from a means of treatment which the physician, less favoured in consequence of the obscure position of the parts he treats, may be led to doubt altogether.

As another instance of palpable advantage witnessed in surgical practice from the use of external application for disorders of deeply seated parts I would direct attention to the efficacy of the actual cautery of some severe cases of spinal disease: and I will select one

particularly striking case of which an account will be found in detail in the monthly Journal for August, 1854. A man, 27 years old, had been for 18 months affected with disease of the upper cervical vertebrae which had been steadily advancing in spite of treatment till his admission into the Royal Infirmary of the 20th of June 1854. "His countenance wore a peculiar expression of mingled suffering and apprehension" as Mr. Syme expressed it. He complained of severe pain in the head and neck, aggravated by any sudden movement so that this was a great constraint about all his actions.



Bust of Lord Lister, by Brock, in the Royal College of Surgeons of England. (by kind permission Guthrie, D. (1949), Lord Lister. Edinburgh: Livingstone).

He always kept his head bolt upright except when in bed and could neither lie down nor sit up without supporting his head with his hands; he never turned his head without the rest of his body. There was great swelling of the upper part of the neck, and he could only open his mouth a little way: deglutition was extremely difficult and a remarkable prominence of the bodies of the upper cervical vertebrae was to be felt in the pharynx. On the day after his admission Mr. Syme applied the actual cautery over the spinous processes of the upper cervical vertebrae. Next day he found less pain on moving the head and in 2 or 3 days his countenance assumed a cheerful aspect. "A steady improvement" says the report, "has since taken place in his symptoms and at the present time (July 15th) he has no pain whatever when he sits at rest and can also use strong and active exertion without uneasiness, and no longer requires to support his head in lying down or rising. He can turn his head round quite freely and look up at the ceiling and it is only in sudden movements of the neck that he feels any pain at all. The swelling in the neck has greatly subsided and he can open his jaws wide and swallow with comparative facility. The sore on the neck is almost healed and he talks of leaving the hospital in a few days as cured. When we consider how far removed the bodies of the cervical vertebrae are from the integuments of the back of the neck, and further that the actual cautery produces by its direct action only a very superficial effect, as complete proof as need be desired of the beneficial influence of an external agent upon severe organic disease in a part far beyond the range of its immediate action is obtained.

Facts scarcely less striking might be drawn from the practice of Physic but as we have seen the question of their *modus operandi* is essentially the same as in that of Surgery and I will for the present content myself with the illustrations already brought from the latter sources and proceed to the discussion, imperfect as it must be, of the Theory of the action of these external applications.

First I would remark that the consideration of the effects of cupping of the inflamed iris, not to mention other less conclusive instances, shows that the explanation of the action of this group of remedies must not be sought in the arrangement and connections of the blood vessels. If community of vascular supply were the cause of the influence of external agents over internal organs, we should expect to find this most strikingly illustrated in the case of

local abstraction of blood; but we have seen that in the iris, as in the lung, it is anatomically absurd to suppose that the withdrawal of blood from the surface to which cupping glasses or leeches are applied can produce any direct drain from the vessels in the affected part, inasmuch as the internal organs and the surface are supplied by branches of widely differing trunks. The only other great means of mutual functional connection between one part and another with which we are acquainted is the nervous system; and it is therefore to this source that we must look for the unravelling of the mystery we are considering.

Imperfect as our knowledge of the Anatomy and Physiology of the nervous system is, we yet know enough of its laws of action to see that it is through the medium of this great bond between the various component parts of the frame, that the effects in question are produced. And now I would wish to direct attention briefly to the sympathetic relations which exist through the agency of the nervous system between one part of the body and another; and more especially between internal organs and the surface placed over or in vicinity of them. This great law is manifested partly in sympathy of sensation; the external surface is richly supplied with sensory nerves while the internal organs have very little sensibility of their own. We see an obvious final cause for this. The surface is that part of the body which is brought into contact with the objects of the external world and requires sensibility to appreciate their presence and influences; and again any disturbances produced by these foreign bodies can be more readily rectified when the attention of the mind has been drawn to them. Hence both for the purpose of appreciating the qualities of these foreign bodies and rectifying the disturbances which they may create, acute sensibility is requisite in the integument. In both these respects however, the reverse obtains with internal organs. They are not, generally speaking, exposed to contact with the external world and also it is less necessary for the attention of the mind to be directed to their derangements because their inaccessible position makes it impossible to apply direct means to rectify such disorders. It would have been a cruelty, if it may be said with reverence, to have made the intestinal canal as sensible as the skin so that the mind should have been constantly conscious of irregularities of form or surfaces of the materials passing along it, perceiving sensations like those of painful friction or itchings of the skin, while at the same time the hand could

not be applied to remove or diminish an unwieldy mass or to rub away the sense of itching. But though internal organs cannot, as a general rule, be reached directly by human means, yet it would appear as if the Creator had defined that their derangements should be, though but to a limited extent, under the control of treatment. As this can be effected only by indirect means it has been arranged that some part of the surface, generally that lying most nearly over it, shall be placed in sympathetic relations with the organ within so that agents acting on this portion of the integument may produce an influence upon the organ. And in order that mankind may be directed to this indirect mode of treatment it is so planned that the portion of the surface that is in sympathy with the organ for curative purposes shall also sympathise with it in sensation; shall, as it were, feel for it. Thus where the intestines are undergoing contraction beyond the limits of health, the hand is instinctively placed upon the surface of the abdomen. Who has not felt the soothing influence of the most superficial friction of the integument in intestinal colic?

In the same case Nature tells even the savage to apply warm applications to the skin of the abdomen and a correspondent from a Hospital in the Dardenelles tells me that there, where diarrhoea is very prevalent, the natives wind an astonishing number of yards of cloth round their bellies to counteract this tendency of the climate. Again to take the respiratory organs. How remarkable is the tenderness of the skin frequently present over the apex of a tuberculous lung! And how plainly does Nature tell us to avoid and guard against the exposure of the chest and throat when the lungs or bronchial tubes are inflamed. So too when the iris and sclerotic are attacked with inflammation it is not the eye but the integument of the face in its vicinity that is painful, and the headache which results from congestion or inflammation of the brain is commonly quite indistinguishable to the patient from the painful sensation produced by neuralgia of the nerves of the scalp. Lastly I would allude to the pain in the penis and perineum in cases of stones in the bladder. Were the pain felt in the organ that is the seat of the abnormal concretion it would be indistinguishable, at least to the non-professional man, from colic of parts of the intestines in the same situation; but as matters are arranged the infant affected with calculus at once draws the attention of his parents to the urinary organs by his energetic demonstrations of the uneasiness which he experiences in the external parts.

Along with this sympathy of sensation, we see frequent proof of sympathy of Physiological action.

In the case of the respiratory organs the whole integument is more or less in sympathy with them, but the anterior part of the thorax and the soles of the feet more especially and the deep inspiration that occurs when the body is plunged into cold water and the first breath excited in the newborn infant by contact of the surface of the body with the external air, are instances of this sympathetic physiological action. Another striking example of it is one familiar to every Accoucheur, who, if the uterus remains relaxed after labour producing hæmorrhage applies cold cloths to the vulva or lower part of the abdomen with the confident expectation that the uterus will at once contract into a firm globe. It is of course not necessary to point out that the cold applied to the vulva cannot possibly produce any reduction of temperature in the womb. I will content myself with one other instance of this sympathetic Physiological action, illustrative once more of the relations that exist between the integuments of the face and the iris, viz. the dilation of the pupil induced by extracts of Belladonna smeared upon the brow and lids. This dilation is clearly due to contraction of the dilating fibres of the pupil. When Belladonna acts unusually freely or when a strong solution of its active principle has been applied to the conjunctiva, the dilation far exceeds anything that could be accounted for by supposing the sphincter pupillæ relaxed. I remember seeing this effect very strikingly in a child with congenital cataract to whose eye I applied solution of sulphate of atropine preparatory to dividing the lens, with the effect of making the pupil almost equal in diameter to the cornea so that not only the whole exposed part of the anterior surface of the lens but the black inner margin of the ciliary body was brought into view. Wharton Jones has made the curious observation that while all other saline solutions tried by him produced in the arteries of the frogs web constriction followed after a few seconds by dilatation or else dilatation without any visible interval of constriction, solutions of atropine caused a gradual and permanent constriction of the arteries taking place in about the same time and lasting about as long as the dilatation of the iris when the solution is applied to the human eye. Hence it would appear probable that the Belladonna, when applied to the surface of the eyelids, not only causes contraction of the muscular fibres of the muscles of the skin,

