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THE CONQUEST OF PAIN

THE STORY OF ANÆSTHESIA

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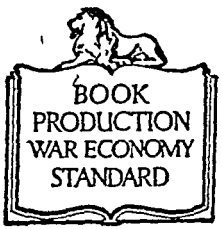

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PREFACE

It is an odd undertaking surely, in the midst of a war, to set down the history of man's attempt to conquer pain. And yet there is something symbolic in this choice. For though wars be breeders of pain, pain itself, war or no war, wages a life-long struggle against the bodies of all living things, be it man or beast—be it, some say, a flower.

When I look about me and wonder at the glories of the human intellect, the achievements of human skill, the rich improvements which the centuries have brought to civilised life, I am tempted sometimes to bestow a kind of supreme palm of achievement to one of man's many endeavours. I weigh the pros and cons, the benefits of wireless, of television, of steam, the motor-car, the aeroplane. None of these in my view, however, bear comparison with the gift of anaesthesia, that was bestowed upon, if not an undeserving, certainly an ungrateful humanity.

I have seen enough pain and suffering as a doctor and a surgeon to know the meaning of this truly divine blessing. I know that through it life and sanity have been made possible for thousands, nay millions of sufferers and lost souls. I know that before it man went in terror of his physical ills. My imagination fails me when I think of the long groaning centuries, of millions slain by simple appendicitis, of the millions to whom a surgeon's knife was as dreadful as death's scythe.

Yesterday, a blood-stained ogre, to-day the immaculate surgeon, the man who by needle and by mask can bring that "little death" which men call sleep, at which if angels be pitying, all the elements on earth and in the sky rejoice.

But man, you man, reader of this book, son of Adam, brought into the world by your mother's pain, how have you and the generations before you considered this problem and how have you rewarded those benefactors who brought you the comfort and the balm of anaesthesia?

You have ladened your princes with gold chains. You have rewarded men of blood with the kingdoms of this earth. To your slayers and oppressors you have given ribbon and diadems. But what did you do to Morton, to him who first applied the use of ether? What honour did you give him in his lifetime? He could tell you if he would but speak from his grave. You have put up a stone for his monument, the same stone perhaps which you hung round his neck when he was alive.

But he is not the only one whom you mocked in your darkness. He lived a bare hundred years ago on the fringe of that era of great discoveries which brought steam and electricity into use.

There were others. There was Raymond Lully, man of the Dark Ages, who, as early as the thirteenth century, discovered the remarkable property of ether. He was dabbling with the abracadabra of alchemy. He was trying to turn base metal into gold when he stumbled upon the secret of what he called "sweet vitriol", precious, more precious than all the gold the earth or sun or the wide universe could hold.

But man wanted gold. Man's eyes shone with the pain of their desire for gold. They shone with physical agony as well, but Raymond Lully was constrained to return to alchemy, to the silly witch's brew, to the magic formula.

Two centuries fly past our history's windows. Another one called Theophrastus Bombastus Paracelsus von Hohenheim, a great teacher this man, a Socrates in the medical field. He knew nothing of Raymond Lully's "sweet vitriol." But he rediscovered ether on his own accord, mixing, they say, sulphuric acid with alcohol and heating the mixture. He tried it on chickens and induced sleep. Perhaps he dared not try it on man, for to save man by a liquid would have meant the gibbet or perhaps the piled-up faggots in his native square.

So the story unwinds. It has a grandeur which catches the heart. It is the story of heroism and endurance as great as any in the annals of the world. It is only half written.

Man has conquered the feeling of pain beneath the surgeon's knife. He has yet to conquer its cause.

To those who take up this torch, to those whose hearts have been broken and especially to those whose hearts will be broken, I dedicate this story.

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THE CONQUEST OF PAIN

CHAPTER I

PAIN

PAIN is as old as life. Perhaps it is even older. Who knows but it was a condition of creation itself, of God and His universe. The great aching stars that have looked down on Prometheus, who knows but that perhaps their torture was greater than his.

Man, we like to think, as the highest developed organism, feels pain strongest. But it does not mean that he alone is sensitive to it. Did not Francis of Assisi preach kindness to life in its every and manifold form? Avoiding the beetle in his path, he preached that though dumb, it was as capable of pain and suffering as himself.

Primitive man, little given to kindness, was always prone to imagine that all things animate and inanimate were as capable of knowing joy and sadness and suffering as he himself. The stones he trod on "felt" his touch. He pointed to the flower that opened its buds in the sunshine and pronounced it "happy". Was he wrong when modern science has recently proved that a plant is capable of suffering? The Indian biologist, Sir Jagadis Chandra Bose, has adduced beyond every measure of doubt that plants feel pain as man. More than that. The scientist has actually been able to render flowers insensitive to pain by the application of chloroform.

Man must have fought to rid himself of pain at the earliest times. For pain was kin to death, to annihilation, and life was but a struggle for breath. To lose this fight meant that man would be reduced to dust.

Most animals when sick go forth in search of plants to cure them. Imagine the Neolithic man, cramped with a

stomache ache after an over-indulgent meal of mammoth or perhaps some even more indigestible reptile, stumbling through the primeval forests, searching for something his brain could not name but his tongue and his organism craved for. He would pick berries, sometimes a leaf, and, chewing this with all the solemnity of a sick person, he would wonder whether the juices would bring him the much-sought relief.

He was a stranger among the giant trees, an adventurer, an unknown Columbus on the unchartered seas of pain. He who had ripped the skins of wild beasts from their trembling bodies, adventured into the realm of medicine to bring succour to himself and his squalling cave-dwelling infants on some wind-swept promontory outside the forest.

The forest watched him with a thousand eyes. The very trees seemed to hold their breath. He was sure that things were hidden in these woods that he could neither see nor touch. The curing leaf and the bright berry, for these he braved the mockery and the silence of the woods. Perhaps he would talk to himself to break the fearful monotony of silence.

In his hairy hand he held a berry. For it he had defied the silence. He had robbed this remedy from the demons that lived in the woods. With quickened imagination he would tell his fellows how the demons had befriended him, how they had led him to the tree on which the berry grew. Perhaps this was the knowledge that the book of Genesis warns us against. He would boast to his fellow creatures that he held the key to pain. He would sell his berry for a wreath of coral shells, for the title of priest or priest-king.

Others as adventurous as himself found more than one magic berry. They added herbs and plants to their lore. These were the man-gods, the first allayers of death-dealing pain. Man worshipped and feared his first physician.

Triumphant gratitude led to equally triumphant rage when he discovered that his medicine man did little but alleviate the pain. Rarely could he get to the root of it. The magician, to justify himself, had to experiment; had

to acquire a greater store of knowledge. Magical rites and incantations in themselves, he discovered, were not enough. Believe as he did in the berry and in jumbled words, he found that the physical often had to be cured by the physical.

To-day, in many museums of Europe, Neolithic skulls which have obviously been trepanned, are exhibited. Consider the daring of primitive ancestors of ours who, with no tools but flints, bravely sought to do what even to-day, with the most up-to-date equipment, still remains a major operation. He sought to release the pressure (or the demon) in a man's skull.

How he came to discover the seat of the trouble must remain a profound mystery. Conjecture, however, allows us to consider whether or not the early blood sacrifice made to propitiate the gods, or to summon a good harvest, may not have given these early priest-doctors their first knowledge of the human body. For, indeed, they were the first dissectors of the human frame. The Greeks in their higher reaches of civilisation, it will be remembered, forbade the cutting up of the Body Beautiful, and consequently knew less of surgery than their own Neolithic ancestors.

Imagine a dawn with the sun far younger than it is to-day and man but a newcomer to walking on two legs. The patient was a hunter, perhaps, a brave enough man, a good thrower of the stone-tipped javelin. Suddenly, when the hunt was at its highest, he would faint away and leave his comrades in the lurch. For some reason better known to themselves, they would drag him away from the maws of the hungry beasts and take him back to his cave. When the patient awoke, he would babble; he would smite his head. They could almost hear the demon rattling inside it. The need was to release the demon, but how? Only the priest knew. "Open the skull and it will fly out," he would advise.

The man was seized, probably bound or his head held between a cleft sapling. With nothing but a sharp flint the priest-surgeon would cut the scalp and then with a long and sharper flint, he would scratch away on the skull

until he had made a hole an inch or perhaps an inch-and-a-half long. This release of pressure on the brain would often work the cure. The demon would fly off and, providing the oozing blood could be stopped, all would be well.

But the pain of this terrible operation must have seared the saved man's memory for ever. He would hate the flint, the hunting-spear, and all cutting instruments, for they had brought pain as terrible perhaps as the devil in his head. That pain, man would through many centuries endure. Here and there he would find relief, but not for some hundred years would its curse be lifted from every son of Adam. Then the taste of the knife would be not like fire but like the soft touch of trickling water.

It is quite probable that other operations besides trepanning were performed in the New Stone Age. Bones showing treatment of fractures, even complicated fractures, have been excavated in various parts of the world. The use of splints made from bark was known, for example, to American Indians. But they knew little of anatomy and consequently the bones set by them are poor examples; poor, that is, when compared with the aborigines of South Australia who, for long centuries, have known how to encase broken limbs in clay. We consider the use of plaster of paris as the most modern application. It is only just that we should give tribute to those who, without any knowledge of science to guide them, showed such ingenuity.

