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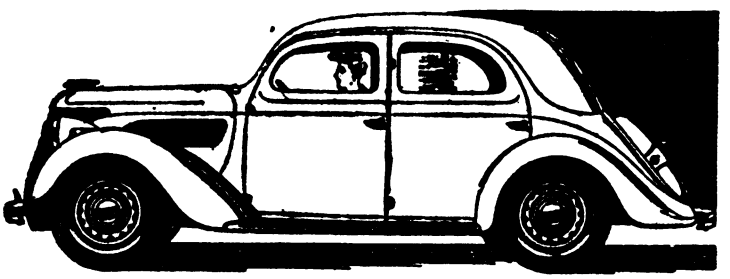

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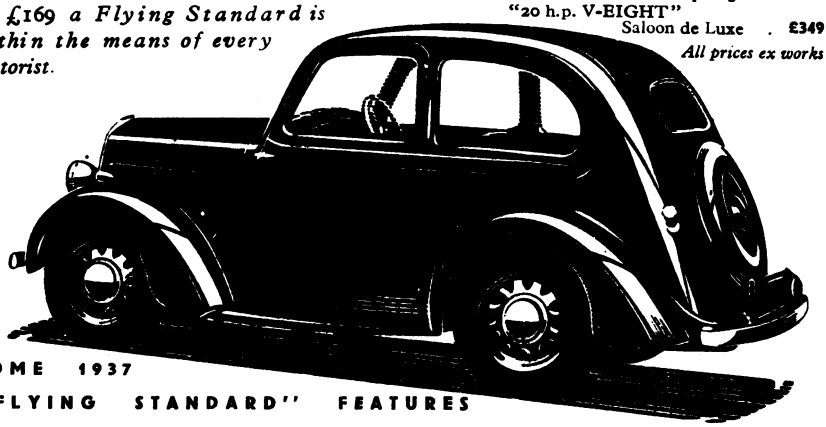

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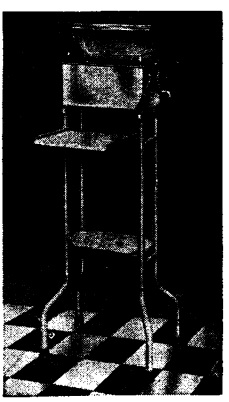

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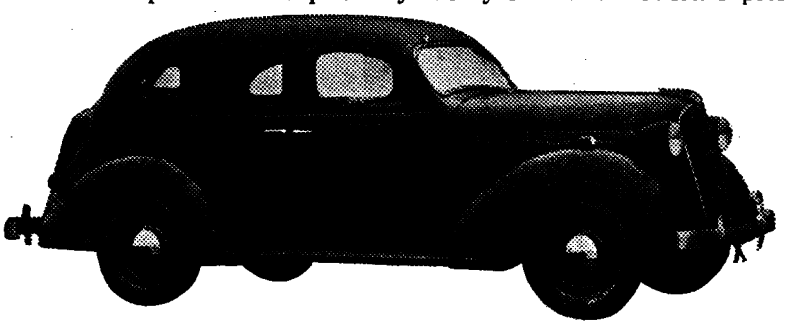

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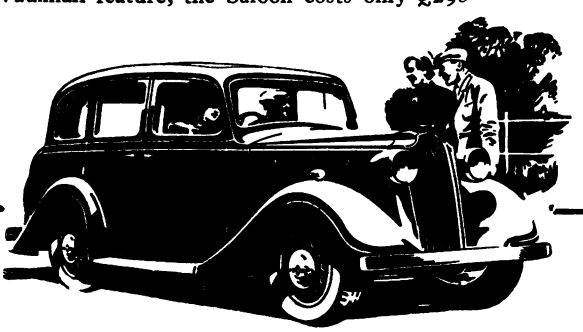

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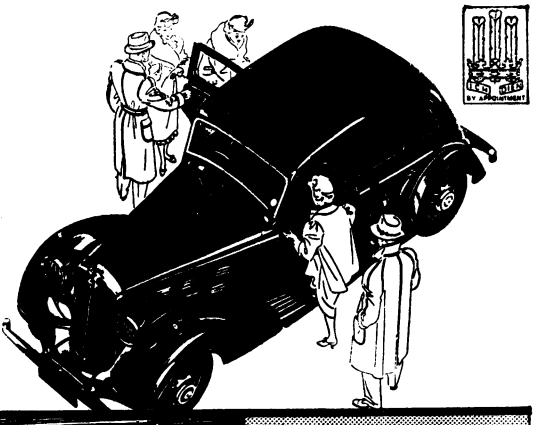

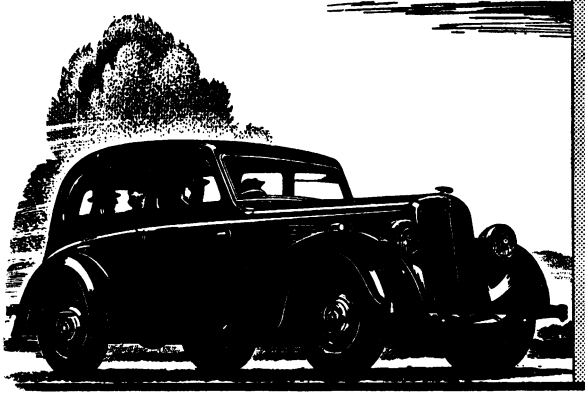

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Conclusions.

It can be seen that the carotid sinus region is a highly specialized sensory region which plays an important rôle in the maintenance of the normal respiratory and circulatory functions. Especial emphasis has been laid here on its importance in the response to anoxia. In this connection it is interesting to recall, as Barcroft[16] has shown, that the stimulus for the first respiration of the child after birth is oxygen lack, so that the first reflex which plays a part in the newly-born animal, and makes possible for it an independent existence, originates in the region of the carotid sinus.

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VOL. VI 1st JANUARY, 1937 No. 1

Students of Medicine

By S. I. TURKINGTON, M.D., D.P.H.

Opening Address to the Medical School, Royal Victoria Hospital, Belfast

THE history of medicine is only too often a dry catalogue of names and dates, when it should be a record of the shifting currents of medical thought through the centuries.

Some years ago, when reading histories of medicine, I was struck by the fact that very little was said about the student of medicine; what manner of man he was, how he lived, and how he worked in those bygone days. It is a difficult subject, for records are scanty, and, as Sir Thomas Browne has said, "the iniquity of oblivion blindly scattereth her poppy."

It is my intention, however, in this address, to try to show you something of the life of the student of medicine at various periods within the last thousand years; and, in doing so, to demonstrate how the past explains and influences the present.

Between the fall of the Western Roman Empire in the fifth century, and the establishment of the universities in the twelfth century, there is a great gap of seven hundred years. When the tide of invasion overwhelmed Western Europe, the monasteries stood out like lighthouses in the sea of barbarism, and as Rashdall[1] has said, "the clergy were almost the only class which possessed the rudiments of knowledge in the general extinction of Roman civilization." So it is to the monasteries that we turn for our student of medicine as he existed one thousand years ago.

MONASTIC MEDICINE.

Among the most precious possessions of the mediæval monastery were the manuscripts of classical literature and classical medicine. They were almost the only relics of the great days that were gone; of "the glory that was Greece and the grandeur that was Rome."

The Monastic Rule, passed at Aix-la-Chapelle in the year A.D. 817, imposed as a duty the copying of manuscripts and the care of the sick.[2]

"The Scriptorium of the Abbey," says Fisher,[3] "was the only secure centre for

literary work, and the monkish scribe the chief pillar of learning. Much of our scholarship, not a little of our historical knowledge, is founded on the diligence of scribes, many of them nameless, who have toiled over crabbed manuscripts by a feeble rushlight in the hope that the labour of their pens might be acceptable unto the Lord."

Many monasteries were built in remote districts, and so escaped those "risks of siege, fire, and plunder to which mediæval towns were so liable."[4]

As the years passed they accumulated large numbers of medical manuscripts. For example, there were 118 medical treatises in the library of Dover Priory, and 230 in that of the Abbey of St. Augustine at Canterbury.[5] Most of these libraries contained copies of the works of Hippocrates and of Galen. Galen was imperial physician to the Emperor Marcus Aurelius in the second century, the flourishing days of the Roman occupation of Britain, and it is not improbable, as Sir Norman Moore has said, that men who actually consulted Galen about their health may have tramped down the Roman Causeway in Cheapside to the north of the Thames.[6]

Chaucer has given us a list, in the "Canterbury Tales," of the fifteen medical works, Greek, Roman, and Arabic, with which his "Doctour of Phisik" was familiar. The very survival of these manuscripts through the previous centuries of storm was due to the monkish scribes, and it is their proud claim that they "guarded the gates of learning in Europe."[7]

The order of Saint Benedict also placed the care of the sick above all things. In each monastery was a monk appointed to give medical care to the brethren, to the poor of the district, and also to strangers; to "the way-worn pilgrim knocking at the gate, the infirm man bent with age, and the stricken leper in his sombre gown."[8] This monk, the *infirmarius,* was the real student of medicine in the Dark Ages.

It is noted by a French authority,[9] that the monk-physicians abroad even took pupils, and founded little schools named after abbeys and cathedrals. They were not without clinical knowledge. They recognized, for example, the collapsing pulse of aortic regurgitation, and this they called the "pulsus caprizans," the leaping pulse. They also noted the feeble flicker of fibrillation, and this they termed the "pulsus vermicularis," or worm-like pulse; and to his description of these two pulses, the monkish chronicler adds the grim note, *"Redolentque sepulchrum"*—"They smell of the graveyard."[10] Their activities were not always kindly regarded by their superiors; and one who had left his monastery to practise medicine was stated, somewhat tartly, by his abbot to have done so "through love of filthy lucre and a vagabond life." Perhaps their modesty about their accomplishments is best illustrated by the doleful remark made by one of them : "How many men shall die before I become master of this mystery, God knoweth."

In order to provide for emergency, the *infirmarius* slept in the infirmary, whether patients were present or not. He provided, from monastic funds, medicine and comforts for the sick, materials for cleaning the room and lighting a fire, and fresh rushes for covering the floor.[11]

Venesection was carried out as a routine, by the *infirmarius,* four times in the

year—in February, April, September, and October, but not during Lent, or during the work of harvest-time.

It is interesting to reflect that the practice of venesection goes far back to primitive times. When illness was held to be due to anger of the gods, the letting of blood by the priest was a direct personal sacrifice to propitiate an angry deity. And if we take the view that anatomy was first studied by the Egyptians during their practice of embalming the dead, we can trace a beginning in religious observance of the two great sister-sciences of surgery and anatomy.

The building set aside as an infirmary was small and primitive to modern eyes. It had only a few rooms—one for the "valde infirmi," the patients who were very ill; one for the medicus, or monk-physician; a room where patients were placed after bleeding; and a warm room for sweating, probably heated by some method such as the hypocaust, for though we pride ourselves on our plenum system of ventilation, the Roman villas in Britain were warmed by a system of central heating.

Patients in the infirmary were strictly disciplined. The sick man could discuss his ailments with the *infirmarius,* but there was no general conversation except at recreation-time, and even at meal-times the inmates ate in silence.

It is easy for us to smile at the tiny monastic hospital with its venesection, its purgation, and its sweating; but when one considers the modern treatment of uræmia—venesection, purgation, and sweating, perhaps we have not advanced so very far in a thousand years. Such as it was, it was the "sole solace of the poor and needy, and refuge of the stranger and destitute." It is true that beds were probably a luxury, and that the patients slept on pallets of straw, but the diet was ample, from any records we have, and the bulk of the food came fresh from the monastery garden.[12]

The food of the patients was prepared by a "prudent, skilful cook," chosen by the *infirmarius*. "Day and night he was to show himself solicitous for the general welfare of those in the infirmary. He had to help in the general kitchen, and obtain from thence the requisite meals for the sick."[13]

There was often a herbarium, or herb-garden, beside the infirmary; and much importance was attached to a knowledge of herbs. "Learn to know the properties of plants and the art of mixing remedies," said Cassiodorus to the monks. "If the knowledge of the Greeks is not unknown to you, you have the book of herbs of Dioskorides, who has pictured forth the plants of the field with surprising accuracy."[14] "One of the pleasantest pictures," says Withington,[10] "in an age presenting little of that character, is the peaceful monk, gathering his herbal simples and brewing decoctions comforting to the minds and bodies of his neighbours." Herbals were often compiled in the monasteries: the "book of herbs" being the ancestor of our "Materia Medica"; and Walafrid Strabo, who flourished about A.D. 850, has left us twenty-three little poems in excellent Latin on the favourite herbs in his monastery garden. The advertising columns of a modern newspaper show that the herbalist is still with us, a survivor from the earliest days of medicine.

The kind of herbs used by these early monks may be learned from a list of those

grown in the ninth century by St. Gall. Some were chosen on account of what Stuart calls[15] "the touching belief that nature had indicated which plants were good for certain diseases by imprinting the image of a bodily organ on their leaves. The heart-shaped wood-sorrel was useful for cardiac cases; and the liver-wort or hepatica, for liver cases." Or preference may have been given to plants mentioned in Scripture, such as "anise, mint, and cummin." These were to be found in the monastic garden; and anise and mint are still in our pharmacopœias to this day.

It was much later on that the mediæval monk began to dabble in chemistry. It is said that the works of Basil Valentine, a Benedictine monk, contain the earliest mention of hydrochloric and sulphuric acids, and the salts of antimony. Had his works been published when they were written, he would have been regarded as the founder of medical chemistry, an honour now held by Paracelsus.

It is easy to see how an extern service grew up. Little villages sprang up around a monastic foundation. The abbey has long since perished, but the village survives; in Northern Ireland we may instance Greyabbey and Whiteabbey.

An almoner was appointed to visit the poor, the sick, and the bedridden of these villages. The *hospitarius,* or guest-master, looked after the welfare of visitors; for the great abbeys, especially on the main roads, were the "halting-places of rich and poor whom business, pleasure, or necessity compelled to travel on the king's highway."

Illness must often have overtaken the mediæval traveller, and as examples of those whose last illness was treated in a monastery, one may quote Edward the First, King John, and Cardinal Wolsey. Helpless sufferers were brought to the monastery for treatment, and D'Arcy Power mentions that in the early days of St. Bartholomew's Hospital, then a religious house, the patients treated were the sick found in the streets, who were admitted freely and without question.[16] Beadles were also appointed to bring in patients, and in this custom one may trace the beginnings of a primitive ambulance service.

And now to sum up. Just as our word 'hospital' is derived through the Latin *'hospitale,'* a guest-house, from *'hospes,'* a guest, and just as the tiny monastic infirmary was the seed from which sprang the great hospitals of to-day, so the placid, kindly *infirmarius,* the monk-physician, was the ancestor of our modern student of medicine.

THE MEDICAL SCHOLASTICS.

Student Life at Mediæval Oxford.

Probably the greatest single achievement of the twelfth century was the establishment of the universities; and among these the University of Paris rapidly became world-famous. It must be remembered that the greater part of England and France were at that time united as one kingdom, and it was during this union that the University of Oxford was founded. Then, in 1229, a great riot at the University of Paris led Henry III to issue his famous invitation to students from Paris "to come into England and settle in what cities, boroughs, and villages they pleased to choose." Oxford and Cambridge shared alike in the influx of Parisian students.

Latin was the living language of all abodes of learning, and the boy destined for the university puzzled out his elements of Latin in the psalters and missals of his cathedral or monastic school. Life was cheap in the thirteenth century, and his career at the university began early. Twenty was the minimum age for graduation; and, as many courses lasted seven years, he came up as a freshman at the early age of thirteen. But it was not the Oxford of to-day.

"In the stead of long fronts of venerable colleges," says Green,[17] "history plunges us into the mean and filthy lanes of a mediæval town. There lived thousands of boys, huddled in bare lodging-houses, clustering around teachers as poor as themselves, in church-porch and house-porch; drinking, quarrelling, dicing, and begging at the corners of the streets. Mayor and Chancellor struggled in vain to impose order on this seething mob of turbulent life.

"Among this strangely mingled mass, society and government were democratic. Wealth, strength, skill at arms, and pride of ancestry, all went for nothing in the lecture-room. It was a real Republic of Letters."

The first university statutes were promulgated in 1430, just over five hundred years ago. They did not interfere with the private life of the student, but they tried to impose curfew, to compel attendance at lectures, and to enforce residence in a Hall. As mediæval students were exposed often to the most bitter want, we read of one Hall whose students were regularly turned out to beg in the streets.

These poor students sometimes became servitors to a master, or to a rich colleague, and at Cambridge, the bursar's accounts show that they dug foundations, carried earth and bricks, and did other unskilled labour.[18] It became a recognized mediæval charity to receive a poor student into one's house, or to support him at the university, or even to give him something at the door. "Alms! give alms to a poor scholar for the love of God!"

The room in which he lived was a cold and cheerless place, as there were usually no fires in either classroom or living-room. The windows were unglazed, and closed by wooden shutters; the ceiling unplastered, and the floor strewn with rushes. The furniture consisted of a table, a few "playne joyned stools," a truckle-bed in the corner, and a chest for personal effects.[19]

Electric light is now a commonplace of civilization, but candles furnished the only means of illumination in those days, and they were held to be very dear at twopence a pound. Therefore it was the custom for students holding an evening discussion to cluster round the light of one candle. We may picture them, seated round a fire, if they were very fortunate, with the candle guttering in the draught from the unglazed window, and the firelight lighting up the eager faces :—

"They sit there, in the shadow and shine
Of the flickering fire of the winter night,
Figures in colour and design,
Like those by Rembrandt of the Rhine—
Half darkness and half light."

Food may seem cheap to modern eyes with meat a farthing a pound and cheese

at a halfpenny a pound. Tea and coffee were unknown, and beer was twelvepence a quart. But "Oxford fare" had a very bad name.

It was difficult and expensive to transport food to a mediæval university town, and the student was often reduced to great want.

Breakfast, however, was a meal that could be dispensed with by the hardy and economical. Dinner was at ten o'clock, and, for the poorer sort, was a "penny piece of beef among four, having a few porridge made with the broth of the beef, with salt and oatmeal." Supper was at five o'clock, and was often no better than the dinner.

The wealthier student was fond of vivid apparel. We read of those who "ruffled it after the fashion of courtiers, who affected lovelocks, red hosen and long shoes, and wore rings for vain-glorying, pernicious example, and scandal of others."

It is of interest to note that our modern academic gown is directly derived from the early monastic habit worn when all were "clerks." Hoods were originally worn for warmth. They were lined with fur, as is our B.A. hood of to-day, and a Papal letter of 1258 is still extant which gave permission for their use, "as the cold of these parts is vehement." The thirteenth-century graduate must have been glad of a fur-lined hood in the unwarmed buildings of a mediæval university in the depth of winter. With the introduction of silk as a lining, instead of fur, came the adoption of varying colours of silk to denote the different faculties.[20]

The long hanging sleeves of the gown are pure thirteenth-century costume, a fact which can easily be verified by the study of old memorial brasses in cathedrals.

The college cap of the 'mortar-board" type came much later, and was developed in its present form in the early seventeenth century.

It is said that the pocket which survives to this day in the hood of our university gowns is the last relic of the receptacle in which the mediæval student placed the crusts of bread which he had begged on his daily rounds.

Before proceeding to study medicine, the mediæval student must take a degree in arts. As Cholmeley[21] points out, "the arts course was a severe test. To have passed through it meant that a man could hold his own in ordinary life, and that he had mingled with men from various districts of his native land, and with foreigners for seven or eight years. A Master of Arts possessed a very good mental training; and, if he proceeded to study one of the other faculties, he would do so better equipped than many a student who nowadays begins the study of medicine."

But the study of medicine was very different from that of to-day. The mediæval student knew nothing of clinical, or bedside, medicine, nothing of the study of anatomy by dissection, and nothing of written examinations. His progress was secured only by compulsory reading of textbooks, and enforced attendance at lectures in rooms where the "masters could lecture, each with some precious volume open in front of him, while the students sat on the floor, took notes, and applauded or hissed him, like a rowdy audience at the theatre."[22]

These lectures began at six in the morning, and lasted till ten. After dinner at ten, there were further lectures, and the student was expected to study till supper at five o'clock. Informal classes were held by the lecturer, at which students were

questioned in turn. These were termed "resumpciones," and seem to have been the equivalent of our modern "grind in medicine."

To the mediæval student, the written word was the end of all discussion. Just as Aristotle was supreme in logic, Cicero in rhetoric, and Paul in theology, so Hippocrates and Galen were supreme in medicine. They were regarded as infallible authorities, and they dominated the medical world.[23] "The young people," says John of Salisbury, "pride themselves on their knowledge of Hippocrates and Galen, and introduce their aphorisms on every occasion."[24] It was these endless disquisitions that won for these men the title of "Medical Scholastics."

Among the textbooks of the time may be noted the "Aphorisms," the "Prognostics," and the "Regime of Acute Disease," of Hippocrates; the "Crises and Critical Days" and the "Simple Medicine" of Galen; and the "Fevers" of D'Isaac, or the "Antidotes" of Rhazes; the last two marking the rising influence of Arabic medicine, then becoming known through the Moorish domination of Spain. On these authorities the student had to "respond," and to "oppose," in the school of the regent doctors, and it was at this time that the word 'professor' was first used. It was derived from 'profiteri,' to expound; the professors being those of the teaching doctors who publicly expounded a certain subject.

The Faculty granted three degrees, those of bachelor, licentiate, and master. The higher degrees were obtained by further years of reading and disputation. Graduation ceremonies were the occasion of much speech-making. The candidate gave a discourse, took the oath, and was invested with the insignia of his office. He was also expected to give a dinner to his examiners.[25]

Perhaps we may best judge these mediæval students by the letters they wrote, the songs they sang, and the statutes which the university passed to restrain them. Here is a student's letter, written from Oxford in the year 1220 :[26]

"The city is expensive, and makes many demands. I have to rent lodgings, buy necessaries, and provide for other things. Wherefore I beseech your paternity that, by the promptings of Divine pity, you may assist me. For you must know that, without the aid of Ceres and Bacchus, Apollo grows cold." That letter was written 716 years ago, and though its phrasing is archaic, its appeal is very modern.

