and to use conventional x-ray therapy as being somewhat safer in its effect, more predictable in its results, and attended by less hazards to the patient, even though it may cause some sickness or discomfort in the course of treatment.

Antimitotic Drugs

The alternatives to irradiation are the antimitotic drugs, urethane, which is given by the mouth, and modifications of nitrogen mustard, which are administered intravenously. The general effect of urethane is similar to that obtained by treatment with x rays—namely, a fall in total leucocyte count and a reduction in primitive cells, so that the haematological pattern returns to normal. At the same time the spleen and lymph nodes are reduced in size, whilst accompanying anaemia may be greatly improved. The great advantage of urethane is the ease of administration and the relative infrequency of unpleasant effects as compared with x rays. However, a proportion of patients manifest intolerance by anorexia, nausea, vomiting, and, less commonly, by diarrhoea and drowsiness. Not all subjects react favourably, and treatment needs to be carefully controlled by regular blood counts, since thrombocytopenia, agranulocytosis, and even aplastic anaemia are readily produced by over-dosage. The inhibiting haematological effects continue for some time after the withdrawal of the drug. In my own experience, urethane has given the best results in chronic myeloid leukaemia and, save for a few cases of intolerance and a few of failure, is as effective and less misery-making than x rays. The drug is also reasonably effective in chronic lymphatic leukaemia, but is valueless in any of the forms of acute leukaemia. The usual dose of urethane is 0.5–1 g. three or four times a day, administered by mouth. Treatment is continued until the leucocyte count falls to about 50,000 per c.mm., whereupon the dose is reduced to 0.5–1 g. for the whole day; the treatment is stopped when the count reaches 20,000 per c.mm. Maintenance treatment can be prescribed once the early signs of relapse appear.

Synthetic modifications of mustard gas, the nitrogen mustards, have the same effect as the original material—namely, to cause aplasia of the haemopoietic system—and they have been used for the treatment of various neoplastic conditions, including leukaemia. The two compounds most used are the *bis* and *tris* nitrogen mustards, and of these the *bis* form is the less toxic. The drug is not suitable for the acute leukaemias, and does not appear to be more effective than x rays in the chronic forms of the disease, though some improvement has occasionally been found in cases resistant to irradiation. The results are extremely variable and irregular, but the chronic myeloid type responds most consistently and somewhat better than the chronic lymphatic forms. The dosage is 0.1 mg. per kg. of body weight administered intravenously, daily or every second day for one to seven days. Untoward effects include pain, inflammation, and, sometimes, thrombosis at the site of injection, with tissue necrosis if leakage or extravasation occurs. At the same time, within an hour of injection there are usually systemic symptoms such as anorexia, nausea, vomiting, headache, and vertigo. If dosage is excessive or not properly controlled agranulocytosis, thrombocytopenia, and aplastic anaemia readily occur. There can be little doubt that this form of treatment, for which much was hoped, is unpleasant, not without danger, and no more effective than irradiation.

Folic Acid Antagonists

The discovery of the effect of folic acid on haemopoiesis led to the trial of folic acid antagonists in the leukaemias. These *pterins*, of which aminopterin has proved the most satisfactory, are of considerable theoretical interest, since they open up a potential line of treatment affecting cell metabolism rather than cell destruction. However, it must be admitted that, in general, the results of treatment have been to produce haematological rather than clinical improvement—a criticism which unfortunately applies equally to all forms of treatment designed to control the activity of the leukaemic process. With aminopterin the toxic manifestations may be severe, and even fatal; these include severe and refractory stomatitis, agranulocytosis, enteritis, aplasia of the bone marrow, haemorrhagic symptoms, and loss of hair.

One of the difficulties of treatment is the immense variation in the clinical picture, the presentation, the symptoms, and the general features of the disease from case to case, so that what suits one case may be quite unsuitable for another. On the whole, the condition has to be treated symptomatically, and there is little point in treatment for treatment's sake when the case is symptomatic, as treatment does not appear to prolong life.

On the other hand, when the form of the disease is radiosensitive—and in this respect lymphosarcoma can usually be included—much can be accomplished in the way of improving comfort and efficiency by reducing the size of a tumour or an affected organ, thereby relieving symptoms caused by pressure, traction, or obstruction.