Man, the healer, even goes so far, among South American Indians, as to collect a species of ant with especially powerful jaws. They are used for the treatment of large open wounds. Pressing the edges of the wound together, the surgeon releases the ants and these little creatures, irritated by what they consider to be an unnecessary disturbance in their normal routine, bite viciously into the flesh of the patient. The surgeon, long practised in his task, cuts off the bodies of the ants and leaves their firm jaws to act as clips. Thus closed, the wound has a good chance of healing.

The first definite proof of an operation on flesh is to be found on a bas-relief dating from 4000 B.C. on a temple

wall in Egypt. This bas-relief depicts the circumcision of a boy who has reached puberty. A woman is holding his hands back. There is terror on the youngster's face. Before him kneels the priest preparatory to cutting of the foreskin.

What was in the mind of that surgeon? He knew that the child would scream, as thousands of others on whom he had operated, had screamed. As yet he was powerless. Egypt, the land of the poppy, had not given its secret to man.

A circumcision was necessary if the child was not to be treated as an outcast. Even foreigners had to submit to it if they wanted treatment as equals. It is said that Pythagoras, eager to study in Egyptian temples, had to submit to this operation.

The problem of pain and its alleviation under the surgeon's knife, must have engaged the brains of as many skulls as Attila piled in his procession of conquest. Here and there, in isolated parts of the world, magic and chemistry jostled together. The surgeon and the quack, the philosopher and the priest, the king with the magic touch, the saint—all these at some time or another sought to slay the giant, the riddle of whose strength they tried to guess.

At a later period in Egypt the effects of opium were well known. One of the early stories tells how even the gods made use of it. The great Sun-God Ra called on the Goddess Tefnut to cure the terrible pains he endured. Beautiful Tefnut was not skilled in the art of medicine and the concoction she gave her master produced a terrible headache. But pitying Isis brought juice from the "berry-of-the-poppy plant" and Ra was instantly cured.

But opium slew as much as it cured, drove men and women to seek it and to prize it above their families and their honour. Wives betrayed their husbands and kings their kingdoms, and the surgeon who used this opium might well have been sentenced to the galleys if he did not know the exact dose and the exact reaction it would have on his patient.

The Indians, too, were great practitioners of surgery until Buddha the Loving came to interpose his doctrine and

forbade the dissecting of human bodies and animals, though it be for good purposes. They too knew the use of pain-relieving concoctions. Theirs was hashish, the Indian hemp. It is said Bhoja, a Hindu king, was sent into sweet sleep by the fumes of sammojini before his surgeons trephined his skull.

But man turned hashish to evil purpose and gave to posterity the word-root of assassin—a drinker of hashish. The original assassins dwelt in some valley not far from the Caucasus known as the Garden of the Assassins. These men were stranglers *par excellence*. Under the influence of this narcotic their hand was strengthened for deeds terrible and dark.

Hashish and opium were known in China too. Most of the ancient splendours of India and Egypt found themselves reproduced there, rediscovered by a civilisation older than we can compute. One, Pien Chiao, writing in about 300 B.C., told this surprising story:

"Two men by the name of Lu and Chao visited me. I gave them a subtle drink which reduced them to unconsciousness for three whole days. Then I operated on them and explored the regions of the stomach and the heart. I then cut out both heart and stomach and exchanged them in these two persons. Such was the wonderful drug that they uttered no sound and in a few days I suffered them to return home fully recovered."

But surgery advanced at a greater rate than the conquest of pain. And yet one wonders how surgeons dared to operate in Babylonia around the year 2250 B.C. For did not the Code of Hammurabi, King-Physician and surgeon himself, lay down that "should a patient lose his life owing to an unsuccessful operation, the surgeon's two hands should be struck off as punishment"? It is permissible to wonder whether Hammurabi applied the law to himself or whether he was evenly successful.

But it was the Indians perhaps, somewhere in the years 2000 and 1000 B.C., who reached the most remarkable heights in the art of surgery. The sacred books of India, for example, describe one hundred and twenty-five different

surgical instruments. They stress the need for anatomical knowledge and agree on the advisability of dissecting human bodies. The beginner familiarised himself with botany and performed his first operations on plants. Says one book:

"The art of making specific forms of incision should be taught by making cuts in the body of a gourd, a water-melon or cucumber. The art of making cuts either in the upward or downward direction should be similarly taught. The art of making excisions should be practically demonstrated by making openings in the body of a full water-bag or in the bladder of a dead animal or in the side of a leather pouch full of slime and water."

It was by the perfection of their skill and dexterity, rather than any discovery in anaesthesia, that these early Indian surgeons attempted to alleviate the terrible pain of operation. But it was not for nothing that the great Indian Hindu teacher Sakya Muni said: "This is the noble truth of suffering, that to be born is to suffer, to die is to suffer, to fall sick is to suffer."

But the threat of death and disease was stronger than the fear of the knife. Even human vanity it seems overrode the jangle of pain. In this same India, plastic surgery was developed to a high degree. As it was a common punishment in India to cut off the nose of a man who had offended against the law, the Indian surgeons developed a remarkable skill in not only remoulding but even building up new ones. Split ears, caused by the wearing of heavy earrings, were repaired by "slicing off a patch of healthy flesh from one of the severed lobes of the ears which is more elongated on its anterior side than the other".

Whilst surgery increased in skill, there was perhaps some hope that the knowledge of pain alleviation or anaesthesia would also develop. With the dawn of the sixth century B.C., however, came the decline of Indian surgery. Paradoxical as it may seem, the cause for this decline was Gutthama Buddha who, descending from his native Himalayan slopes, taught the eightfold way to the Indian people.

Buddha himself was a keen student of medicine. His

love and desire to help went out not only to human kind but to the animal world as well. It is said that he founded the first animal hospitals in the world, the forerunner of our R.S.P.C.A. organisation. But his influence on surgery was deprecatory. He forbade dissection or as we should say, vivisection, on animals, the very things which the sacred books of ancient India had demanded of the student of surgery. Sacrificial offerings too were abolished. All this may be regarded as a milestone in the advance of the human spirit. But its effect on surgery was disastrous. For did not the great master teach that disease and death were to be regarded as unclean? Taken to absurd limits, the higher caste Indians shuddered at the very sight of blood. It was only the lower castes, the men who were called and who came to regard themselves as "unclean", who would have any dealing with the flesh of man. And so it came that it was they, the outcastes of Indian society, who took over the surgeon's knife and struggled in obscure hovels to perfect the science in which the ancient priests of India had rejoiced.

The baneful influence of religious mysticism can also be noted in Egypt. More than that. Religious mysticism attacked both the surgeon and the scientist who endeavoured to seek a remedy for pain. The man of learning was accused of interfering with the course of nature. The amulet, the holy figurine, and incantations were considered the proper methods for appeasing a disease. Yet of all the ancient civilisations the most authentic data we possess regarding surgery were found in Egypt. Four important papyri relating to the subject have been discovered.

The George Ebers Papyrus, discovered in the Theban Acropolis between the crumbling thigh bones of a mummy, contains a list of seven hundred remedies compiled by priests. The opium-yielding poppy is one of them. It is mentioned in a long list which includes the castor oil plant, the use of calamine, arsenic and caraway seeds.

These documents are a strange mixture of what we to-day would call science and superstition. But to the Egyptians the distinction was too slight to be worthy of

serious attention. They believed these prescriptions to have come from the gods. With the "berry-of-the-poppy plant", given by Isis to the Sun-God Ra, they valued "water-in-which-the-phallus-has-been-washed" as an important all-round remedy. The castor-oil plant was known as an aperient.

One of the most interesting papyri is the one written by a surgeon about 1600 B.C., known to us as the Edward Smith Papyrus. This surgeon casts a cautious scorn on the charms and magic formulas which had come to oust surgery in later years. The unknown writer made an excellent scientific attempt to study his cases and list them according to their frequency. He chose forty-eight typical cases demanding treatment. What is remarkable is that this surgeon of 3500 years ago employed very much the same methods which we use to-day. The treatment prescribed for the dislocation of the jaw, for example, is practised in all the hospitals of the world to-day. For fractures he used splints made of wood or linen dipped in glue. Adhesive plaster was known to him. He made good use of the endless bandages supplied to him by the embalmers.

This Edward Smith Papyrus is older than the George Ebers. The difference in time is barely some seventy years but the difference in scientific approach becomes immediately obvious. The man who wrote the Ebers Papyrus believed in the excellence of magic. Here, for example, is the ointment he suggests as useful for the extraction of splinters:

"Cook the blood of worms," he says, "and mix it into oil. Then kill a mole, cook it and drain it in oil and follow by mixing the dung of an ass in milk. Apply the paste with the proper incantations."

It was thus that mankind frittered away its resources of scientific knowledge. With the decline of surgery man's attempt to find the greater alleviator also declined. The doctor turned to more profitable occupations. Instead of discovering cures, he concentrated on the production of exquisite cosmetics and perfumes. Only wealthy clients, I should imagine, could afford to put "the blood of a black

calf boiled in oil" on their hair to prevent it from turning grey. One highly-priced pomade consisted of nothing less than the fat of six animals—the hippopotamus, the cat, the horse, the crocodile, the ibex and the snake.

But if Egypt's medicine and surgery deteriorated to such cosmetic horrors, the knowledge of her surgeons and doctors was passed on to the Greeks, and it was in this country that man first made an attempt to separate religion from medicine. It was to Hippocrates, known to this day as the "Father of Medicine," that man owes much of his achievements in the medical field.