A handful of their songs has come down to us—part of the famous Goliardic verse. Two of the most popular are still to be found in students' song-books, the first being the "Gaudeamus," which, as Miss Waddell[27] says, "seems to ring in the twilight streets of all the old university towns in Europe." The other, the "Mihi est Propositum," was written in Germany by the Archpoet,[28] whose real name we do not know. Dying of consumption, coughing, starving, he could write verses which have the genuine swinging lilt of the students' song :—

"Down the broad way do I go,
Young and unregretting;
Wrap me in my vices up,
Virtue all forgetting."

Of the university statutes, perhaps I may quote the beginning of one in its sonorous Latin :

"Scholares, ebriosi, noctivagi cum instrumentis musicis" ("Students, drunken, wandering by night with musical instruments"). Imagine yourself in those narrow streets on a winter's night. The little band of revellers moves along, the light of their torches shining on the snow. From the shuttered windows of a nearby tavern comes the rattle of dice and the roar of one of the great Latin drinking-choruses. Farther up the street, shouts and the clash of steel herald the beginnings of a town and gown fight, and then at last the heavy strokes of the curfew bell ring out over the little mediæval town.

And that, ladies and gentlemen, is how your predecessors lived at Oxford University five hundred years ago.

THE NEW LEARNING.

Vesalius and Padua.

The revolt against the classical tradition in medicine did not come until the early years of the sixteenth century. It was then that the pioneers of modern medicine taught in the universities of Italy, especially at Padua; and, in order to understand the beginnings of the new medicine, one must consider the geographical position.

Since the time of the Crusades, Venice, then "at the pinnacle of her wealth and glory,"[29] was mistress of the seas. She "held the gorgeous East in fee," and into Venice poured all the trade of the Eastern Mediterranean with cargoes as varied as those of the navies of Tarshish, which bore "gold and silver, ivory and apes and peacocks unto King Solomon."

Venetian galleys traded with all the ports of the Levant, and from thence the great camel-trains and caravans constituted the overland trading route through the heart of Asia, to Bokhara, to Samarcand, and to far-away Pekin itself, as you may read in the travels of Messer Marco Polo, the Venetian. "This was the ancient 'Silk Road,' the most romantic and culturally the most important trade route in the history of the world."

With new markets came new ideas. Asia had never fallen under Roman influence. She had "let the legions thunder past, and plunged in thought again," but Asiatic thought had never been poured into the Roman mould. The influence of Arabic medicine was widespread, exerted chiefly through the great medical schools of the Moorish kingdom of Spain.

Drugs and spices from Asia were being introduced into treatment, and Arabic names remain in our pharmacopœia to this day—myrrh and camphor and senna, and "all the drowsy syrups of the East."

"It was in Italy,"[30] says Castiglioni, "that the Latin world came into contact with the half-forgotten treasures of Greek wisdom, with the wisdom which the Arabs had borrowed from the Greeks, and with the original products of the remoter East. . . .

"The stream of foreigners was continuous, and the intercourse of the Italian markets with the East and Egypt, France and Spain, Germany and England, was constant and flourishing."

All these diverse currents of thought met in Venice; and Padua, as Renan has

said, was "the Latin quarter of Venice." So it was in Padua that the new medicine was born.

The leader of the revolt against classicism was a young man from Northern Europe. His family came from the little town of Wesel, so he was Andrew from Wesel, known, according to the fashion of the time, as Andreas Vesalius.

Among his contemporaries and immediate successors were men whose names are daily heard in every dissecting-room in Europe — Fallopius, Eustachius, Morgagni, Fabricius, and Sylvius. Castiglioni[30] points out the great wisdom of the Venetian Republic, which guaranteed freedom of study to all nations, irrespective of race or religion.

"Nations" were formed to give hospitality to the students. At Padua the German "nation" alone had 977 students in the medical faculty in the sixteenth century, and the English "nation" had its chancellor, its beadle, and an important position in university life.

The main route to Padua lay over the Simplon. The journey was usually made on horseback, and the discomfort of the inns is well described by Seebohm in the "Oxford Reformers" :[31] "One room serves for all comers, and in this one room, heated like a stove, eighty or ninety guests stowed themselves, books, baggage, dirt, and all.

"Their wet clothes hang on the stove to dry, while they wait for supper. There are footmen and horsemen, merchants, sailors, women, and children, sound and sick, combing their hair, wiping their brows, and making as great a confusion of tongues as there was at the building of Babel.

"At length, in the midst of the din and stifling closeness of this heated room, supper is spread, a coarse and ill-cooked meal, which our scholar hardly dares to touch, but is obliged to sit out to the end for courtesy's sake. And when past midnight he is shown to his bed-chamber, he finds it to be rightly named: there is nothing in it but a bed, and the last and hardest task is to find between its unwashed sheets some hours of repose."

A hundred and fifty years later John Evelyn rode over the Simplon on his way back from Padua to London, and noted a fact of medical interest :[32]

"Amongst these mountains inhabit a goodly sort of people having monstrous wens of flesh hanging to their throats, some of which I have seen as big as a hundred-pound bag of silver hanging under their chins; among the women especially, and that so ponderous that, to ease them, many wear linen bound about their head and coming under the chin to support it, but *'quis miratur tumidum guttur in montibus?"*

Here he quotes Tacitus to the point, thus showing that the Romans had noted the association of goitre with hilly districts, fifteen hundred years ago.

We can imagine the English sixteenth-century student riding down from the Alpine passes through the fields and vineyards of Northern Italy, till at last he caught sight of Padua, the walls, the domes, and the church spires of the typical mediæval town.

"Once inside," says Newman,[33] "he would find himself in the dark, tortuous, narrow streets, arched, and lined with arcades and overhanging stories with small latticed windows."

His lodgings were poor and mean, food was bad, the windows were unglazed and often filled with sheets of linen, artificial light was primitive and expensive, and there was no organized recreation.

Luke was the beloved physician *"medicus carissimus,"* so the medical session began on St. Luke's Day, the 18th October. It lasted for ten months, and during this time the human body was several times dissected in public by the professor of anatomy. Great preparations were made by the students for these "public anatomies."[34] Trustworthy treasurers were appointed to buy knives, trephines, mallets, and sponges. Torches were also required to light the theatre at night. Invitations were sent to the chief officials of the city and the university; and before dissection began, an introductory address, preceded by music, was given by the anatomist.

Vesalius carried out his dissections in a temporary wooden theatre, but in the time of Fabricius a permanent building was erected, which still bears his name.

A "public anatomy" after nightfall must have been a macabre scene. The only light was provided by two candelabra, and by torches held by students. In the small oval central space was the table with Vesalius conducting the dissection. Round this stood the dignitaries of the city, the nobles and notabilities of Padua, grave and attentive in their picturesque mediæval silks and velvets.

Farther out in the dimness were the six concentric galleries, packed with eager students, so herded together that their heads were only three feet above those of their comrades in the row below. The scene flashes up before us, as clear and vivid as a cinema-film, then it slowly fades out again, in the dancing flicker of the torch-light.

Such was the golden age of Padua. Its fame was worldwide. Shakespeare mentions Padua in "The Taming of the Shrew," and the great Dr. Johnson "had a mind to go to Padua."

When Harvey, the discoverer of the circulation of the blood, went to Padua in 1598, it was considered a bad year if less than a thousand students matriculated. Each student paid a hundred gold ducats yearly.

The salaries of the professors varied. Fabricius, who was Harvey's tutor, received eleven hundred florins, but it is said that the great Galileo, founder of modern astronomy, never received more than a thousand florins.

"The gold ducat and the florin appear to have been coins valued at about nine-tenths of the English gold half-sovereign, but their present value, as measured in purchasing power, is not less than four times that of the period of Vesalius."[38]

What does the modern medical student owe to Padua?

Vesalius ended the domination of the written word. It is to him we owe the beginning of modern anatomical teaching, even though, as Castiglioni observes, "it began with something between a rite and a theatrical performance."

To Morgagni we owe the association of medicine with pathology. For sixty years

he scarcely missed a lecture, and at the age of ninety, in a trying winter, he held the whole course of anatomy, though the great halls had no stoves.[36]

To da Monte we owe the very beginnings of clinical medicine, when he took students to the Ospedale San Francesco, and lectured to them at the bedside. In the year 1567, a student named Heurnius, from Leyden, studied at Padua. He became professor of medicine at Leyden in 1581, and was destined to hand on the very beginnings of clinical teaching from Padua to Leyden.

Vesalius, Fabricius, and Morgagni—such were the great teachers of Padua, and the European student flocked to hear them, notwithstanding his bitter poverty and the hardships of his journey.

The great story of the Vagantes, the mediæval students who wandered from city to city in quest of learning, has been told by a graduate of Belfast University, Miss Helen Waddell.

For the wandering clerks, like the Latin tongue, knew no frontiers. "Swift and unstable as the swallows," wrote one of them, "hither and thither, like a leaf caught up by the wind, or a spark in the brushwood, we wander, unweariedly weary."[37]

THE RISE OF CLINICAL METHODS AND CLINICAL TEACHING.

Sydenham and Boerhaave.

The evolution of modern medicine has been slow. The monasteries kept alive the feeble flame of classical medicine, through the blackness of the Dark Ages. The rigid scholasticism of the twelfth century was followed by the breakaway from classical tradition in anatomy which came with Vesalius at Padua. But it was not until over a century later that medicine also broke away from its classic forms, and the pioneer in this case was an Englishman.

Thomas Sydenham was born in 1624. His studies at Oxford were interrupted by the great Civil War, in which he and his brothers served on the side of Parliament; and it may be that his Puritan intolerance of ecclesiastical authority was reflected in his dislike for dogma and scholasticism in medicine.

After obtaining his medical degrees, he settled in practice in King Street, Westminster, where Whitehall now stands. King Street was a famous thoroughfare.[39] Down it Charles the First had passed to execution on that bitterly cold January morning in 1649, and Cromwell lived there and held his court in the old palace of Whitehall close at hand. At the lower end of the street flowed the Thames, not between massive embankments as it flows to-day, but edged with swamps and marshes. Fever was terribly rife in London at the time of the Stuarts, and Sydenham set himself to study these fevers at the bedside, and to describe them as he saw them, instead of using descriptions written by Hippocrates and by Galen. He was the first and greatest of our clinical clerks, and some of his descriptions have not been bettered to this day. He held no hospital appointments, he taught no students; he was what we would describe as a general practitioner; and he revolutionized clinical medicine. One is irresistibly reminded of James Mackenzie, a general practitioner in Burnley two centuries later, who founded modern cardiology

by accurate clinical observations at the bedside, and records taken by a polygraph constructed by a local watchmaker.

Sydenham's great work in fevers was published in 1676, and was a record of his observations extending over fifteen years. His choice of this subject was probably due to the fact that fevers then made up about two-thirds of all medical cases,[40] whereas they are now only responsible for about one-tenth of those recorded. Of the year 1665 he writes: "That tertian fever which in the said year so much prevailed, contracted itself into a small compass. After autumn, the quartans decreasing, the continual fever now violently raged all spring, at which the vernal intermitting fevers succeeded, which, going off about May, the smallpox here and there appeared, and disappeared at the approach of the autumnal epidemics."[41] From this terrible picture we assume that malaria must have been endemic in London, and we know that Cromwell suffered severely from the "tertian fever," which ultimately killed him.

Sydenham also describes rheumatic fever, and his account of chorea was so accurate that the name "Sydenham's chorea" may be heard to this day. The whole art of medicine is observation; and here is part of his description:

"Chorea is a certain kind of convulsion which chiefly invades boys and girls from ten years of age till puberty. First it shows itself by a certain lameness . . . of one of the legs, which the patient drags after him like a fool, and afterwards it appears in the hand. . . . If a cup of drink be put in his hand, he represents a thousand gestures, like jugglers before he brings it to his mouth. His hand being drawn hither and thither by the convulsion, he turns it about for some time, till at last, happily reaching his lips, he flings it into his mouth and drinks it greedily, as if the poor wretch delighted only to make sport."

Sydenham founded modern epidemiology, but he went farther than the mere observation and collection of facts. He attempted to distinguish one disease from another, so beginning the scientific distinction known as differential diagnosis. For this is the method which governs advance in medicine, or, indeed, in any other science. First there is the collection of facts and the attempt to differentiate one series of facts from another. Then comes the deduction of the laws which govern these groups of facts, and medicine progresses when its laws are understood. Clinical observations are visible, but they may be transitory and changing. The law which governs them is invisible, but it is permanent, and it is the law that endures. For the things that are seen are temporal, and the things that are unseen are eternal.

Another fifty years were to pass before the introduction of clinical teaching in medicine, and this time the scene shifts to Holland. Previous attempts had been made to introduce instruction at the bedside, but essentially our present system of clinical instruction is due to the genius of one man, Hermann Boerhaave, who was born in 1668, and became professor of medicine at Leyden in 1709.

Boerhaave had a great respect for Sydenham, referring to him always as the "immortal Sydenham." Sydenham was the founder of modern clinical medicine, Boerhaave the exponent of modern clinical teaching. As the athletes, in the famous

simile of Ovid, hand on the torch one to another in the relay race, so, in medicine, we see the torch of progress handed on from a great man to his successor.

In the seventeenth century, Leyden must have been a quiet, sleepy Dutch town, of the type that Jan Vermeer has immortalized in his landscapes. In the town was an old convent, which had been converted into a small hospital as early as 1595.[42]

Heurnius had made there a tentative effort to introduce clinical teaching as he had seen it at Padua, but it was left for the genius of Boerhaave to develop it on the lines on which it is practised to-day.

There were only two wards of six beds each—a ward for men and a ward for women, yet half the doctors in Europe were trained round those twelve beds. Students came in such number that the little wards were crowded, and some were forced to watch the clinical instruction from balconies.

It was here that the methods of clinical investigation, and of clinical instruction, were first worked out. Day by day Boerhaave went from bed to bed, recording his histories and examining patients. Students were called up to examine cases, to answer questions, and to prescribe treatment.

Boerhaave possessed a genius for getting at the essential facts of a case, and expressing them in clear and graphic language. He became immensely popular with the motley throng of students of all nations who jostled one another in his little wards, for they appreciated his kindness of heart, his simplicity, and the painstaking care with which he taught them. Men were there from every European country, and it was men from Scotland who were destined to introduce his system of clinical teaching to Edinburgh University.

A few years later Leyden became the most famous school of medicine in Europe, and men went there to take out post-graduate courses, as they go to the Mayo Clinic to-day.

The written works of Boerhaave are long since dead, but his personality still lives. Every time you go round the medical wards of this hospital for clinical instruction, you are paying a silent tribute to the memory of Boerhaave, and every time you take careful notes of a medical case, you are serving as clinical clerk under old Thomas Sydenham.

That is how Boerhaave became known as the "teacher of Europe."[44] He was a man of great erudition, for the practice of medicine depends on more than the knowledge of purely medical facts. It demands at the same time development and culture of the mind. As was said of a practitioner long ago : "To a fair knowledge of medicine, he united a shrewd and profound knowledge of mankind; and so he succeeded where others failed."

To his clinical work Boerhaave added also the teaching of the theory of medicine. He began the day, at seven in the morning, by demonstrating botanical specimens in the physic garden.[43] He lectured also on physics and chemistry, and touched on anatomy and physiology. This was the first attempt to organize a medical curriculum; and it is curious to reflect that the order survives unchanged to this day. One begins with botany, physics, and chemistry, passes from these to anatomy and physiology, and so on to medicine.

Boerhaave must have been a man of great physical strength, for he taught for five or six hours daily during the session, for a period of twenty-nine years, from his appointment in 1709 till his death in 1738.

It is an attractive picture: the big, forceful, kindly teacher, doing his rounds in his little wards, and patiently working out his system of clinical instruction among the jostling crowds of eager students.

It is true that he spoke to his own generation, but after two centuries we are still "listening in" to his clinical teaching in the wards of the old hospital in Leyden.

SCOTTISH MEDICINE IN THE EIGHTEENTH CENTURY.

"In the seventeenth century," says Trevelyan,[45] "Scotland, as poor as a thin soil and mediæval methods of agriculture could make her, and still without any considerable trade with England or across the sea, sent forth her most adventurous sons to serve abroad, as captains and ancients in the armies of Gustavus Adolphus."

Scott has shown us in the "Legend of Montrose" the perfect type of wandering Scots soldier of fortune in the person of Dugald Dalgetty. And just as the Scottish swordsman travelled far afield over Europe, so also did the wandering Scottish scholar.

In the year 1718 there sat on the benches of Leyden University eight or ten young men from Edinburgh,[46] pupils of the great Boerhaave. Among these were two destined to become famous—Alexander Monro, first professor of anatomy, and John Rutherford, first professor of clinical medicine at Edinburgh University, and grandfather of Sir Walter Scott. These men introduced into the new school of medicine at Edinburgh the system of teaching which they had learned from Boerhaave in Leyden.

The foundation of the Edinburgh medical school may be attributed to the foresight of John Monro, the father of Alexander Monro. "As a surgeon in the army of King William the Third, he had seen the necessity for improved medical education,[47] and, as a travelled man, he knew what medical education was on the Continent.

"His affection for his only son, and his desire to see a medical school in Edinburgh, became united in the idea of his son being the founder."

That is why Alexander Monro was sent as a student to Leyden in 1718, where he became a "favourite and admiring pupil of Boerhaave."[47]

In 1720, on his return to Edinburgh, Monro delivered his first series of lectures in anatomy and surgery, the first regular lectures on any subject ever read in Edinburgh.[48]

He continued to give these lectures without a break for almost forty years. He first taught in Surgeons' Hall, but in 1726 removed to the university. At that date he and his colleagues were given university appointments, with full power to examine candidates. The appointments were made *"ad vitam aut culpam."*[49]

It is difficult to render the inimitable terseness of the Latin, but "Death or disgrace" is the phrase nearest to the meaning.

The next step was to provide clinical instruction, and in 1736 a Royal charter

was obtained for an infirmary, which was opened in 1741, and in which clinical instruction was given for 138 years, till it was superseded in 1879.

It was there that Rutherford began his system of clinical teaching which was to become world-famous. Here is his own description of his aims:

"The method I propose to pursue is to examine every patient before you, lest any circumstance be overlooked. I shall give you the history of his disease in general; second, inquire into the cause; third, give you my opinion how the disease is likely to terminate; fourth, lay down the indication of cure which will arise. I shall make as accurate observations and as just conclusions as I can. I hope this will produce a good result, and help to make you real physicians."[46]

This was written about two hundred years ago. Could we write a much better summary to-day? It was in this manner that bedside clinical teaching was introduced, with its attendant systems of clerking and dressing, now in use all the world over.

Rutherford's standard textbook on medicine was Boerhaave's "Aphorisms"; and St. Clair, lecturing in physiology, used Boerhaave's "Institutes."[50] Nothing could better illustrate the genius for teaching which Boerhaave must have possessed, than the fact that the University of Edinburgh was founded on his system, both clinical and theoretical.

Alexander Monro (primus) held the chair of anatomy from 1719 till 1754, when he was succeeded by his son, Alexander Monro (secundus), whose tenure of the chair lasted until 1808, a period of fifty-four years. In his time his class grew until five hundred students attended. He was at the head of his profession as consultant physician, he was an excellent lecturer, and in research he is celebrated by the association of his name with the foramen of Monro. He handed on his chair to his son, Alexander Monro (tertius), who retired in 1846. Thus came to an end the "dynasty of the Monros," who held the Edinburgh chair of anatomy for one hundred and twenty-six years in unbroken succession.[51]

The achievement of these men was great. In a city of about thirty thousand inhabitants, and in a country distracted by the Jacobite rebellion of 1745, they succeeded in founding one of the most famous schools of medicine in the world.[47] "Students flocked to hear them from the most distant quarters of His Majesty's Dominions." Even though America was fighting her War of Independence against Great Britain, American students continued to attend, as the Scots "escaped the bitterness left by the war in the minds of Americans against England."[52] These American students became later the founder of the great American schools of medicine, just as Irish students of medicine at Edinburgh influenced the school of medicine at Dublin University, and founded our school of medicine at Belfast. For it was in the year 1784 that there sat on the benches, listening to Alexander Monro the second, a young student from Glenarm named James McDonnell, who was destined in 1827 to deliver the first lecture on clinical medicine ever given in Belfast.

Among the Southern Irishmen who studied at Edinburgh were the great names of Corrigan and Stokes in medicine, and perhaps the greatest genius of all, "who touched nothing that he did not adorn"—Oliver Goldsmith.[53]

From 1773 till 1778, a Belfastman, William Drennan, studied under Monro, and his letters to his sister are preserved in our Ulster Record Office.[54]

He shows us the discomfort of the crowded cross-channel packet in the days of sail and contrary winds.

He tells of his Edinburgh lodging at half a crown weekly, with an extra shilling for coals. "I swear to you there is not a couch in the room, and the armchair made of hard, bony mahogany."

He describes how he rises at six in the morning, strikes his flint, blows his tinder and lights his match. After stretching his legs in the meadow, he takes his breakfast of bread and milk. "From nine to one o'clock I am blown about with the wind of doctrine of the University—nine to ten, practice; ten to eleven, chemistry; eleven to twelve, materia medica; twelve to one, at the infirmary."

His letters contain many vivid touches. He is the continual joke of the lads for his endless talk of Belfast; and he dreads the final examination, with its fee of twenty-five pounds, which he describes as a "fiery trial."

Alexander Monro the second, the teacher of Drennan and McDonnell, was, as a lecturer, clear and impressive. In a memorandum to the authorities of Edinburgh University,[47] made towards the end of his career, he stated that, in a period of fifty years, over thirteen thousand students had attended the lectures given by his father and himself; and that at the rate of eighty pounds per annum for each student, over a million pounds sterling had been brought into Edinburgh.

Many instances are given, however, of the poverty and frugality of students in those days. We read of a student who spent six shillings and ninepence weekly, amounting in twenty-four weeks to eight pounds two shillings.

And here is a student describing his arrival in his lodgings: "I looked round the whitewashed room; a truckle-bed stood in the corner, some square bits of peat smouldered in the pavement of the fireplace, which had no grate, the wind began to rise, the curtainless window to rattle, and the hail to pelt. I undressed, extinguished the tallow candle, and crept into bed."[50]

Attempts made at various times to found halls of residence for students in Edinburgh, after the English model, resulted in failure.

"The Scottish student," says Sir Alexander Grant, "prizes his independence: and it must be said in general that he does not abuse it. Indeed, the habits of self-control called forth in the student who lives in his own lodgings as his own master, and there commences to fight the battle of life, are perhaps the most valuable results of his university life."[55]

Such was eighteenth-century Edinburgh, almost two hundred years ago. From Edinburgh sprang the great American schools of medicine. In Ireland she profoundly influenced the University of Dublin; and it was on the foundation of Edinburgh teaching that our own medical school of Belfast has been built.