A DIAGNOSTIC UNIT FOR PRACTITIONERS AND ITS FIRST FIVE YEARS' WORK*

BY

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This paper describes a small diagnostic unit for general practitioners which has been built up in London during five years since the war, a unit with its own pathological laboratory and full-time pathological technician, with an x-ray department and radiographer working on the spot. The work of this unit has been carefully supervised by a consulting pathologist and by a consulting radiologist. It has been in the nature of an experiment, and will be described as such, step by step, just as it developed from its very small beginnings. This experiment has not been connected with the National Health Service; but I hope that its results will prove worth recording, without any suggestion or implication that it should be copied exactly elsewhere. General practices differ enormously, nowhere more so than in the centre of a large city; and what is convenient and satisfactory for one is unlikely to suit another. It is not my intention to criticize any other type of family practice. Quite enough criticism of general practice has been heard recently. I shall try to put forward something positive—a description of an experiment which is being tried,

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and of experiences which are being gained, upon which can be built perhaps, later on, something wider and more enterprising.

History of the Unit

Soon after qualifying in 1931 I worked in general practice in a colliery district in Derbyshire. I was struck then by the discrepancy between hospital work and practice, so far as simple diagnostic facilities were concerned. After six years' postgraduate hospital work I returned to general practice, this time in London. Once again this difficulty in diagnostic procedures struck me, even more forcibly than before. The simplest tests, those which one could easily do oneself with the minimum of apparatus—urine testing, for example—seemed very much more difficult in practice than they had ever been in hospital. We most of us know the "specimen" bottles wrapped up in brown paper and string which lie about the floor of a doctor's car, on the hall table, or about the consulting-room, not always even labelled, and not always, I think we must admit, tested at once. A family doctor seems to have less time at home than he had in hospital in which to do even simple tests himself, and it is more difficult for him to keep his test-tubes properly cleaned and his reagent bottles filled.

In 1939 Dr. Dunning-Gale, a friend of mine in a practice near by, equipped a small laboratory in which he was doing some excellent pathological work about the time when war broke out. He joined the Marine Commandos and was killed on the beaches at Dieppe while looking after his wounded during the Dieppe raid. I joined the R.A.F.; and in 1946, when I returned once more to practice, I found that he had left some of his equipment to me in his will. It was this gesture of Dunning-Gale's, and the unhappy memory of those brown-paper-covered bottles, which decided me to try for a small laboratory myself.

As I was not a pathologist, or fully trained in pathological technique, this meant finding a reliable technician as well as equipping a laboratory. With children at home, my wife and I planned that the unit should be away from where we lived. At that time I had not even got a consulting-room, so we were starting from scratch, and with very little capital. A home for the unit was found in a house which had space for a couple of consulting-rooms (one now used by a full-time assistant), a waiting-room, and a secretary's room, with an unused kitchen in the basement suitable for a laboratory. This laboratory was equipped as best I could, and soon I was fortunate to obtain the assistance of a first-rate clinical pathological technician who had been doing this work for many years in R.A.F. hospitals. From the beginning a consulting pathologist has supervised the technician's work, the laboratory, and the stock solutions, and he has visited the laboratory once or twice a week to give moral support and expert advice. During the past three years over 7,000 pathological investigations have been done for me in this laboratory.

Soon after we started, a small mews cottage behind the house came up for sale. The Portable X-Ray Company was persuaded to buy this, and in it were installed at once an x-ray tube, a developing-room, and a full-time radiographer—all within 30 ft. (9 metres) of my consulting-room, with only two doors between. During

the past three years this radiographer has x-rayed over 1,400 patients for me. Every x-ray film taken in this unit has been reported upon by a consultant.

The Consulting-room

The consulting-room couch is wider and rather longer than usual, and is covered with a 4-in. (10 cm.) "Dunlopillo" mattress, which is soft and comfortable, and has a loose washable cover made in duplicate. Near the couch is an electric convection heater, so that patients seldom complain of cold; and above it is strip lighting (not fluorescent), which gives a soft light that does not dazzle the patient and casts very little shadow. This couch is high enough—2 ft. 10 in. (86.5 cm.)—for the examiner's comfort so that he does not have to bend to examine the patient, and wide enough—2 ft. 6 in. (76 cm.)—for him to sit on the edge. With a stool no patient has yet complained of any difficulty in getting on to this couch. To allow patients to dress and undress in private a curtain running on rails round the couch was found to be more satisfactory than a movable screen.