but at the same time contraction of the dilator pupillae by sympathy. This view of the phenomena is demonstrated by the beautiful experiment of Bernard upon the sympathetic nerve in the neck, the division of which (for instance in the cat) produces turgescence of the vessels of the ear and face generally, and contraction of the pupil of the side operated on; the dilator pupillae and the constricting fibres of the vessels of the integument being together relaxed so that the sphincter pupillae acts without antagonism and the relaxed arteries yield to the distending force of the heart; and that this explanation is the correct one is proved most striking by the converse experiment of stimulating the sympathetic by galvanism when the pupil becomes at once enormously dilated and the vessels of the ear, previously engorged, become invisible. The dilators pupillae and constricting fibres of the arteries are both together made to contract by the stimulus applied to the sympathetic, which is thus proved to have dominion over both, while the third cerebral nerve is known to preside over the sphincter pupillae.

I have dwelt thus fully upon this last example because the case of the iris is very illustrative in more ways than one. Thus :

1. The distribution of the blood vessels proves, as we have seen, that they are not the medium of sympathy between the surface of the face and the iris.

2. The temporal and supra- and infra-orbital pain of iritis shows that the soft parts of the face around the orbit sympathise in sensation with affections of the iris.

3. The action of Belladonna, as explained by the observations of Jones and the experiments of Bernard, show a sympathy in physiological action between the same parts and further appear to prove the important fact that this sympathy of Physiological action takes place through the medium of the sympathetic.

4. The effect of the cupping glass above detailed shows that along with the sympathy of sensation and physiological action is found a clear example of the influence produced upon an internal organ by one of the most disputed though most celebrated external therapeutic means.

Diseased action is but a modification of the process of health and accordingly, while an internal organ and the surface over it sympathise in physiological action there are no more striking examples of sympathy than those in which deeply seated parts become affected with disease in consequence of external applications.

Thus if a person sits long upon a cold stone he will very probably be attacked with inflammation in or around the prostate gland, or if the subject be a female an attack of endometritis may ensue, the latter case being strictly parallel with the physiological action lately attended to of the contraction of the uterus under the influence of cold applied to the same region. Again while the sudden application of cold to the chest or soles of the feet induces sighing inspiration, the same agent in long continued action on the same part of the surface is apt to induce inflammation of the mucous membrane of the bronchi. It is needless to multiply instances of facts so familiar and I would only now observe that where we see inflammation of an internal organ thus readily induced through the medium of the nervous system by the action of cold upon the surface over it, it appears but natural that agents of a different or opposite nature such as heat, may be effectual in curing inflammation where operating upon the same parts of the surface; in other words where the external surface sympathises with the internal organs in causing disease, so under other circumstances it may sympathise with it therapeutically. Accordingly there is no more effectual remedy for a bronchitis caused by exposure of the back to cold than a hot pediluvium while the hot hip bath is no less beneficial in prostatitis.

From these considerations of the laws of sympathy, we have no difficulty in understanding in a general way how external therapeutic means may produce an effect on parts deeply seated.

I cannot but feel that in this paper I have dealt very imperfectly with a subject which though intensely interesting is extremely difficult. For the accuracy of the facts mentioned I can vouch, and I feel also confident of the truth of the general theory that it is through sympathy, in other words through the nervous system, that the external therapeutic application, to which I have specially alluded produce their beneficial effects upon parts within. With regard to the more intimate application of this theory, to these several methods in particular, I express myself with greater hesitation, and feel that it is at present in but a crude form.

If however the object which I proposed to myself has been in any degree attained, if the facts bearing upon this important subject have been placed in a clearer light, and if the confidence of any of our members in the use of these means of treatment has been strengthened I shall feel myself deeply rewarded.

“WAYSIDE HOUSES OF ILL-REPUTE”

— DIVERTICULAR DISEASE OF THE COLON

By T. W. BALFOUR

From a Dissertation delivered before the Royal Medical Society

on January 29th, 1965.

A diverticulum is simply a blind pouch and it can occur in any section of the alimentary tract; this article concentrates on those arising from the large bowel.

The question of how diverticulae are produced was for many years the subject of pure conjecture rather than of scientific proof. If we turn back the pages of medical journals over the past century, we see many shifts in the emphasis of man's efforts to elucidate the cause of acquired colonic diverticular disease. The current theory is that abnormal inter-haustral contractions of rings of thickened muscle result in the development of very high intra-colonic pressures in response to certain specific stimuli, the most important being morphine and prostigmine. By contrast, “probanthine” and atropine tend to abolish the pressures.

I must stress that basal pressures are similar in patients with diverticular disease and in normal controls. (This tends to refute any close casual relationship between the “spastic colon” and diverticular disease.) It is *only in response to certain stimuli* that the abnormal intraluminal pressures may be recorded.

One important practical point is that the above facts represent *prima facie* evidence against using morphine to alleviate the pain of acute diverticulitis.

Pathology

There is no muscle in the wall of an acquired diverticulum. This should be contrasted with the *congenital* type in which the wall is composed of all layers of the bowel—as for example in the solitary caecal diverticulum.

There is simple herniation of the mucosa through the circular muscle. Rarely, the protrusion may turn and dissect between the layers of muscle.

Incidence

The disease is rarely seen before middle age — but it has been reported in a boy of 14 years. It is commonest in the sigmoid colon, and its incidence falls disto-proximally.

The geographical variation in incidence is significant, the disease being virtually unknown in, for example, the pure Indian population of the Peruvian Andes. It is also extremely rare within the Japanese and the Koreans. These 3 races all have a very low incidence of obesity and constipation (as compared with U.K. or U.S.A.); and their staple diet is of much higher residue.

Diverticular disease is increasing in most

Western communities. It is true that the oldest profession in the world may conduct business within wayside houses of ill repute; but diverticular disease is by no means the oldest disease of the colon. Its increasing incidence is due partly to an aging population, but also to the increasing sophistication of Western life and dietary habit.

RADIOLOGICAL STAGING

This is a vital feature of the new approach to diverticular disease. Four stages are recognisable:—

1. *Prediverticulosis* — a radiological concept only, which cannot be recognised at operation or autopsy. The appearance on barium enema Examination is described as “ripple”, “palisade”, or “saw-tooth” according to the degree of development.

2. *Diverticulosis* — discrete flask shaped pulsion diverticula, often containing the crescentic shadow of a faecolith. No irregularity of contour seems to suggest inflammation.

3. *Diverticulitis* — specific diverticula with irregularity in certain segments of colon indicating inflammatory change. This stage is reached by only a few of the patients who exhibit “stage 2”. Stagnation has produced ulceration and bacterial invasion of the wall of the diverticulum.

4. *Peridiverticulitis* — a persistent filling defect, often radiologically indistinguishable from carcinoma, is present. Here the infection has passed beyond the wall of the inflamed diverticulum.

One important feature about this staging is that the enlightened physician of 1966 must appreciate that “prediverticulosis” is a disease entity which may be just as active as “diverticulitis”. It can, for example, in certain cases bleed more severely than diverticulitis.

It is useful to employ the term, “diverticular disease” as an umbrella with which to cover all stages and all clinical manifestations.

Clinical Features are widely discussed in any standard medical text-book. I will not dwell upon them. The commonest symptoms are pain, constipation or diarrhoea, bleeding, distension and obstruction.

The commonest findings are abdominal tenderness, an elevated E.S.R., a positive F.O.B., and a sigmoidoscopic appearance which excludes ulceration or neoplastic change.

Natural History

Very little is known about the natural progression of diverticular disease. However, a recent study conducted at the Western General Hospital (Edinburgh) was designed to probe two of the many unanswered questions:—

1. Can the patient in whom the serious complications of diverticular disease will develop be identified at an early stage?