That is why, in the history of medicine, an outstanding place must be given to Edinburgh, "the old grey, castled city, where the church bells clash of a Sunday, and the salt showers fly and beat."

EPILOGUE.

And now we have travelled down the long road which leads from thirteenth-century Oxford to twentieth-century Belfast.

It is my privilege to welcome you on behalf of the Royal Victoria Hospital, and I have tried to show you that, though you have entered your name on the roll of a hospital that is modern, yet in doing so you have become successors to a tradition that is centuries old.

To those who ask what is the use of trying to recall the past in this fashion, I would quote a paragraph which appears to sum up the answer :

"For though we pride ourselves on the freedom of our wills, we are less ourselves than we are our ancestors. Their blood beats in our arteries, and our thoughts have to fit themselves as best they can into brain-cells that are part of our inheritance."

It is true that individual life is short; the generations of students come and go, but the great schools remain. There is an apostolic succession in medicine, and the succession of this, our school, would appear to be Padua to Leyden, Leyden to Edinburgh, and Edinburgh to Belfast; and our students are the lineal descendants of the men who tramped round Boerhaave's little wards at Leyden, or who stood in the flickering torchlight, listening to Vesalius, at Padua.

Medicine will have many things to teach you.

"At the door of life, at the gate of breath,
There are worse things waiting for man than death."

And you will see very many piteous sights. Just as every day the tide washes up on a sea-beach, so every day into this great hospital there comes "the turbid ebb and flow of human misery." They will come to you, as they have come to us, for help in their pain and weariness, and you will learn that you cannot be a good doctor without pity.

Again, in medicine more than in any other profession, you will meet with the eccentrics and the oddities of life. You will encounter all sorts and conditions of men, and it should teach you a wider tolerance and a broader understanding, for, "if a man does not keep step with his fellows, perhaps it is because he is listening to a different drummer. Let him step to the music which he hears, however measured, or far away."

And, in this connection, let me recall to you one of the most striking passages in all literature, the famous analysis of charity : "And though I understand all knowledge and all mysteries, and have not charity, I am nothing." And so you may have an understanding of the "mystery and craft" of medicine, but if you have not charity—*caritas*—a tolerant understanding of the humanity of your patient, you are nothing.

Thanks to the labours of the men who have gone—Gordon, Symington, Lindsay, Whitla, Fullerton, Milroy, to name only a few, the Belfast school of medicine is well and honourably known all the world over.

It is right that you should applaud what these men have done for us—but never forget that our future lies with you, with our students. We who are now on the

staff are trustees of a great tradition, but "we grow older with the silent years," and the day will come when we must hand over our trust to our successors. And when that day comes, and

"To you from failing hands, we throw
The torch, be yours to hold it high,"

we know that you will not prove forgetful of that great tradition which has been handed down through the centuries of English medicine, "unchanging to the changeful generations of men."

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AIR RAID PRECAUTIONS

WING-COMMANDER HODSALL TO ADDRESS BELFAST MEETING.

THROUGH the good offices of the Ministry of Home Affairs, a meeting has been arranged for 4th February, 1937, to be addressed by Wing-Commander Hodsall (Under-Secretary of State, Home Office, London, in charge of Air Raid Precautions) and the Principal Medical Officer, Major Blackmore. This is a special opportunity for medical men to become aware of the importance of this subject, as they will be the first line of call for knowledge and help in the event of emergency, and it has been decided that all medical men (whether members of the B.M.A. or not) will be admitted to the meeting. Major Blackmore will be available to answer questions and give information to medical men. This is the first meeting arranged to be held in Northern Ireland on this subject, and the Branch feel honoured that the two principal officials concerned have promised to address the members. It is to be hoped that there will be a large attendance.

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A Review of Duodenal Surgery

By P. T. CRYMBLE, M.B., F.R.C.S.ENG.
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Presidential Address, Ulster Medical Society,
OCTOBER, 1936

THE DUODENUM AND ITS SURGERY.

APPLIED ANATOMY.

THE duodenum is one of the most interesting of the abdominal viscera; it is linked up with numerous pathological conditions, and is of interest to the physician, the surgeon, and the pathologist.

Developmentally it may be the seat of an atresia, or it may show diverticula along its pancreatic border, especially in the region of the ampulla of Vater, but it should be noted that these diverticula are never found in the first part. Its relation to the vertebral column renders it liable to traumatic rupture, where the third part may be crushed against the lumbar vertebræ, and its relation to the superior mesenteric vessels suggests the possibility of compression of the third part and dilatation of the portion lying on its oral side.

The gall-bladder and duodenum are intimately related. The second part lies in contact with the gall-bladder, and here adhesions may form, an abscess may develop, gall-stones may be discharged intraperitoneally or into the duodenum, and fistulæ may develop between the viscera or between the viscera and the abdominal wall.

The common bile-duct descends behind the first part and medial to the second part, finally opening at the ampulla of Vater, four inches from the pylorus. The duct may be blocked by a stone, the removal of which may require mobilization of the second part, or may lead to a transduodenal choledochotomy. Anastomosis of the gall-bladder to the second part is indicated for common duct obstruction by pancreatic tumour, whilst a tumour of the bile papilla may be removed locally, or may justify a free removal of the second part and an implantation of the common duct into the first part.

Apart from these anatomical relations, easily visualized and easily explained, there are other links between the two viscera, such as the combination of cholecystitis and duodenitis, the occurrence of gastro-duodenal hæmorrhage after gall-bladder operations, pylorospasm secondary to gall-stones, and duodenal symptoms relieved by cholecystectomy. These, perhaps, fall into the zone of applied physiology rather than that of applied anatomy.

Although the duodenum is exceedingly well supplied by blood-vessels derived from the hepatic and superior mesenteric, there is only one vessel of applied

importance, and that is the gastro-duodenal artery. It is about the size of the radial, and descends behind the first part of the duodenum just lateral to the lesser sac, and in front of the pancreas. Here it is ideally situated to give copious hæmorrhage into the floor of a posterior duodenal ulcer, and this vessel is always the cause of fatal duodenal hæmorrhage. The vessel may be encountered by a surgeon during gastrectomy, after he has divided the duodenum and is about to infold the lower end. The vessel may be sought deliberately, or it may be punctured accidentally during the infolding operation.

Finally, the form of the duodenum in the coronal plane shows wide variations from an open U to a complete ring. The latter condition may lead to an error in gastrectomy, since the duodeno-jejunal flexure may be adherent to the first part, and may be included in the sutures infolding the duodenal stump. The flexure becomes obstructed, the duodenum distends, the upper end gives way, and death follows.

RESULTS OF DUODENAL OPERATIONS IN THE ROYAL VICTORIA HOSPITAL, BELFAST, 1928-36.

Number of cases	138
No replies	32
Operation deaths	10
Subsequent deaths	4

Analysis of Cases.

Non-obstructive ulcer	60
Obstructive duodenal ulcer	60
Perforations	14
Cancer	2
Duodenitis	2

Subtracting the deaths and 'no replies,' we are left with ninety-two cases, and the present condition of these ninety-two cases is as follows:—

Very good	69
Fair	15
Poor	8

The ten operation deaths included—

3 of the perforations.
2 aged patients (67).
1 cancer of the ampulla of Vater.
1 uræmia.

The operation mortality in duodenal ulcer worked out at five per cent.

Pathology.

Having dealt with the gross anatomy of the duodenum—and a very thorough knowledge of this region is essential for diagnosis as well as surgical interference—let us survey the possible pathological conditions.

Ulcer stands supreme in importance, but it has attracted so much attention, its signs and symptoms are so well known, that I do not propose to discuss it. A short review, on the other hand, of the gross pathology, the operative procedures, with the results of 132 cases subjected to operation, might be of interest.

The ulcer may be single or multiple, is usually limited to the first part, and most frequently attacks the antero-superior quadrant. It is on this area of mucus membrane that the squirts of gastric fluid impinge, and this may explain the selection of this site for ulcer. The upper border and the posterior surface are also commonly affected.

The ulcer may be acute or chronic, and many perforations are supposed to result from acute ulcers. An ulcer may heal, it may perforate, it may give rise to a single hæmorrhage, to repeated hæmorrhages, or, when the gastro-duodenal artery is perforated, to a fatal hæmorrhage. It may surround itself with so much scar-tissue and œdema that obstruction ensues, with its sequelæ—vomiting, loss of weight, and retention, or the formation of scar-tissue may so shorten the duodenum as to produce diverticula on the upper or lower border, just as a concertina, when compressed, produces bulgings of the fabric.

Whilst many points in the surgical treatment of duodenal ulcer are still debatable, there is one sheet-anchor to which we can all cling: "That a gastro-enterostomy performed for duodenal obstruction following ulcer gives excellent results." By excellent, I mean something between eighty and eighty-five per cent. Because, of course, the operation is attended by a certain mortality—jejunal ulcer may ensue, gastric ulcer may ensue, and gastric carcinoma may develop. Still, to cure nine people out of ten is a very successful effort, and I know of no operation in surgery which gives such universal satisfaction to patients.

My follow-up produces forty-one very good results in this operation, with three fair results and only two poor results; whilst non-obstructive duodenal ulcer treated by gastro-enterostomy gives only twenty very good results, seven fair, and four poor results. The gross material from which these results were obtained were sixty non-obstructing ulcers and sixty obstructing ulcers. If obstruction is marked, recognition is easy: there will be loss of weight, emaciation, vomiting, and visible peristalsis. Less marked degrees of blocking may require the test-meal or the opaque meal, and these are more sensitive tests than the operation findings, but it is a question if some of these radiographic retentions are not due to spasm of the pyloric canal.

A much more difficult problem is the proper procedure in the case of the non-obstructing duodenal ulcer which has resisted prolonged or repeated medical treatment. It would appear probable that females, old people, and those free from hyperchlorhydria, are suitable for gastro-enterostomy, whilst young males with hyperchlorhydria are the most unsuitable subjects for gastro-enterostomy, and this

last group is the real point at issue in the various surgical schools. This is the field for physiological gastrectomy, where, by removing half the stomach and leaving the pyloric end, acidity is diminished and anæmia is prevented. Here also is a possible indication for a local excision of a suitably placed ulcer, followed by a reconstructive pyloroplasty. Much will depend on the actual situation of the ulcer and the presence or absence of some extraduodenal exciting cause such as a chronic appendix, an inflamed gall-bladder, an ileal kink, a dolichocolon, or septic teeth.

Strange to say, the duodenum is remarkably free from cancer. Duodenal ulcer shows no tendency to become malignant, and it is a most remarkable picture to see the way a gastric cancer refuses to cross the duodenal threshold. Cancer is found, however, in the region of the bile papilla.

A recent paper by Somervell and Orr in the "British Journal of Surgery" (October, 1936), has some interesting observations on the etiology of duodenal ulcer in South India. In Travancore, for example, where the natives live on tapioca and rice—a diet deficient in vitamins A, B, and C—duodenal ulcer is six hundred times more prevalent than in Northern Punjab, where the people have a very well balanced diet.

The function of vitamin A is to maintain the functional integrity of the cells covering the body-surfaces. The vitamin deficiency lowers the defences of the mucosa, leads to an invasion of it by bacteria, with a production of a duodenitis and ulcer.

This is by no means the only etiological theory in existence, since we already have the familial tendency, the acid factor, the embolic, the anatomic, the toxic, and the neurogenic, but it does seem to bulk largely in certain parts of India.

Bad Results Following Gastro-Enterostomy.

From a study of the literature one would conclude that the whole story could be summed up in the words—*jejunal ulcer;* but in my somewhat small collection of cases, jejunal ulcer has occurred only twice, and in both cases a jejuno-colic fistula had resulted. This very unpleasant complication yielded to the operation of separating the jejuno-colic adhesion and closing the two apertures. The original gastro-enterostomy was left intact, and both patients were cured of all symptoms. I have seen one perforated jejunal ulcer following a gastro-enterostomy by another surgeon, which gave a good result with simple closure.

Gastric Ulcer as a Sequel.—I have met with this condition on two occasions—a large gastric ulcer developing in the presence of a gastro-enterostomy. In both cases the gastro-enterostomy had been performed by another surgeon, and the ultimate pathology was disclosed at the operation of gastrectomy.

Inflammation of the Stoma with Hæmorrhage.

This was a most instructive case, and demonstrated the controlling effect of a gastro-enterostomy on a duodenal ulcer.

In 1917 gastro-enterostomy was performed for duodenal ulcer, and the patient remained well for seven years, when pain and bleeding reappeared. In 1927 I saw him with Dr. Unsworth, and we decided that he must have a jejunal ulcer. The

gastro-enterostomy was undone, no jejunal ulcer was found, the margin of the stoma was red and inflamed-looking, and there was no duodenal ulcer. He remained quite well for one year, when pain and bleeding returned. In 1930 a two-third gastrectomy was performed, and a duodenal ulcer was recognizable. Up to the present he has remained free from symptoms.

Cancer Following Gastro-Enterostomy.

In 1931 I performed gastro-enterostomy on a man aged 57, who had suffered for ten years with pain and vomiting. He was found to have an obstructing duodenal ulcer. Five years later he had developed a cancer of the stoma and adjacent stomach. Mr. Woodside performed gastrectomy, and up to the present the patient has remained well.

I know of one case in whom a pyloric carcinoma developed in the presence of a gastro-enterostomy of many years' standing.

One cannot help regretting that these two cases did not have gastrectomy performed instead of gastro-enterostomy.

Hæmorrhage.

I have seen one death from hæmorrhage, some months after gastro-enterostomy had been performed for a well-developed duodenal ulcer. Whether the bleeding came from the old duodenal ulcer, or from a secondary ulcer in the jejunum or stomach, is unknown. The immediate result of the operation was good.

Vomiting.

One of my cases died of persistent vomiting, and the obstruction appeared to be at the distal jejunal opening. Somervell and Orr advise the passage of a nasal stomach-tube, which must be guided intra-abdominally through the obstructed place into the jejunum. In this case the stoma was perfectly patent, but the jejunal exit from the stoma region was not functioning, although the finger could be passed quite freely through it both before death and after. The blood-urea was very high before death (278 mgm.), and I am not sure of the relative proportions of obstruction and uræmia.

Pyloroplasty.

Occasionally one is in doubt at operation as to the presence of a duodenal ulcer. There may be a white area on the external surface, or a small palpable thickening. Rather than subject a patient to an *unnecessary* gastro-enterostomy, it is much wiser to open the pyloro-duodenal region boldly and inspect the interior. If no ulcer be present, the incision can be sewn up transversely; if an excisable ulcer be present, it can be excised, and the opening sewn up transversely. These are both very useful manipulations, and can be done with very little danger to the patient. More elaborate forms of pyloroplasty have been introduced, not only for duodenal ulcer, but also for pyloric hypertrophy and pyloric spasm. In one of these, suitable for spasm or hypertrophy, one carries out extramucus resection of the anterior half of the pyloric sphincter. In another, the whole thickness of the pyloro-duodenal

wall is removed, plus an ulcer from the anterior half of the canal, and a new opening reconstructed by transverse suturing. This is a direct operation for duodenal ulcer, and the Mayo Clinic advise it for young patients with a non-obstructing ulcer on the anterior wall, who have marked hyperacidity and a high-lying hypertonic stomach. It is also suitable for cases of duodenitis, and direct attack should be considered in those cases where hæmorrhage has been prominent. The contra-indications for direct operation will depend upon the accessibility of the duodenum, and the extent and nature of the pathology (e.g., posterior ulcer, extensive scarring, or multiple ulcer). At present, in the Mayo Clinic, thirty per cent. of duodenal ulcers are being treated by local excision and some form of pyloroplasty or duodenectomy, but in the past most of the cases were treated by gastro-enterostomy.

Duodenal Hæmorrhage.

Some physicians claim that they have never seen a death from hæmatemesis, and it is perhaps unreasonable to expect any physician, who has watched thirty or forty consecutive cases of hæmorrhage recover, to call in a surgeon except in one of those rare cases where in spite of transfusion and medical treatment no progress is being made. It is therefore likely in this country that the surgeon's appearance will be late, and at a time when gastrectomy will carry a high mortality. Severe duodenal bleeding sufficient to cause death is nearly always from the gastro-duodenal artery, and if this vessel could be ligatured, proximal and distal to the bleeding spot, the bleeding should be controlled. This vessel can only be clearly demonstrated after division of the duodenum, but it should be possible to ligature it above and below the first part of the duodenum without opening the bowel. Fatal gastric hæmorrhage is almost always from the left gastric artery, and here again it might be possible to ligature the vessel above and below the ulcer.

When one operates for gastro-duodenal bleeding, the first thing to do is to determine the presence of a lesser curve or duodenal ulcer. If these are absent, then no operation should be necessary; if one or other be present, then ligatures should be applied to the suitable vessel. If the patient's condition permits, a gastrectomy should be done, and during this the vessel which is the cause of the bleeding can be ligatured. Previous X-ray examination may point to the source of bleeding, and a normal radiogram would exclude any surgical interference. A sharp hæmorrhage in a known case of duodenal or lesser-curve ulcer should be a warning signal to the physician. It is apt to recur; a large vessel is involved, and the surgeon should be called in early.

Gall-Stones and the Duodenum.

Large gall-stones may erode the adherent walls of the gall-bladder and the second part of the duodenum, and may escape along the bowel, or, if sufficiently large, the stone may be held up in the lower ileum and produce acute intestinal obstruction. The very large stones which block the colon or rectum must escape direct from the gall-bladder into the transverse colon. The real pathology is often missed in these cases, as the abdominal colic and vomiting is put to the credit of gall-stones in the gall-bladder.

Once the stone has escaped into the duodenum, the fistula tends to close. The gall-bladder may perforate, stones may escape, and an abscess cavity, partially walled off by the duodenum, may form. In one of my cases, stones were removed from such a cavity, and ten days later the wall of the duodenum gave way with the formation of a fistula. The patient died a few days later.

Carcinoma.

A carcinoma of the ampulla of Vater is a most serious condition. The early onset of jaundice brings the patient to the operating-table when the growth is still small, but the operation of a duodenectomy is so complicated by an implantation of the common duct, and no satisfactory way of dealing with the pancreatic duct, that the mortality is high. In one case a pedunculated adeno-carcinoma was removed trans-duodenally. This operation was in 1934, and the patient is still well. In a second case, where the duodenal wall was extensively involved and jaundice had been present for some months, I removed the second part of the duodenum, closed the proximal and distal ends, did a gastro-enterostomy, and implanted the liver end of the common bile-duct and the pancreatic duct into the stomach. Death followed in five days.

Foreign Bodies.

Whereas removal of foreign bodies from the stomach is a fairly common procedure, and one which is easy to do and attended with very little risk, it is quite otherwise with the duodenum. Materials which pass the pylorus usually escape along the bowel and are passed naturally. A hair clip, known as Kirbi's grip (two to two and a half inches long), is occasionally swallowed, passes through the pylorus, but seems unable to circumnavigate the bends of the duodenum. It is apt to lodge in the second part, and may require surgical removal. It can usually be milked back into the stomach and then removed through a small gastric incision. I have met one such case in the Belfast Hospital for Sick Children.

Megaloduodenum, etc.

I have never yet been called upon to operate for megaloduodenum, or true congenital diverticulum. Out of 114 true diverticula seen in the Mayo Clinic, only four were thought worthy of operation. Most of the diverticula admitted to our wards in the Royal Victoria Hospital involve the first part, and are secondary to duodenal ulcer.

Megaloduodenum requiring operation must be a comparatively rare condition, since I have never yet knowingly encountered one. An occasional brilliant result has been achieved by duodeno-jejunostomy, but in many cases the result is disappointing.

A duodenum may be dilated, and the seat of stasis in the absence of any mechanical obstruction; in others the superior mesenteric vessels are supposed to cause obstruction by pressure; whilst in a third group, a congenital atresia, a tumour, or abnormal peritoneal bands, give a clear explanation of the obstruction.

The type of individual in whom one would suspect this condition is the under-

nourished person who suffers from bilious headaches and vomiting. If the radiogram reveals stasis in a dilated second part of duodenum, the diagnosis—chronic duodenal ileus—may be made. It is only in the presence of marked symptoms that operation — duodeno-jejunostomy — should be suggested, since this condition is found in poor surgical material. They are asthenic, have migraine, low blood-pressure, and suffer from abnormal motility of other organs. The duodenal symptoms comprise a relatively small part of the picture.

The duodenum may be obstructed by congenital stricture or by tumour growing in the wall. It may also be obstructed by pressure from without—for example, congenital anomalies such as faulty rotation or abnormal peritoneal bands or adhesions, and again by post-operative bands and adhesions. In one very interesting case, described by Foucar in 1923, there was duodenal obstruction produced by a chronic volvulus of the small bowel, the twisted mesentery compressing the duodenum. At a recent post-mortem examination in the Royal Victoria Hospital there was a dilated duodenum and much dark-coloured small bowel. There was no mesenteric thrombosis or embolus. The man was jaundiced, and no explanation of the jaundice could be found. Could a volvulus be a possible explanation of his bowel condition? I believe it is possible to undo a volvulus, unwittingly, during an operation or a post-mortem examination. Thickening of the mesentery by tuberculous glands can also cause duodenal obstruction, but it must be exceedingly rare, since we have not met the condition in the Belfast Hospital for Sick Children, where we meet many cases of tabes mesenterica. Perhaps we have failed to recognize the condition.

Closure of the Duodenal Stump.