All records are kept on quarto-sized case cards—I have never regretted having them as large as this—which are filed in folders with letters and reports. A flap top to these folders reduces the chance of papers being pushed into the wrong folder. Adequate filing facilities are most important, with a secretary who will keep them up to date. Off the larger consulting-room is a cupboard which can be used as a dark-room for transillumination of sinuses, and there is also an x-ray viewing-box. It is a great help if the chair in which the patient sits is a semi-upright one—not too low—and as reasonably comfortable as circumstances permit, and the comfort of the doctor's chair is of equal importance. A restless or uncomfortable patient or doctor makes things much more difficult, especially when a long and careful history-taking is necessary. In many chronic or incurable diseases good treatment may depend as much upon a proper understanding of the general situation as of the local disease itself. And so it is worth while paying attention to such things as the comfort of chairs and couches.

For investigation of local disease a hospital or nursing-home is often the best place for diagnosis; for appreciation of the situation as a whole no one is in a better position than the general practitioner, who should regard the hospital investigation or specialist's opinion as but one step in his own more comprehensive recognition, or diagnosis, of what the illness is really doing to the patient and to those around him.

The Diagnostic Bag

My small diagnostic bag is an ordinary thin music-case—12 by 16 by 3 in. (30 by 40 by 7.5 cm.)—with partitions put inside (Fig. 1). When quite full it weighs 9½ lb. (4.3 kg.). In it I carry case cards, notepaper, temperature charts, and diagnostic instruments: clinical thermometer, wooden spatulae, torch, stethoscope, sphygmomanometer (my light aneroid one remains accurate—it is tested at intervals against a mercury instrument), ophthalmoscope (with a special bulb for transilluminating sinuses, and in its lid pins and a camel-hair brush for testing sensation), auriscope (with a small pair of aural forceps and a wax hook), nasal speculum, knee-jerk hammer, tuning-fork, tape-measure,

FIG. 1.—Diagnostic bag and instruments.

finger-stalls, and a small tube of lubricant. The other more bulky instruments such as proctoscope and vaginal speculum are kept, together with rubber gloves, ear-syringe, etc., in another case in my car.

My pathological containers are carried in one of the partitions of this small diagnostic bag. This partition is little bigger than a box for 100 cigarettes and measures only 8 by 4 by 2 in. (20 by 10 by 5 cm.). In it are the following sterile containers: for six complete blood counts; for three throat, urethral, or vaginal swabs and smears; for three sputum, urine, or faeces specimens; three citrate tubes for erythrocyte sedimentation rates and oxalate tubes for blood ureas; three plain tubes for Wassermann, Kahn, van den Bergh, or Paul-Bunnell tests, serum uric acid, serum proteins, agglutination tests, etc., and three fluoride tubes for blood sugars. In this small partition, also, is the apparatus necessary for taking blood from a finger (a bottle containing spirit, with a needle fixed in its rubber cork, with glass pipettes in another tube); after use I heat the needle in the flame of a cigarette lighter, and wipe it, before putting it back into the spirit. There is also, in this partition, the apparatus for taking blood from a vein without using a syringe (No. 1 or No. 2 s.w.g. stainless-steel needles, dry-sterilized in twists of paper, with short lengths of translucent plastic tubing to be fixed to them before use). No blood specimen usually takes more than two or three minutes to obtain. I also carry a small aluminium screw-topped box for used needles, pipettes, etc.; each end of this is cork-lined inside, so that the needles are not blunted when shaken about.

Much of one's diagnostic work is centred in these small pathological containers; and, if these are with one

FIG. 2.—Fly-box containing tablets and capsules.

all the time, the taking of specimens is a very light burden. A great deal depends upon having them small enough, light enough, and easily portable. I find that the laboratory is invaluable for the preparation, sterilization, and maintenance of these containers, and my work would be much more difficult without these servicing facilities. If one wants to carry out more complicated diagnostic procedures—such as pleural puncture, lumbar puncture, etc.—specially sterilized and sealed tubes containing the necessary syringes and needles (sterilized in an autoclave, sealed with cotton-wool, and with a cork covered with paraffin wax) are kept in another bag in the car, together with a small bottle of 10% formalin for biopsy specimens. I always like to wear sterile rubber gloves when doing lumbar punctures, especially in a patient's home.

To save carrying two bags, most practitioners should have in their diagnostic bag a certain amount of apparatus for emergency treatment. I do this myself. One can have the bag or case as large and as heavy as one likes, but my object is to show how much can be done with a small, light one. There is room even in this small case for a syringe, ampoules, and a fisherman's fly-box containing 12 different sorts of tablets and capsules (Fig. 2). An aluminium fly-box like this is very light—when full it weighs only 6 oz. (170 g.)—and I strongly recommend it as an easy means of carrying these pills; there is a flap in the lid in which can be kept a card used as a register for dangerous drugs.