2. In particular, does the radiological nature of the disease afford us any clue as the course of the disease?

The detailed results of this study cannot be considered here, but the relevant conclusions are of importance. These are:

1. It still remains true that 70% of patients with diverticular disease will be maintained in good health by simple medical measures, or often in the complete absence of treatment.

2. There remains 30% of patients who will have further trouble; and the problem is to decide at an early stage of the disease and at an early age of the patient which individuals will fall into this group.

3. Radiological features do not represent infallible clues in the detection of this 30% who will develop complications of varying severity.

4. It seemed reasonable to suggest that patients with recurrent attacks or attacks associated with the signs and symptoms of inflammation should be submitted to early surgical resection in the hope of avoiding some of the highly dangerous complications.

By analogy to the “fair, fat, forty” female who is reputed to be exceptionally prone to gall bladder disease, it was evident after conducting the follow-up interviews that there exists a corresponding diverticular diathesis in the “short, stout, sixties or seventies”!

TREATMENT

Medical: There are few maladies which receive more unnecessary treatment than diverticulosis. On the strength of a few pelvic diverticula innumerable patients are condemned to a strict and frustrating low-residue diet. It is true that dietary modification is usually advisable, but this should be directed mainly towards weight reduction; the “low residue” component need only be the avoidance of pips and skins of fruit and vegetables.

The other features of good medical management are:—

COMPLICATIONS

- (a) Regular use of non-irritant laxatives — liquid paraffin, “milk of magnesia”, or “isogel”.
- (b) Occasional use of antispasmodics and antibiotics to quell recrudescences.

Surgical: Surgery has much to offer today in the treatment of diverticular disease; and the present trend is toward operation at an early stage. The ideal operation is a one stage resection with end-to-end anastomosis; but in the face of certain complications a temporary colostomy may have to be done—although it must be noted that a proximal diverting colostomy does not always prevent subsequent fistula formation, perforation or haemorrhage.

In certain cases of widespread involvement only 20 cms. of pelvic colon is resected. If the whole colon is removed, then the large bowel loses its important function as a collecting and dehydrating chamber.

INDICATIONS FOR OPERATION

The old policy of watchful waiting is no longer tenable here. The pendulum of opinion is swinging towards earlier surgical operation in a younger, healthier patient before dangerous complications develop. This new policy has resulted in the establishment of a set of relatively rigid criteria which can be utilised as operative indications.

These are :—

On History :

- (1) Failed medical treatment — repeated attacks still occur.
- (2) Increasing severity of attacks, particularly in patient over 50 years old.
- (3) Pain and fever predominate in attacks. This suggests active inflammation.
- (4) Persistent bleeding per rectum, in absence of other causes and in presence of a normal clotting mechanism.
- (5) Urinary symptoms, particularly frequency and dysuria in the male, suggestive of early colovesical fistula.
- (6) Sub-acute obstruction.

Additional features in favour of operation would be :—

On Physical Examination :

- (1) Mass palpable
- (2) Marked tenderness.

On X-Ray or Sigmoidoscopy :

- (1) Persistent filling defect.
- (2) Unable to exclude carcinoma.

Herein lies the potential danger to your life once you have crossed the portal into a wayside house. It is not uncommon for the symptoms of early diverticular disease to be trivial or even completely absent until the stage of complications is reached. Such complications are :—

- (1) Obstruction (Acute or chronic in the small or large bowel).

There are four possible pathological processes by which obstruction may be effected —

- inflammatory mass
- abscess
- co-existing carcinoma
- adynamic ileus

- (2) *Perforation*

- Local — Pericolic abscess
- Pelvic
- General — Faeculent Peritonitis, a highly fatal condition.

- (3) *Fistula* — External; Internal.

Diverticular disease is the commonest cause of vesico-colic fistula, which usually presents with frequency and dysuria; only rarely are the classical features found — that is, pneumaturia and strangury on defaecation.

- (4) Haemorrhage; as persistently positive faecal occult blood or as massive colonic haemorrhage — of which diverticular disease is now recognised as commonest cause.
- (5) *Portal Pyaemia* — metastatic abscesses. V.v.rare.
- (6) *Malignant Disease* often co-exists in the typical age group with which we are dealing. It is not a true complication of diverticular disease.

CONCLUSIONS

This paper has dwelt upon the more challenging and interesting facets of diverticular disease — the natural history; the method of specific radiological staging; the indications for early surgical intervention.

Enthusiastic advocacy of early one-stage surgical resection must not blind us to the necessity for good medical treatment in many uncomplicated cases, nor to the advisability of multiple staged operative procedures in the face of certain complications.

ANAESTHESIA IN PATIENTS WITH CARDIAC OR RESPIRATORY DISEASE

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The degree and frequency of difficulties associated with anaesthesia depends primarily on the skill and experience of the anaesthetist. However, with the increase in life expectancy and advance in anaesthesia and surgery, a greater number of patients previously considered unfit are now being submitted to surgical operations. In many of these patients incidental cardiovascular, respiratory or other disease, frequently of long-standing, may present problems in the conduct of anaesthesia. Furthermore, many drugs used in the treatment of these conditions can potentiate or modify the pharmacological actions of anaesthetic, analgesic and muscle relaxant drugs and increase the risk of accidents and complications during and following anaesthesia. It is clear, therefore, that the degree of anaesthetic risk may be quite unrelated to the extent of the surgical procedure. For example, the quite major operation of gastrectomy in a generally healthy young man is, from the anaesthetist's point of view, a relatively safe and simple procedure, whereas the extraction of a few teeth in a patient with a history of a recent myocardial infarction or with severe asthma may be fraught with considerable danger. Not infrequently, of course, patients with severe heart or lung disease may require a major surgical operation, either for the treatment of the cardiac or pulmonary

disease or for some other serious surgical condition and, in such circumstances, the overall risk is still greater. Although it is often quite impossible to eliminate the anaesthetic dangers associated with concurrent disease or to bring about its rapid and spectacular cure, nevertheless the risk can generally be considerably reduced by careful preparation of the patient before anaesthesia and surgery. Even the knowledge that the disease is present or that the patient is receiving certain drugs can go a long way to reducing the risk of accident by alerting the anaesthetist to the possibility of abnormal reaction to anaesthetic drugs. For example, patients who are currently taking monoamine oxidase inhibitors for the treatment of depression may occasionally show a profound reaction to analgesic or vasopressor drugs. It is quite probable that the possibility of such treatment may have been overlooked by the anaesthetist in his pre-operative examination, unless the physician or general practitioner who is responsible for prescribing these antidepressant drugs has been careful to mention the fact in his letter to the hospital or has impressed on the patient the importance of informing the anaesthetist about his treatment for this seemingly quite unrelated condition.

Where the operation is one of election the patient will usually have been under the care

of a physician before being referred to surgery and the necessary therapeutic measures carried out to bring him into the best possible condition for operation. In the case of patients admitted from the surgical waiting list, or more particularly, in patients admitted to hospital for emergency surgery, the existence of concurrent disease of the heart or lungs may be quite unsuspected. While the anaesthetist has a major responsibility for assessing the fitness of all his patients for anaesthesia it is in the latter group that careful pre-operative examination and assessment is most important if accidents are to be avoided.

It would be impossible to review even briefly in a short article all the potential risks of anaesthesia in patients with concurrent 'medical' diseases and it is proposed, therefore, only to outline some of those met with in surgical patients with coexistent cardiac and respiratory disease and to indicate how these can be avoided or treated.

ANAESTHESIA IN PATIENTS WITH HEART DISEASE

Pre-operative period.

The pre-operative functional status as judged from the patient's history is usually of more value in assessing the degree of risk than the type of heart disease which is present. However, in certain types of heart disease the risk is particularly increased and every effort should be made to control or correct factors such as tachycardia, infection and anaemia which may precipitate arrhythmias and heart failure during anaesthesia and surgery. On the other hand, in patients requiring emergency surgery, as for closure of a perforated ulcer or control of haemorrhage, although treatment of the co-existing heart disease will be limited, a knowledge of its presence and of current drug-therapy will reduce the risk of accident.