This is one of the commonest operations on the duodenum, since it forms one of the steps in most forms of gastrectomy. According to some authorities, it is leakage from this stump which is the usual cause of death following gastrectomy. The inaccessibility, the shortness, the friability, the incomplete peritoneal covering, and the close proximity of the pancreas and gastro-duodenal vessels, all militate against a perfect infold. To overcome all these difficulties, and to prevent, at the same time, leakage of duodenal contents and bleeding, suitable instruments and careful technique are required. I have not found the ordinary textbook method satisfactory—applying crushing forceps, dividing the duodenum on the oral side to these, suturing the duodenum over the forceps by a continuous suture, removing the forceps, and tightening. The crushing clamp is too bulky, the continuous suture may leave a loose loop, or the suture may refuse to tighten. For many years I have used a Martel's clamp for dividing the duodenum, the pylorus, or the stomach. It consists of three pairs of blades which can be compressed by a clamp and held in position after removing the clamping device. Each pair of blades can be released separately. First one releases the middle blades; then the duodenum or stomach is divided close to the oral blades, and that leaves a crushed fringe of duodenum, which can be sutured with perfect ease and comfort. The vessels on the upper and lower border of the duodenum are now ligatured a short distance from the clamp, and a pair of fine Pringle colon-forceps are applied to the duodenum,

immediately anal to the duodenal blades of the Martel. When the Pringle forceps are in position, one releases the duodenal blades of the Martel. The Pringle forceps are now used to infold the stump, and this is done with a continuous suture. In a recent case, owing to shortness of the stump and inaccessibility, I found it impossible to infold, and I rotated the forceps through 180 degrees and fixed the stump in this position. The patient made an excellent recovery, so that presumably there was no leakage.

The oral blades of the Martel remain on the stomach, and are removed with the specimen.

Donati's clamp, of which I have no experience, corrugates the duodenum, and permits a straight needle to be passed through the corrugated portion, drawing a thread after it. On removal of the clamp, this thread is tightened, and a suitable stump for infolding is produced.

In conclusion, I should like to return my grateful thanks to Mr. J. W. Millen for his assistance in collecting the material used in the follow-up.

REVIEW

AURAL THERAPY IN RELATION TO DEAFNESS. By Professor D. F. Fraser-Harris, M.D., D.Sc., B.Sc.Lond., F.R.S.E. London: The Sterling Medical Publishing Co., 1936. pp. 45. Price 7s. 6d.

This little book of forty-five pages, written in the simplest language, contains a brief account of the commoner causes of deafness as an introduction to the main theme, which is the accurate measurement of the auditory defect and its correction by suitable hearing aids.

In the chapter on "Causes of Deafness," the author states that the removal of an aural polypus will restore the patient's hearing to normal. This would appear to be too optimistic, as the polypus is only the cause of part of the deafness. Again, otosclerosis is pronounced to be a rheumatic condition, whereas the cause is still very much in doubt.

The audiograph is described, and specimen charts showing the degree and position of the hearing loss in decibels are shown in the form of graphs.

This is a very much more scientific test than the old tuning-fork method. The author points out very lucidly its great value in assessing the results of treatment, and in the accurate prescription of suitable hearing aids which will amplify only those frequencies which are reduced, and not to over-emphasize those frequencies which are normal. The author points out that the hearing is definitely improved in some cases after using a suitable aid for some time.

The penultimate chapter describes a form of treatment by the "thermo-catheter." This is an electrically-heated speculum for the introduction of drugs via the meatus, in the form of ointments.

The last chapter deals with the variations in the acuity of hearing met with during the treatment of chronic deafness, and points out some of the causes such as a "cold in the head" producing temporary deterioration of hearing, and mentions the possible fallacy in judging improvement by any method of treatment if the patient is first seen during the acute exacerbation.

This book can be warmly recommended to all those interested in the problems of the deaf.

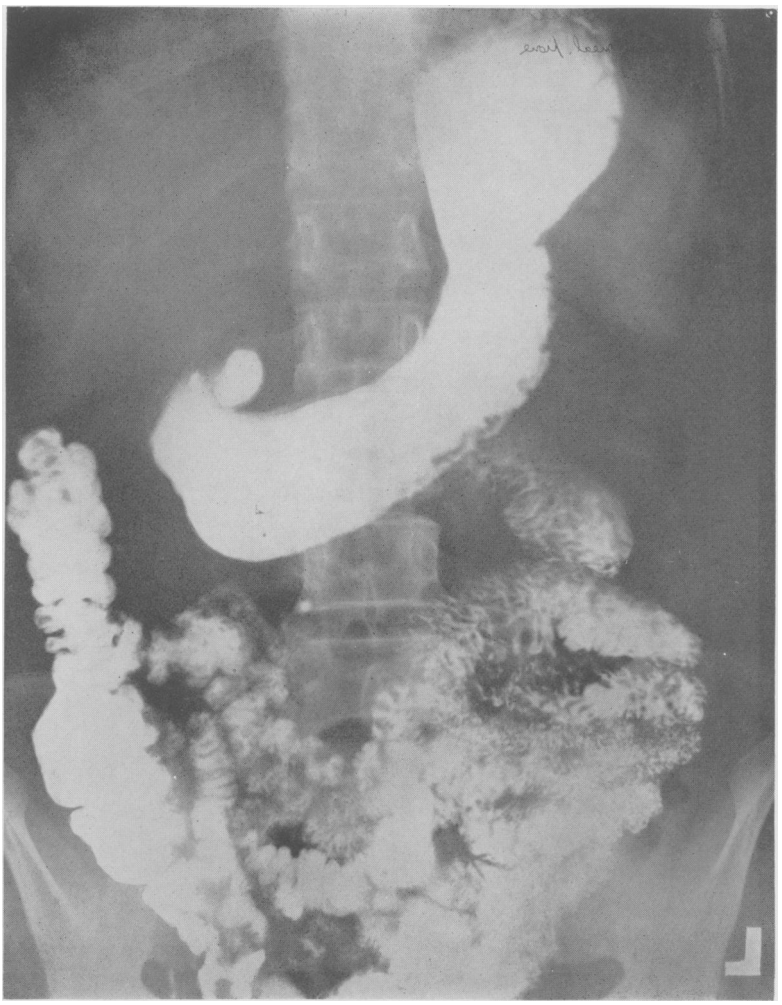

FIG. 1.

Radiogram of stomach and duodenum showing a diverticulum of the first part of the duodenum. The operation revealed a duodenal ulcer, and the diverticulum was secondary to this ulcer. The pathological area was infolded and a gastro-enterostomy performed.

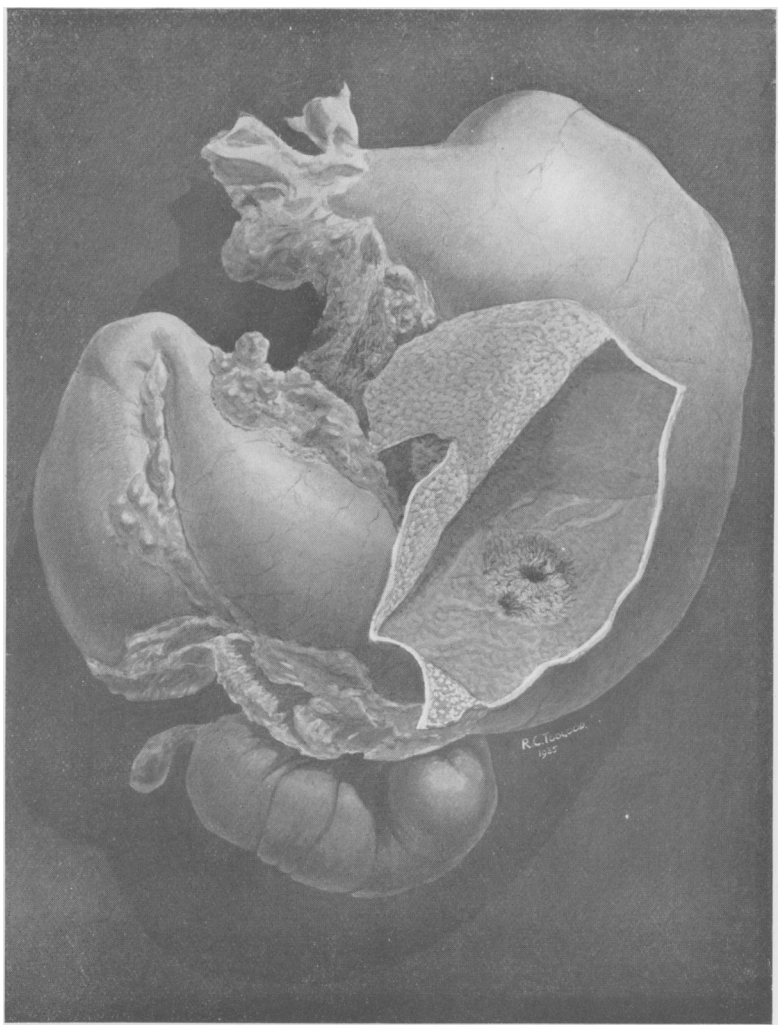

FIG. 2.

Dilatation of the stomach and duodenum following gastro-enterostomy for duodenal ulcer. The stomach has been opened to show the stoma. The gastro-enterostomy was quite patent, and the obstruction appeared to be at the distal jejunal orifice.

FIG. 3.

The pylorus and adjacent portion of the duodenum have been crushed between the blades of the Martel clamp. A large branch of the gastro-duodenal artery, passing to the gastro-colic ligament, is hooked forwards on an aneurism needle. A large aperture has been torn in the bloodless part of the lesser omentum in the application of the clamp, and the caudate lobe of the liver is lying exposed. The right part of the lesser omentum (hepato-duodenal ligament), containing the hepatic artery, common bile-duct and portal vein, is seen to be intact. The inferior surface of the liver with the gall-bladder, is seen.

FIG. 4.

The central blades of the Martel clamp have been removed and the crushed viscus divided close to the gastric blades. A segment of crushed duodenum, projecting beyond the duodenal blades, is being sutured by continuous forty-day No. 00 catgut. The left gastric vessels are hooked forward by a needle. The body of the pancreas lies exposed. The gastric blades of the clamp remain in position until the stomach has been removed.

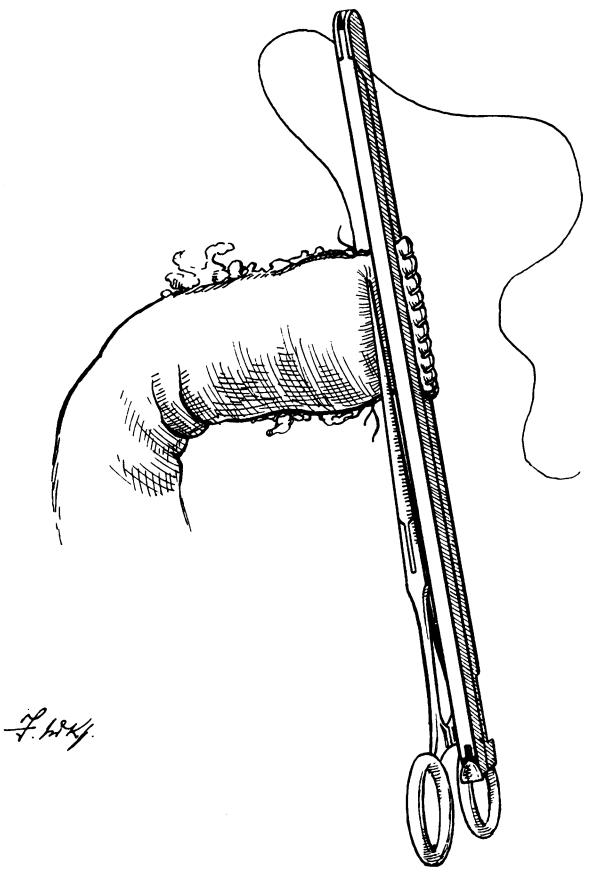

FIG. 5.

The duodenal blades of the clamp are in situ, and the crushed edge of the duodenum has been controlled by a continuous suture. The vessels on the upper and lower margin of the duodenum have been ligatured by a twenty-day No. 1 catgut, and the upper ligature has been left long for use subsequently in the infolding. A fine Pringle clamp has been applied to the duodenum, close to the Martel blades. This clamp prevents the duodenum retracting after removal of the Martel blades, and is of use in the process of infolding the duodenal stump.

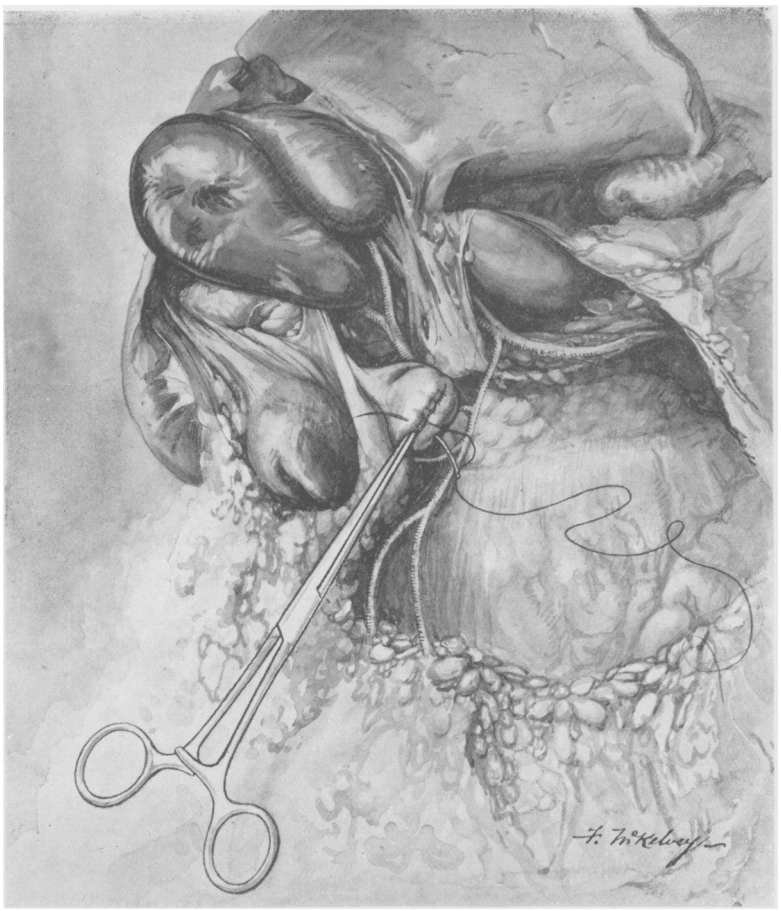

FIG. 6.

The Pringle clamp has infolded the duodenal stump, and the infolded position is maintained by a sero-muscular continuous suture. This suture begins by tying the vessels on the upper margin of the duodenum, and during its insertion the clamp is released once or twice, shifted downwards, and reapplied. This enables one to recognize any uncontrolled vessel, and permits the tightening of the suture step by step.

The gastro-duodenal artery giving off the right superior and inferior pancreatico-duodenal branches is demonstrated.

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Chrysotherapy in the Treatment of Rheumatoid Arthritis

By J. C. C. CRAWFORD, M.D., B.CH.
from the Royal Victoria Hospital, Belfast

THIS paper is based on a two-years experience in the treatment of arthritis by gold salts. Of the twenty-seven patients treated, thirteen were typical cases of rheumatoid arthritis. Thirteen others were considered to be examples of climacteric arthritis. Their joint condition resembled that of the rheumatoid cases, but was associated with endocrine disturbances of the menopause. The last case was one of osteo-arthritis, included in the series for purposes of comparison. They were studied at the Royal Victoria Hospital and in private practice.

Following favourable reports of the use of sanocrysin in pulmonary tubercle, the effect of gold salts on other conditions was investigated, and it was soon evident that in chronic joint disease of infective type they were especially effective. This development was mainly due to French workers like Forestier, and to Germans, especially to Umber[1] and his associates. English medicine, laying emphasis on vaccine therapy, has until recently neglected this therapeutic field. As to the mode of action of gold salts, this is still imperfectly known. It is probably a stimulation of some defence forces of the patient, rather than a direct bactericidal action.

There is a wide choice of gold salts, but the two in common use in rheumatic cases need alone be mentioned—the British product, myocrisin, and solganal B oleosum. In both the gold salt is in oily suspension for intramuscular administration. Suspension in oil renders absorption into the circulation a gradual process, thus avoiding sudden flooding of the system in a patient who may have an idiosyncrasy for gold.

TYPES OF ARTHRITIS BENEFITED BY GOLD.

Rheumatoid arthritis is the indication *par excellence* for chrysotherapy. We include under that term those cases called secondary or infective, in which a septic focus is apparently of etiological importance. It must be realized that the response to chrysotherapy will be much better in the more recent case. Forestier[2] has said that "it is not the age which matters, but the age of the disease." In his five hundred cases, of those of under two years' duration, fifty per cent. were permanently cured; of those of longer standing only twenty to thirty per cent.[3] In these latter, cartilage erosion has often begun and adhesions and deformities are frequent. Obviously these changes cannot be fully corrected, and perfect restoration of function is no longer possible, though all pain and joint activity will usually be lost.

Chronic arthritis of known causation, gonococcal for example, may also benefit from gold, as do cases of climacteric arthritis, as we shall see later. In spondylitis ankylopoietica good results are also obtained.

On the other hand, in arthritis of a degenerative type, such as osteo-arthritis, and in neuritis and fibrositis, there will be little or no benefit derived from gold therapy.

The contra-indications to gold treatment are few. Cases of renal disease and colitis should be avoided on account of the toxic action of gold on these organs; while, to be safe, liver disease should also be excluded, even though gold is almost non-toxic to the liver.

Toxicity of Gold Salts.

It is essential to recognize that gold salts are dangerous drugs, which must be treated with the same respect as we have learnt to accord to mercurial and arsenical preparations. Before gold therapy is undertaken, its mode of use and the dangers which may be met with must first be understood. On this understanding there need be no hesitation in embarking on its use.

Toxic effects may be due to idiosyncrasy, where after minimal doses a toxic reaction invariably develops. More often, however, they are due to overdosage or to cumulative effect. Certainly the frequency of toxic reactions in the hands of different workers seems to bear a definite relation to the vigour with which treatment is prosecuted. Thus Pemberton[4] has found that "few patients escape without any signs or symptoms," but his large doses are not in accordance with modern practice and are not to be recommended. We shall have more to say regarding toxic reactions later in this paper.

The Conduct of Chrysotherapy.

As a preliminary to treatment by gold salts, it is of importance that the following should be carried out :—

1. A complete general examination of the patient, bearing in mind especially any renal or hepatic insufficiency and noting any endocrine abnormality. Thyroid or ovarian extract may be indicated in the latter to supplement gold therapy. A careful search should be made for septic foci. These are best eliminated after a number of gold injections have been given. Teeth should be extracted one or two at a time, to avoid the effects of flooding the body with toxins by wholesale extraction.

2. A blood sedimentation test should always be carried out. This serves alike to confirm clinical diagnosis and to form a preliminary figure by which progress can be measured when the test is repeated every six or eight weeks during treatment. It is a more searching criterion of cure than are clinical findings, and gold treatment should not be terminated while it remains above the normal level. Its description does not come within the scope of this paper, but the technique is simple and easily carried out in general practice.

The patient is instructed on a number of points at the beginning of treatment :—

1. He should be taught to recognize and report a general or a focal reaction following an injection. A general reaction will be shown by such symptoms as drowsiness, nausea, malaise, and pyrexia; a focal reaction by an increase in the pain and swelling of the affected joints; these manifestations usually appearing in about twelve to twenty-four hours and lasting one or two days.

2. He should also report any of the following toxic effects—rashes, pruritus, pain and sores in the mouth, a metallic taste, vomiting, diarrhœa, and jaundice.

3. He should bring with him, when coming for each injection, a sample of urine

to be tested for albumen. This procedure should never be omitted before an injection is given. Only in this way can incipient kidney damage be detected. There may only be a trace of albumen, but no gold should be given until it is absent, nor indeed for a week or two later, while in the more serious cases it is better to abandon chrysotherapy altogether.

4. He should be warned not to expect quick results, that improvement may only begin after two or even three months, and that treatment must be maintained for much longer. A good prognosis can, however, be given with confidence in nearly every case.

It is preferable, where possible, for the patient to spend the early weeks of chrysotherapy in bed, especially where disease is active. In nearly all our cases, however, the patient of necessity carried on with her household duties, and rested as best she might. A temperature chart is useful for the detection of reactions and in showing a case's progress.

Glucose and liver have been prescribed in an attempt to prevent toxic effects. Our experience has been that they are of no benefit. Calcium, preferably the gluconate, probably is of value, however, and it should be taken while gold is being given.

Dosage of Gold Salts.

The initial dose should always be 0.01 g. This amount is repeated four days later; then with intervals of four or five days between each dose the amount rises through 0.02 g., 0.05 g., and 0.1 g. to 0.2 g. In each case the dose is given twice, passing then to the next highest. A dose larger than 0.2 g. should never be given. Once reached, it should be repeated at intervals of five to seven days until two to three grains, the total for the course, has been completed. It should be the rule, however, that if any reaction is produced by a given dose, the next injection should be of the same value, and only be given when all painful manifestations have completely subsided. Thus the scheme of dosage will need frequent modification, each patient being considered individually.

Toxic reactions will, of course, also lead to interruption of treatment. In the slight cases, such as mild rashes and stomatitis, our experience coincides with that of others, that chemotherapy may be resumed cautiously a week or two after their subsidence, and that further trouble is rare. After severer toxic manifestations such as exfoliative dermatitis or marked albuminuria, gold therapy should be abandoned and other measures, vaccine treatment for example, substituted.

After a course of two to three grams, an interval of about six weeks is interposed before a second course begins, similar except that a start may be made with a dosage of 0.05 g., it being now known that the patient tolerates gold well. In all cases a minimum of two such courses should be given, even though for some time signs and symptoms of disease have disappeared. During treatment the sedimentation rate will have been carried out at six-weekly intervals, and on whether it is now normal, and whether there are any signs of active disease, will depend the necessity for a further course of gold. In any case, the patient must report at three-monthly intervals, when any return of symptoms or rise in the sedimentation rate is

an indication for resuming treatment. If after a year of observation the clinical condition and sedimentation rate reman normal, he may be considered cured.

It is not necessary to emphasize that concurrently with gold therapy there should be instituted such general measures as rest, fresh air, sunlight — natural and artificial, the avoidance of cold and damp, a nourishing diet, supplemented, if necessary, by vitamin preparations, and various physiotherapeutic measures.

Results of Chrysotherapy.

The results of chrysotherapy in thirteen cases of rheumatoid arthritis, and thirteen others of what we may classify as climacteric arthritis, are as follows :—

	Rheumatoid arthritis	Climacteric arthritis
Apparent cure - - - -	3	1
Very much improved - - -	5	5
Improved - - - -	4	5
Relapsed when albuminuria developed	1	1
No improvement - - -	0	1

Those 'apparently cured' showed complete freedom from all pain and disease activity, and from signs of disease other than residual deformities and ankylosis, while in all cases the sedimentation rate maintained a normal level. Those 'very much improved' still had slight pain and disability in one or two joints, but were otherwise perfectly well. In all but one the sedimentation rate had reached normal. The 'improved' cases still showed a good deal of joint activity, though often remarkable improvement had taken place. Some of these last two classes were still under treatment, and might thus be expected to enter a higher group later. Two cases, after beginning to respond to chrysotherapy, relapsed when albuminuria developed, and it was necessary to stop injections.