The Pathological Laboratory

The pathological laboratory (Fig. 3) is the old kitchen of the house; it is a bright room with a large skylight, and is lined with white tiles. Over the benches we have installed fluorescent lighting. In this laboratory,

FIG. 3.—The pathological laboratory.

amongst other equipment, we have a microscope, incubator, centrifuge, scales, water bath, autoclave, an ordinary sterilizer, hot-air oven, refrigerator, "still," and sluice.

During the past three years—since the unit has really been on its feet, from January 1, 1948, to December 31, 1950—the technician has done 7,020 pathological investigations for me: urine testing (2,414), blood counts (2,222), E.S.R.s (1,289), blood urea estimations (326), blood Kahn tests (325), blood-sugar estimations (97), blood-sugar-tolerance curves (18), examination of nose and throat swabs (89), sputum examinations (59), examination of faeces (47), urethral and vaginal smears (39), examination of pus and exudates (38), van den Bergh tests (22), blood coagulation time (11), examination of blood smears for malarial parasites (10), bleeding time (9), Paul-Bunnell reactions (5). A great many other more complicated tests, most of the bacteriology, and all the histology have been done elsewhere.

The X-ray Department

Fig. 4 shows the x-ray apparatus. We hope to install a rotating anode tube in the near future, though the present apparatus has done most excellent work. The patients' changing-room leads off the x-ray room. The dark-room is behind, with a special rapid drier. Downstairs is the film-storage room. We store all our films

FIG. 4.—The x-ray department.

in special envelopes—18 by 14 in. (45 by 35 cm.)—and in wooden racks.

During the last three years we have taken 1,476 sets of x-ray photographs: chests (624), spines (201), nasal sinuses (126), skull vault (96), feet and ankles (64), pelvis and hips (57), hands and fingers (48), renal tract (48), gall-bladder (46), knees (40), shoulders (36), legs (32), wrists (27), arms (24), pregnancies (4), and teeth (3). We do no barium meals or barium enemas, cholecystograms, or intravenous pyelograms, and nothing where an expert has to screen the patient to get a satisfactory result. All these special x-ray films are taken elsewhere. The radiographer's time is fully occupied, because when she is not taking pictures for me she is doing so for other practitioners in the neighbourhood.

In the corner of the x-ray department is the electrocardiograph. During the last three years 118 electrocardiograms have been taken by someone trained in this work, and every one has been reported upon by a consultant.

Use of these Diagnostic Facilities

Everyone will understand that for much of a general practitioner's diagnostic work neither a pathological laboratory nor an x-ray department is required. Minor infectious diseases such as colds, rubella, chicken-pox, mumps, slight attacks of influenza, herpes zoster, most skin troubles (from eczema to warts), and many other conditions (from inguinal hernia to Dupuytren's contracture) can usually be diagnosed and treated without a pathological laboratory or a diagnostic x-ray department. For the rest of a general practitioner's diagnostic work, however—an important and often serious part—these additional methods of investigation may sometimes be of great value.

On going through my notes of the past five years I have been able to pick out those diagnoses in the making of which, or in the management of which, simple pathological and x-ray investigations have sometimes been helpful. I have examined 3,864 different patients during this period. Some have been seen once or twice only—birds of passage stopping in London on their way to the country or abroad; others have been attended a great many times for various troubles, which accounts for the high proportion of pathological tests and x-ray films in relation to the total number of patients. One man of 48 has been under my care with eight different major illnesses: starting with an amoebic abscess of the prostate gland, followed during these five years by virus pneumonia, a prolapsed lumbar intervertebral disk, a fractured metatarsal bone, a rodent ulcer on his back (needing wide excision by a general surgeon), bacillary dysentery (after an air trip to India), osteoarthritis of his cervical spine (with a severe stiff neck for several weeks), and ending up with acute anterior poliomyelitis from which he has already sufficiently recovered to start playing golf and tennis again. This man has always regarded himself as a tough and healthy country fellow, and still does so. I quote his case as an example of how much work one single patient, who considers himself usually in rude health, can from time to time give a doctor.

This unit has enabled work to be done in general practice which would have been very difficult without these facilities. Patients can be investigated more quickly, more fully, and more cheaply than has hitherto been possible. A correct diagnosis can often be reached

in a shorter time and early treatment ensured. As an example, a patient who attends with a cough (with or without haemoptysis) can have, if it seems advisable, after a full history and clinical examination, his chest x-rayed, sputum examined, a blood count made, E.S.R. ascertained, and urine examined on the spot. The practitioner can see the x-ray film before the patient leaves the house, and with the radiographer's help he can usually give the patient a fair idea of what is wrong and what treatment may be needed; or, more often and better still if things are normal, he may immediately (or within a few hours) be able to set the patient's mind at rest.