Patients with coronary artery disease are especially subject to increased risk when signs of heart failure are present. In those patients who give a history of angina pectoris of increasing severity and with less and less provocation or where there is a history of myocardial infarction within the preceding three months, operation should be postponed unless the surgical indication is urgent. This also applies to patients with remediable conditions such as hyper-

thyroidism or myxoedema in which appropriate drug treatment will allow the subsequent operation to be performed with greatly reduced risk.

Many patients with heart disease show a nervous tachycardia which may precipitate heart failure. This risk is considerably reduced by adequate pre-operative sedation. When auricular fibrillation is present with a rapid ventricular rate, an attempt must be made to control this with digitalis before anaesthesia is begun. The dose of digitalis administered will depend on the time available before surgery and on the previous treatment but, whenever possible, the operation should be postponed to allow digitalisation by the oral route to restore a normal ventricular rate and to control the heart failure. On the other hand, unnecessary delay and attempts to treat long standing auricular fibrillation in elderly patients with only minimal signs of failure are unwarranted and unlikely to improve significantly the risk of anaesthesia and surgery.

When a mechanical restriction to heart action is present, as in patients with constrictive pericarditis or aortic stenosis, ability to adapt the cardiac output to compensate for alterations in venous return or myocardial activity is impaired and they are, therefore, less able to withstand deep anaesthesia and rapid blood loss. Circulatory arrest due to asystole, ventricular tachycardia or ventricular fibrillation may occur in cases with heart block, especially where a history of Adams-Stokes seizures is obtained. The risk may be increased if conduction is further impaired by digitalis.

Care should be taken with intravenous infusions of blood or fluid in patients with heart disease for, when these are given rapidly or in excessive amounts, heart failure may be precipitated. This is particularly serious in patients with coronary or valvular heart disease when acute left sided failure with pulmonary oedema may ensue.

Patients with well compensated rheumatic heart disease or systemic hypertension generally withstand anaesthesia well and, if this is properly managed, the risk is little more than in a patient with a normal heart.

Anaesthetic management

Despite the various effects of different anaesthetic agents on the heart and circulation

the skill and care with which they are administered is, by and large, of greater importance than the choice of anaesthetic drug. It is clear, therefore, that scrupulous attention to detail, rather than alterations in technique, is of greatest importance in anaesthesia for cardiac patients.

During induction, care must be taken to avoid hypoxia and hypotension. It is desirable to allow the patient to breathe oxygen for a few minutes to remove nitrogen from the lungs before starting the administration of the anaesthetic. This will reduce the risk of hypoxia and speed the induction of inhalational anaesthesia with nitrous oxide or cyclopropane. In orthopnoeic patients it is most comfortable for them to start the induction in the sitting-up position, but when an intravenous barbiturate drug is used to induce anaesthesia the patient should be supine as there is a danger of a sudden fall in blood pressure due to myocardial depression and vaso-dilatation. When endotracheal intubation is required this is best carried out with the aid of a muscle relaxant drug so that laryngeal reflexes are suppressed and the risk of spasm and reflex cardiac effects reduced.

During maintenance of general anaesthesia the emphasis is on the avoidance of hypoxia and hypercarbia. This entails the use of an oxygen-rich gas mixture, a clear airway and efficient pulmonary ventilation. If muscle relaxants are employed or central respiratory depression occurs, breathing must be controlled. Blood loss at operation must be carefully measured and, when transfusion is necessary intravenous fluids must be given slowly and cautiously, a careful watch being maintained for early signs of heart failure. Arrhythmias, usually extrasystoles, frequently occur during general anaesthesia and are rarely serious in patients with normal hearts. In patients with heart disease, however, all cardiac irregularities must be viewed with concern, particularly if they are associated with a rapid ventricular rate. Ventricular arrhythmias may be due to a direct effect of the anaesthetic on the heart or to the release of endogenous catecholamines in response to carbon dioxide retention or hypoxia. Steps should, therefore, be taken to reduce carbon dioxide and improve oxygenation but, if these are ineffective, a small intravenous dose of one of the new beta receptor-blocking drugs, pronethalol or propranolol, may be used to suppress the arrhythmias.

Many drugs used in the treatment of heart

disease may, through their therapeutic action or by side-effects, give rise to untoward reactions during anaesthesia. Digitalis and quinidine may increase the risk of serious arrhythmias although of course, their proper use to prepare certain patients for surgery is fully justified. All the drugs commonly used to produce diuresis in patients with heart disease act by inhibiting the renal tubular reabsorption of electrolytes and are, therefore, liable to produce changes in acid-base balance and potassium depletion. The risk of carbon dioxide retention during anaesthesia in patients receiving these drugs is, therefore, of more serious significance and the response and duration of action of muscle relaxant drugs may be altered. Many drugs used in the treatment of hypertension may potentiate the action of the neuromuscular blocking drugs used to produce muscular relaxation during anaesthesia. They also increase the risk of serious hypotension during anaesthesia and, even when their administration has been withheld for some days before operation, in the case of rauwolfia compounds and guanethidine, which deplete catecholamine stores in the tissues, hypotension and bradycardia are liable to occur during general anaesthesia.

Regional analgesia techniques have a useful place for extra-abdominal procedures in patients with heart disease but epidural and spinal analgesia are generally unsuitable because of the risk of hypotension.

Post-operative period

While most surgical patients with heart disease who have been carefully prepared and anaesthetised tolerate anaesthesia and operation well, there is likely to be an increase in the incidence of complications and in mortality rate following surgery in these cases. Although the frequency of such complications as atelectasis, infection and purely surgical complications is no greater than in patients with normal hearts, they are more likely to be serious. This is because cardiac patients are constitutionally less able to withstand the additional strain and because even minor complications may precipitate some cardiac derangement such as acute cor pulmonale following pulmonary embolism or heart failure secondary to chest complications. A careful watch must be maintained in the post-operative period for arrhythmias, signs of acute coronary insufficiency and heart failure and measures taken to eliminate such predisposing factors as anaemia and over transfusion.

ANAESTHESIA IN PATIENTS WITH RESPIRATORY DISEASE

Pre-operative period

In most surgical patients with concurrent respiratory disease the investigation of the latter is usually restricted to history and physical examination and X-ray of the chest. Whether this is adequate or not depends on the extent and severity of the respiratory condition, its susceptibility to therapeutic measures and the urgency and nature of the surgical procedure contemplated. If time allows, it may be advisable in some cases with severe respiratory dysfunction to assess the degree of respiratory disability by pulmonary function tests. The precise tests employed will, of course, depend on the nature of the disease process, but in general those designed to measure the mechanical factors in breathing, such as the timed vital capacity or maximum ventilatory volume, are most helpful. However, even such simple tests as the patient's ability to blow out a lighted match at a distance of six inches can give useful information about the degree of airway obstruction. The ultimate efficiency of respiration can be assessed by estimating the arterial oxygen and carbon dioxide tensions, but this is only employed when ventilatory failure is present or anticipated.

In patients where the respiratory disease is acute the operation should, if possible, be postponed but, even in chronic cases, a few days' delay may allow measures to be taken which will make the conduct of anaesthesia safer and reduce the risk of post-operative complications. Such measures include the control of chronic infection by appropriate antibiotic therapy, tapping of pleural effusions, evacuation of secretions and instruction in physiotherapy, reduction in airway obstruction by bronchodilator drugs and the treatment of right-sided heart failure secondary to chronic lung disease.

Drugs such as opiates, barbiturates and pethidine which depress respiration should be used sparingly in these cases before operation. Although atropine is usually given in the pre-operative period to reduce secretions during anaesthesia the dose should not be excessive as viscid secretions are difficult to expectorate and may produce areas of collapse by blocking fine bronchioles in patients who are already susceptible to respiratory complications.

Anaesthetic management

At first sight it might be thought that local or regional analgesia would be most satisfactory for patients with coexisting respiratory disease, but whether these are indicated depends to a considerable extent on the nature and severity of the operation and on the skill of the anaesthetist. For operations on the lower abdomen or lower limbs a low spinal or epidural may provide satisfactory operating conditions with adequate spontaneous respiration, but where the operation is on the upper abdomen the advantages are far outweighed by the respiratory impairment associated with a high block. Further, while an operation on the upper extremity may be satisfactorily carried out under a brachial plexus block or by an intravenous local analgesia technique, these are not devoid of risk and, in particular, the inadvertent production of a pneumothorax during a supra-clavicular block could prove disastrous. Attempts to overcome discomfort or allay apprehension, associated with local analgesia, by the use of analgesic and sedative drugs or by light general anaesthesia are liable to accentuate the difficulties by depressing respiration.