It will be seen that, while gold was perhaps not quite so successful in climacteric arthritis, it was of undoubted benefit. This was especially so when it was combined with a follicular hormone product, such as prognyon. Gold itself had no definite effect on other symptoms of the climacteric such as flushes, irritability, and dizziness.

Analysis showed that in all cases except one, which never responded, definite improvement in the arthritis began before the end of the first course, while in half the cases this had become noticeable by the fifth injection. An improvement in the general health of the patient often preceded progress in the joint condition, and was a remarkable feature during treatment in many of the cases.

The single case of osteo-arthritis did not improve under chrysotherapy over a period of nine months, and thus supports the general opinion that gold salts are of little or no value in this condition.

The following table shows that our results are comparable with those of other workers, though exact comparisons are, of course, impossible, since each has his own standard of improvement, and it is impossible to eliminate the personal factor. The standards of grouping are, we believe, in each case essentially the same. Warren Crowe's figures for vaccine therapy[5] are added, so that comparison with

the results of another widely-supported mode of treatment may be possible. The results are expressed in percentages.

TABLE II.

	Cure and great improvement	Definite improvement	No improvement
Present investigation - -	53	35	12
Hartfall and Garland - -	69	23	8
Pemberton - - -	50	38	12
Forestier - - -	69	21	10
Warren Crowe (vaccine therapy)	39	39	12

TOXIC REACTIONS.

Toxic reactions of some type occurred in twelve out of the twenty-seven cases. In some cases two or three types of toxic effect were noticed, appearing at different times during treatment. Many, however, were slight and transitory while none were of a serious nature.

Six types of reaction were met with—albuminuria, pruritus, rashes, diarrhœa, stomatitis, and a metallic taste in the mouth. Study of our cases showed that they might occur at any time during treatment, and that no rule could be laid down in this respect.

Seven of our cases showed albuminuria at some stage of treatment. This is a larger incidence than is usually reported. In all but two cases, however, only a faint trace was noted, which, on omitting an injection, disappeared a week later. In the two exceptions the condition was more serious, lasting three and four months respectively, and necessitating abandonment of gold therapy. There was no case of the acute hæmorrhagic nephritis which occasionally results from gold therapy.

Rashes of some type also appeared in seven cases. Some of the more evanescent of these had disappeared before the patient reported back to us. Four were erythematous, two papular, and the last, the only extensive one, was morbilliform. Appearing after the second dose, it covered all the body except the face, was intensely itchy, and was associated with a transient albuminuria. No case of exfoliative dermatitis occurred in the series. This serious and occasionally fatal complication is usually the result of repeating a dose of gold in the face of some skin lesion, but it may sometimes occur without warning, as in a case reported by Hickey.[6]

Pruritus was associated with five of these cases, while on four other occasions it was noticed alone, always of slight intensity and lasting a day or two only. It may, however, be intense and lead to severe insomnia.

Diarrhœa of toxic origin appeared in one case, but nausea and vomiting, and abdominal pain, which may all be of toxic origin, were not recorded. Jaundice was also absent, but it is a rare symptom, since gold is almost non-toxic to the liver.

Stomatitis occurred in two cases. Here the mucous membrane of mouth and tongue were red and tender, and showed small, very painful vesicles, which gradually disappeared over two or three weeks. In Forestier's experience these manifestations are much more frequent. Stomatitis occurred in twenty per cent. of his cases.[7] A metallic taste resembling that associated with the giving of other heavy

metals was also noticed twice. It appeared within five minutes of the injection, and might last only a few minutes or as long as a week.

Other rare toxic symptoms not met with in our cases were purpura and submucous hæmorrhage, and agranulocytosis. Ameuille and Braillon[8] record seven cases of the latter, with three deaths, following gold therapy, and Hartfall and Garland also record a fatal case. The possibility of agranulocytosis should be borne in mind, especially where there is any tendency to subcutaneous or submucous bleeding, when a hæmatological examination is very desirable.

In the treatment of toxic reactions, such general measures as copious fluids and purgatives are indicated. Glucose may well be prescribed, though the liver factor is negligible in gold toxicity. In severe cases, injections of sodium thiosulphate should be given. It seems, however, to be of much less value in gold than in arsenical poisoning.[6, 9, 10] In addition, the appropriate treatment for the manifestation in question should be given; for example, local applications and alkalis internally in skin lesions, or pentonucleitide injections if agranulocytosis supervenes.

Conclusions.

1. Chrysotherapy is a valuable method of treatment, both in rheumatoid arthritis and in arthritis associated with the climacteric.

2. A thorough examination of the patient should be carried out as a preliminary to treatment. The possibility of renal disease should be excluded, and endocrine deficiencies and septic foci should be noted for treatment.

3. It is essential that there should be a careful watch for toxic reactions, and that when they occur, gold treatment should be immediately suspended. Glucose and liver seem of no value in their prevention, but calcium should certainly be given with this object.

4. Periodic blood sedimentation tests are essential for prognosis and the control of treatment.

5. The patient should understand that treatment is essentially prolonged, extending over many months and asking much of his patience and co-operation. These, however, will rarely be unrewarded.

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The Carotid Sinus and Respiration

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INTRODUCTION.

SOME time ago in this Journal, Boyd[1] described the results of recent work on the carotid sinus mechanism chiefly in regard to its effect on the circulation. The carotid sinus is also known to exert an important influence on respiration, and in this article it is desired to give an account of some of the work dealing with this aspect of its function, and to draw attention to the rôle played by the carotid sinus in the regulation of breathing.

ANATOMY.

The carotid sinus is a small dilatation at the beginning of the internal carotid artery. It has a special sensory nerve supply—Hering's nerve, a branch of the glossopharyngeal. Associated with both the circulatory and respiratory functions of the sinuses are areas on the aorta supplied by the two depressor nerves, branches of the vagi. The sinuses and aortic areas are parts of the circulatory system specially sensitive to various types of stimuli, and it is interesting to note that Koch[2] has deduced that apart from these there are no other sensory areas in the systemic circulation. The stimuli are of two kinds: firstly, stimuli set up by alterations of pressure of the blood in the aorta or sinuses, and secondly, stimuli caused by alterations in the chemical composition of the blood flowing through these parts. These alterations are increase or decrease of oxygen or carbon dioxide respectively.

DISCUSSION.

Many of the older clinicians and physiologists described alterations in respiration following digital pressure over the internal carotid artery in man, or electrical stimulation of the aortic nerve in animals. The definite relation between the carotid sinus and respiration was shown by Moissejeff,[3] who demonstrated that raised pressure in the carotid sinus of the dog could cause a cessation of breathing. The question was investigated very fully by Heymans[4] and his co-workers, by means of "crossed perfusion" experiments in dogs. This is a technique where the sinuses of one dog are connected in the circulation of a second animal, and the effects of various pressure changes studied. It was found that increase of pressure in the carotid sinuses or aorta caused a diminution of respiration, while decrease of pressure caused an increase in respiration. These reflexes depended on the integrity of the nerve supply of these areas, and were abolished by section of the nerves of Hering or the aortic nerves respectively. These results were confirmed by other workers.

The question arises as to the relationship between these respiratory reflexes and the circulatory reflexes, as it is well known that increase of intrasinusoidal pressure causes a fall in blood-pressure, and vice versa. Koch[2] suggested that the respiratory reflexes are due to irradiations of excitations primarily intended for the vasomotor

centre. This view was opposed by Schmidt,[5] who believed that the respiratory reflexes were quite separate from the circulatory, and probably arose from end organs quite separate and distinct from those participating in the circulatory reflex.

In support of this view, he put forward the following reasons :—

1. The intensity of the respiratory reflexes bears no relationship to that of the circulatory.
2. The respiration tends to "escape" from the first effects of alteration of sinus-pressure, while the blood-pressure does not.
3. The respiratory reflex is a response merely to change in pressure, not to absolute level of pressure, while the circulatory change is more nearly proportional to the absolute pressure level.
4. In many cases there may be change in the respiration without alteration in blood-pressure.

The second group of respiratory reflexes, which may be called chemical reflexes, as distinct from pressure reflexes, are those elicited by changes in the amounts of carbon dioxide and oxygen in the blood flowing through the vasosensory areas. These reflexes have been studied either by perfusing the sinuses and aorta with blood containing varying amounts of carbon dioxide and oxygen, and observing the respiratory response, or else by recording the effects of the inhalation of various gas mixtures on the breathing before and after denervation of the vasosensory areas. The first experiments were those of Heymans,[4] who found that increase of carbon dioxide or deficiency of oxygen in the blood in the sinuses or aorta causes an increase in respiration, while decrease in carbon dioxide causes a decrease in respiration. These findings opened up the possibility that the control of respiration depended more on the sensitivity of specialized parts of the vascular system, rather than on that of the respiratory centre itself. Schmidt,[5] in order to verify these results, examined the response of animals to carbon dioxide excess and oxygen lack before and after denervation of the sinuses and aortic area, and found that after denervation the animal can no longer respond to anoxia by increasing its breathing, but on the other hand the response to carbon dioxide excess is unaltered. He therefore concluded that the vasosensory areas are important for the response to anoxia, but the respiratory centre itself can cause hyperpnœa in response to CO_2 without the help of peripheral impulses. Selladurai and Wright,[6] and also Wright,[7] studied these reflexes in the rabbit and cat, and found that the vasosensory areas were responsible for the response to anoxia, but there was some doubt about the response to CO_2. In some cases it was lessened in the denervated animal, but it was not abolished.

In all these experiments just mentioned there were two disadvantages. In the first place, the animal was suffering from a certain amount of shock from the operation for denervating or perfusing the vasosensory areas. Secondly, the animal was under the influence of an anæsthetic during the recording of the respiration. This introduces complications, as the result of an anæsthetic is to mask the effects of respiratory stimulants and to exaggerate those of respiratory depressants. These difficulties can, to some extent, be overcome in chronic experiments. Here the operation for

denervating the vasosensory areas is first carried out, and at a later stage the respiration is studied. In such experiments, two things are important. The animal must be allowed sufficient time to recover completely from the first operation before any investigation of the respiration is made, and also respiration must be examined without an anæsthetic and by some means which interferes as little as possible with normal function. For this purpose, either mask breathing can be used or respiratory movements can be recorded by a rubber bag around the chest.

The first chronic experiments were those of Gemmill and Reeves[8] with dogs. These workers found that the dog, after denervation, can no longer respond to anoxia by hyperpnœa, but may even show a depression of respiration. On the other hand, removal of the reflex pathway does not interfere with the response to increased carbon dioxide. Later Gemmill, Geiling, and Reeves,[9] continuing this work, found that if the anoxia was of gradual onset, and not of a severe degree, increase of respiration in the denervated animals might be obtained. Green and de Groat[10] studied further, by similar methods, the response to increased carbon dioxide, and found that although the denervated animals could respond to increased amounts of this gas by hyperpnœa, the response was somewhat less than that of the normal animal. Decharneux[11] examined the effect of high altitudes on denervated dogs, and found that they could respond to the lowered oxygen tension by increasing their respiration.

This result, as that of Gemmill, Geiling, and Reeves, is not in agreement with the other anoxia experiments, and its significance will be referred to presently.

Chronic experiments on the rabbit have been carried out by Wright[12] and by Smyth.[13] In both cases it was found that the denervated rabbit could still respond to carbon dioxide excess by hyperpnœa, but could no longer increase its respiration in response to oxygen lack; on the contrary, it was found in the latter case that a great depression of respiration was produced.

An examination of these results leads to the important conclusion that the increase in breathing of an animal in response to oxygen lack is a reflex originating in the carotid sinuses and aorta, and if this reflex pathway is destroyed, anoxia causes a depression of respiration instead of a stimulation. The only cases which do not fit in with this hypothesis are those where the anoxia was of gradual onset and not of extreme degree. In the absence of further evidence, we must postulate that anoxia of this type may stimulate directly the respiratory centre in the absence of the reflex mechanism. Apart from the case of gradual anoxia, however, it is evident that a fundamental revision of our ideas of the respiratory centre is required. Formerly it was believed that in the respiratory centre itself was provided a mechanism sufficiently sensitive to maintain the respiration at a suitable level for the body needs. The exact nature of this mechanism was not agreed upon. The response to oxygen lack was attributed to a direct action on the centre (Rosenthal), sensitization of the centre to carbon dioxide (Herman), or increase in acidity in the neighbourhood of the centre (Gessell). In the light of recent work, we must conclude that the sensitive mechanism lies not in the respiratory centre in the medulla, but in the end organs in the aortic or carotid sinus areas.

In regard to Herman's view, it has been shown by Selladurai and Wright[6] that in the absence of this reflex pathway, anoxia actually depresses the sensitivity of the respiratory centre to carbon dioxide.

The response to carbon dioxide must be considered separately. In most of the experiments referred to, it was seen that even after denervation of the reflex mechanism, the animal can still respond to increased carbon dioxide by increasing its respiration. Although Heymans[4] has shown that through the carotid sinuses and aortic areas respiration can be reflexly affected by the amount of carbon dioxide in the blood, it seems that this reflex does not play so important a rôle as the anoxic reflex, as even in its absence the animal can respond to carbon dioxide excess. It can, therefore, be concluded that changes in the amount of carbon dioxide in the blood can influence respiration, either by a direct action on the respiratory centre, or reflexly through the carotid sinus and aortic areas.

Summary.

In the preceding paragraphs two types of respiratory reflexes have been described: pressure reflexes and chemical reflexes. Attempts have been made to separate these reflexes and to localize their respective end organs. De Castro[14] suggested on histological grounds that the chemical reflexes might originate in the carotid body—a small mass of chromaffin tissue in the carotid region—while the pressure receptors might be localized in the sinus wall. Schmidt[5] showed that ligature of the occipital artery in the dog removed the chemical but not the pressure reflexes, and in the dog the carotid body is supplied by the branches from the occipital artery. Bogue and Stella[15] have produced further evidence in support of this view. They examined the action currents in the carotid sinus nerve, and found that the impulses during asphyxia or anoxia were different from those produced by changes in intrasinusoidal pressure. They also found evidence that the former type originate in the carotid body.

The effects of blood-pressure, carbon dioxide, and oxygen on the respiratory centre are summarized in the following table, where a comparison is made between the direct action of these factors upon the centre through its blood supply, and the effect they produce through carotid sinus and aortic reflexes. The plus sign indicates stimulation of respiration, and the minus sign depression.

Direct Action on Respiratory Centre.		Action Through Carotid Sinus and Aortic Reflexes.		
Blood-pressure increase Blood-pressure decrease Oxygen increase	No effect	Blood-pressure increase Blood-pressure decrease Oxygen increase : no effect	— +	
CO_2 increase	+	CO_2 increase Oxygen decrease	+ +	(?) Carotid body reflexes
Oxygen decrease CO_2 decrease CO_2 large excess	—	CO_2 decrease	—	
Oxygen lack, slight degree and gradual onset (?)	+			

Conclusions.

It can be seen that the carotid sinus region is a highly specialized sensory region which plays an important rôle in the maintenance of the normal respiratory and circulatory functions. Especial emphasis has been laid here on its importance in the response to anoxia. In this connection it is interesting to recall, as Barcroft[16] has shown, that the stimulus for the first respiration of the child after birth is oxygen lack, so that the first reflex which plays a part in the newly-born animal, and makes possible for it an independent existence, originates in the region of the carotid sinus.

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Renal Function Tests in Nephritis with Special Reference to Urea Clearance Test

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THERE is much truth in the statement that the laboratory is the pacemaker of medical progress, but yet, when we come to critically examine our knowledge of impaired renal function, we realize that, at least as far as the study of renal disease is concerned, the advance has not been very great. It is from the standpoint of reviewing the problems that confront us when we are asked to examine a renal case from the biochemical standpoint, rather than reporting any results, that I have written this article at the request of your editor.

It is now over a century since there was admitted into Guy's Hospital an intemperate sailor, John King. He was placed under the care of Richard Bright. The patient presented the features, so common to us now, of œdema with pleural effusion and ascites, enlarged heart with pericarditis, and scanty urine with albuminuria. The kidneys were small and granular, and it was this organ that Bright described as being the seat of primary disease. He published his observations in 1827. Since then an enormous amount of work has been done, with but little advance.

In 1914 the modern trend of thought began to crystallize out with the publication of the work of Vollard and Fahr, and their introduction of an anatomical and pathological classification consisting of three main types — glomerulo-nephritis, nephrosis, and nephrosclerosis. This was followed by Addis's work, in which he tried to correlate clinical findings with a quantitative study of the formed elements in the urinary sediment. Another step forward was made in 1930, when Van Slyke and his co-workers published their monogram, in which they called attention once again to their test of renal function which they had published several years before. The modern classification of Bright's disease is as follows :—

I. Inflammatory group :
   1. Acute nephritis.
   2. Subacute nephritis.
   3. Chronic nephritis.

The patient has an attack of acute nephritis, which may be so severe that he dies, or on the other hand may be subclinical. His recovery from the acute attack may be complete, or he may pass into the subacute stage with œdema, and finally, if he lives long enough, end up as the chronic nephritic with uræmic symptoms.

II. Vascular group—nephrosclerosis.
   This includes—
   1. The senile kidney.
   2. The kidney of essential hypertension—the end-result of a condition not renal, but primarily vascular.

III. Degenerative group.

Here we are probably dealing with organic states rather than with organic diseases of the kidney. It includes :—

Lipoid nephrosis.

Toxæmic kidney.

Kidney of pregnancy.

It is possible that the renal lesions in eclampsia may really be vascular in origin rather than degenerative, while nephrosis is falling farther into the background, so that for practical purposes we are left with two main divisions—inflammatory and vascular.

Looking at this classification, then, the problems of renal investigation as they strike me from the point of view of clinical pathology, are these :—

1. The measurement of the degree of renal impairment during an attack of nephritis and the extent of permanent renal damage.

2. The clear differentiation between the organic state of nephrosis and the organic disease of subacute nephritis.

3. The separation of the patient with chronic nephritis, and whose time with us is short, from the patient with benign essential hypertension, and whose only danger is lest some fool should find it out and try to reduce it.

4. The further elucidation of the renal lesions of eclampsia.

Do renal function tests help us at all? The aim of any test of biological function has been defined as the effort to determine the existing function of an organ in relation to the function if the organ and organism as a whole were normal. A qualitative test is never very satisfactory, but in the proper evaluation of renal function an attempt to measure the amount of functioning tissue quantitatively must be our objective.

Renal function tests are divisible into four main groups :—

1. Examination of urine and the ability of the kidney to concentrate and dilute.
2. Examination of the blood chemistry.
3. Examination of the ability of kidney to eliminate injected foreign substances.
4. Simultaneous examination of blood and urine, i.e., clearance tests.

To even mention all the tests that have been devised would lengthen this paper into a monogram, so I will only deal with those I am personally familiar with.

I. First Group : This includes the naked-eye examination of the urine, the test for albumen, noting the specific gravity of a morning or twenty-four hour specimen and the presence or absence of casts. It is obviously the first and most important duty of the physician to perform these correctly.

Two other tests are very useful :—

1. MacLean's urea concentration test, where we examine the amount of urea in the urine after fifteen grams of urea by mouth. It is not a very delicate test, but it does show renal impairment a considerable time before there is any rise in the blood-urea.

2. Calvert's urea concentration test : a much simpler test than above, and in many ways more valuable. The patient has no fluid after 5 p.m., and on going to

bed empties his bladder and discards the urine. At 7 a.m. he empties his bladder again and collects this specimen, labelling it (*a*). He then drinks at least two glasses of water or weak tea, and two hours later collects another sample, labelling it (*b*). The specific gravity of each specimen is then examined, and normally that of (*a*) should be high, 1,025 or so, while (*b*) should be under 1,005. Any degree of fixation of specific gravity denotes renal impairment.

The examination of urinary chlorides has long been given up as a test of renal function. It is influenced far too much by extra-renal factors. The diastolic index is also useless except in a few special cases.

The value of separating out this group of renal function tests is that they every one can be done by the general practitioner with very little apparatus at his disposal. He can examine for albumen, using either the heat-test or, better still, the salicysulphonic acid test. He can examine the deposit microscopically and look for casts, and by the aid of a simple urinometer do Calvert's concentration test. The information thus derived is always significant, and often of diagnostic and prognostic importance. With regard to specific gravity, it may be said that both temperature and albuminuria have very little effect on it. For every three degrees above 15° C. we may add one to the figure obtained, and it has been estimated that so massive an albuminuria as one per cent. would raise the specific gravity by less than three. After performing these few simple tests, the doctor may be able to give an opinion as regards diagnosis and prognosis which any specialist may be unable to improve upon.

II. Examination of the Blood: This includes estimation of the urea, non-protein nitrogen, uric acid, and creatinine content of blood. The drawback to this group of tests is that a normal figure gives us little information as regards the state of renal reserve. For example, a raised blood-urea does tell us that for some cause the kidney function is impaired, but a normal blood-urea does not exclude serious renal damage. As has often been shown, the blood-urea is quite normal after a unilateral nephrectomy, and so may be within the usual limits with half the renal tissue destroyed. Any figure over 40 mgm. per cent. is usually regarded as pathological. It is to be noted that the blood-urea is low in the later months of pregnancy, owing, it is thought, to the demands of the growing fœtus for the protein of the maternal diet. I have quite often got figures below 12 in pregnancy. Again, it may be raised by extra-renal factors such as intestinal obstruction.

Realizing this danger of taking a single reading of blood-urea as an index of renal function, Mosenthal and Hiller in 1917 suggested the ratio of the urea nitrogen to the non-protein nitrogen of the blood as an index of the amount of effective functioning renal tissue, irrespective of the level of the blood-urea. This gives us the "asotemic ratio," or urea ratio, and is expressed according to the formula:

$$\frac{100 \times \text{urea nitrogen}}{\text{non-protein nitrogen}}$$

When renal function fails, the concentration of all forms of nitrogen in the blood

rises, i.e., urea, uric acid, creatinine, etc. Now, urea nitrogen makes up sixty to seventy per cent. of the total non-protein nitrogen in normal blood, but in disease the urea nitrogen in blood increases faster than the total amount of nitrogen contained in other substances, and so the urea ratio is elevated when renal function is impaired. This estimation has the advantage of being in some respects a quantitative test and yet can be carried out on one sample of blood. The normal figure is usually taken as 40 or less, while any figure over 80 is pathological. As far as I have been able to test it out, this test has no special advantage over other tests to be mentioned later, but it does give a rough quantitative estimation of the amount of functioning renal tissue.