The pathological laboratory and x-ray units have often been extremely helpful in the investigation of patients who complain of general weakness and who want a thorough overhaul; in diagnosing those with unexplained pyrexia, headaches, sore throats, or upper respiratory tract infections (especially when the nasal sinuses are involved), persistent coughs, effort syndrome, pains in the chest, hypertension, blood diseases, abdominal pain, abdominal swellings and diarrhoea; for investigating albuminuria, glycosuria, renal disease, and all urinary infections; and for the examination of urethral or vaginal discharges. In the case of accidents the value of immediate x-ray examination of bone or joint injuries is almost too obvious to need mention; and the x-ray unit has been invaluable, also, in dealing with those many patients who complain of pains in the back or of "rheumatism" in or near a joint. For the investigation of the cardiac arrhythmias and coronary disease an electrocardiogram is almost essential. In cases of pregnancy both the pathological and the x-ray units may be useful; during antenatal work we like to do urine tests once a month; and we usually do a blood count, rhesus factor investigation, blood grouping, and Kahn test some time in early pregnancy, repeating the blood count and sometimes taking an x-ray film later.

A pathological laboratory on the spot is also helpful in controlling those methods of treatment in which serial blood counts may be needed, such as in watching the response of anaemias to treatment, or in the use of sulphonamide drugs, thiouracil, troxidone, and A.C.T.H.

For many a patient with anxiety or depression associated with somatic symptoms, especially those with cancerophobia or fear of pulmonary tuberculosis, pathological or x-ray investigations may have a therapeutic value in setting the patient's mind at rest. The fact that the emphasis in this paper is on diagnosis rather than on treatment does not mean that we do not know that it is treatment of the patient which is our main concern, and that all diagnoses are made towards that end.

Some of the Conditions Diagnosed During the Past Five Years

It may be of interest to record, very briefly, some of the diverse conditions seen during the past five years (picked out of my 3,864 notes) in which simple pathological, x-ray, or electrocardiographic facilities on the spot have sometimes been extremely helpful, either for diagnosis or in the management of a case.

Skeletal System.—*Fractures* (96 cases); *dislocations and subluxations* (7); acute osteomyelitis (1); chronic osteomyelitis (4); Paget's disease (3); pelvic osteitis (1); osteoma of skull (1); senile osteoporosis (7); *osteoarthritis* (94); *rheumatoid arthritis* (24); gout (28); pyogenic arthritis

(2); *internal derangements of knee-joint* (20); tuberculous arthritis of knee (1); *ankylosing spondylitis* (7); periarthritis of shoulder (3); prolapsed cervical or lumbar intervertebral disks (*); supraspinatus tendonitis (16); tennis elbow (6); myositis and fibrositis (*); syphilitic amyotrophy (1); myasthenia gravis (1).

Alimentary System.—*Infections of gums and mouth* (*); chronic parotitis (2); submaxillary calculus (1); carcinoma of oesophagus (1); pharyngeal pouch (1); *gastric ulcer* (14—3 with haemorrhage); *duodenal ulcer* (33—6 with haemorrhage, 2 with perforation); subphrenic abscess (1); gastro-enteritis (*); bacillary dysentery (3); *acute appendicitis* (31); amoebic dysentery (3); diverticulitis (6); ulcerative colitis (3); papilloma of colon (4); carcinoma of colon (7); paracolic abscess (2); bleeding piles (*); ischio-rectal abscess (1); carcinoma of rectum (4); *cholelithiasis* (18); cholecystitis (9); relapsing pancreatitis (3); carcinoma of pancreas (3); *infective hepatitis* (45); acholuric jaundice (1); cirrhosis of liver (15—5 with portal hypertension, 2 with haemorrhage); carcinoma of liver (1); diaphragmatic hernia (3); roundworms (2); tapeworms (3); *threadworms* (12).