In the meantime the millions went to their graves racked with dreadful pains, which the knife had failed to excise. Many more millions died an early death because they counted it preferable to the torment of the saw and the scalpel. The sinner, needing time for repentance, preferred to brave the fires of hell than the cauterising iron of the surgeon he looked upon as a man-devil

CHAPTER II

THE FATHER OF MEDICINE

HIPPOCRATES was born in Cos in the first year of the 80th Olympiad, in 460 B.C. He was the seventeenth descendant of Aesculapius, a chief of Thessaly. Homer in his Odyssey, describes Aesculapius as a skilful surgeon who, with god-like hands, came to the assistance of the Greeks wounded before the walls of Troy.

Man is apt to deify what he admires. Fame made Aesculapius the son of Apollo, the God of Healing, who had fallen in love with Koronis. Cheiron the Centaur taught the son of this union the art of medicine. But the skill of Aesculapius fired the ever-jealous Zeus with a tormenting envy and he, the Omnipotent, fearing that Aesculapius and his medicine might give man the gift of eternal life, slew the demi-god with his thunderbolt. Yet despite this divine anger, the Greeks erected temples in his honour, and their priests continued this minor god's work.

Not so long ago, the shrines of Aesculapius at Cos and Epidaurus were revealed by archaeologists. There came to light a weird collection of plaster, stone or iron replicas of contorted faces, pain-bitten limbs, together with innumerable prayers inscribed with Dorian inscriptions; all telling of the miseries endured by the sufferers before the great Aesculapius came to their rescue.

It was in one of these hospitals, or rather temples, that stood at Cos that Hippocrates was born. Together with other descendants of Aesculapius, he lived in a building erected beside the temple and spent his youth learning from the priests. It is said Hippocrates was an attentive scholar.

"Always wash your hands in the fountain before touching a patient!" the priest would say to his pupils.

The priests often lost patience with Hippocrates. There he was, loitering by a pillar, sitting as inanimate as a statue. The inevitable question was framed on his lips.

"Why, my teacher," he asked at last, "why should we wash our hands in the fountain?"

"Son of Aesculapius," the priest said patiently, "you know but two words in the Greek language. And why, Hippocrates, and why, don't you rise when you ask me a question?"

In the tense silence the boys look furtively over their shoulders. But Hippocrates does not stir. He answers in a quiet voice:

"My teacher, I cannot rise, for have you not bidden me to obey Aesculapius? See, he feels cold and needs the warmth of my lap." He lifts his garment to show the rolled-up snake hiding in its folds.

The priest is vexed but cannot punish him. The boy is right. The sacred serpents of Aesculapius must be obeyed, for the God is resurrected in them.

"And why," Hippocrates continues with tactful obstinacy, "and why, my teacher, must I not touch a patient with unwashed hands?"

Reluctantly the priest gives the explanation. "Because there are demons living in dirt, and if you touch an opening with your soiled hands, whether a wound or a natural aperture like the mouth, these demons will creep through it and take possession of the patient. Then it will be your duty to expel the demons, and this is not always easy. There is enough suffering in our hands for us already. For Prometheus is not the only one punished by the gods. Was not Aesculapius himself cut out of his living mother's body? If the eternal torment of Prometheus is to be chained to the Caucasian rocks, ours is to be plagued by pain and disease. We have accepted Zeus' gift and opened the box of Pandora and let loose all the demons in it, and now they are hiding everywhere. But do not lose courage. Let us not regret that we have accepted the godly gift of fire. Let our gratefulness and industry ease Prometheus' torment and let us fight against the curse. Aesculapius is helping

us. Let us work! Who knows but that in time our fame will not grow wings, strong enough to reach Prometheus in his exile? Let him know man was worthy of him to risk the scorn of Zeus. Perhaps Prometheus will smile his first smile, and in his loneliness ask the grey rocks: What are chains?"

As the priest leaves the hall, everybody follows him except Hippocrates. He unfolds his robe and bends down sadly to the sleeping snake.

"Tell me, Aesculapius," he murmurs, "tell me, is it wrong to enquire the reason for things? Men resent to be asked 'why'—are the gods annoyed also? The priests are secretive—they hide things from us. But how can I understand methods of treating the ailing without knowing the reasons why I should employ these methods, and only these methods? Ignorant of them, I cannot learn to heal, I cannot be a good servant of yours, O Father Aesculapius."

Silence answers Hippocrates. The snake is as cold to touch as the marble pillar against which he leans. There is a sound of footsteps. He turns round. There is no one to be seen. Fearing to be overheard, he presses his lips to the head of the snake and whispers quickly:

"Tell me what happened to the boy who was carried here last night to sleep in the temple? The priests said he left before I woke. But he could not walk yesterday, and no one fetched him. Where is he, Aesculapius?"

The snake uncurls and slowly slides down to the floor. She lifts her head and rhythmically sways from one side to the other, as if to some faint music which only she can hear. With a loud hiss, she splits the thick silence in two.

Hippocrates watches breathlessly. He follows the snake out of the temple. He follows her past the bitter-smelling poppy-fields, past the healing springs, oblivious to all, but determined not to lose sight of her. She leads him into the forest. Sometimes he can hardly discern her in the thick undergrowth except by a sudden rustle, or the shimmer of her yellow belly.

He finds himself standing in the midst of a clearing. The snake crawls slowly towards a sunbeam which lights

up a bronze vessel. With a graceful movement, she dips her head in it and laps the milk. Hippocrates recognises the libation-bowl—it is designed to please the spirits of the dead. A strange curiosity pervades him. Who can be buried here?

He advances. The earth is but freshly disturbed. The ground is soft, loose. An aromatic scent rises to his nostrils. He touches the earth—it is moister and softer than the surrounding ground. This grave has been dug only a few hours ago. The bowl of milk was filled to the rim before the serpent had drunk from it. The boy, the priests had said, had been taken away by his parents before he woke. He had not gone to play his childish games, but to lie stiff and still underneath the earth, with only the worms as playmates.

Hippocrates wanders through the chill forest. He has not far to go. He finds several abandoned burial vessels, unfilled and showing signs that they had lain there for a long while. He had discovered the resting place for the patients who had died in the temple of Aesculapius!

This then, was the reason for the priests' reluctance to answer his questions, he surmises. They had to hide their own helplessness. They had not discovered remedies against all Pandora's evils as they claimed. He had read with awe the votive tablets hung up in the temple. Some of them claimed the most astonishing cures. He remembered them now with a smile, trying to sort out in his mind those that proclaimed the truth, and the many which concealed it.

One tablet, he remembered, spoke of a man who had come to the temple of Aesculapius to be cured of dropsy. The tablet claimed that while he slept his head was cut off, and his body held upside down and drained from all superfluous fluid. Then the head was replaced and the man woke the next morning, feeling healthy and strong.

"I wonder," Hippocrates asked himself bitterly, "which of these bronze vessels belongs to him?"

But there were other tablets which, he knew, spoke the truth. Patients woke up in the morning with their abscesses

cut and drained. They had felt no pain during their sleep. Hippocrates knew this to be true, even if he could not explain it, for lately the priests had allowed him to help them in their nightly surgical work. When he assisted the priest in cutting one such abscess, he had feared the patient might awake in the process. But instead, the patient smiled at the touch of the knife, as if it were some feminine caress, a kiss of Circe. Hippocrates had enquired how this was possible, but the priest smiled:

"The incense and the ointment do not allow them to wake," he answered.

But when Hippocrates had asked what it was in the incense and the ointment that caused oblivion and freed man of grief and pain, all the priest said was:

"Plants in our herbal gardens. You will be taught in time. The serpents found them for us. They are great helpers. Watch!" And Hippocrates observed a snake sliding up to the patient and licking the drained abscess.

A great change went on in the mind of Hippocrates as he lay there in the grass, looking up at the tree-tops. Bitterness and pity each struggled in turn for supremacy in him. He was bitter at the discovery that the priests did not speak the truth, that they concealed things from him. He had considered them as infallible. Yet he had pity for them too. He pitied them for their powerlessness. Many of the priests were kindly men and it must have meant deep sorrow to them to confess their helplessness by burying the little boy in the lost clearing in the woods.

What was it, Sophocles had said in one of his plays?

> "Truly to tell lies is not honourable;
> But when the truth entails tremendous ruin,
> To speak dishonourably is pardonable."

Yes, he understood the priests. They had to maintain popular faith in themselves. But it hurt him, Hippocrates, one who was destined to be a doctor, to be deceived by them.

The shadows of the cypresses grew longer and Hippocrates remembered his duties. It was time to go to the temple.

The ailing would soon arrive for the nightly treatment. He plucked some wild flowers and put them on the grave of the boy. "May you be resurrected," he murmured, "and may the gods give you strong limbs this time, and colour to your cheeks!"

The bronze vessel was emptied of milk and the snake was gone. "I will bring new milk for you and wine. You must not feel lonely!"

Hippocrates hurried away to the temple. He was received with impatience.

"And where have you been, Hippocrates? Asking the trees why they grow upwards and not downwards, and why they stop at a certain height and don't catch the sun or the moon in their branches?" asked the priest who had admonished him but a few hours ago. "You are dusty, and look at your hair, there are leaves in it. Is this the way you are serving Aesculapius?" He pointed down the valley. "See, they are coming to seek our help."

Hippocrates turned round. He saw a long line of people making their way through the narrow gorge. But this familiar sight failed to rouse the usual exhilaration in him. His brow darkened as he thought of the boy and the empty bronze vessel on his grave.

A timid whisper disturbed him in his thoughts. "Hippocrates, it is our turn to play the flutes to-night." He turned round and saw his friend Teucer, ready for the holy rites.