The test in this group, then, that is done most frequently is the simple estimation of blood-urea. It is, of course, a non-toxic substance, and so we are merely using the accumulation of a waste product in the blood as a measure of the degree of renal inadequacy. The creatinine output, however, is much more constant, and so the blood-creatinine estimation has been suggested as a more delicate index of the degree of renal failure. Actually it is very doubtful if the information so gained is of any greater value than the blood-urea figure. It has, however, a certain prognostic value, in that any figure higher than 5 mgm. per cent. indicates in chronic nephritis that death will probably take place inside a year.

III. Third Group. This group includes the various dye-tests that have been devised, and also the use of uroselectan as an index of renal function. They have been extensively used in America, but much less so in this country. The general concensus of opinion is that they are no more delicate than other much simpler estimations. Their chief scope is in surgery, so we may pass them by.

IV. Fourth Group. In this group the blood and urine are studied simultaneously. The blood is the environment in which the kidney works, and the urine is the result of its labours, and so it is only natural that if we want to study its function properly, we must study both blood and urine. The substances most studied are urea and creatinine, and thus there have developed so-called clearance tests dealing with one or other of these substances. The creatinine clearance test has little to recommend it, as it means giving an intravenous injection, and the results given by the test are in no way superior to that of the urea clearance test. In this latter test we have by far the best test of renal efficiency yet devised. During a year's work in a laboratory where this was practically the only renal test asked for, I had abundant opportunity of examining its usefulness, and when properly done and correctly interpreted I have never yet seen it fail. We shall pass over the history of the evolution of the test, although history is always interesting, except to say that it is really founded on pioneer work of Ambard and later by Addis. It is to Van Slyke, however, that we owe the present test in its simplified and corrected form. It combines, as no other test does, the three essential data necessary for any accurate measure of renal efficiency, i.e., the concentration of urea in blood and urine, and the volume of urine excreted in unit-time. This latter is most important in any accurate estimation of the functioning kidney, and is the great criticism that can be levelled at such tests as MacLean's urea concentration test.

The principle of the test is simple. Addis and others had shown that, provided the volume of urine was above a certain standard, then the urea excreted is directly proportional to the blood-urea content; in other words, the urea excretion per minute was equal to the amount of urea in about 75 c.c. of blood. This standard of urine-volume Van Slyke has called the "augmentation limit," and found that it was about 2 c.c. per minute for an adult. This is what he calls the maximum blood-urea clearance, and, when the output of urine is above the limit, it represents the amount of blood cleared of urea per minute.

$$\text{Maximum clearance :—} \quad Cm = \frac{U}{B} \times V$$

When U = urine area in mgm. per cent.
B = blood-urea in mgm. per cent.
V = volume of urine.

When the volume of urine falls below the augmentation limit, the formula becomes—

$$\text{Standard clearance :—} \quad Cs = \frac{U}{B} \sqrt{V}$$

It represents 54 c.c. of blood cleared of urea per minute. For the sake of comparison, it is usual to express both as a percentage :—

thus :

$$Cm = \frac{U}{B} \times V \times \frac{100}{75} = \frac{U}{B} \times V \times 1.33$$

$$Cs = \frac{U}{B} \times \sqrt{V} \times \frac{100}{54} = \frac{U}{B} \times \sqrt{V} \times 1.85$$

In carrying out the test, no special preparation of the patient is needed except that, since the results are probably more accurate if the urine volume is fairly high, it may be an advantage to give the patient a glass of water before and/or during the test. Van Slyke states that, except in fairly advanced cases of nephritis, it ordinarily makes no difference whether the patient is in bed or up and about. Clearances below fifty per cent. usually show lower readings if up and about, than if they were in bed. The patient has an ordinary breakfast, except that he should take no coffee or strong tea. It is usual to do the test during the morning, collecting the two-hourly samples of urine, and taking off the blood for urea estimation some time during the end of the first and the beginning of the second hour. It is essential to be very accurate in the collection of the specimens of urine, and the nurse must be very definite as to the time over which the specimen was collected, using a stop-watch if it is available, and timing to the nearest minute. If there is any doubt as to the bladder being empty, then a catheter must be passed.

It is not desirable in a paper such as this to go into the details of laboratory technique, except to state that it is essential that the blood-urea estimation should be done accurately, as it is the denominator, and a simple calculation will show that if there is any error in this reading the whole estimation will be wrong. There are several good methods of doing urine-urea. Some workers seem to think that

the test is difficult to do; except, of course, from the fact that it involves three estimations, and so is somewhat time-absorbing, there are no other difficulties. An interesting point has arisen of late. At first I always estimated urine-urea, but, following a suggestion made by Van Slyke, I now estimate the urea and ammonium content of urine, and use this figure for U in the formula, as a routine. If the ammonia of the urine comes from the urea of blood, then this is also a theoretically more correct reading, besides being a great technical convenience. The figures thus got are higher, but probably more accurate. The technique now used by Van Slyke in his laboratory is the rapid hyperbromide method both for urine and blood, using, of course, his improved hyperbromide reagent.

We estimate the clearance on each specimen of urine, and then take the average figure as our result.

Anything above eighty per cent. is usually taken as a normal figure, anything below fifty per cent. as indicating impaired renal function. But it must not be imagined that the figures given by this test are mathematically exact as regards renal impairment. Blood-urea concentration and urine-volume are two important factors in urea output, but they are by no means the only ones acting. If this is realized, the test is one of the most useful we now possess, and gives a lowered reading long before other renal function tests show any defect, and shows improvement when other tests give no such hopeful indication. Alving and Van Slyke have investigated the significance of the concentration and dilution tests. They conclude that urea clearance measures the function of exacting nitrogen, and that the concentration test measures the function of excreting mineral salts. The modification of this test introduced by Fowweather will probably improve the efficiency of the test considerably. He measures the clearance after giving 15 gm. of urea, and finds the range of normal much narrower than in the original method, which thus makes the test more delicate and reliable.

Conclusions.

1. By means of simple tests on the urine itself, the physician can form a very reliable opinion as regards renal efficiency.

2. The examination of the blood alone is a very unreliable index of early renal impairment.

3. In the Van Slyke urea clearance test we have the most delicate renal function test yet devised. In cases where the reading is doubtful, it should be repeated, using Fowweather's modification.

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THE BELFAST HOSPITALS

No. 1. The Belfast Hospital for Sick Children

THE Belfast Hospital for Sick Children was inaugurated at a public meeting held at 25 King Street, on May 15, 1873, under the presidency of the Mayor of Belfast. At this meeting it was decided to establish a hospital "on the same principle as the hospital in Great Ormond Street, London."

Until the opening of this hospital on June 23, 1873, there was no hospital in Belfast devoted exclusively to the treatment of sick children, and its need was shown by the fact that within three months after its inauguration nearly five hundred young children had been treated as out-patients.

The success of this venture prompted those responsible for the hospital to extend its activities, and an intern department was organized, with nine beds for intern patients. This ward was opened on August 4, 1873, and a further nine beds were added to it in the following October.

The need for a hospital to treat children was thus shown to be a real one, for in the annual report of the hospital for the year 1874, it was stated that "317 intern patients and 5,408 extern patients were treated at a total cost of £650." Dr. Brice Smyth was the attending physician, and Dr. Fagan (afterwards Sir John) was the attending surgeon, to both of whom the success of the hospital was to a large extent due.

The objects of the hospital were laid down in the report for 1934. They read :

"(1) To provide for the reception, maintenance, and medical treatment of children of the poor during sickness, and to furnish advice and medicine to those who cannot be admitted into the hospital.

"(2) To promote the advancement of medical science with reference to the diseases of infancy and childhood.

"(3) To diffuse among all classes of the community, and chiefly among the poor, a better knowledge of the management of infants and children in health and during sickness."

To these objects was added a fourth :

"(4) To offer instruction to medical students in the diseases of childhood."

The first class for this latter purpose was opened at the commencement of the summer session, 1874.

Dr. Samuel Browne, R.N., the honorary consulting surgeon of the hospital, in his report for 1874, stated : "The committee of management of the General Hospital (afterwards the Royal Victoria Hospital) felt that the origination of a special and separate hospital for the treatment of sick children was a boon and relief to the General Hospital, for there could not be a doubt that the introduction of children into the adult wards was an evil, and interfered materially with the comfort of the

patients, hence he felt a separate institution was an absolute necessity, and the establishment of such a charity had been long delayed."

It is pleasant to notice this agreement between those responsible for the Hospital for Sick Children and the board of management of the General Hospital, as, unfortunately, a dispute arose, even before the doors of the children's hospital were open, between its committee of management and the members of a committee who, at a meeting held on May 21, 1873, decided to open a "new Dispensary and Hospital for the treatment of women and children" in opposition to the Belfast Hospital proposed about a week previous.*

The unfortunate dispute appeared to rest on the mere question of amalgamation of the two proposed hospitals, but a much deeper reason lay below the surface. The original suggestion of the Belfast Hospital was to erect a hospital for the treatment of sick children alone, and its promoters held that diseases of women were amply provided for by the General Hospital and the Samaritan Hospital for Women. They did not think it wise to change their original policy, and therefore would not amalgamate with the suggested "Hospital for Women and Children."

The result of this failure to secure unity of purpose was that the second proposed hospital, which afterwards became the Ulster Hospital for Children and Women, started on its own responsibility in a house in Chichester Street, as a dispensary for the treatment of children alone.

The Belfast Hospital for Sick Children from the date of its opening continued to perform a valuable work, and its affairs went from success to success. This so encouraged its committee of management, that it decided to raise a building fund for a new and enlarged hospital. Funds were forthcoming, and a plot of ground was obtained in Queen Street for the building of the new hospital. Plans were prepared in 1878, and the contract given for its erection.

At this time another effort was made to settle the differences between the Belfast Hospital for Sick Children and the Ulster Hospital, which had then transferred its premises to Fisherwick Place. But in spite of all efforts, "the negotiations were not attended with success."

The only obstacle to the amalgamation of the two hospitals, according to an appendix to the report of the Belfast Hospital for 1879, was the absence from its code of a rule to sanction the admission of clergymen to visit patients. A rule was then made in the Belfast Hospital regulations to overcome this difficulty. It read :

"That clergymen be freely admitted to visit children of their own denomination, subject to such regulations as the board of management may from time to time prescribe, provided that always there shall be no interference, directly or indirectly, with children of other denominations."

A meeting of the sub-committees of the two hospitals met on November 11, 1878, and it would appear from the report of this meeting that the only point at variance between them appeared to rest on the adoption of a rule from the Ulster Hospital : "That the Word of God be free throughout the hospital."

* A report of this meeting was published in the Belfast newspapers of May 23, 1873.

The Belfast sub-committee explained to the Ulster "that the invariable practice of the Belfast Hospital was, and had always been, to leave the reading of the Bible, and every other means for promoting the spiritual welfare of the children, under the control of their parents and to the clergymen of their own persuasion, but to allow no one, by engaging in the wards in any open religious services, no matter how unobjectionable in themselves, to interfere between the children, whom misfortune of sickness had brought under the influence of the hospital, and their natural guardians."

The Ulster Hospital sub-committee insisted that "they could acquiesce in no basis of amalgamation which did not leave the Word of God so free that it could be read aloud to the children by the visiting ladies, and morning and evening by the matron of the institution."

The Ulster committee met on November 13 and 15, and resolved: "That the committee of the Ulster Hospital for Children, while they were most anxious for any means whereby the usefulness of their own hospital, as well as that of the King Street (Belfast) Hospital, may be increased, cannot see their way to acquiesce in any plan for amalgamation save on the basis of their first fundamental rule, whereby the Word of God is so entirely free in the hospital that it may be read to the children by the visiting ladies, and morning and evening each day by the matron of the institution."

This resolution was considered by the sub-committee of the Belfast Hospital, and they were of the opinion that the principle embraced in it would, if adopted, entirely destroy the thoroughly unsectarian character of their hospital, and would practically close its doors against many of the children for whose benefit it was founded. They were unanimous in feeling that it would not be possible for the committee of the Belfast Hospital to accept it as "the only basis on which an amalgamation of the two hospitals could be effected."

The general committee of the Hospital agreed with the sub-committee, and the proposed amalgamation of the two hospitals was not made.

This dispute seems, on the surface, one that should have been amicably settled, but the deep-seated roots in its origin made it impossible. The difficulty arose through the fact that the Belfast Hospital had been founded, and was controlled, mainly by the activities of Dr. Brice Smyth and Dr. John Fagan, the former a Unitarian and the latter a Roman Catholic. The Ulster Hospital, on the other hand, was founded and controlled by Presbyterian interests, and the dispute really was a clash between opposing religious forces.

But in spite of these early disputes, the committee of management and its medical advisers successfully conducted the Belfast Hospital, and watched over the building of their new hospital in Queen Street. And they opened this new hospital on April 24, 1879, with forty beds for intern patients.

The building fund for the new hospital was closed in 1881, and a rent extinction fund opened in its stead, to raise funds to purchase the hospital head rent of £65 per annum.

The work of the hospital in its new home was widened, and a department of ophthalmology was opened, with Dr. Joseph Nelson in charge, and a dental department under the care of Mr. J. J. Andrew. Students then began to attend the clinics for the study of diseases of children in increasing numbers, and during session 1878-9, the last year in the King Street premises, fifteen students were in attendance, but in 1880-1 there were thirty-four students on the roll. The training of nurses was also undertaken by the hospital, and the first probationers entered for duty in 1885.

A convalescent home was the next step which the committee of management undertook, and in 1890 suitable ground was purchased for its erection for a sum of £120. This site was situated about a mile and a half from the Newtownbreda tramway terminus, and Mr. Layon was appointed to draw up plans for what was to be known as the Victoria Convalescent Home. It was to contain twelve beds.

The foundation stone for the home was laid by the Marchioness of Dufferin and Ava on September 19, 1889, and it was opened for the reception of patients in 1891. The home served a useful purpose for many years, but in October, 1908, it was discovered that defects had arisen in the sewerage arrangements, and the home had to be closed.

The cost of replacing the sewerage arrangements by a complete new system was considered prohibitive, and because of this fact, and of certain other points which arose, the home was not reopened. Temporary arrangements were then completed for the care of convalescent patients in Carrickfergus. But the great war of 1914-9 brought with it a greatly increased cost of living, and the running of the home proved an exceedingly difficult problem. Then a further difficulty arose of obtaining nurses, on account of the calls for help in the war hospitals, and the committee of management were obliged to close the home, and it has not been opened since.

The work of the hospital in Queen Street became heavier with each succeeding year, students attending the clinics increased in numbers, more probationers applied for training than could be accommodated, and the numbers of patients increased to such an extent that the accommodation available for their treatment became quite inadequate. So once again the committee of management was faced with the problem of finding a new site on which to build a greatly enlarged hospital.

But a new hospital would require large sums of money to build and furnish, and later to pay for its upkeep. The money, however, was forthcoming, and a rebuilding fund was opened in 1923 by a bequest from the late Henry Musgrave of £10,000. By January 29, 1925, this fund had risen to £15,278. 6s. 1d., and the immediate building of the new hospital was decided upon. In 1929 the fund had risen to £56,000, and a new and beautiful hospital was erected on the Falls Road, at a cost of £113,000, of which over £90,000 had been collected before it was opened. The foundation stone of this hospital was laid by Mrs. Harold Barbour, who contributed a sum of £10,000 towards its building, and the fully-equipped hospital was opened by Her Grace The Duchess of Abrecorn in 1932.

The new hospital was soon recognized as one of the medical show-places in Belfast circles, so complete was it in its equipment and plans. There was a large waiting-hall for extern patients, dedicated to the memory of James Rea, who contributed £5,000 for its erection. The four operating-theatres were furnished in stainless steel, and the cupboards fitted with nickel-plated bascule locks. A blank cheque was given to the hospital by the Atkinson family to purchase the furniture of the out-patient theatre, and another blank cheque was given by Mr. Frederick Davis and Miss Davis to equip and furnish the ward theatres.

The plot of ground on which the hospital was built was generously granted free of charge by the Corporation of the City of Belfast.

A feature of the hospital as it now stands is the inclusion of a series of private wards for paying patients, for the use of sick children of people of moderate means.

There are baby wards set aside from the main children's wards, and a number of small wards for mothers in cases where it is undesirable to separate mother and child. Complete massage and ultra-violet ray treatment rooms are also provided, and there is a play-room, fitted with vita-glass, for convalescent patients. In the basement there is a completely fitted laboratory for bacteriological and biochemical investigations, an electro-cardiograph, and an X-ray installation.

During the short history of the hospital many notable men have been on the honorary staff :—John McCaw, a leader in his time in the treatment of diseases occurring in childhood. Robert Campbell, who was the first surgeon to successfully operate on young patients suffering from congenital inguinal hernia in the extern department of a hospital. The economic value of this innovation is incalculable, as the condition is such a common one and requires early attention; Robert Campbell was also a pioneer with his views on the etiology of acute appendicitis, and was the first to recognize what is now known as the "obstructed appendix." Andrew Fullerton, whose pioneer work on urology is too well known to require comment; and many others, including the two distinguished founders of the hospital, Dr. Brice Smyth and Sir John Fagan.

But the work of the hospital is ever advancing. The board of management has succeeded in paying off the debt with which it opened, and is now debt free; and recently a new ward of eight additional beds was opened by the generosity of Mrs. R. G. Glendinning and Mrs. K. Moore (daughters of Mrs. Bass Capper, after whom the ward has been named), bringing the number of beds up to eighty-four. Last year 1,332 patients were treated as in-patients, and 20,032 patients in the extern department, with a total of 60,991 attendances.

Such a record of valuable work is one of which the people of Belfast may well be proud, and a monument to the memory of those men and women who have freely given of their time and money on the board of management, and to the doctors and surgeons who have given of their best, that the children of the poor might be restored to health and happiness. —R. H. H.

Impressions of the Oxford Meeting, July, 1936

By EILEEN M. HICKEY, M.D., M.R.C.P.I.

THE late afternoon of 19th July saw the arrival of two weary, hungry travellers at Oxford station. They commented sadly but without bitterness on the fact that whatever strides English railways have made within the last few decades, Sunday travelling in that country has remained very much in *statu quo*.

The gloom that had settled down on the spirits of the jaded travellers was not at all alleviated by the knowledge that their quarters in Somerville College would not be available until the following day, so that the problem of securing suitable accommodation for the night still lay ahead.

Inquiries at the first hotel of any size encountered after leaving the station, elicited the anticipated response, "Full up." The proprietor, however, proved to be a man of understanding and resource. He made no effort to disguise the fact that he thought it unlikely that beds would still be vacant in any of the large hotels. Fortunately he knew of a small, unpretentious "private hotel" near at hand, which could still accommodate one or two guests, provided that they did not object to having meals out other than breakfast. This was certainly a straw to be clutched. The result was incredibly happy. The host was a man of many parts and much talent. In a week crowded with notable personalities he stands out still as one of the most original. With him, waiting was not an occupation, but an art. G. B. Shaw's immortal waiter may have equalled but certainly not surpassed him. Lords and fine gentlemen were numbered among his clientèle. The flavour of his bacon and eggs, already delicious, was unaccountably enhanced by the deftness of his serving and the raciness of his anecdotes. There was a subtle touch of flattery in the very gesture by which he swept away offending crumbs from the presence of his guests before conferring (yes ! conferring would appear to be *le mot juste*) on them the pot of Cooper's Squish !

Parting with such a host was indeed a sweet sorrow, and Somerville, it was obvious, would have to be something very special to make up for such a loss.

Oxford, however, beautiful city of spires, soon cast its glamour over the travellers. Mere man faded before the silent beauty of old walls, cool canals, tapering spires, glimpses of velvety lawns spied through ancient doorways, gently flowing rivers, venerable trees. Few English cities make an appeal like this beautiful seat of learning. Its colleges are of such a variety, each stamped with its own individuality, with its own traditions, with the memories of the great men who lectured or pursued their studies within its walls, that it would take the stranger days to make even a nodding acquaintance with some few of them.

Those who attended the president's reception in the quadrangle of Christ Church on the evening of 21st July, are not likely to forget the beauty of that scene. The tracery of the turrets round the old quadrangle silhouetted against the clear evening sky, the ghostly green of the lawn illumined with festoons of fairy lamps, and the

dark water of the fountain mirroring the lamps, a throng of many hundreds garbed in academic dress of many hues, mingling with as many others in more sober evening raiment, distant strains of madrigals floating down the wide, worn steps to the quadrangle, heard above the murmuring of many tongues, all conspired to make an unforgettable scene on a perfect summer's evening. "Old Tom" tolled the hours in his great tower, and the sound of his mellow tones seemed almost a reproach to the multitude of revellers garbed in fine raiment strutting below.

Another memorable scene was that of the adjourned general meeting of the Association in the Sheldonian Theatre. Every available seat in the historic building was filled by doctors from every part of the British Empire, and some few distinguished guests from other countries, all attired in their robes. In the vast throng it was pleasant to recognize so many familiar faces. The president, with all the dignity of office, led the procession of notable personages through the centre of the building to the presidential seat, and outstanding even in this dignified throng followed our president-to-be.

Those who availed themselves of a spare evening to see one of the open-air theatrical performances in the enchanting grounds of Worcester College, and who found their eyes straying at times from the players to the graceful swans gliding over the surface of the lake, and their ears listening to the rustle of the leaves, carried away with them the rare memory of art and nature blending in one harmonious whole.

Oxford's buildings have so much of beauty, of venerable age, of historic association for the stranger, that mere personalities at this meeting seemed to count less, perhaps, than they would have in any more plebeian setting. The Lord Nuffield's keen, eager, intensely vital personality was one of the most arresting. At the Association dinner he appeared to revel in the merry jests of his neighbours, and at his own reception in the grounds of the Radcliffe Observatory, now the Nuffield Institute (one of his many munificent gifts to medicine), one carried away the memory of a twinkling eye and a very hearty handshake.