Cardiovascular System.—*Coronary insufficiency* (39); *coronary occlusion* (33); rheumatic valvular disease (8); aortic stenosis (1); subacute bacterial endocarditis (1); pericarditis (1); congenital heart disease (3); *auricular fibrillation* (25); extrasystoles (*); complete heart-block (3); branch-bundle block (9); paroxysmal tachycardia (11); vasovagal attacks (7); syphilitic aortitis (1); aortic aneurysm (2); *hypochromic anaemia* (54—15 from haemorrhage); *hyperchromic anaemia* (5—2 pernicious anaemia, 2 tropical, 1 pregnancy); haemolytic anaemia (1); myeloid leukaemia (3); lymphatic leukaemia (2); haemophilia (1); polycythaemia rubra vera (1); agranulocytosis (1); *benign hypertension* (264—16 with heart failure, 9 with epistaxis); *malignant hypertension* (8); peripheral arteriosclerosis with claudication (28); with gangrene (3); thrombo-angiitis obliterans (4); erythema induratum with ulcers (1); calcinosis (1); saphenous thrombosis (16); posterior tibial thrombosis (1); femoral thrombosis (1); retinal vein thrombosis (5).

Endocrine System.—*Diabetes mellitus* (29); renal glycosuria and lag curves (5); pituitary tumour (1); obesity (*); menopause (*).

Infectious Diseases.—*Sore throats* (*); complications of measles (7); whooping-cough (*); *glandular fever* (13); rheumatic fever (7); erysipelas (7); malaria (1); paratyphoid B (1); tick typhus (1).

Skin.—Recurrent boils and styes (28); non-healing ulcers (6); secondary syphilis (2).

Respiratory System.—Upper respiratory tract infections (*); *acute and chronic sinusitis* (*); epistaxis (*); bronchitis (*); bronchiectasis (8); severe asthma (9); *carcinoma of bronchus* (5); adenoma of bronchus (1); *virus pneumonia* (56); *other types of pneumonia* (16); *pulmonary tuberculosis* (28); pulmonary infarction (5); atelectasis (4); pulmonary abscess (1); secondary pulmonary carcinoma-tosis (6); pleurisy with effusion (7); acute empyema (3); chronic empyema (1); spontaneous pneumothorax (1).

Urinary System.—*Albuminuria* (*); oxaluria (7); phosphaturia (3); *urinary tract infections* (74); *uraemia* (8); *renal calculi* (11); renal tuberculosis (4); hydronephrosis (1); pyonephrosis (1); polycystic kidneys (2); *nephritis* Type I (3), Type II (4); hypernephroma (1); renal papilloma (1); bladder papilloma (1); carcinoma of bladder (1); *benign enlargement of prostate with obstruction* (29); carcinoma of prostate (4); prostatitis (4).

Genital System (Female).—*Pregnancies* (146): 23 miscarriages (8 with severe bleeding), 1 pregnancy with acquired syphilis, 1 with congenital syphilis, 1 with appendicitis, 4 with pyelitis, 7 breast abscesses, 1 hydrocephalus (diagnosed during pregnancy by x-ray examination). Sterility investigations (26); fibroids (21—9 with

(*)=numerous cases.

haemorrhage); menorrhagia (*); metropathia haemorrhagica (7); pyogenic salpingitis (3); tuberculous salpingitis (1); *leucorrhoea* (30 cases for investigation: 2 with mycelium infection, 7 trichomonas, 2 gonococcal); carcinoma of ovary (2); ovarian cysts (4); tuberculous mastitis (1); carcinoma of breast (10).

Genital System (Male).—Non-specific urethritis (5); *gonococcal urethritis* (5); epididymo-orchitis (5); gumma of testis (1); seminoma (2).

Nervous System.—*Anxiety and depressive states with somatic symptoms* (*); severe migraine (15); *cerebral thrombosis* (35); cerebral embolism (3); cerebral haemorrhage (2); *epilepsy* (19); diabetes insipidus (1); disseminated sclerosis (16); syphilitic meningo-encephalitis (1); cerebral tumours (6—3 glioblastoma, 1 astrocytoma, 2 secondary carcinoma); meningioma (1); subdural haematoma (2); vaccinal meningitis (1); mumps meningitis (1); colloid cyst of ventricle (1); intracranial aneurysms (4—1 arteriovenous); intracranial angioma (2); acute poliomyelitis (9); spinal tumours (2); amyotrophic lateral sclerosis (2); syphilitic myelitis (1); acute infectious myelitis (1); tabes (2); cervical sympathetic palsy (2); Morton's metatarsalgia (2); peripheral neuritis (4).

Lymphatic System.—Benign reactive hyperplasia (*); tuberculous lymphadenitis (8—cervical 5, mesenteric 3); reticulosis (2); lymphadenoma (1); lymphosarcoma (1).

Relations with Specialists

It was thought at first that fewer specialists would have to be consulted as the result of these more complete preliminary "first-aid" diagnostic investigations, but the reverse has proved to be the case. On going through my notes I was surprised at the number of different specialists called into consultation during these last five years. It is not always realized that there are as many as thirty or more recognized specialties in doctoring now.