"Come quickly!" Grasping Teucer's hand as if in despair, Hippocrates ran to the fountain, trailing his astonished friend behind him.

"Don't run so madly! Has a fury entered you? We must be calm and collected when the patients come—not sweaty and garbed in crumpled linen!" Teucer protested.

But Hippocrates laughed. He threw his robes off and jumped into the fountain, scrubbing himself furiously, as if to wash away all his pains.

"Are you so concerned about the patients, Teucer, that you don't want to run? Or is it your fat you are concerned about? You know, my friend, if you go on growing

like that, one can easily make two of you and both of them will be fair-sized men."

Teucer sat down on the grass, short of breath.

"Take it whichever way you like: perhaps you are right. But I feel comfortable in my body. It suits me. It may not be nice to look at, but it has its advantages. Look at yourself. You may be smooth to the touch, but you are as cold as one of our marble statues, How you shudder under the fountain! I am kept nicely warm by layer upon layer of ungainly flesh!" He trailed his arm through the water, demonstrating to his friend that no cold could penetrate him.

"It is not the fountain that causes this shudder, Teucer. I have a secret. I will tell you later."

The two friends were just in time to welcome the crowd of patients that had come to seek relief. They took their flutes and blew a few notes in readiness, whilst the patients were washing themselves at the fountains. The temple already smelt heavily of incense. The two friends sat side by side behind a pillar. From this position they could watch everything that happened in the big hall where the priests were waiting for the sufferers.

The first to enter was a woman big with child. At the sight of her, Hippocrates and Teucer lifted the flutes to their lips. Their notes were answered by the harp-players across the hall, and taken up one by one by all the musicians, until the melody grew to a crescendo. Slowly and rolling painfully, like a ship in travail on a heavy sea, the woman came forward and spoke to the priest:

"The child is long in coming. It is afraid of life and hides in my warmth. Help me, O priests, I am weary with pain, and weary with fear of the greater pain to come."

One by one the ailing came forward and asked the priests for help. And to each of them they gave some ointment, asking them to smear their body with this and to pray to Aesculapius.

"Free your mind of all thoughts of pain, nay more, free your mind of every familiar thought, and make it pure and clean as your body. Anoint yourself, listen to

the music and when you are weary, lie down to sleep. In your sleep, Aesculapius will come to you and tell you the remedy for your ailment. Do not fear, Aesculapius has never forsaken anyone!"

Hippocrates watched the familiar scene with a sad smile.

"What is your secret?" Teucer whispered.

"The priests deceive us. People do die in the Temple of Aesculapius. Not all who enter here see the light of day again."

"But . . ."

"By Apollo, it is true, Teucer." Hippocrates interrupted his friend. "I can prove it." And he told him how the serpent had led him to the grave of the boy.

Teucer did not say anything for a long while. He played his flute when it was required of him and stared blankly in front of him when there was a pause. When all the patients had gone to rest for the night, he turned to his friend and said:

"Hippocrates, I am too comfortable and snug in my body to be daring. But you are my friend, and whatever you say, I will do. Yet, my brother, I am frightened for you. Have you forgotten the saying 'Who so shall follow truth too near the heels, it may haply strike out his teeth'?"

"I will risk it, I am not frightened."

One of the priests passed the two friends, and as if struck by a thought, he turned round and said to Hippocrates:

"I overheard what you said just now. 'I will risk it, I am not frightened'. I do not know to what you referred. But you are young and still a fearless soul. I am old, and therefore am conscious of how little I know. You need not be puzzled—I will answer your 'whys'," he added with a smile. "Yes, I will answer your whys so that you may become kinder to us priests. Will you help me?"

"How can I be of help to you, my teacher?"

"By knowing no fear."

"I will come," Hippocrates replied.

"And I will follow you," the faithful Teucer echoed.

But Critto the priest turned kindly towards Teucer.

"No, not you. I want Hippocrates and no one else."

Teucer feared for his friend, lest some harm should come to him, therefore he said: "Where can I wait for you, Hippocrates?"

"At the shrine of Apollo," Hippocrates answered. And with this he left his friend and followed the priest to his study.

Hippocrates had never been to this room before. Crito, the priest, took up his lyre and nodded to Hippocrates to make himself comfortable. Eager to know why the eminent Crito had called him, the boy was about to open his lips when the teacher said:

"Be silent, boy; silence has many beauties."

But Hippocrates did not feel at his ease. He loved this teacher above all other priests. He was never impatient at his questions; he even encouraged him. But what did this strange behaviour mean? Why was the priest sad? His face seemed tormented in the half-light, as if labouring under a heavy burden. Hippocrates had never seen him like this. Crito had always appeared a picture of self-composure, as every true philosopher should.

"What thin hands he has!" Hippocrates thought. "He looks old and tired."

But the soft melody the priest played on his lyre made the boy forget the strange situation. A great feeling of loneliness pervaded him. It seemed as if the walls were melted to nothingness by the song, as if the room had vanished and had become a playground for all the winds. He felt the darkness like a thick curtain, hiding the sun, and wondered whether it would ever lift again.

"Is that what the boy feels in his grave?" he thought. "For him the curtain of darkness will not rise again. I, too, will lie like this one day."

Crito suddenly smiled. His fingers rested on the lyre caressingly. "Doest thou learn the meaning of fear, my boy? Remember Sophocles' saying: 'Search not out all things; it is good that much should be unknown'."

Crito ignored the boy's enquiring gaze and changed his tone of voice as if he was lecturing to a class.

"I have asked you here to-night because I need someone to assist me. You have seen the woman who came to us this evening and who could hardly walk. The child in her is a heavy burden—it should have been born many days ago. But there is something wrong with this woman; the child will never come without assistance. We have to tear it out of her, and that is dangerous. The woman may die. That is why I told you I was frightened to-night, Hippocrates."

"Die?" interrupted Hippocrates.

"To feign is base, my boy. I saw you in the woods, and that is why I chose you to help me. I was young once too, Hippocrates. Not always did I wear the robes of a priest. Like you, I had to discover the truth for myself. Only those who search are ready to bear the burden of knowledge. Until now you saw only the glory of the servants of Aesculapius. From now on you will bear with us the heavy burden of defeat. A greater physician than any of us comes at last to ease our patients' pain. Where we fail, death takes over."

Hippocrates lowered his eyes. He was ashamed of his unspoken reproaches, and now that Crito had chosen him for his assistant, he trembled lest he may not be ready to take on the responsibility.

"Do you think I will be able to serve . . .?" he asked timidly.

But Crito interrupted him.

"We did not hide knowledge from you, Hippocrates. We only hid our ignorance. If your knowledge is not sufficient, mine is not either. It is our task, with the help of Aesculapius, to augment this knowledge. From now on you are one of us priests. By now the woman is fast asleep. If we succeed, she will awake to-morrow and her child will be in her arms. If we fail, her dreams will fade into death without suffering. Let us go!"

Crito laid his lyre aside and stood up. He laid his hands on Hippocrates' shoulders reassuringly.

"You left your childhood in the woods, my boy. Be courageous! Your pain will pass. Not only the body knows growing-pain, the soul also knows it."

Pain.
(Sculpture by Dr. R. Tait Mackenzie.)

[*Face page* 32

A contemporary caricature of mesmerism, faith-healing cult which held sway just before the French Revolution.

While Crito collected his instruments and gave last instructions to Hippocrates, Teucer paced up and down before the shrine of Apollo. He felt tired. Had he not been so curious to know why Crito had asked Hippocrates to go with him, he would have gone to rest in his rooms. But he loved Hippocrates dearly and he was frightened lest his secret should have been discovered.

"One never knows what these priests are up to," he murmured. "They are always behaving in such mysterious fashion. Better not ask them any questions—it makes life uncomfortable."

Teucer loved good food and wine. He knew how to enjoy life. He always hid a flask of perfume in his robe. When bored he took it out of the folds and smelt it.

"Life is beautiful," he said to himself. "Hippocrates, you are a fool. What importance is it to you if the boy died? We all have to die one day. Why embitter a single day, nay, why embitter a single hour by such dark thoughts as you perpetually harbour? I want to enjoy life. . . . Enjoy life, enjoy life," he shouted at the top of his voice.

"Enjoy life, enjoy life," came the faint echo from the hills.

"That's right," Teucer murmured with satisfaction. "You hills have sense. You are waiting for the sun to warm your bellies. He will come soon, let me assure you, he will come soon. But don't ask me why, why. I know the sun will come and he will take your flowers by the neck and pull them a bit higher, so that they needn't smell your muffy earth all the time."

And Teucer took his wine cup and emptied it as a toast to the hills and himself. He had provided himself well for the long wait. There were grapes and melons and a whole assortment of sweetmeats and a half-empty flask of wine by his side.

"Yes, he will take your flowers by the neck and pull them up and pull them up, he will pull the blue ones and the red ones and the yellow ones, not forgetting the white ones, the white ones," he chanted. "And here is a toast to the flowers!" And Teucer emptied another cup.

"Now I have drunk a toast on everything around me,"

he murmured sadly, "and still Hippocrates does not come. I have drunk a toast on the sun, the moon and stars, the hills, the flowers, the rivers—there is nothing left for me to drink a toast on. Oh yes, there is one thing I have forgotten, my poor dear cypress!" And Teucer tottered over to a tree and embraced it, asking its forgiveness.

"Am I so ungrateful?" he murmured. "I have leaned my weary back against you and I haven't drunk a toast for you. Yours is the biggest one—no cup for you, you deserve the flask." He took the flask with both hands and emptied it. He then fell exhausted to the ground.