In the majority of cases, therefore, a general anaesthetic is preferred, attention being directed towards the prevention or control of ventilatory insufficiency by measures aimed at maintaining a clear, unobstructed airway and ensuring that the alveolar ventilation is adequate to provide efficient oxygen uptake and carbon dioxide excretion.

The induction of anaesthesia by inhalational agents is often slow and difficult in patients with respiratory disease, due to the fact that there is frequently impairment of diffusion and uneven ventilation associated with a large functional residual volume and consequently delay in the uptake of anaesthetic gas or vapour by the pulmonary capillary blood. Except in severe asthmatic patients, where the risk of accentuating bronchospasm is increased, anaesthesia is, therefore, usually induced with sodium thiopentone and intubation carried out with the aid of a muscle relaxant drug.

In many cases of disturbed respiratory function, especially in those with advanced emphysematous changes in the lungs, it may be difficult to decide whether the anaesthetised patient should be allowed to breathe spontaneously or whether controlled respiration should be employed. Both methods have possible hazards

and the best technique for the individual case must be decided after taking into consideration the extent and nature of lung damage and the site, duration and severity of the operation. The anaesthetist must attempt to produce satisfactory operating conditions compatible with the safety of the patient but, at the same time, he must bear in mind the risk of post-operative complications, particularly the difficulty of establishing efficient spontaneous respiration at the end of the operation. Where the operation is one requiring little relaxation neuromuscular blocking drugs can be avoided and satisfactory operating conditions may be achieved with the patient breathing spontaneously throughout. On the other hand, the majority of operations will require a degree of muscle relaxation and this can be most safely produced by the specific muscle relaxant drugs. In these circumstances the risk of hypoventilation is paramount and efficient controlled respiration is obligatory. Many anaesthetists would go further and consider that, except for the most minor procedures, all patients with severe respiratory disease benefit from efficient controlled respiration which eliminates impaired thoracic movement and reduces uneven ventilation and defective gaseous exchange in the lungs. They believe that, if ventilation was adequate before operation, the use of controlled respiration will not increase the difficulty of establishing efficient spontaneous respiration at the end of the operation.

The main problems in anaesthesia for asthmatic patients are related to the evacuation of secretions and the control of bronchospasm. Excitement and anxiety must be allayed by adequate pre-operative sedation, but care must be taken with the use of opiates and barbiturates which can cause considerable depression of respiration. Drugs, such as thiopentone, cyclopropane and d-tubocurarine, which enhance parasympathetic activity or cause histamine release must be avoided or used with the greatest caution. Pethidine, which has a bronchodilator action, is well tolerated by asthmatic patients and, when bronchospasm is present, 0.25 to 0.5 G of aminophylline may be given by intramuscular injection half an hour before the start of the anaesthetic.

Post-operative period

Following operation, breathing in patients with pre-existing respiratory disease is likely to

be further impaired. Attention should, therefore, be directed towards the prevention and correction of such causes of hypoventilation as residual muscular paralysis due to relaxant drugs, central respiratory depression by analgesic drugs, and respiratory obstruction and restriction of chest expansion by tight abdominal binders or bandages round the chest. Besides dealing with these immediate causes of hypoventilation, the chest should be regularly examined, if necessary with the help of radiography. Occasionally a pneumothorax, from the rupture of an emphysematous bulla or other cause, may occur and, especially when this is under tension, it may be necessary to insert an intercostal drain to evacuate air under a water seal until full re-expansion has occurred. After abdominal, and particularly upper abdominal operations, lobular or lobar atelectasis may develop. The risk is increased in cases with pre-existing respiratory disease where sticky secretions are present. This condition usually develops within the first few days after operation and demands immediate and strenuous efforts to ensure re-expansion of the collapsed lung tissue. The type of anaesthesia is unimportant as a cause of these chest complications, the incidence being the same in cases who have received regional as in those who were given a general anaesthetic.

Occasionally these factors causing hypoventilation are severe enough to cause features of carbon dioxide retention and hypoxia and the condition of ventilatory failure develops. Tracheostomy facilitates the removal of secretions and may decrease dead space sufficiently to increase alveolar ventilation and make gaseous exchange more efficient. If ventilatory inadequacy is still present, however, it will be necessary to institute some form of intermittent positive pressure ventilation to tide the patient over the immediate post-operative period.

Conclusion

It would seem probable that many of these problems associated with anaesthesia in patients with concurrent disease of the cardiovascular or respiratory systems are likely to increase in the future with greater life expectancy and further advances in therapeutics. It is, therefore, incumbent on all physicians, general practitioners, surgeons and anaesthetists to be on the constant lookout for new hazards in patients who are suffering from intercurrent disease.

PRE-ECLAMPSIA TOXAEMIA OF PREGNANCY

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*Based on a dissertation read to the Royal Medical Society,
on 5th November, 1965.*

The toxaemias of pregnancy form a discrete clinical syndrome which has been recognised as a disease of pregnancy almost since the practice of medicine began. Their aetiology and pathogenesis are still unknown, and despite all the resources of modern medicine, there is no treatment more effective than termination of the pregnancy — a therapy which was discovered several centuries B.C. There is no question that the nature of the condition provides one of the most fascinating problems of contemporary medical research, but the urgency of gaining an understanding of the condition, and of evolving more effective therapy, is only seen by considering the damage actually done by the disease, and the toll it still takes of maternal and infant life.

Present day maternal mortality figures are approximately 0.4 deaths per 1000 births. Of these, 18% are due to pregnancy toxaemia, which is second only to abortion as the largest single cause of maternal loss of life. For the child, the risk of stillbirth or early neonatal death is more than doubled in toxaemia, compared with normal pregnancy. It is possible to calculate that the loss of infant life in United Kingdom which can be ascribed to toxaemia is about 3,000 deaths per annum. For comparison, the total number of deaths in road accidents is about 7,000 per annum. Thus pregnancy toxaemia can be taken to be responsible for

nearly half as many deaths as our much-publicised traffic problem.

The actual incidence of the condition is difficult to assess, largely due to the problem of establishing a generally acceptable set of diagnostic criteria. Average figures seem to suggest an incidence of 10% in first pregnancies, and 5% in other pregnancies, but estimates as high as 25% of all pregnancies have been quoted.¹ Thus toxaemia of pregnancy is not simply a rare and interesting obstetric curiosity. It is a very real disease, responsible for considerable suffering, which deserves our close and critical appraisal.

Definition of Toxaemia

Toxaemia of pregnancy is strictly a syndrome, not a disease. It is characterised by three features — hypertension, oedema and albuminuria — and these three features define the condition. However, they do not all need to be present to justify the diagnosis, since in mild cases, albuminuria may be absent or minimal. There are also three possible origins or foundations for the toxaemia, and these are pre-eclampsia, essential hypertension and chronic nephritis.

The classification becomes further complicated by the fact that quite apart from the toxaemia deriving from essential hypertension,

patients with essential hypertension suffer an increased risk of developing a superimposed pre-eclamptic toxæmia. It is possible for a patient to have essential hypertension throughout pregnancy without developing toxæmia, but the interesting question of whether the same may be said of pre-eclampsia cannot be answered.

The three conditions are commonly classed together since differentiation between them, particularly in the late pregnancy, is often impossible, and since the treatment is largely identical, resolution is usually an academic point. There is, however, some basis for considering pre-eclampsia a discrete condition. In this type, the onset of toxæmia is often asymptomatic and usually occurs after the thirtieth week of pregnancy. It may advance slowly or rapidly, and all but the mildest form will produce histological changes in the liver, kidney and placenta. Severe pre-eclampsia will lead to eclampsia. This pattern is characteristic of the pre-eclamptic type of toxæmia, and forms the basis for the statement that pre-eclampsia can occur in the patient with essential hypertension. Subsequent discussion is confined to this type of toxæmia, since it seems possible that the basic pathology underlying it is also partly responsible for the production of the other toxæmias. However it should be emphasised that this is an assumption without solid foundation, and is not generally accepted.