One of the main objects of this paper is to show how helpful even a few of the simplest pathological tests can be, tests which an unqualified person might be taught to do quite easily. Our technicians happen to be fully qualified, but in America and on the Continent girls of secretarial status are often taught to do blood counts, blood-urea estimations, etc. In this country we are slow in adopting this additional help, though I know that one of the best-known consulting physicians in London has a carefully trained but unqualified girl doing all his routine urine testing. The criticism is made that no tests of this sort ought to be done except by a qualified expert, but there are not really enough experts to go round, or enough money for their high salaries even if there were. Then the question is asked: "Should anyone but an expert draw conclusions after looking at an x-ray film of the chest or of a bone for a fracture?" In dealing with these simple x-ray films we find that a qualified doctor, perhaps with the radiographer's help, can make a correct provisional diagnosis in about 80% of cases; in the remaining 20% the consulting radiologist's aid is really needed. A provisional diagnosis is a very great help when we first see the patient, and it may save valuable time, especially when we are dealing with accidents, and when it comes to deciding on immediate treatment or to what specialist or hospital the patient should be sent for it.

Laboratory Facilities for all Practitioners?

Many believe that the future welfare of general practice in this country will depend very much upon

whether or not the family doctor is given the tools with which he can do his diagnostic work efficiently, because an early and correct diagnosis is the first step in the treatment of any complaint. Bedside diagnostic methods are just as important as ever, but they are now supplemented to a great extent by simple pathological facilities, x-ray films, electrocardiograms, etc., and a doctor without these extra facilities is often severely handicapped so far as clinical diagnosis is concerned. To have to call in a specialist every time we want a slide examined, or a blood count or a straight x-ray film of the chest done, is not far different from calling in a specialist every time we want to examine an ear-drum or do a rectal examination. That we know is bad doctoring.

A good doctor does as much as possible himself and asks for help when he is stuck. With his wits about him, and the necessary simple technical aids to his hand, no one else is in such a good position to make early diagnoses as is the family doctor. Simple diagnostic facilities should be made available to all general practitioners. This will increase their diagnostic efficiency, make their work more responsible and more interesting, keep them in closer touch with their patients, and raise their standing in the profession. For patients it will shorten the period needed for completing their investigations, and will save them a great deal of waiting, travelling, and time. For hospitals it will reduce overcrowding in the out-patient departments and the number of routine investigations, and it will give specialists more opportunities for dealing with their difficult cases. I know that even my little unit has already saved the out-patient departments of the hospitals around it quite a fair amount of work.

Whether these simple investigations, for which a general practitioner should himself be responsible, are done in a small local diagnostic unit, in a large health centre, in a local general-practitioner hospital, or in a near-by general hospital, does not, I think, matter at all. The important thing is for the family doctor to be able to ask for them *himself* and to have them done somewhere near him, that he has access to the technician who does the tests, to the microscope and to the slides or x-ray films, and that the reports come to him quickly.

The Germ of the Health Centres?

The much-talked-of health centres are not forthcoming so soon as many had hoped, and it is possible that, as an interim measure, the formation of small local supervised practitioner diagnostic units might go a long way towards solving the problem in any place where five or more doctors work, especially in those areas where the hospital is far away or when the hospital authorities are unable or unwilling to help. One can hardly imagine how a large London teaching hospital, for example, could provide routine diagnostic facilities for all the practitioners in its neighbourhood.

I know that there are somewhat similar units working in America and elsewhere, but in Britain they are few and far between. It is hoped that this description of our experience over the last few years may stimulate others to work along similar lines, both inside and outside the National Health Service. Even if half a dozen other experimental centres were set up it would be a step in the right direction. Our unit serves its own particular purpose, in its own particular locality, conveniently and satisfactorily enough for us and for our patients to want to continue to use it. Such a unit

elsewhere would have to grow up in its own way to suit its own local conditions, and local circumstances will govern its precise development. Every group of doctors and every type of practice will need something special of its own, and no two units are likely to be exactly the same. Variable factors to be taken into account in planning such a unit are the number of doctors using it, their distance away from it, whether or not they are in partnership, the special subjects in which they are interested, the type of building and what rooms are available, the facilities at local hospitals, whether the doctors are full-time or part-time in the National Health Service, and the all-important question of, "Who is to pay?"