"You still angry, cypress?" he complained. "Just because I left you to the last? Well, to show you my affection, I will perfume you also. Every single leaf of you I will perfume."

Teucer climbed the first branch with great difficulty, pulled his perfume bottle out and started to give each leaf one drop of it. He was quite excited and forgetting which leaf he had scented and which not, he had to sniff them like a dog on the trail.

"You've got too many leaves, cypress," he said, getting tired of his task. "Psh, keep quiet, don't shake your head. Two of those priests are coming!"

Two priests came slowly towards the shrine of Apollo. One of them looked around as if searching for something. When he saw the abandoned fruit at the foot of the cypress, he smiled and picked up a dark blue grape.

"So they don't only kill little boys but steal, too," protested Teucer under his breath. "My beautiful grapes!" But he kept quiet for fear of being detected.

The two priests went to the shrine of Apollo and lit the bronze lamps. Teucer could not hear the question that was put to the pythoness. But he heard her answer:

"Who seeks for what you seek, must die not one death but a thousand. Give goodness and you will harvest evil. Give evil and you will harvest good. Misery will be your fate as everybody's after you for millenniums to come. But mankind will worship your bones after they have torn the flesh from it."

"How gruesome," whimpered Teucer in the cypress. "Why do people make life so difficult when it is so simple? And this is the last drop of perfume I have, you greedy cypress," he said, violently shaking his flask so that it slipped from his hand.

It hit the returning priests and Teucer recognised their faces.

"Hippocrates!" he shouted in despair. "Hippocrates, in priest's garments!"

The shock was too great for him. He followed his perfume flask in the fall and Hippocrates and Crito carried him to his quarters, together with his empty flask.

. . . . . .

For many years, Hippocrates worked as priest in the temple of Aesculapius at Cos. He concentrated on the study of herbs and diet, to which he attributed much importance. He saw little of Teucer, for Teucer specialised in the making of perfumes and incense. Crito, however, was a frequent visitor in Hippocrates' study. He answered readily the innumerable whys put to him by his former pupil. But of late the enquiries had become less frequent. Hippocrates had exhausted the priest's knowledge.

Working systematically, Hippocrates took each plant he found and studied its qualities under different treatment. He found their healing influence varied according to preparation.

"We know the nature of medicaments and samples, and make many different preparations with them, some in some way, some in another; some samples must be gathered early, some late; some we dry, some we crush," Hippocrates wrote.

Teucer entered the study, sniffing the air with disgust.

"Everywhere this beastly garlic of yours, Hippocrates," he said. "How will you be able to appreciate my new creation? It is a poem, a real poem, with darkness and pain in it, so you ought to like it."

"What is it made of?" Hippocrates turned reluctantly from his work.

"Base—distilled quince blossoms. They must be gathered with the morning dew on them, and yes, sweet marjoram too, and . . ."

But Hippocrates interrupted his excited harangue. "Quince blossom is an excellent medicament also," he said.

"Oh, leave me some flowers for the joy of life," Teucer exclaimed. "You rob our gardens of every plant and bring them to die in your dusty study." He kicked a cabbage lying on the floor viciously with his foot. "Everything you mix together without rhyme or reason." Teucer extricated some fading cyclamens out of a heap of onions, lettuce and thistles. "You know what beauty I could create out of this plant," and he waved the crushed cyclamen before his friend's nose.

"I know, I know, my friend. But I have finished my work here." Hippocrates smiled sadly. "Strange how little remains of all the years I have devoted to work. Just this list of samples with instructions how to treat each plant."

Teucer looked over Hippocrates' shoulder.

"Olive, carrot, garlic, hemlock, thyme, onion, poppy, almonds, cyclamen, laurel, myrrh, mandragora," he read. He read through the whole list of four hundred plants compiled by Hippocrates as medically valuable. (Two hundred of these medicines are used to this day.)

"So you will not come to rob our gardens any more?" Teucer asked, and when Hippocrates shook his head, he said: "I do not know why, but I shall miss you. You never look at the world as I do. You strip things of their beauty to get at their usefulness. And yet, Hippocrates, I feel near you as if you were my brother. Solve that riddle for me."

"You are a seeker and so am I. What matter that you search for beauty and I for a better art of healing, if both of us devote our lives to this? We are near in our pain of disappointment, in our joys of discovery."

Hippocrates went to the window and, turning his back on his friend, spoke as if to himself.

"Yes, I have finished here. I have gathered my harvest. Other pastures are calling me. Teucer, a great wind is

rising from over there, sweeping before it old, senseless traditions, clearing the air of all stuffiness, bringing daylight to every dark study. Ah, the curtain of blindness is going to be torn from the eyes of man. Teucer, the air is sweet in Athens. Come with me to the city of builders, the city of seekers."

Teucer was astonished at Hippocrates' enthusiasm.

"They are carting away the rubble in Athens. Pride dictates them not to mourn their destroyed monuments. Let the Persians see that Athens is greater than its buildings. Pericles is creating a city more beautiful than the one the barbarians envied. But they are not only rebuilding their city, they are rebuilding life itself. I heard Pericles make his last oration. This is what he said:

"'Our constitution favours the many instead of the few; this is why it is called a democracy. . . . We do not feel called upon to be angry with our neighbour for doing what he likes, or even to indulge in those injurious looks which cannot fail to be offensive, although they inflict no positive penalty. But all this ease in our private relations does not make us lawless as citizens. Our ordinary citizens, though occupied with the pursuits of industry, are still fair judges of public matters. For, unlike any other nation, regarding him who takes no part in these duties not as unambitious but as useless, we Athenians are able to judge, at all events, if we cannot originate, and instead of looking on discussion as a stumbling-block in the way of action, we think it an indispensable preliminary to any wise action at all.'

"You hear this, Teucer? 'And instead of looking on discussion as a stumbling-block in the way of action, we think it an indispensable preliminary to any wise action at all.'

"Does that not sound to you like the saying of a seeker? Brother, come with me, come to breathe the free air of Athens."

Seeing the perplexed gaze of his friend, Hippocrates continued smilingly:

"But perhaps I have to persuade you in a different way. If I love the city for its freedom of thought—I may have

to tell you that the Athenians are great appreciators of beauty. They will flock to you to smell your perfumes. And there also you will find Pythagoras, who studies in the temples of Egypt. Perhaps he can give you the secret of the famous perfume of the Pharaohs."

Teucer listened silently. His fingers played with the faded cyclamen in his hands. He watched Hippocrates, hardly listening to his words.

"I love him for this light on his forehead," he thought, "and the ecstasy in his heart. I know him too well to be deceived by his studious manners." But aloud he said:

"I will come with you, Hippocrates. I, too, am weary of this place. I hear the Parthenon is finished. I want to see it."

. . . . . .

Athens hardly took notice of the two travellers. They were used to strangers who came to gaze at the Parthenon and to walk their streets. But Teucer and Hippocrates welcomed this lack of attention, desiring only to watch and to drink in the beauty of the majestic city.

Teucer soon opened a perfumery. He became especially famous throughout Athens for his "Melenum", and the citizens paid him well for it. Now and then he would take a jar and walk through Athens' streets in search of the man who appreciated his perfume most, but who was too poor to afford it. Usually his friend Hippocrates was to be found with him, sitting in the market place. Teucer pushed through the crowd.

"Socrates," Teucer whispered in his ear, "I have brought you another jar of Melenum."

"Teucer, friend of Venus, your gift is welcome. I have finished the jar you gave me."

"And here is another perfume. It is made of crocus. Try it and tell me what you think of it—it is only an experiment. I haven't succeeded yet. Something is missing; I don't know what. Perhaps you can help me. But tell me, where is Hippocrates? I thought he would be here as usual."

Socrates stroked his beard. "Hippocrates is on a boat

going to Egypt. He left the city this morning. 'I want to see for myself what Pythagoras saw,' he told me. 'I will come back to Athens, to you and all my friends.' And with that he left us."

Hippocrates had considered the idea of leaving Cos many weeks before he carried it out. To leave Athens had taken him only one day to decide. From now on Hippocrates stayed only as long at any place as he needed to collect knowledge. When he found what he was seeking, he left for another land and another truth. But always, at certain intervals, he returned to Athens where he discussed his findings with Socrates and Pythagoras to value the harvest. As if driven by a centrifugal force, he left again for another country which he had not yet explored.

He was sixty-three years of age when he came to Athens for the last time in his life. Walking down the street to the market place, he noticed new buildings. He nodded at them with satisfaction. "New buildings for the new world. Well done, Athenians."

But the market place was empty. As if struck by a chill wind, he shivered. Panic overcame him. "Has Athens lost its soul?" he asked himself.

Hippocrates rushed through the streets.

"Teucer, Teucer, open!" He knocked violently at the closed door of the perfumery. "Teucer, it is I, your friend Hippocrates."

Teucer opened the door. But instead of the warm welcome, he was received with a cold "Come in!"

"Have I been away for so long that you don't recognise me any more?" Hippocrates asked.

"Oh, yes, I recognise you. You are Hippocrates, the great doctor." Teucer's voice was level, as if speaking in his sleep. His eyes seemed not to notice things near him: they looked through them as if they were made of glass and had the sad expression of one who gazes over stretches of waste land.

"Teucer, what has happened? Am I not welcome?"

"Oh, you are welcome—but the joy is gone out of me. Joy is dead! Tear the sun out of the skies, he mocks me.

Why seek for better things? Destroy, destroy, it is so much easier. Let us learn from the barbarians, let us learn from the Persians! Why build Parthenons if we destroy beauty itself? Why speak of ideals if we destroy truth?"