Presentation of Pre-Eclampsia

Pre-eclampsia is a condition confined to pregnancy. The three primary features of toxæmia have been described, and in this form, the hypertension is usually the first to appear, followed by the fluid retention. Hypertension is commonly taken to be present when the blood pressure reaches 140/90, but since the B.P. during the second trimester may normally be as low as 110/70, a sudden rise from this to 130/85 could well represent the onset of toxæmia. It is therefore imperative that the blood pressure is recorded under identical conditions each time the patient attends for antenatal care.

Fluid retention appears as a generalised oedema not to be confused with ankle-swelling, which is often present in apparently normal pregnancy. Tightness of the wedding-ring, or puffiness of the eyes is often the patients complaint, and although a worsening ankle oedema must be held to be suggestive of toxæmia, evidence of a non-dependent oedema is a much

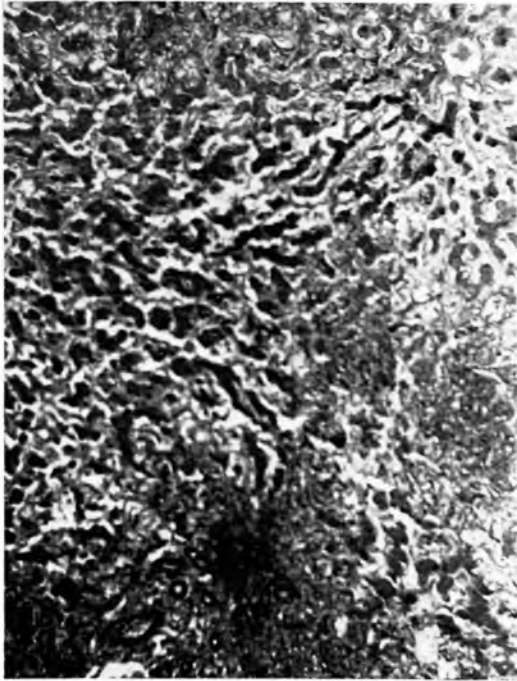
stronger clue. Albuminuria is a late sign of pre-eclampsia and of little use diagnostically. Its degree does, however, carry considerable prognostic significance.

It is exceptional for a firm diagnosis of pre-eclampsia to be made on a single consultation. If the patient is attending regularly, a finding of a rise in blood pressure of 10 mm. diastolic, a complaint of oedema, or a weight gain of 3 lb. in two weeks requires that the patient be seen again within two or three days. If the findings are confirmed, the diagnosis of toxæmia should be made, and therapeutic measures instituted. This may sound easy, but one must remember that ankle oedema is common in pregnancy; urinary infection (producing a trace of albuminuria) is also common, and any anxiety will elevate the blood pressure. All three signs may thus co-exist without having any basis in toxæmia. Diagnosis is thus made from repeated routine checking of weight, blood pressure and the urine, and provided these tests are conscientiously carried out successful early detection can be achieved.

In the more severe case of pre-eclampsia other manifestations of the toxæmia are added — namely headache, visual disturbances, epigastric pain and vomiting, and the condition may proceed to frank eclampsia with episodes of convulsions, coma and then further convulsions. Even if left untreated, not every case of pre-eclampsia would proceed to eclampsia, but there is no way of predicting the course of the disease at the time of its onset and it is not possible to detect those destined for the severe type of toxæmia. Early diagnosis and careful observation is therefore necessary in all cases.

Pathology

The classical pathology of eclampsia is represented by changes in the liver and kidney which are quite characteristic. The liver is said to undergo a periportal necrosis in the first instance, but this of course may extend to a massive necrosis with liver failure. A mid-zonal necrosis is also seen in some cases. However it is the periportal lesion that is characteristic of eclampsia and it has been shown that it is caused by leakage of plasma into the space between the column of liver cells and its sheath of connective tissue, producing compression and necrosis of the cells.² The leakage is of blood rather than plasma in cases of haemorrhagic necrosis. Multiple small haemorrhages are also present beneath the capsule of the liver, and within the organ itself.



Liver In Eclampsia showing periportal necrosis (by courtesy of Mr. L. P. Mackenzie).

The kidney exhibits a characteristic glomerular change with endotheliosis, swelling of the endothelial cells and oedema of the interstitium. No abnormality of the basement membrane has been found. The placenta shows evidence of premature ageing with areas of infarction and fibrin nodes on the villi, but there are no changes characteristic of the disease. Elsewhere in the body, the lesions are those of capillary thrombosis and haemorrhage, and small haemorrhages are found generally.

Investigations into blood flow have shown that the kidney in pre-eclampsia has a low blood flow as a consequence of reduction in diameter of the afferent arteriole³ and there is some evidence that the uterine and placental arterial supply is also diminished.⁴ Blood flow to the liver, brain and limbs in pre-eclampsia has not been shown to differ from normal pregnancy, but in eclampsia, the cerebral blood flow is severely reduced⁵. Thus the pathology of the condition, together with the clinical manifestations appears to indicate that there is an arterial or arteriolar constriction in at least

kidney and placenta which has given rise to an increase in peripheral resistance, and so to hypertension. The capillary haemorrhages and liver changes can be regarded as secondary to hypertension, and the eclamptic convulsions are almost certainly due to cerebral anoxia following arteriolar spasm.

The renal picture of a broadened pale renal cortex and congested medulla, with microscopy showing swollen glomeruli, immediately calls to mind the lesion of acute glomerulonephritis. The similarities, of course, go further—the presenting clinical signs in both conditions include hypertension, non-dependent oedema and albuminuria, and in severe glomerulonephritis, convulsions also occur. It is therefore necessary to bear in mind the possibility of pre-eclampsia having a related pathogenesis, and being essentially an immunological reaction to a sensitising agent derived from the foetus or placenta. However considerable difficulty arises when an attempt is made to explain the relationship of the oedema to the hypertension, and in trying to correlate the degree of hypertension with the extent of renal damage. Nevertheless, some support is produced for immunological explanations of pre-eclampsia and although these do not hold widespread popularity, they should not be overlooked.^{6,7}

Actiology

Before considering some of the other possible causes of pre-eclampsia, it is desirable to record some of the epidemiological findings that will have to be reconciled with any acceptable theory.

1. Pre-eclampsia appears more often in first pregnancies than in subsequent pregnancies.
2. Essential hypertension predisposes to it, and conversely, pre-eclampsia predisposes to the development of essential hypertension in later life.
3. Multiple pregnancies carry a higher risk of pre-eclampsia than normal pregnancies.
4. Hydatiform mole predisposes to pre-eclampsia.
5. Death of the foetus in utero is usually associated with improvement in the condition, but eclampsia can occur after delivery of the foetus and expulsion of the placenta.

There is no justification for assuming automatically that since pre-eclampsia is a disease of pregnancy alone, its origins will be found in

the products of conception. Gross changes occur in many organs during pregnancy, and these must be regarded with every bit as much suspicion as the uterine contents. Nevertheless, with some grounds, many workers believe in the production of a pressor substance by the placenta, and the liberation of this material into the maternal circulation, causing the hypertension. By analogy with the kidney, the concept of the "Goldblatt placenta" has arisen, but positive evidence of a humoral vasopressor material liberated as a result of uterine or placental ischaemia is sadly lacking. It is known that the plasma renin level is elevated during pregnancy, but there is no evidence that the uterus or placenta is responsible for this, nor that the elevation is greater in toxæmic patients than in normal pregnancy.⁸ Investigation of the steroid hormones in toxæmia has given conflicting results, but the general feeling seems to support an elevation of the 17 - hydroxysteroid output, with a reduction in the adrenocortical response to A.C.T.H. even lower than in normal pregnancy.^{9,10} It has been suggested that the ratio of mineralocorticoid/glucocorticoid hormones is elevated in toxæmia¹¹ but current work all seems to refute the proposal that aldosterone production in toxæmia is higher than in normal pregnancy.^{12,13} An elevation of aldosterone output would, of course, be an excellent preliminary to rationalising the salt and water retention.