At the civic reception in the Town Hall, the dignified bearing and fine features of the Right Worshipful the Mayor, Councillor Mrs. Townsend, stamped her clearly as one of the most impressive personalities in a brilliant and learned throng.

The scientific meetings seemed much as such meetings usually are; some a little disappointing, perhaps, because one expected too much, others, when the subject itself did not suggest anything remarkably interesting, proved unexpectedly entertaining and stimulating, perhaps largely owing to the vivacity and happy mode of delivery of some of the speakers.

One of the most delightful of the afternoon excursions was to Mr. R. W. ffennell's County Classrooms and Dormitories for Oxford and London Schoolchildren at Hill End Farm. The guests were met by Mr. ffennell himself, a charming philanthropist, enthusiastic about his work, yet always anxious to efface himself, happy in the knowledge that his scheme is bringing health and happiness to so many little slum children. The open-air swimming-bath run in conjunction

with school was a scene of hilarity and wild splashings. Efficiency with economy seemed to be Mr. ffennell's watchword in planning and building this little colony. He has set out to demonstrate that such a scheme can be worked cheaply and efficiently, and that it is of incalculable benefit to the children. That his voice is still one that is crying in the wilderness is obvious. The world of county councils and urban districts is slow to be convinced, and slower still to move. One would like to think that it may be of some small consolation to this philanthropist to know that many of his visitors were greatly impressed by all that they saw, and hope that before long his example will be followed by many local authorities.

A tour round the colleges on the last morning was greatly appreciated by all those who were able to participate. Magdalen, with its deer-park, its beautiful tower, its ancient trees, the Cherwell lending enchantment to its shady walks, was one of the most admired. The great kitchen of Christ Church, with the cardinal's hat perched on high in the corner, served as a potent reminder that in the days of its foundation the necessaries of life were not beneath the notice of high dignitaries. In the dining-halls, so many historic figures look down from the walls—kings, princes, poets, physicians, scientists, writers, that one's appetite would need to be good to dine in such august company.

Somerville, though modern, has a charm of its own, and has none of that garishness that characterizes so many modern structures. To those who never had the privilege of belonging to a residential university, it was of great interest to savour its calm atmosphere. The homely comfort of this college, with its beautiful dining-hall looking out on lawns and trees, through high, spacious windows, was a very pleasant background to an extremely busy week. The homely atmosphere was not a little enhanced, it may be confessed, by the fact that a large number of the visitors housed there for the B.M.A. meeting hailed from Belfast. It was customary at breakfast for each guest to take his own portion from the serving-hatch and carry it to his place of choice at one of the long dining-tables. It was, therefore, no uncommon sight to see one crimson-robed professor bearing on high, with grace and dignity, his plate of bacon and sausages, conversing meanwhile with yet another professor, kipper-laden plate in hand. Who would be dull in an atmosphere so convivial!

It would appear that all who journeyed to Oxford fared well, if one could judge from the beaming faces that one encountered at every turn. One would like to think that next summer, when the meeting will take place in Belfast, that the visitors will fare equally well. If there is little of antiquity or historic interest in our buildings, there is beauty hard to surpass in our countryside, and there is little doubt but that our tradition of Irish hospitality will surpass itself. To all our prospective visitors, therefore, *caed mile failte!*

CASE REPORTS

ACUTE SUPPURATIVE LABYRINTHITIS: OPERATION; RECOVERY

By KENNEDY HUNTER, M.B., F.R.C.S.E., D.L.O.
from the Benn Hospital, Belfast

THIS case is reported because of its comparative rarity.

G. H., aged 22 years, was admitted to the Benn Hospital on 30th June, 1936. He had been suffering from left otorrhœa for fourteen years, and had been an in-patient for nine days in the Benn Hospital in 1934, under the late Dr. Gibson. He then had pain and mastoid tenderness which settled down after a paracentesis had been performed, but the ear continued to discharge.

On admission, he gave a history of pain in the left ear for four days, accompanied by a brown discharge. On the day before admission he became giddy, objects appeared to rotate, sometimes one way and sometimes another. The pain had subsided, but he now felt very weak.

On examination, he appeared drowsy and walked with an unsteady gait, but Romberg's sign was absent.

The left ear revealed granulations filling the middle ear, and a pulsating discharge. There was sagging of the postero-superior meatal wall; no mastoid tenderness. There was absolute deafness in the left ear, with a noise-box in the right ear. There was no response to the caloric test in the left ear. Spontaneous nystagmus was present, the slow component being towards the left, the quick towards the right. Optic discs appeared normal. Tongue was furred, temperature 98.4°, pulse 84.

30th June, 1936—Left radical mastoidectomy. There was a large cavity full of cholesteatoma and pus. An area of erosion was seen behind the lateral semi-circular canal, overlying the position of the posterior canal; this was thought to be the site of entry of infection to the labyrinth. A swab from the wound showed bacillus proteus on culture.

Lumbar puncture: Fluid under pressure, clear; cells, 1,140 per c.c., polymorphs and lymphocytes in approximately equal numbers; protein, 0.97 per cent.; globulin, plus; culture, sterile.

1st July, 1936—Felt much better, Nystagmus less. No headache, No neck rigidity or Kernig.

2nd July, 1936—Complained of headache at 4 a.m., much less marked at 9.30 a.m. Appeared rather drowsy. Nystagmus more marked. Some neck rigidity. No definite Kernig. His condition remained much the same until 14th July, when it became definitely worse; headache was severe, marked neck rigidity and a definite Kernig were present.

14th July, 1936—Lumbar puncture: Fluid not under pressure; cells, 1,014 per c.c., mainly polymorphs.; culture, sterile.

As the signs of incipient meningitis were present, it was decided to open the labyrinth.

14th July—Labyrinthectomy (Neuman). The posterior semi-circular canal was exposed with a fine gouge, the lateral canal was opened from behind, the bone between the openings was removed, thus reaching the ampullary ends behind the facial nerve. The promontory between the oval and round windows was removed, thus opening up the cochlea. A probe could be passed between the two openings behind the facial nerve.

A large area of dura of middle fossa was exposed, and appeared normal. The dura of posterior fossa anterior to sinus was exposed, and appeared normal. A small area of dura behind the lateral sinus was exposed, but, owing to hæmorrhage from the mastoid emissary vein and the condition of the patient, no more was exposed.

The wound was left widely open and packed with B.I.P.P.

15th July — Temperature 99.4°, pulse 76. Condition satisfactory; very little reaction, nystagmus unchanged, no subjective sensations.

16th July—Condition fair; complained of headache. Purulent discharge from the labyrinth openings. Temperature and pulse normal.

17th July—Not so well; complained of severe headache. Vomited once after food. Neck still stiff. Lumbar puncture: Cells 1,700, polymorphs. and lymphocytes; Protein, 0.08 per cent.; culture, sterile.

18th July—Improved; temperature 99.8°, pulse 64.

28th July—Still slight headache. Labyrinth still discharging. Lumbar puncture: Cells, 40; protein, 0.09 per cent.; globulin, plus; culture, sterile.

18th August, 1936—Occasional headaches. Lumbar puncture: Cells, 80; protein, 0.035 per cent.; globulin, plus.

20th August—No headaches. Wound cavity lined by healthy granulations; no discharge.

29th August—Operation: Thiersch graft from thigh to cavity, packed with B.I.P.P. gauze.

5th September—Graft took completely; slight redness round skin edges.

30th September—Operation: secondary stuture of skin edges.

9th October—Wound healed. Radical cavity epithelialized. Slight mucoid discharge from the eustachian tube. Discharged from hospital.

I have seen the patient twice since his discharge from hospital; his only complaint is a slightly unsteady gait. This is explained by a functioning labyrinth on one side and a dead labyrinth on the other. His balance should be practically normal when he learns to compensate. Of course, he will always be absolutely deaf in his left ear.

I should like to thank Dr. Eileen Bartley and Dr. R. S. Allison for their very valuable assistance with this case.

NOTE ON STEINACH II OPERATION FOR THE ENLARGED PROSTATE

By IAN FRASER, M.D., M.CH., F.R.C.S.ENG.

SOME twelve months ago I was asked by a patient for details of the operation of Steinach II, and its value, and I had to confess that I had never heard of it. Through the patient I was put in communication with a well-known Englishman who himself had had this operation performed, and was so satisfied that he was urging all males of the prostate age with obstructive symptoms to have this very minor operation performed at an early age, instead of the more hazardous one of enucleation of the prostate when the symptoms had become more advanced.

To get further information, I put a query in the "British Medical Journal," asking for the results so far obtained in England. I got no replies, but instead I got a series of letters from various doctors asking me to send them what information I got. Dissatisfied with this, I decided to go to Switzerland and personally see the operation and its exact technique, as well as discuss the procedure and its value with Dr. Paul Niehans, who is its great protagonist there, and to whom many people from the British Isles are flocking.

I was doubtful of the value of a small operation in the region of the testis, and of its effect upon a large prostate, and I was more dubious when one had already seen the unsatisfactory results of trying the vas deferens in the inguinal canal, a procedure practised many years ago for enlarged prostate and, like castration and others, now abandoned. The ligature of the vas at the external ring has been called Steinach I.

Steinach is an octogenarian Viennese physiologist. He is not a surgeon, and relegates all his work to others to do.

The technique is simple. The one point where one can go astray—and upon this Niehans is very emphatic—is the exact site of the ligature. The ligature of strong silk is tied around the rete testis just a short distance from the body of the testis—not too close, or it is said it may tighten the tunica albuginea of the testis, cause œdema, and so an atrophy; and not too far away, as it may compress the veins and so prevent the absorption of the hormones which one is attempting to liberate into the general circulation. Furthermore, at this particular point there is said to be a small ganglion which it is intended should be caught in the ligature.

The French hold that this is very important, and they explain the occasional sudden relief of obstruction which is sometimes seen in an hour or two after the operation, by the effect on the ganglion.

The whole procedure takes ten minutes or so on each side. It is carried out under local anæsthesia, and through a small incision less than one inch long on the anterior surface of the scrotum. There is no shock or loss of blood, and certainly the most feeble patient can stand it without fear of collapse or other complication. The mortality is claimed to be nil, which is different from that for prostatectomy,

"an operation which," Legeu said, "if the patient did not die, invariably cured him."

There are many points to be answered. What does the medical profession think about it?

In America, in one clinic in Boston, there have been several thousand cases performed, and on the whole it is well received. In France it has been twice up for consideration at the urological section in Paris. On the first occasion, after debate it was turned down in the voting, but one year later, with further experience, when a vote was taken, it was accepted as a sound procedure in selected cases. It has supporting it there, well-known men such as Marion, Luys, Papin, Hertz-Boyer; and against it Chevassu and Fey. In Evreux in North France there is a very large urological clinic in which it is greatly practised. In Switzerland, Paul Niehans is the man who has popularized it. He is a student of Steinach, and a general surgeon with his chief interest in urology. He has performed the operation some six or seven hundred times, and is greatly convinced of its value. He strikes one as a very keen man, and certainly as far as I was concerned, he was most anxious to show everything. He put one case specially on for operation, and demonstrated several others in various stages of convalescence.

He does not intend publishing his results till he has done a thousand cases, or has followed the results for ten years. He is not an empiricist, but has gone into the subject deeply from tissue-grafting and hormone injections, etc.

Throughout Great Britain the operation is being tried; many surgeons, convinced of its value, are performing it extensively, e.g., Chiene of Edinburgh, but in England acceptance of this operation has been slow.

Probably the failure of Steinach I (or simple ligature of the vas) was a factor, and possibly only relegated to the operation for trial were moribund cases which were unfit for more severe procedures.

At the Royal Society of Medicine some six months ago, a series of twenty cases were shown, with very mixed results. The cases chosen were very advanced, and would have made bad statistics for any operation, yet several were definitely improved. A heated debate followed, from which little of value appeared. In the middle of this an elderly layman rose and said that he had had the operation performed some months before, and no matter what anyone said, he wished to say he was now quite well. Such cases occur and make one think.

What is its value? It undoubtedly has a value, but unfortunately with many people the idea has arisen that it will replace prostatectomy or diathermy. It will not. It is an alternative method for the suitable case. Niehans himself told me that he is doing many prostate enucleations, although many people have the idea that he does nothing but Steinach II.

The choice of an unsuitable case has done the operation great harm. The man with a malignant prostate—the prostate with an abscess or a mass of calculi—or the small fibrous prostate already greatly shrunken, cannot be expected to atrophy further. These cases are entirely unsuitable, and the old methods must still be employed.

Niehans, in the cases where he does an ordinary suprapubic prostatectomy, always performs a Steinach I—to prevent the infection from the septic prostate cavity passing to the testis and epididymis—and at the same time a Steinach II. It helps to tone the man up, it reduces the size of the prostate, reduces the bleeding, and he says renders the enucleation more easy. With many in this country, bilateral ligature of the vas is still performed as a preliminary in all cases.

The indications are the large adenoma or soft generalized enlargement of the prostate. In these cases it is definitely stated that a palpable diminution in the size of the gland can be felt by rectal examination. If the relief of obstruction is a rapid one, then the cause must be found in the relaxation of the sphincter arising from the tying of the ligature over the small nerve-ganglion in the rete testis—this is the view of Hertz-Boyer; but if the results are delayed (as the shrinkage is), then it is due to the absorbed hormone.

Results, naturally, cannot be as good on the prostate, which, with œdema, infection, etc., is getting hardened and fibrosed. Thus the operation is always advised in the early stages.

Obvious indications are :—

1. The man with prostatic symptoms who is afraid of the more serious operation.
2. The man who from other causes—heart, nephritis, bronchitis, etc., is an unsuitable surgical risk.
3. The early case who is willing to try an operation taking twenty minutes and involving very few days in bed, with the possibility of avoiding what appears to him the inevitable operation later on.

The following are three personal cases on which I have performed it, with the indications.

Man aged 70; very fat, plethoric, bad heart, up every hour at night; a very bad surgical risk and a large prostate.

Man aged 68; acute retention; bladder with thirty ounces and blood-urea 228. After three months of suprapubic drainage his blood-urea never came to the level to warrant enucleation being safe, and so, although still with the Millin urinary bag attached, Steinach II was performed. This man has since had the rubber drainage removed.

Man aged 63; large prostate, refused prostatectomy (one brother had already died following prostatectomy). Had had diathermy twice, but still had considerable residual urine.

One constantly sees the patient who is a risk for the more serious operation, and I hold with such it is worth giving a trial first. If it succeeds, all is well; if it fails, some time has been wasted, but that is all. Niehans will go further, and say that the patient is better prepared for the enucleation, as bleeding will be less severe and the prostate will shell out with greater ease.

I am not making a plea that the operation should be popularized, but I do suggest that it is worth a trial in certain cases, and it certainly is worth adding to one's repertoire when faced with the enlarged prostate. Some years ago I went

over the total records of all prostatic cases admitted to the Royal Victoria Hospital, Belfast, for ten years. They numbered approximately 440. Of these, two hundred did not come to operation, i.e., they recovered and were discharged, or were malignant and inoperable, or were moribund and died. Of the remaining 240 who were subjected to operation, there was in all a mortality of seventeen per cent. These figures I was asked to compile for a general census that was being made all over Great Britain. Our figure seemed very high, but it compared favourably with that of twenty per cent. for all England. It is serious when one thinks that out of every five prostatic patients submitted to the major operation, one is probably going to die; and so an operation with no mortality is surely worthy of consideration.

Choice of case is necessary, or failure will follow; but failure fortunately does not harm the patient, and he must know what the possibilities are. The operation is essentially the same one as is being used extensively on the Continent for rejuvenation. The patient is said to be more potent than before, but naturally is sterile.

To those interested I would recommend Dr. Niehan's article in the "Lancet," or, better still, a visit to his clinic or his hospitable home overlooking Lake Geneva.

A CASE OF SCURVY

By EILEEN M. HICKEY, M.D., M.R.C.P.I.
Hon. Physician to Mater Hospital, Belfast.

FIFTY years ago a healthy young man joined the Army. He served six and a half years in India, with no other ill-effects than occasional attacks of "the ague." He was transferred to the Reserve in 1892, and worked as a dock labourer from 1892 till 1896, when he re-enlisted in the militia. In this he served for three years. He was called up for active service in the Boer War, and served for one and a half years in South Africa, where he was in skirmishes almost daily, lying at night without shelter, suffering at times from "hunger, cold, starvation, and dirt." During the whole of this period he had not even a cold. After this war he left the militia for the regular army again, and after some time in Aldershot he was sent for eighteen months to Malta, where he enjoyed excellent health. Subsequently he was sent back to South Africa, where he remained for about another year and a half. On the day of his discharge he doffed his uniform and changed into civilian clothes. Hurrying down the stairs he fell and broke his thumb very badly. He was kept in the military hospital for a night, and allowed to go home the following day at his own request. He received no compensation for his thumb (which, though not entirely useless, is grossly deformed), as "there was no evidence that he was on duty at the time." From 1905 till 1915 he worked as a dock labourer. By this time he was married and settled in Belfast. When the Great War broke out he re-

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enlisted, but is "afraid he gave the wrong age," as he was over fifty. This time most of his service was at home in Ireland and England. Finally he was sent to Italy in a garrison battalion, and after he had been there for about fifteen months the Armistice was signed. On the 14th May, 1919, he was discharged with a disability pension of forty per cent.

He resumed work at the docks. After some years he had a severe accident at work which resulted in fracture of both bones of the left forearm. For this disablement he had half pay for seven or eight months and a lump sum of twenty pounds on discharge. Eventually he was able to resume work at the docks, and continued until the age of 65, when he found it increasingly difficult to obtain work, and so was very glad to get his old age pension. His wife had died shortly before this time, and he continued to live in the house, quite alone, as they had no family.

For some time all went on much as before, but gradually when he had reached 70, and his appetite was not so good, the trouble of preparing and cooking a meal began to count more than the meal did. Finally a stage was reached at which one meal only was prepared in the day. This consisted of tea, bread, bacon, and eggs. For about six months on this fare he was unaware of any change in his health, then he began to be conscious that his gums were sore and that bruises were appearing on his body, mainly on the legs, but without obvious cause. He consulted a doctor, who sent him into hospital.

His condition on admission was that of a severe purpura. The spots varied in size from mere petechiæ to patches twice as large as a post card on the inner sides of his thighs. There was another large area of subcutaneous hæmorrhage over the lower ribs on the left side. His arms, face, and back had escaped. He did not complain of his joints, and his muscles and bones did not appear to be tender. His breath was extremely foul, and his gums were so spongy and swollen round the teeth sockets as to give the impression of tumefaction. His urine contained a trace of albumen, and some blood-cells, but nothing else of note, and his blood-urea was within normal limits. His blood showed a hæmoglobin percentage of forty-two, and his red cells were reduced to about half the normal. The white cells were only slightly reduced. The slide showed no notable deviation from the normal. The clotting- and bleeding-time were normal. The platelets were reduced to a little over a hundred thousand per c.mm.The capillary resistance test, by means of a sphygmomanometer band applied for five minutes at a pressure midway between systolic and diastolic, did not produce any more hæmorrhages. He was put on to ordinary diet with plenty of fresh vegetables and an orange every day, also some iron to counteract the anæmia and a mouthwash for his gums. In three or four days the unpleasant odour from his breath had begun to disappear, and was gone in a week. He had no more hæmorrhages after his admission to hospital. Two weeks later he was feeling very well indeed. All the discolouration was slowly disappearing from his skin, his gums were practically normal, and his hæmoglobin had gone up to seventy per cent., with a corresponding rise in his cell count.

He has been instructed in the slogan that "an apple a day keeps the doctor away," and is ready to be discharged.

ULSTER MEDICAL SOCIETY

THE opening meeting of the session was held in the Whitla Medical Institute on Thursday, 29th October, 1936. Dr. Foster Coates introduced the incoming president, Professor P. T. Crymble, F.R.C.S.Eng., and installed him in the usual manner. Professor Crymble, after returning thanks for the high honour conferred upon him, referred to the loss the Society had sustained during the past year by the death of Dr. W. J. Taggart, who had been a Fellow of the Society for over twenty years. He said that Dr. Taggart was greatly loved and respected by a large number of patients as well as by all his medical colleagues. A man of retiring disposition, he was, nevertheless, widely known, extremely able, and most popular with everyone. Professor Crymble then expressed the deep sympathy of the Society with the widow and family.

Professor Crymble then delivered his presidential address, "A Review of Duodenal Surgery." This is published elsewhere in this number of the Journal.

The second meeting of the session was held in the Whitla Medical Institute on Thursday, 12th November, 1936. In the unavoidable absence of the president, Mr. T. S. Holmes occupied the chair. The speaker of the evening was Dr. Maurer, of Davos, Switzerland, who delivered an address on "Incomplete Pneumothorax." It is hoped to publish this paper in the April issue of the Journal.

The third meeting of the session was held in the Whitla Medical Institute on 26th November, 1936. The meeting took the form of a joint discussion with the Northern Ireland Branch of the British Dental Association. The subject was "Dental Sepsis in Relation to Constitutional Disease." In the unavoidable absence of the president, Dr. Foster Coates occupied the chair, and introduced the speakers. Sir Thomas Houston spoke on the medical and bacteriological aspects. Mr. Marshall Swan then followed on the dental side, and Dr. Maitland Beath gave the radiological point of view. The meeting was then opened for general discussion, and many members spoke, emphasizing different aspects of the problem.

H. H. STEWART, *Hon. Secretary.*

18 Malone Road, Belfast.

BRITISH MEDICAL ASSOCIATION

105th ANNUAL MEETING, BELFAST, 1937

President-Elect: PROFESSOR R. J. JOHNSTONE, M.P., F.R.C.S., F.C.O.G.

THE provisional programme for the 105th annual meeting is now taking shape, and although the details have still to be worked out, it has been possible to let the local press have some idea of the social and scientific sides of the meeting.

It is not necessary here to give in detail the names of the sixteen scientific sections, but most of the office-bearers have accepted the invitation of the Central Council, and when the list is complete it will appear along with the rest of the programme in the "British Medical Journal." As far as possible there will be joint meetings of two or more of the scientific sections, as past experience shows that not only are the subjects discussed at such meetings of more general interest than those chosen when a section selects a subject strictly within its own sphere of specialization; but it is possible to get, say, a physician, a surgeon, and a radiologist to give papers on the different aspects of the same subject. Some of the subjects suggested for discussion at these joint sections are of more than usual interest to practitioners.