Teucer, like a prisoner who tears senselessly at his chains, tore his garment and ran around the room, smashing everything in his path. When he came to his precious jars, he stopped for a moment and then with a wide sweep, smashed them all on to the floor. There was an explosion of scent.

Hippocrates, fearing to hear the answer, whispered: "What is it, Teucer?"

Steadying himself against the wall, he answered: "Socrates has been condemned to death. He is drinking the hemlock now . . . this evening."

Hippocrates left the weeping Teucer in his ruined perfumery and ran through the streets. He had never been to Socrates' home before, but he knew where he lived. He remembered vaguely that he was married and had children. Somehow, these details had never been important to him but now, when he realised for the first time that Socrates could die like any other mortal, all mortal things about him came into his mind.

When he entered, he saw Plato and other familiar faces. Had it not been for their sadness and despair, one could have mistaken the scene for one of their usual gatherings in the market place. They were grouped round the reclining Socrates. His was the only smiling face. With a scented goblet in his hand, that had never contained anything but wine, he spoke consolingly:

"You too must face death with a good courage and hold it true that no evil can happen to a good man, either in life or after death. His fortunes are not neglected by God, and what has come to me to-day has not come by chance. And so I am hardly angry with my accusers or with those who condemned me to die. And now the time has come and we must go hence; I to die and you to live. Whether life or death is better is known to God and to God alone."

As Teucer had nót been able to suppress his grief, so, too, Apollodorus found it beyond his strength. He uttered

a cry of helplessness and revolt, and all the others present wept with him. But Socrates turned to them quietly and said:

"What are you doing, you strange people? I sent away the women mainly in order that they might not misbehave in this way, for I have been told that a man should die in silence. Be quiet then, and have patience!"

And as if not to prolong the agony of his friends, he raised the goblet and drank the hemlock.

That night Hippocrates left for ever the city he used to love so well. "What is a body without a soul? What is Athens without Socrates?" he demanded, if he was asked for the reason of his absence.

He went to Larissa in Thessaly, the birthplace of Aesculapius.

His body showed signs of age, but his spirit was as fearless as ever. He was the first to separate medicine from religion and to make a science of it. He openly condemned the use of amulets and litigations. He told the pupils who flocked to him from all parts of Greece that truth was something man had to fight for and that would not fall into one's lap like a ripe fruit. All who wished to study under him, had to swear this oath:

"I swear by Apollo the Physician, and Aesculapius, and Hygeia, and Panacea, and all the gods and goddesses, that according to my ability and judgment I will keep this oath and this stipulation—to reckon him who taught me this art equally dear to me as my parents, to share my substance with him, and to relieve his necessities if required; to look upon his offspring in the same light as my own brothers, and to teach them the art, if they should wish to learn it, without fee or stipulation; and that by precept, discourse, and every other mode of instruction, I will impart a knowledge of the art to my own son and those of my teachers and to disciples bound by a stipulation and oath according to the law of medicine, but to none others. I will follow that system of regimen which according to my ability and judgment I consider for the benefit of my patients, and abstain from whatever is deleterious and mischievous. I will give no deadly medicine to anyone if

asked, nor suggest any such course; and in like manner I will not give to a woman a pessary to produce abortion. With purity and with holiness I will pass my life and practise my art. I will not cut persons labouring under the stone, but will leave this to be done by men who are practitioners of this work. Into whatever houses I enter I will go into them for the benefit of the sick, and will abstain from every voluntary act of mischief and corruption; and further, from the seduction of females and males, of free men and slaves.

"Whatever in connection with my professional practice or not in connection with it I see or hear, in the life of a man, which ought not to be spoken of abroad, I will not divulge, as reckoning that all such should be kept secret.

"While I continue to keep this oath inviolate, may it be granted to me to enjoy life and the practice of the art, respected by all men in all times! But should I trespass and violate the oath, may the reverse be my lot!"

The lecture hall was filled with pupils. There was a hum of excitement, for they were waiting for a practical demonstration of Hippocrates' art. Two assistants carried in the patient, who had been injured in a wrestling match. He was moaning pitifully.

Hippocrates entered with a stick in his hand. Turning to the pupils, he broke it over his knees in two parts.

"This patient has broken his upper arm and the bone looks like this, now," and he held the two pieces of the stick so that one overrode the other. "What would you do to heal him?"

Silence answered Hippocrates. Then from the far end of the hall came a voice:

"Do you know at what place exactly the bone is broken?"

"Yes," Hippocrates answered, "I know. Well, does that help you?" and he smiled encouragingly at the boy.

"I would cut the arm open at that point and then pull the bone apart and fit it properly. Then I would wrap the arm up—the flesh will grow together, I know—here, look at this scar," and he stretched out his arm, "I climbed a tree and hurt myself . . ."

But laughter interrupted him in his excited recollection of the accident.

"And why do you laugh?" Hippocrates turned towards the other boys, his face stern with disapproval. "Why?"

"One does not cut when one treats a fracture," came the answer.

"And why not?" he turned towards the boy sitting next to him. But he blushed and turned his face away.

"Why not?" Hippocrates spoke to the second boy.

"The flesh is not injured, it is sound, one need not, no one ever does," this one stammered.

"No one ever does," Hippocrates growled. "As if that is an explanation!" He paced along the whole row of pupils and gazing disapprovingly into their eyes, asked each one in turn:

"Why wouldn't you cut the flesh in case of a fracture?" The question sounded like a threat.

When Hippocrates came to the boy who had aroused the laughter, he stopped short and smiled at his flustered face. "You would be right if our flesh was hard as stone. But see, it moves," and he took the arm of the boy, gripping the wrist firmly and moving the flesh above it up and down. "Feel it? It is elastic."

The boy's eyes lit up. "Then one can pull the bones apart and . . . and . . ."

"Yes, one can pull the bones apart, without cutting." And turning to the boys, Hippocrates said: "You wise men, you learn early to hide your ignorance by ridiculing others."

"Bring up the patient!" he ordered.

"You won't cut me?" the wrestler asked, trembling with fright.

"No, I won't cut you," Hippocrates answered, gently taking him by the healthy arm and leading him to a wooden bar hanging from the ceiling by two thick chains. "It will hurt, but only for a short while and you will be healthy again just as before. You are not frightened, a strong man like you?"

"No, I am not frightened," the wrestler answered, looking suspiciously at the wooden crossbar. "I am only cold,

that is why my teeth chatter," and he pointed apologetically at his trembling jaw.

Demonstrating with the broken stick, Hippocrates again turned to his pupils.

"As you said," he nodded towards the boy in the far corner, "the bones must be pulled apart first and then manipulated so that they come together again exactly as they were before broken. That needs great strength, and we therefore do it with weights. For it is difficult to pull the bones apart and at the same time to fix them. Lift the patient carefully!" he ordered the assistants.

The boys had forgotten the anger of their teacher and were watching every movement, forgetting all else around them.

The patient was lifted so that his armpit rested on the wooden crossbar.

"Courage," Hippocrates whispered into the wrestler's ear, while he was bending his injured arm at the elbow joint at right angles. "Keep the arm in this position!" he said to the assistant, "and grasp the wrist firmly."

Hippocrates then took a broad silk scarf from his neck and hung it over the bent elbow. To its ends he attached a heavy stone.

The wrestler ground his teeth. "That hurts," he moaned.

"It will soon be over," Hippocrates murmured and then explained what he was doing to his pupils at a high speed, so as to avoid unnecessary suffering for the unfortunate wrestler.

"The weight pulls the bones apart. This makes it easy for me to fit them properly. They are already fairly in line and it needs only a minor adjustment."

While manipulating the arm, Hippocrates turned to another assistant, busy with a big bucket of glue. "Pass me the bucket!" he said.

Drawing out a long, glue-soaked bandage, Hippocrates started to wrap it round the arm of the patient.

"This," he explained to his pupils, "I have learned in Egypt. The best way to keep adjusted fractures in position is to use a linen bandage like this one and dip it thoroughly

in glue. As you see, it is soft and pliable now, but soon it will be hard as stone and encase the arm firmly, so that it keeps the bones in position. You keep it on until the arm is healed and then I take it off for you," he said, turning to the exhausted patient.

The patient was taken off the wooden cross-bar. "Is that all?" he asked Hippocrates.

"That is all," he answered. "Soon you will have no more pain. The Gods be with you." The patient was led out of the hall.

"Have you observed properly what I did with him?" he turned to the pupils. "If so, you try it on yourself. No, you needn't break a bone for the sake of this. Just explain the procedure. You will be the patient!" and he pointed to the boy who had aroused the laughter.

The boy came forward shyly and another boy volunteered to be the doctor.

"How many assistants do you need?" Hippocrates asked.

"One for the glue-pot, and one for holding the wrist. Two."

"And a third one," Hippocrates answered. "Never forget to save as much suffering for the patient as possible. And the more time you save, the less will be his suffering. Take one assistant for handing you the stone or whatever you use as weight. Everything that can be prepared in advance, must be prepared in advance."

Hippocrates sat down and watched the pupils who played patient and doctor as excitedly as they did their sports.

"Stupid, what if I cut your arm now, so that I can adjust your bones?" one of the boys said teasingly to the boy over the cross-bar.

The "patient" blushed. "Why do you always laugh at me?" he said.

"You are so funny, Teucer!" answered the boys. "Hippocrates is only patient with you because you are so small. He has pity on you, only pity."