There are also published works on the presence of an anti-diuretic material found in pre-eclamptic patients sera, suggesting a posterior pituitary-like hormone as the causative agent, but in spite of the natural tendency to think of the posterior pituitary when concerned with a problem of vasoconstriction and water retention, this too has led nowhere.^{14,15}

Recently, great interest has centred on the monoamines, and in particular 5 - hydroxytryptamine. The discovery of reduced monoamine oxidase activity in the placentae of pre-eclamptic patients led to the theory that 5 - hydroxytryptamine accumulated in these patients, producing vasoconstriction.¹⁶ Since monoamine oxidase activity is known to be related to oxygen tension¹⁷ this vasoconstriction, by lowering placental oxygen tension, would reduce monoamine oxidase activity still further and so a vicious circle would be set up. However the monoamine oxidase inhibitor drugs do not appear to precipitate pre-eclampsia, as they might be expected to do if this theory were valid, and there is no positive evidence to support the contention that these drugs are

unable to cross the "placental barrier". In any case, a paper published recently failed to confirm the basic finding of reduced monoamine oxidase levels.¹⁸

Although pre-eclampsia amply justifies its title of "the disease of theories" there is no question that current thought is focused on a humoral origin of the hypertension, related to ischaemia of the uterus or its contents. However, although the idea is not new,^{19,20} the importance of variation in sensitivity of the blood vessels to the known pressor agents does not seem to have received the intense experimental investigation that it warrants. There are two possibilities.

1. That the blood vessels in the pre-eclamptic patient are inherently more sensitive to a pressor material produced by the uterus or its contents in all pregnancies.
2. That the uterus in pre-eclampsia is liberating into the maternal circulation a material which is not in itself a pressor substance, but increases the sensitivity of the blood vessels to the known pressor materials. The possible implication of monoamine oxidase in the aetiology of pre-eclampsia renders one very conscious of the precedent provided by the action of the anti cholinesterase drugs at the neuromuscular junction.

There is no question that the influences — notably endocrine influences — on the sensitivity of blood vessels to substances such as the catechol amines, serotonin, angiotensin and the posterior pituitary hormones are worthy of intense investigation. Progress in research into essential hypertension must be closely followed by those interested in pre-eclampsia, and it could be that the two conditions have much in common.

Management of Pre-Eclampsia

A woman admitted to hospital with mild or moderate pre-eclampsia is usually confined to bed, given a sedative such as phenobarbitone or amylal, and nothing more. Some obstetricians also restrict the patient's salt intake. Complete bed rest and sedation are designed to provide the best environment for peace of mind and a general absence of the emotional strains of daily life, but of course, steps must also be taken to isolate the patient from any sources of personal worry if these exist. In severe cases a check on urinary output is necessary, but in the majority observation of blood pressure and weight will show the success of these measures. Bed rest

alone, by virtue of being a horizontal position, will reduce ankle oedema, so this must not be regarded as an index of the response to treatment.

For the minority of patients in whom this regime is unsatisfactory, the use of hypotensive drugs may be necessary. The rauwolfia and veratrum alkaloids have been used — reserpine in particular is a good drug for the milder degrees of hypertension. Severe cases will require the use of guanethidine in conjunction with a thiazide diuretic, since it is imperative to bring the blood pressure down to less dangerous levels. One hopes that the risk of eclampsia is correspondingly diminished. However the effect of the more potent anti-hypertensive and diuretic drugs on the prognosis for the child has been disappointing, and it appears that this is largely due to their small effect on uterine blood flow and therefore on placental supply.

The obstetric management of pre-eclampsia can demand agonising decisions. It may be said that as pregnancy advances to term, pre-eclampsia will tend to become more severe, and the ageing placenta will fail to meet the requirements of the foetus. On the other hand, the foetus in pre-eclampsia is commonly smaller than average, and early induction of labour is liable to produce a very small baby, exposed to all the risks of prematurity. The problem is therefore one of when to induce, and no hard and fast rules are available. Assessment of the baby's size is usually carried out clinically and some idea of placental function may be gained from the urinary pregnanediol output, but experience remains the best foundation for making the decision. Induction before 36 weeks will be necessary in patients with severe hypertension and albuminuria, since here the prognosis for the infant is better than that for

the foetus in utero. The correlation between albuminuria and prognosis has been mentioned earlier. Nevertheless, the great majority of cases can be left to 38 or 39 weeks, when induction should usually be carried out. The conventional methods of induction are used, and this is not the place to discuss the relative merits of these. But it is not out of place to add that the general rule of failed oxytocin induction being an indication for Caesarian section is in no way invalidated by toxæmia.

The management of imminent or frank eclampsia is a standard procedure and there is little to be gained from reiterating it here. It is obvious that pre-eclampsia is a condition where it is vital under present circumstances to concentrate on early diagnosis and the prevention of eclampsia, rather than the treatment of eclampsia itself. Surveys of maternal mortality in toxæmia indicate that nearly 50% of the deaths could have been avoided with early diagnosis and treatment. The size of this avoidable mortality is in part due to patients who, for one reason or another, have failed to seek medical attention, but it still represents an unnecessary loss of life, and the importance of every pregnant woman receiving anti-natal care must be firmly impressed on the general population. Nevertheless, even with the best care available, the treatment of toxæmia seems inadequate for the mid-twentieth century, and it looks as if permutations and modifications of present methods will provide nothing but trivial improvement. It is likely that the solution will eventually come from the endocrinologist who is investigating the problem at the fundamental level, and one would hope that from this, an efficient therapy will be developed to banish this disease of theories from our maternity hospitals.

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The past year has been a historic one in the life of our Society. There have been many changes, some ambitions achieved and some fears allayed and above all a golden opportunity to bring the society more up to date has been grasped. There are many advantages of being a historic Society but the ideals and aims of the



The Consultation Press, where current textbooks and journals are available for the use of members.

Society must not dwell in the past but progress with modern ideas and methods. The premises at 7 Melbourne Place were becoming too cumbersome for the Society and far from being an asset were becoming a liability. The most important items in the past year have been the Appeal, the Opening of 3 Hill Square and the New Premises.

THE APPEAL

The Appeal Committee was set up in 1960 under the Chairmanship of Sir Derrick Dunlop. This Committee has worked hard and secured the future of the Society and for this present members are greatly indebted. The Appeal has gathered from past members, friends of the Society and from the sale of Melbourne Place a sum slightly in excess of £50,000 which will enable a new home for the Society to be found. The exact nature and site of this building are still to be determined but we can look forward to a time when our Library and Society will be housed in a permanent home.

Not all the original members of the appeal have been able to see the fruits of their hard work. Mr. J. J. Mason Brown was joint Treasurer until his untimely death. It is difficult to



The opening of the Societies' Premises. The Senior President addressing the meeting. Dr. W. A. Alexander and Sir Derrick Dunlop at the left on the front row.

conceive how much the Society owes to his interest in the Society and to the tremendous amount of hard work he put into his position as joint treasurer. A further loss to the Appeal was the death of Dr. J. K. Slater who was until early last year an active member of the Committee. It is with gratitude that we note that Dr. M. D. W. Low and Dr. Halliday Croom have been elected to fill these vacancies.

No note on the present state of the Appeal would be complete without a tribute being paid to Sir Derrick Dunlop as chairman of the Committee. Much of the success of the Appeal has been due to the untiring efforts of this great friend of the Society. He has been Chairman since the Appeal was launched in 1960 and it is difficult to imagine any other who could have steered such a successful course.

THE OPENING

On the 27th October, 1964, the temporary premises of the Society were opened by Dr. W. A. Alexander, Ohm Praeses. The meeting was presided over by the Senior President, Mr. Alex. M. Davison. Sir Derrick Dunlop in introducing Dr. Alexander paid tribute to his many years of devotion to the Society and mentioned how appropriate it was that Dr. Alexander be chosen to perform the opening ceremony. In his speech Dr. Alexander gave a brief account of the history of the Society and reminded those present of how at one time the Royal College of Surgeons, during the building of their present premises, were guests of the Society and allowed the use of our Hall for their meetings. Dr. Alexander also drew attention to the fact that the site of these temporary premises must be very close to the site of the

first Hall of the Society. The premises were then declared open by Dr. Alexander. In thanking Dr. Alexander, the Senior President mentioned the many years of service which Dr. Alexander has given to the Society, especially in his 30 years as Treasurer. As a token of the appreciation felt by members Dr. Alexander



The museum, where microscopes and slides, a collection of X-rays with viewing boxes, pathological specimens, and medical illustrations can be used at the members leisure.

was then presented with a replica of the medallion discovered under the foundation stone of the original Hall of the Society in Surgeon's Square in 1852. The medallion had been suitably inscribed with a record of Dr. Alexander's activities in the Society. After the meeting was adjourned those present inspected the facilities offered at Hill Square.