As we are not connected with the National Health Service our patients pay extra for their pathological tests and x-ray films. All suitable patients are offered the alternative choice of hospital out-patient investigations, but most of them prefer to have everything done on the spot, at the time of their clinical examination, so that they can be told the results that day or the next. These tests have been kept as low in cost as possible and they are considerably cheaper than we had at first expected. It is a moot point whether there should really be much difference in the overall cost to the Exchequer of essential pathological and x-ray investigations done in a unit like ours (but run by the State) and those done in a hospital. The equipment, the stock solutions, the developer, the films, and the technician's and radiographer's time must cost about the same wherever the work is done, and the problems of rent and other overhead charges must necessarily vary with local conditions.

Two of the many criticisms which might be made of this conception of supervised practitioners' diagnostic units cancel themselves out to some extent. The first is that doctors might be too busy to make use of these units, and the second is that the facilities in these units might be abused and the technicians be swamped with unnecessary work. That a doctor in a busy surgery might be too busy to use extra diagnostic facilities is against our experience, both in hospital out-patient departments and in practice. For a patient who may be anaemic, less time is taken to ask for a haemoglobin estimation than to write out a prescription for iron. If the provisional diagnosis of anaemia is thus confirmed the doctor knows where he is. If the haemoglobin is normal he saves not only iron but also a great deal of time; he can look elsewhere at once for the true explanation of the patient's symptoms, and in the early stages of serious illness this may be important. With regard to the second criticism—the possible abuse of these diagnostic facilities—this is a common and somewhat facile criticism often levelled at new methods of diagnosis or treatment. On the whole doctors are fairly reasonable people even, we hope, when rushed off their feet, and one feels that the benefits of a local diagnostic unit would more than outweigh any disadvantages arising from the thoughtlessness of a few.

I hope that this experiment of mine will continue for some time, and we shall be glad to receive any criticisms or helpful suggestions which can be incorporated in our work. We should like to think that those having the difficult task of planning the health centres, or whatever it is that the authorities decide to have in their place, may find some of our experiences useful. If anyone would like to know further details, this unit of ours with its humble special departments is open for inspection

at any time by appointment, and we shall be pleased to see and to show round anyone who cares to come.

KNIGHTHOODS FOR THE KING'S DOCTORS

On December 14, as one of his first acts since resuming his full duties as Sovereign, the King conferred knighthoods on Dr. Geoffrey Marshall and Mr. C. Price Thomas, and invested them with the insignia of Knights Commanders of the Royal Victorian Order. The occasion was the King's 56th birthday. Dr. Marshall was one of the four physicians who have been in attendance on the King since his illness in May. Mr. Price Thomas performed the lung resection in September.

Dr. GEOFFREY MARSHALL was born in 1887. He was educated at St. Paul's School and Guy's Hospital, where he was a demonstrator of physiology, medical registrar, and tuberculosis officer. He qualified in 1911. During the 1914-18 war Dr. Marshall served in the R.A.M.C. with the British Expeditionary Force. He was twice mentioned in dispatches and awarded the O.B.E. After the war he resumed academic work, and in 1920 obtained the London M.D. (Gold Medal) and the M.R.C.P. He was elected F.R.C.P. in 1928, and has been a Censor of the Royal College of Physicians. Dr. Marshall specializes in diseases of the chest. He is on the staff of the Brompton Hospital, and he is a consulting physician to Guy's and to a number of other hospitals and sanatoria. He is also an honorary consulting physician to the Ministry of Pensions, and was chairman of the Medical Research Council's Streptomycin Clinical Trials. In the New Year Honours this year Dr. Marshall received the C.B.E. for his work as principal medical referee to the Civil Service Commission.

Mr. C. PRICE THOMAS, born in 1893, was educated at Caterham School. In 1914 his education was interrupted by the outbreak of war, and he joined up as a private in the R.A.M.C. Later he was trained as an operating theatre attendant and given some medical training. He went to the Dardanelles, and was in the retreat from Serbia. Later on he was in Salonika. After the war he went to Cardiff Medical School, where he won the Hughes Medal in anatomy. He then proceeded to the Westminster Hospital with an entrance scholarship, where he qualified in 1921, obtaining the F.R.C.S. two years later. He is now a member of the court of examiners of the Royal College of Surgeons. After holding various resident appointments Mr. Price Thomas was elected to the surgical staffs of the Westminster Hospital and the Brompton Hospital. In addition he is civilian consultant in thoracic surgery to the Army and the R.A.F., and consultant adviser in thoracic surgery to the Ministry of Health. He is an ex-president of the Thoracic Society.

[Elliott and Fry, London.]