Hippocrates saw tears in the boy's eyes, but did not

say anything. He rose and left the hall. As he passed, he took the young Teucer by the hand.

"Teucer, if your father saw you now, he would be disappointed. He loves beauty and you look ugly with your eyes red from weeping and your face swollen."

The boy was silent.

"Teucer, you are my most gifted pupil," Hippocrates continued, "but I am afraid for you. You think too much of the opinion of others. A true doctor has faith in himself."

Teucer stared at his teacher with amazement.

"Gifted, most gifted pupil?" he asked in astonishment. "I who always give you the wrong answers? I who am to go back to my father's perfumery in Athens and help him in his work because I am no good for anything else?" He jumped up and would have run away had not Hippocrates held him back by force.

"Sit down, Teucer, you are an impulsive child," the doctor said smilingly. "And if I smile now, I smile not at you but at your father in you. He was impulsive too. Had you asked your father about me, he would have told you that I was put up to ridicule in my youth just as you, Teucer. And not only by pupils but by my teachers too. 'Why-why-Hippocrates' they used to call me. One thing you will have to learn, Teucer, and that is to trust yourself and your inner voice and not to care about the reaction of the others. Be faithful to yourself, that is the main thing. The people ridicule what they do not understand. They just learn the recognised truths by heart as they learn to count—without understanding the truths they proclaim. You don't do that, you stumble and search, and therefore, I said, you are my most gifted pupil."

And Hippocrates told Teucer's son of his youth, of the ridicule he suffered at the temple of Aesculapius.

Teucer listened excitedly to his story. For the first time he saw Hippocrates not as the revered teacher, high above all, but as a human being and a friend of all living things.

"So I need not return to Athens!" he exclaimed. "You think I will succeed? Father wanted me to carry on with

his perfumery, but I couldn't after I had seen the girl. I will tell you," he spoke low as taking a friend into his confidence. "I saw a girl in Athens. Father and I were walking along the streets in the noon when we saw a girl resting against a pillar. She stood there more beautiful than any of the statues of the Parthenon. Father murmured something about giving her a flask of perfume; you know that he always goes round with a flask and if he meets someone very beautiful, he gives it to him as a present. Just then the girl turned and on the back of her neck was a huge ulcer. It made me sick and I could have wept. Father nodded his head sadly and told me 'Hippocrates could have cured her'. And upon my questioning him, he told me about you. That was when I decided not to go to father's perfumery but to study under you."

"To cure the girl?" Hippocrates asked.

"At first, yes, only to cure the girl. But now this is not the reason for it any more. She is not the only one I want to heal. Hippocrates, illness is so ugly. I want to stamp it out. I want to make men happy, not only here, not only in Athens, no, everywhere where man lives. Hippocrates, help me, I want to learn so much, so much." Teucer sank on his knees and took the hands of Hippocrates imploringly. "Don't lose patience with me, Hippocrates, I will study every minute of my life."

"Even if people laugh at you, Teucer?"

"Yes, even then."

"Even if they fight against you and are your enemies?"

"Why should they be, Hippocrates? I only want to help mankind: surely they won't hate me for that?"

"If you want to help mankind, you must do it in spite of them, Teucer. You must be willing to be lonely and to find people turn against you. Search for truth, and you will make enemies." Hippocrates turned gently towards Teucer. "Have you ever heard the name of Socrates, my son?"

"Why, yes," Teucer answered. "Father often speaks of him. He said Socrates was the only man he had ever met who really appreciated perfumes, who knew their poetry."

Hippocrates smiled. "Perhaps he was that too. But he was also the wisest man who has ever lived, and the greatest seeker after truth. And that is why he ended with a cup of hemlock in his hand, sentenced to death by the very men who ought to have worshipped him."

The two sat in silence for a long while. Hippocrates crushed some cypress leaves between his fingers.

"I am not as great as he. That is why Fate was gentler to me." He paused. "Ah, where is the soul of Athens now?"

Hippocrates turned towards Teucer. "I will tell you what the oracle of Apollo said to me at Cos. It is long ago, but I have not forgotten. I am growing old waiting for my fate:

"'Who seeks for what you seek, must die not one death but a thousand. Give goodness and you will harvest evil. Give evil and you will harvest good. Misery will be your fate as everybody's after you for millenniums to come. But mankind will worship your bones after they have torn the flesh from it.'

"That is what the pythoness said, Teucer. And I am still waiting. Perhaps I did not seek fervently enough.

"But Teucer, if your heart is full of love for man, as you say, if you really want to help, to search for truth, swear by the oracle of Apollo that you will not waver from your path whatever happens, swear that the laughter of the multitude will fall on deaf ears!"

Teucer bent before Hippocrates and slowly repeated the oath:

"I swear by the oracle of Apollo that I will not waver from the path of truth."

From that day forward the young Teucer became the devoted assistant of his master Hippocrates. Unlike other teachers, Hippocrates had no secrets from the pupils in whose skill and integrity he believed.

"I have written books," he would say to Teucer, "but parchment, this skin pergamot and papyri are as mortal as we are. They shall fade. The best book is the mind of men."

In this Hippocrates was right. Very little remains of his original writings, but his precepts—not omitting the "Doctor's Creed"—remained as a beneficent influence of his "writing on the consciousness of mankind."

"Pain," he would say, "is a curse. Do not believe those Greeks who say that it is 'the baying watchdog of health'. It is not. I have followed its symptoms, and know that it is no infallible guide to the seat of disease."

This truth has been demonstrated in modern diagnosis. But more remarkable still is it that his precepts were either forgotten or lost for many centuries. He and his disciples experimented long with the problems of overcoming pain. They, too, found that opium was not a satisfactory "anaesthetic".

"The hemlock which the great Socrates took that sent him on his journey to God," he would say, "that hemlock holds the secret of our search. Notice, Teucer, that it induces sleep, and a paralysis of the nether limbs. I remember that when this poison had nearly completed its work, Socrates, in order to test how far death stood from him, put his hand to his mouth and bit it. I watched his face closely and could recognise no pain. Now, you may think it wrong that I should notice such details at the death-bed of the great, but Socrates, who loved his fellow men, would have wished it so. If we could so distil hemlock that we could rid it of its death-giving propensities, we may find the answer to the riddle we seek."

The experiments of Hippocrates, however, took him beyond this study of hemlock, but his recognition that poisons could in proper doses be used, influenced medicine considerably. There exists no complete document, however, which can lead us to suppose that he ever solved the riddle completely. One other method which we know was used by him—namely that of numbing a limb with ice and snow before beginning operative work—is interesting because of its application in modern times.

Here, for example, is an extract from the London *Evening News* of June 15th, 1943:

"Refrigeration is being used in a new 'shockless, drugless, almost bloodless surgery,' writes Lieutenant Carclay Newman, of the U.S. Naval Reserve, in the American Medical Association's magazine, *Hygeia*.

"'Ice numbs the nerves that carry the reaction of a wound to the brain and helps to prevent shock, which is one of the chief dangers of an operation,' he explains. 'As bacteria are living creatures, cold inhibits their growth and spread through an infected wound.'"

It is thus that the world's clock turns to the experiments of Hippocrates. It is thus to prove "that there is nothing new under the sun", not even the ignorance of the centuries which turned away from Hippocrates' teachings and discoveries and which, up to comparatively recent times, taught that pain was an essential condition of life, sent by God Himself, and those that tampered with His handiwork were doomed. They forgot that even during the cruel Roman execution by crucifixion it was the custom to give the condemned a drink of vinegar mixed with gall. They forgot that the Son of God Himself was prepared to put His lips to the hyssop bough to seek in His mortality some succour for His dreadful pain.

CHAPTER III

BEFORE AND AFTER THE FISTULA

We do not know how successful Hippocrates was in what he called the "death of pain". Opium treatment failed very largely because of its action on the patient's heart. Alcoholic stimulants were less successful because of the bad operative condition of the body.

Yet experiments went on happily, often with lethal results. Roman surgeons many centuries after the death of Hippocrates, for example, in cases of dire emergency, recommended that the great carotid arteries in the neck which carry the blood to the brain, should be pressed against the bone of the spinal column. By this means they managed to diminish the blood passing to the brain, with the result that unconsciousness ensued. It happened more often, however, that as a result of this attempted "manipulative anaesthesia" the brain of the patient ceased functioning altogether or perhaps a worse form of death, namely that of perpetual paralysis, set in.

Some improvement, however, was noted by one Roman surgeon. He suggested that by opening one of the arteries in the wrist, the patient could be reduced to unconsciousness by bleeding. Provided this was carefully controlled and watched, it was a commendable form of anaesthesia. Nevertheless, even this method of course was by no means fool-proof and in unskilled hands was positively dangerous. The drug, the flower of sleep, born of the gentle poppy, Indian hemp, mandragora and mandrake, each came to fashion and received a veneration which the gods themselves may have envied.

Pliny, that elaborate old liar, announced in his famous treatise that a mandrake actually possessed sex. A male mandrake took the colour of white and the unhappy female

was a deep soot black. To take out this minor pain-allayer was a risky business.

"Draw three circles round a mandrake root," says Pliny, "with a fine point of a sword and see to it that the wind is in the west."

But the medieval mandrake hunters threatened even more dire consequences for those who pulled out this half-live vegetable. They claimed that in detaching the root from the ground, it would scream enough to frighten the prince of devils, enough certainly to drive a mere mortal mad.