HILL SQUARE

The premises have been leased from the Royal College of Surgeons at the modest rent of one penny per year — if asked for. For this the Society is greatly indebted to the Royal College of Surgeons.

At Hill Square the space is considerably less than that of the old premises but this is greatly to our advantage as all the rooms can be centrally heated and therefore warm at all times. The one drawback is the loss of our Hall, but we have managed to furnish a room suitable for Dissertations and, through the generosity of the Edinburgh Post-Graduate Board and the Council of the Royal College of Surgeons, all our larger meetings are held in either the Pfizer Building or the Hall of the Royal College of Surgeons. The meetings of the Society have therefore remained very similar but are now held in more convivial surroundings.



The Young Room, houses the Societies' Dissertations and part of its library.

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The Library has been partly rehoused at Hill Square. One room is devoted to historic books while another contains a modern up to date reference library where the majority of text-

books and journals in common use can be consulted. The remainder of the library is housed with the University and can be consulted when necessary by applying to the Librarian.

The Museum has been transported from Melbourne Place and discarding many useless appendages it has now been brought up to date with a reorganised slide collection and a set of X-rays. Microscopes and viewing boxes are available at all times for members.

One advantage of the new premises is that there is a comfortable coffee lounge where facilities for making coffee are available at all times. This has proved to be most popular and convenient for members.

It can be seen therefore that the facilities offered at 3 Hill Square, however limited by space, are a good deal better than those of the rather chilling if somewhat historic Melbourne Place.



The coffee lounge; informal, warm and convivial.

RES MEDICA

MASS EXODUS ?

Precise figures are not available for the number of final year medical students who sat the E.C.F.M.G. examination in February. A very conservative estimate is about 30% of the total sat it, but a more probable figure is about 50%. This represents a substantial increase in the number of students who wish to work in the U.S.A. Such an increase cannot be ignored or lightly dismissed.

Students give varying reasons for application. Many feel that they wish to train in the U.S.A. at some stage and that now is the optimum time to sit the E.C.F.M.G. examinations. Some wish to 'interne' there, a few only to work there next summer. A few already intend to practise there. Most of the students also regard the February examinations as an incentive to start working for Finals early.

These applications reflect a number of factors. The attraction of travel and broadened experience is important; the lure of money may be present. But more important, it reflects dissatisfaction with haphazard British post-graduate training. It reflects also a feeling that within the N.H.S. initiative is limited, and that conformity to a very uniform pattern of medical life is demanded.

If the 'drain' of medical graduates to the U.S.A. is to be reduced, and those that have gone enticed back, there should be immediate changes in post-graduate medical education along the lines discussed by Sir George Pickering and others. There should also be an imaginative review of the N.H.S. in the light of nearly twenty years of functioning, and also in the light of health services in other countries.



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MARRIAGE AND MEDICAL TRAINING

The late Professor Ian Aird held that 'it is an advantage (for the young surgeon) if he can remain single until the later years of his training'. Sir Henry Wade once stated that 'a young surgeon must keep his affections in cold storage'. This is remarkably like the attitude of St. Paul so long ago.

"I say therefore to the unmarried and widows it is a good thing for them if they abide even as I

. . . . but if they cannot contain, let them marry, for it is better to marry than to burn." (1 Corinthians 7, 8 & 9).

In spite of the viewpoint of these eminent men, the proportion of doctors who marry young is increasing, as is the number of medical students who are married before the end of their course.

Is this crass stupidity on the part of students and young doctors? Is it a transient phenomenon of no importance? Or is it an understandable trend which does not carry disastrous consequences?

Without a detailed analysis of the motivations and consequences of this trend, comment is necessarily based on personal observation. It is hoped that this nevertheless has validity.

A number of factors are probably involved. The average age of marrying has been falling in this country at a time at which the duration of medical training is extending. With increased grants more students are financially independent of parental support. Society is probably less demanding in its material requirements for marriage. The spouse must, of course, realise

the full implications of such a marriage; the lack of money, usually rented flats, the compulsory hospital residence. There is a feeling that doctors should be free to live a more normal existence. General Practitioners negotiate for a new 'charter', the junior hospital staff demand better working conditions and adequate remuneration. Similarly senior medical students and young doctors may wish to marry. Some marry, of course, because they are compelled to.

The idea that marriage brings in its wake a decline in standards must be firmly refuted. The demands of home life are usually no greater than drinking in the Union or endless parties. A number of married students express the feeling that they are more settled, responsible and capable of work after than before marriage.

Does any particular type of student get married? Looking around at the present married students it is impossible to define them as a group. They comprise a range of students, extravert and introvert, athletic and aesthetic, the highly intelligent and the less intelligent.

In Scandinavia and the U.S.A. these 'early' marriages are more common than here, yet there does not appear to have been a disastrous decline in standards of students and young doctors. In this country it should be clearly recognised that the fact that a student is prepared to undertake the responsibility of marriage does not preclude adequate academic performance nor does it preclude competence as a doctor. Perhaps eminent men in the future, rather than recommending that a young doctor "keep his affections in cold storage", will advise that he keep his affections in a more normal, proper place appropriate to the reasonable, responsible and well-balanced person that the young doctor should be.

BOOK REVIEWS

EXPLORATION MEDICINE. O. G. Edholm. A. L. Bacharade, Editors. John Wright & Sons, 46/- P.410.

More and more expeditions are being sent overseas to remote places. It is the fashion of these expeditions to be small and self-sufficient, often without the services of a qualified medical officer. It is for such expeditions as these that this book is primarily intended.

It is no great co-incidence that many of the contributions to this book are from the armed

services which is familiar with many of the problems faced by small groups of men in remote and isolated places.

It sets out to deal, chapter by chapter, with all the medical conditions and emergencies likely to confront an expedition medical officer, and it does this in clear and workmanlike fashion. The scope of the book is wide and includes not only the care of the injured but the problems of survival in varying climates and conditions both on land and at sea. It also deals with the prevention of disease and injury and the mental health of the leaders and members of an expedition.

As a comprehensive account of expedition medicine this book succeeds admirably. It also

provides a very useful guide for those engaged on 'expedition-like' activities in this country. Many of those who have a hand in the organisation of such activities would do well to read this book.

D.B.

RADIOLOGY FOR GENERAL PRACTITIONERS AND MEDICAL STUDENTS. David Sutton. E. & S. Livingstone. 12s. 6d.

The G.P. usually sees X-rays only infrequently, and X-ray reports from hospitals may form his main contact with radiology. He may therefore find this simple introduction to the scope and uses of modern radiology helpful.

The medical student often seems to glean his knowledge of radiology from a number of haphazard, impromptu discussions during his medical course. The value of this book for him is that it draws together and clarifies his knowledge.

This book is simple and clear, devoid of technicalities beyond the readers requirements and training. The illustrations have, unfortunately, lost considerable quality in reproduction. It can be profitably read by G.Ps. and students alike.

D.L.W.D.

THE ART OF GENERAL PRACTICE. David Morell. E. & S. Livingstone.

This readable little book paints a very real and up to date picture of General Practice. The author states that it is not a textbook in the true sense, yet it presents in an orderly array the essential facts about good modern General Practice.

After an introductory chapter on the scope and outline of General Practice Dr. Morrell clearly elicits the manifold difficulties and problems facing the prospective G.P. by discussing, with examples, the various aspects of the management of a patient. He pays particular attention to understanding the nature of the patient's complaint, the personality of the patient and his environment. He points out the differences between work in hospital and in General Practice. Lastly he describes briefly the ancillary help available to General Practitioners.

This book provides the prospective G.P. with a comprehensive outline of his future work. However, it will be very useful also for the houseman and the undergraduate in giving them a clear idea of the problems of General Practice and greater insight into their patients who are usually referred from General Practice.

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