The first four days of the meeting are taken up by the annual representative meeting. This body meets on the mornings and afternoons of those days, but a special programme has been arranged for the ladies at those times; and in the evenings there will be a dinner, a reception, and a theatre performance.

The "Almanzora," with some 450 people on board, is expected on Monday, 19th. On the Tuesday the annual meeting proper begins.

The day's arrangements include the general meeting, an afternoon tea-party at the Royal Victoria Hospital given by the chairman, the official religious service, the president's address, and the president's reception.

The scientific sections meet on the mornings of the following three days. The afternoons will include garden-parties by the Government of Northern Ireland at Stormont, Queen's University at Lennoxvale, and private ladies and gentlemen. The evenings are devoted to a civic reception, the annual dinner and a reception and dance given by the Northern Ireland Branch and Belfast Division of the B.M.A.

In addition to these entertainments, many of the local places of industrial interest will be open to members, as well as gardens and nurseries of special beauty or fame. Visits will also be paid to the Giant's Causeway and the Silent Valley.

When more details of these arrangements are settled, they will be published along with the scientific programme in the "British Medical Journal."

R. W. M. STRAIN, *Hon. Asst. Local General Secretary.*

9 University Square, Belfast.

BRITISH MEDICAL ASSOCIATION
BELFAST MEETING, 1937

MELBOURNE CHESS CUP.

THIS is the first year that this cup is available for play, and the Belfast meeting of 1937 will be the scene of the first encounter of the potential champions, as the semi-finals and final have to be played off during the meeting next July. Each branch

of the B.M.A. is entitled to conduct the preliminary eliminating contests, and the winner in the branch will play the representative from some other branch until the semi-final stage is reached. Games can be conducted by correspondence if desired, but the first stage must be completed by 20th February, 1937. Dr. D. Kirkpatrick, of Anahilt, Hillsborough, has consented to act as local chess secretary, and those desiring to compete should get into touch with him at once. Full information may be obtained from him or from the Branch secretary.

BRITISH MEDICAL ASSOCIATION
NORTHERN IRELAND BRANCH

MR. H. L. HARDY GREER was inducted in the presidential chair at the opening meeting of the Branch on 3rd December, being introduced by his predecessor, Dr. Wm. Lyle. Mr. Greer thanked the members for electing him to this distinguished position, and referred to the excellent year that was served by Dr. Lyle. A formal vote of thanks to Dr. Lyle for his conduct in the chair and his hospitality during the year was very heartily received. Mr. Greer than proceeded to consider the problem of a maternity service, and reviewed various official and committee schemes and reports. Discussion was invited, and several members took part, including Professor C. G. Lowry (who introduced a number of points) and Professor R. J. Johnstone. In view of a prospective Government committee becoming active in the near future, it was decided to form a small committee to represent the Branch, and to present views relative to a possible maternity service in Northern Ireland.

F. M. B. ALLEN, *Hon. Secretary.*

73 University Road, Belfast.

B.M.A.—NORTHERN IRELAND BRANCH
BELFAST DIVISION

THE opening meeting of the session was held in the Whitla Medical Institute, Belfast, on 19th November.

Dr. Boyd Campbell, in relinquishing the chair to Dr. Maitland Beath, said that the new chairman required no introduction to members. He had worthily represented Belfast radiology not only locally and in England, but abroad as well. Dr. Beath, in taking office, thanked the Division for electing him, and went on to refer to the heavy obituary list of the previous year.

Dr. Beath then read a paper on "Radiology : Its Background and Future." He began by giving a fascinating picture of Röntgen, the pioneer worker from whose

discovery forty years ago the science of radiology was born. He went on to describe the wave of popular interest in the new discovery which followed, and its early applications to medical practice. This had been followed by a phase of development in which the possibilities of the new science became increasingly explored. Its importance was realized, and diplomas in radiology came into being.

To-day a time had been reached when almost all parts of the body had been brought under the scope of radiology, and when expensive and high-powered apparatus became increasingly necessary. The latter tendency seemed to point to centralization of such work in hospitals, where alone, with their large turnover of patients, could such work be financially practicable. There was also a tendency in the other direction. Very simple apparatus was now available, and was being used by the ordinary practitioner, who had had no special experience of radiology. This was to be regretted. The public should realize that it was not getting merely a photograph from the radiologist, but an expert interpretation of it, correlated with the clinical condition. Co-operation between the clinician and the radiologist was indeed vitally important in every case.

The thanks of the meeting were accorded Dr. Beath for his address, on the motion of Mr. Hardy Greer, seconded by Dr. Foster Coates.

J. C. C. CRAWFORD, *Hon. Secretary.*

360 Lisburn Road, Belfast.

BRITISH MEDICAL ASSOCIATION
TYRONE DIVISION

AT a special meeting of the Tyrone Division, held in the Tyrone County Hospital, Omagh, on Thursday, 29th October, at 4 p.m., Mr. McFadden, M.Ch., F.R.C.S., having been invited by Head Office, B.M.A., delivered a very interesting address, "Carcinoma of the Large Bowel," to a large attendance of members. A vote of thanks was proposed to Mr. McFadden by Dr. Eaton, and seconded by Dr. Leary, and Mr. McFadden suitably replied. After refreshments, provided by the matron, Miss Snodgrass, the Division met. Minutes of the last meeting were read, passed, and signed.

The secretary suggested that we record our appreciation in the minutes of the work done by Dr. W. Lyle for the medical profession in general, and particularly the Tyrone Division. This was proposed, seconded, and passed.

Dr. Eaton proposed that the Branch suggest the formation of a Ministry of Health in Northern Ireland, and if possible this matter should be discussed at the one-hundred-and-fifth annual meeting in Belfast next year; this was seconded by Dr. Leary, and passed, and the secretary was instructed to write the secretary of the Branch.

JOHN R. MARTIN, *Hon. Secretary.*

Holmedene, Clogher, Co. Tyrone.

B M.A.—NORTHERN IRELAND BRANCH
NORTH-EAST ULSTER DIVISION

THE opening meeting of the session was held in the Coleraine Cottage Hospital, on Monday, 2nd November. There was a large attendance, and the chairman, Dr. Sloan M. Bolton, presided.

The question of holding a meeting in the near future in the South Derry district, probably in Magherafelt, was discussed, and Dr. Kerlin welcomed the suggestion. It was decided that steps should be taken to arrange such a meeting in January next.

Dr. Sloan Bolton then read his address from the chair, on "Recent Views on the Tonsil and Adenoid Problem." After an interesting historical survey, the speaker dealt fully with the development and function of the tonsil and adenoid. He then considered in detail the many conditions in which tonsillectomy was of benefit, and pointed out the contra-indications. Finally, he gave a full account of the factors which demanded consideration when dealing with hypertrophied adenoids.

Dr. J. A. L. Johnston gave a convincing demonstration, by means of culture tubes, of the fact that people with infected throats can be the means of spreading infection. This mode of infection has, of course, an important bearing on the problem of puerperal sepsis.

On the motion of Dr. Shannon, seconded by Dr. Belford, the best thanks of the meeting were expressed to Dr. Bolton for his comprehensive and lucid review of an everyday problem.

Matron and her staff very kindly entertained those present to tea during the afternoon.

A social meeting of the Division was held in the Café, Coleraine, on Monday afternoon, 30th November, when many doctors and their friends, along with members of the dental and nursing professions, were present. After the chairman, Dr. Sloan Bolton, had entertained the company to tea, Mr. S. T. Irwin gave a most interesting account of the B.M.A. world tour, 1935. Mr. Irwin gave a short résumé of the route followed, and then described in more detail many of the places he had visited. He added, in many instances, accounts of native dances, snake-charmers, funeral processions, and other quaint customs and ceremonies. Finally, when Mr. Irwin ended at Gibraltar, a necessarily brief but lively description of many places throughout the world had been given. One of the features of the tour was the receptions arranged in different parts of the globe by local members of the B.M.A.

The talk was illustrated by the official film of the world tour.

Dr. Evans proposed, and Dr. Ross Thomson seconded, a hearty vote of thanks to Mr. Irwin, and in conveying this the chairman thanked Mr. Irwin and all who were present for making the first afternoon social meeting of the Division such a

success. He expressed the hope that a similar meeting would be an annual event in future.

J. M. HUNTER, *Hon. Secretary.*

36 Eglinton Terrace, Portrush.

LONDONDERRY MEDICAL SOCIETY

THE first meeting of the Londonderry Medical Society for the session 1936-7 was held in the City and County Infirmary, Londonderry, on Friday, 30th October, at 8.15 p.m. The following office-bearers were elected for the ensuing session :— President, Dr. J. McCormick, Buncrana, County Donegal; hon. treasurer, Dr. J. Watson, Londonderry Mental Hospital; hon. secretary, Dr. J. A. L. Johnston, 19 Clarendon Street, Londonderry; Committee : Dr. W. G. McKinney, Dr. A. L. Weir, Dr. R. W. Cunningham, and Dr. J. B. Alexander.

On taking the chair, Dr. J. McCormick returned thanks for being elected to the office of president, and then proceeded to outline the future policy of the Society, and made a strong plea for better support by the members at the monthly meetings. He pointed out that the Society would simply have to rely more on their own resources, as it was becoming quite impossible to keep up a succession of visiting lecturers. After all general business had been concluded, tribute was paid to the memory of one of the past presidents, Dr. S. H. B. Allison, whose death took place since the last meeting.

The next part of the meeting consisted of a Ciné-Kodak demonstration of the technique of varicose vein injection work, and the ambulatory treatment of fractures by means of plaster of paris bandages. Both these films were kindly lent by Messrs. T. J. Smith & Nephew, of Hull, and they were greatly appreciated by all members present.

The second meeting of the Society was held in the City and County Infirmary on Friday, 27th November, at 8.15 p.m. This took the form of a discussion on the treatment of pneumonia, and after a short opening address by the president, Dr. McCormick, a free discussion took place, everybody present contributing something, either of his own experience or in the elaboration of some theory mundane to the subject.

At the conclusion, the president thanked everybody present for giving a helping hand, and said that he personally had enjoyed the debate to the full, and he expressed the hope that this was only the forerunner of many similar evenings.

J. A. L. JOHNSTON, *Hon. Secretary.*

19 Clarendon Street, Londonderry.

REVIEWS

FAMILY MEDICAL INSURANCE.*

By J. LACHLAN-COPE.

Reviewed by J. L. Montrose, LL.B., Professor of Law, Queen's University, Belfast.

This unpretentious but most important book pleads for a reorganization of the relations of the medical professon with their patients, and a reorganization of the medical profession itself. All who are interested in the well-being of themselves and their fellow-men should read it and consider its proposals carefully. The fundamental postulates which underlie the argument are that the theory of medicine is a social science and the practice of medicine a social service. The causes of sickness are to be found not only in the physical conditions of the individual, but also in his psychological reactions and in his economic and social environment: the doctor must be able to appreciate these facts if his treatment is to be satisfactory. In order to obtain the necessary data, he must be in constant touch with the patient, a requirement which is also necessitated by the proposition that the function of a doctor is to maintain health rather than to cure sickness. Health includes character-health as well as bodily health; and for its maintenance proper conditions of work are required as well as proper housing and diet and regulation of sexual life and the use of leisure. Even the general practitioner is a specialist: from the general body of the social sciences he has selected that of medicine. The realization of this coupled with the generally accepted respect for the privacy of other people's lives, should prevent the doctor from pressing too far the author's statement that a doctor "should be actively concerned in the patient's manner of life."

Medicine being a social service, "the health of one being the concern of all," it follows that any organized community is called upon to concern itself with the practical application of all the known laws of health and of all remedial practices which help in the restoration of health. Though Dr. Lachlan-Cope regards the state as something outside the individual—in fact, the state is only the community organized for certain purposes—at one time it was orthodox theory that the organization of individuals should be only for the purposes of the maintenance of public order—in other words, the functions of the state should be limited to the maintenance of public order. The engine of the state was the double-edged sword of war and justice, which protected society from foreign enemies without, and criminals and disturbances of the peace within. This theory never corresponded with the facts. Ireland well knows how the power of England was used for the protection and development of its trade. Even when the **laissez faire** doctrine triumphed in the sphere of commerce, it was defeated in the region of what is now known as public health. During the middle of the nineteenth century, the then recently reorganized municipalities began to deal more vigorously with health problems of urbanization. These fountains of health have now become a mighty stream, and in Great Britain the Ministry of Health is one of the most important state departments. Adequate sewerage, wholesome food, housing and town-planning, the control of infectious diseases, are only a few of the matters which are now the concern of the state. The improvement of health in the community which has followed the developments of public health has established as the cardinal doctrine of all medicine, the old adage that prevention is better than cure. The operation in practice of this matter is, however, to a large extent confined to public health.

The relief of poverty has long been one of the functions of the state. In addition, many go hand in hand; and hand in hand with eleemosynary provision has gone the establishment of hospitals for the sick poor. The medical profession supported and developed the voluntary hospital, but its relations with the poor law hospital were not so happy. Nevertheless, largely

(The editor asked Professor J. L. Montrose, LL.B., Queen's University, Belfast, to review this book, as he thought a layman's views would interest readers of this Journal on a subject which is so seriously engaging the attention of leaders of the medical profession to-day.)

* London: John Bale, Sons & Danielsson, 1936. pp. 64.

through the energy and ability of medical officers of health, the municipal or county hospital is now as efficient and well equipped as the voluntary hospital. Much of the advance of medicine has taken place through the co-operation of doctors in hospitals and in the closely-linked university medical and scientific departments. Modern medicine often calls both in diagnosis and treatment for institutional methods. All the benefits of modern medicine are readily available to the working-classes in hospitals. Moreover, National Health Insurance has provided the working classes with the opportunity, often taken, of frequent resource to the general practitioner; its benefits, however, are not granted in respect of the wife and family of the insured person.

Public health should mean the health of the public, and the public as a whole should be able to enjoy the advantages of preventive medicine and institutional treatment. But this is far from being the present state of affairs. The distribution of these advantages requires organization. Co-operative measures are being taken with regard to the outstanding general conditions of health, such as sewerage and the isolation of those suffering from infectious diseases. Even in this respect, the development of town planning and smoke-abatement schemes is very slow. The health of the working and unemployed classes, moreover, is to a great extent socially planned, at any rate on the medical side. Outside these matters the health of the public is often left to the isolated efforts of the individual patient, and to the isolated efforts of the general practitioner. The rich can obtain through their own financial resources the benefits of preventive methods, through continuous contact with a doctor, and institutional and specialist treatment in cases of sickness. The poor can obtain them through communal resources. Among the middle classes the doctor is often not called in to what are thought mild cases of sickness, and the specialist or laboratory worker consulted only in really serious cases. The cost of ordinary medical attendance is so high that it deters general resort to a doctor, and a serious illness involving institutional treatment may mean "a paralysing disability of debt." Something must be done if the middle classes are to obtain the benefits of modern medicine. Dr. Lachlan-Cope's conclusions with which he begins his book are as follows:—

"(1) The advances in the practice (let alone the theory) of medicine, surgery, and allied sciences have definitely made impossible the continuance of rendering medical services adequately through the general practitioner, and therefore—

"(2) The establishment of institutional treatment is here. This necessitates collaborative work with—

"(3) The corresponding establishment of specialism.

"Furthermore—

"(4) The general practitioner must collaborate more with institutionalism and specialism, and must be trained to this end. This necessitates

"(5) Reform in medical education so that the general practitioner shall be first and foremost a reliable diagnostician.

"(6) Advances in medical sciences have so increased the cost of treatment that we are in the somewhat Gilbertian position that only the very poor and the very rich can afford adequate treatment. Further, the basis of modern medicine is prevention of disease. This again increases the cost of health by necessitating more regular and frequent medical opinion and examination. Therefore, emphatically a new system of family medical insurance is necessitated."

In the discussion of these conclusions, Dr. Lachlan-Cope does not make it quite clear when he is referring to the poor and when to the middle classes. To the latter, different considerations may, of course, sometimes apply. Perhaps the point he is making is that the reorganization he is proposing of the medical profession, will naturally apply to the existing National Health Insurance as well as to the new Family Medical Insurance.

There are positive and negative aspects in which the scheme differs from the National Health Insurance. All members of the family are to obtain complete medical, surgical, and auxiliary services. The family includes the husband and wife and unmarried children under twenty-one years of age, but additional premiums are payable in respect of children above a certain number. On the other hand, no monetary payments will be made in addition to the

grant of medical services. Such payments are included in and, indeed, form the most important part of existing sickness insurance schemes run by insurance companies.

Dr. Lachlan-Cope would have liked the scheme to have been voluntary and independent of the state, but he is persuaded that it is financially necessary that it should be compulsory and subsidized by the state. He does not recognize that the state is merely the mechanism of co-operative effort. A state scheme, he thinks, involves dependence on "outside assistance" rather than individual effort, and "makes for selfishness and weakness rather than the building up of the individual's solidarity." This ideology is widespread, and he may be correct in saying "neither the medical profession nor the public are at all desirous of having health services rendered **only** through state insurance **if it can be avoided.**" Nevertheless, I have heard many who wished that the ambit of National Health Insurance would be extended to cover them. The idea of a modern public service corporation, composed of representatives of the medical profession and of the state, both government and citizens, acting independently of the government, is not considered. Instead, the scheme is to be controlled by the insurance companies concerned and the medical profession, and the state is also allowed representation because of the subsidy it is to make. Those who think that control by insurance companies will result in efficiency should consider the percentage of the premiums received for workman's compensation insurance which is distributed by the insurance companies to the injured workmen.

Actual figures are not given as to the amount of the premiums, but they obviously must not be too high, and a sliding scale adapted to income is suggested. Such details could be determined once the scheme were initiated.

The general practitioner is to remain the "hub of the medical service." He is to diagnose the illness and to direct the patient where to go for further investigation and treatment. But the precepts of preventive medicine are to be applied mainly through clinics which are to be set up all over the country. The clinics are to provide all the modern means for accurate investigation and diagnosis. Members are to attend regularly for examination, and not merely when sent by the general practitioner in case of sickness. Records will be kept, and copies sent to a central medical record department and to the general practitioner. The clinics are to co-operate with the general practitioner, existing local hospitals, nursing homes, and other local medical institutions; and emphasis is laid on the necessity for true co-operation. Treatment will be given at these local institutions, or at the central institution which is to be specially established, and where specialists will be available. Treatment will be given on the recommendation of the general practitioner, or presumably, though this is not expressly stated, on the advice of the clinic. All staff appointments will be paid, and there is to be room for recently qualified men to serve an apprenticeship before practice.

I have only touched upon some of the points of the scheme, and, indeed, the author has not himself fully elaborated the scheme. The present necessity is to convince the medical profession and the public of the desirability of some scheme; the details can be worked out later.

DISEASES OF CHILDREN. By Bruce Williamson. Second Edition. Edinburgh: E. & S. Livingstone, 1936. pp. 329; figs. 61. Price 10s. 6d.

This book, which has now reached its second edition, has the advantage of being a convenient size, and although only about three hundred pages, the type is adequate to make reading easy. To accomplish these desiderata, the author has had to make description as brief as possible, and so only the signs and symptoms indispensable in making a diagnosis are given. This in the main is well done, and the student can refer rapidly to any section.

Pathology is scarcely touched upon, and treatment is merely outlined. Some of the descriptions do not present as vivid a picture of the disease as they might, but this cannot be said of the photographs, which speak for themselves. Some of the diagrams are rather elementary and, one would have thought, superfluous.

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PRACTICAL PHYSIOLOGICAL CHEMISTRY FOR MEDICAL STUDENTS.

By G. M. Wishart, D. P. Cuthbertson, and J. W. Chambers. John Smith & Son (Glasgow), Ltd., 1936. pp. 127. Price 3s. 6d. net.

Writers of practical books on biochemistry for medical students are faced with a difficult problem. Theoretical discussion of the organic and physical chemistry of the compounds and reactions studied must be curtailed, in order that the book may be of reasonable size and the practical instructions readily accessible at the laboratory bench. On the other hand, the theoretical treatment must not be so brief that the book becomes no more than a cookery book, from which the student carries out reactions blindly with no regard to their underlying principles. On the whole, the authors have steered the difficult middle course fairly successfully, though on occasions they have swung to the two extremes. For example, a considerable amount of space is taken up with the detailed classification of the different types of protein which might well have been left to lectures or theoretical textbooks. On the other hand, the structral chemistry of the simple sugars is indicated only in the briefest way, and no indication is given of the reactions occurring in the formation of osazones. It follows that no explanation is to be found of the fact that glucose and fructose form the same osazone, and, indeed, this important fact is not even mentioned. Yet almost a whole page is taken up with the bare structural formulæ of three amino acids.

In spite of these criticisms, the book is in many ways a good one. The tests are described clearly and concisely, and with frequent reference to their clinical application. A very clear table is given of the inter-relationships of the blood pigments according to modern views, also a useful summary of the concentrations of the more important constituents of the urine and their sources. The book is exceedingly well produced in spite of its low price. It is bound in a paper cover, but this will probably last long enough for all but the most chronic medical student.

DIAGNOSIS OF SOME DELUSIONAL INSANITY TYPES IN GENERAL PRACTICE. By Edwin Hopewell Ash, M.D. London: John Bale, Sons & Danielsson, Ltd. 2s. 6d. net.

This useful little book presents a concise review of an important group of the biogenic psychoses as seen in general practice. The author stresses the importance of early diagnosis in prognosis and treatment. It is unfortunate that the student leaves his course in "mentals" with a conception of the psychoses as fixed final entities, with the symptoms and signs present as seen in the mental hospital in the advanced cases presented for study, but with very little idea of the disease processes in their early stages. It is the early stages that are most often seen, and too infrequently recognized, in general practice, and this book is an attempt to fill the gap.

The author stresses first of all the importance of diagnosis from the psychoses of toxic origin, and those arising from ogranic disease of the brain. He then discusses the faint variations from the normal which form the first signs of psychosis before dealing with the differential diagnosis of the individual psychosis. Tables of signs are introduced here, a particularly useful table being that which draws distinction between the anxiety states and early schizophrenia.

The author is alive to the difficulties of the subject, and indicates the manner in which one type of mental disease may present symptoms referable to another; but the book as a whole deals with an important problem from the point of view of the busy practitioner, and the classification is simple.

A clear account which can be recommended to the practitioner in a dilemma, the conciseness will appeal to those who have neither time nor opportunity to study the voluminous and often confusing literature in existence on an important problem.

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