Their advice to capture the mandrake was even more elaborate than Pliny's:

"Stuff the ears with good bees' wax," they advised. "Sift the earth around the mandrake and then attach a long piece of string to a dog's tail. See that this dog is either ailing or at the most very small and worthless. Then tie the other end of the string to the mandrake, give a sharp kick in the wretched cur's loins. As the creature jumps forward, the root will give its dreadful cry and the dog instead of a man will go mad or drop dead."

Wine mixed with mandragora was known to the ancients. Serapian advised its use before amputation. Dioscorides, surgeon attached to one of Nero's legions, also recommended the drink.

Naturally these opiates were not very successful and with the barbarian invasions of Greece, the very art of "chemeia" seemed to pass away. (Plutarch calls Egypt "chemeia" on account of the black colour of its soil. It is probable that the early chemistry was known as Egyptian art.) The Arabs and Persians became its inheritors. Nor did the burning of the library at Alexandria by the order of the Emperor Diocletian in 296 A.D. help to keep the Greek wisdom in the western world. With the coming of the Dark Ages, the art of surgery and medicine was transplanted to the court of the great kings of Persia and the Arabian cities along the North African littoral.

There was the famous Rhazes, a man reputed to have been a great musician, and who, because of his acquaintance with harp strings, was the first to use sutures of animal

gut for the repair of abdominal wounds. To him we owe the discovery of sulphuric acid and the distillation of alcohol from starch. There was Avicenna too, surnamed the Prince of Physicians, another Persian, who in his famous canon propounded the theory of cauterising amputations. He treated wounds with dressings of wine and knowingly or unknowingly made them antiseptic. The good Crusaders who went out to fight the infidels learned medicine from their Saracen enemies.

Usama, a Saracen surgeon who had served against the Crusaders, was amused at their barbarian methods. He had discovered the use of poultices to reduce an abscess on a man's leg and he was applying his method to his wounded enemy when a Frankish surgeon denounced the practice and asked the man: "Which would you do, my brother, die with two legs or live with one?"

"Let me live," said the patient.

"I compliment you on your choice," the Frankish surgeon said and called for a man-at-arms to bring an enormous battle-axe. Without turning a hair, he told the soldier to cut off the injured leg.

The man was a bad hacker and the leg was not completely severed, so the surgeon told him to try again a little higher up.

"I was not surprised," said the wise Usama, "that the man did go to the Unbelievers' hell at the second blow."

He also noted another equally quaint cure which this Frankish surgeon undertook:

"A consumptive woman was brought unto me," he says, "I suggested sedative drugs and a special diet. But since the woman is a Frank, the surgeon of her country pronounced her possessed of a devil in her head. He thereupon commanded that her head should be shaved and that she should be fed on an exclusive diet of garlic and oil. The woman declined. Thereupon he made a cross stretching from her skull to the very bone and proceeded to rub salt into the wound. The woman perished. I then asked whether my services would be needed but they sent me away and preferred their own surgery to mine. I returned

home having learned of their medical practice what had hitherto been unknown to me."

Little wonder is it that the good Usama marvelled at the treatment of the Dark Ages. Here, for example, is another remedy suggested:

"In case that a man may not retain his urine, burn to ashes the bladder of an unprolific, that is to say, a castrated swine, put it into wine, administer it to drink. For the same, fry goat's bladder, give it to the man to eat. Or let him eat a ram's bladder sodden."

In the same way as religion helped to frustrate the art of anatomy in India, so, too, in 1215, the famous Papal Edict of Pope Innocent III, *Ecclesia abhorret a sanguine*, stipulated that to shed blood was "incompatible with the divine mission". So it fell to barbers, executioners and pig castraters to continue this learning.

The knowledge of anaesthesia declined with the general ignorance. But it is reported that in A.D. 529 St. Benedict of Nusia raised a monastery on the site of an old temple of Apollo and here, it is said, that he cured the Emperor Henry II of the stone which he held in his royal bladder. So miraculous was this operation that the emperor went to sleep and on awakening found the stone in his hand. We have no means of knowing, however, of how St. Benedict's anaesthesia was performed.

It may be said in fact that the expert bedside manner developed far more quickly than the art of surgery. Here, for example, is the neatest piece of hypocritical advice ever penned by a medical man:

"When you are called to a patient, may the name of God be your help, and may the angel who walked with Tobias be the companion of your mind and body. At your entrance inquire of him who greets you from what disease the sick man suffers and how his illness progresses; this is advisable in order that when you come to him you may not seem entirely uninformed as to the illness. . . . Again when you reach the house and before you see him, ask if he has seen his confessor, and if he has not done this, arrange for him to do so, or have him promise to do so,

for if the sick man hears talk on this subject after he has been examined and the signs of his illness studied, he will begin to despair of his safety, because he will think that you despair of it. Entering the sick-room, you should have neither proud nor greedy countenance; you should repeat the greeting to those who rise as you enter, and with a gesture seat yourself when they sit down. Next you may resume the conversation with a few remarks in which you praise the neighbourhood, commend the arrangements of the house, if it seems appropriate, or compliment the liberality of the family.

"Then turning to the patient you may ask how it goes with him, and have him put out his arm. At first there may be differences between your own state and that of the patient, either because he is excited at your arrival, or because he is worried about the size of your fee, so that you find the pulse rather confusing; therefore you should consider the pulse only after the patient has become steadier. Take care that he does not lie upon his side nor has his finger over-extended or flexed against his palm. Support his arm with your left hand and observe the pulse for at least 100 beats in order to feel all its variations, and thus you will be able to satisfy the expectant bystanders with words which they are glad to hear.

"Next have the urine brought to you, that the sick man may see you study his illness not only from the pulse but from the urine. When examining the urine you should observe its colour, substance, quantity and content; after which you may promise the patient that with the help of God you will cure him. As you go away, however, you should say to his servants that he is in a very bad way, because if he recovers you will receive great credit and praise, and if he dies, they will remember that you despaired of his health at the beginning. Meanwhile, I urge you not to turn a lingering eye upon his wife, his daughter, or his maid-servant, for this sort of thing blinds the eye of the doctor, averts the favour of God, and makes the doctor abhorrent to the patient and less confident in himself. Be therefore careful in speech, respectable in conduct, atten-

tively seeking Divine aid. If the people of the house invite you to a meal, as often happens, do not seem too much gratified, and do not seek the first place at the table although it is the custom to give this to the priest or the doctor. Do not criticise the food or drink, and when in the country do not show distaste for country food, for example millet bread, even though you can scarcely control your stomach.

"While you eat you may inquire as to the condition of the patient from any one who is present, for in this way the sick man will confide in you all the more, since he sees that you do not forget him while seeking your own comfort. When you rise from the table you may mention that you have been well looked after; this too will give pleasure to the patient."

Even more astute, perhaps, than the above were the remarks made by the eminent French surgeon Henri de Mondeville (born 1260) who developed the doctor's psychological acumen to the extent of forging letters announcing the death of a patient's enemy or the elevation of a sick priest to a bishopric, if he thought it would do his patients good.

"A surgeon," he said, "has to be bold, his hands well-shaped. Always promise a cure to the patient and tell the parents or his friends if there is any real danger. Refuse, however, as far as possible all difficult cases and never interfere with desperate ones. Give advice to the poor for the love of God only but make the rich pay well."

On the question of fees, he advised:

"Never dine with a patient who is in your debt, but get your dinner at an inn. Otherwise he will deduct his hospitality from your fee."

The question of fees apparently has troubled doctors for a considerable time. One Englishman, John of Gaddesden, wrote a chapter in his book entitled "Disagreeable Diseases which the doctor can seldom make money by."

Yet another British physician had a small opinion of his confrères. The requisites for the modern doctor, he said, were an ability to lie in a subtle manner, to show an outward honesty and to kill with audacity.

Despite the slow re-discovery of the art of surgery, prayer was still regarded by both patient and surgeon as the most hopeful promise of a cure. The torments of the operating-table, or rather bench as it was then, must have seared the memory of many thousands, especially those who were mangled by sword and mace and arrow. Imagine, for example, that the battered stump of a leg was always thrust into boiling oil or roasted with red hot irons before being bandaged. Worse still, rabbits' fur mixed with aloes was used to stop the bleeding, inducing in its turn dreadful gangrene and fevers. But even at a later date, in the early eighteenth century, the surgeon recognised the terror and uncertainty of his work. One, for example, wrote this:

"If you be constrained to use your saw, let first your patient be well informed of the imminent danger of death by the use thereof, prescribe him no certain tie of life, and let the works be done with his owne free will and request, and not otherwise. Let him prepare his soule as a ready sacrifice to the Lord by earnest prayers; craving mercie and helpe unfainedlie; and forget thou not also thy dutie in that kinde, to crave mercie and helpe from the Almightie, and that heartily. For it is no small presumption to dismember the image of God."

The good man who wrote this was Woodall, a surgeon of St. Bartholomew's Hospital, London. In his twenty-four years of service he wrote that he had never attended more than five amputations a year. With a terrible honesty he writes that "not above foure of each twenty dismembered had lived to have been healed."

But perhaps far better than the descriptive pen of any writer is this terrible letter written by a patient describing an operation done on his own body:

"I at once agreed to submit to the operation, but asked a week to prepare for it, simply because I wished to prepare for death and what lies beyond it whilst my faculties were clear and my emotions comparatively undisturbed. The morning of the operation arrived. The operation was a more tedious one than some which involve much greater mutilation. It involved cruel cutting through inflamed and

morbidly sensitive parts, and could not be despatched by a few strokes of the knife. Of the agony it occasioned I will say nothing. Suffering as great as I underwent cannot be expressed in words, and thus, fortunately cannot be recalled. The particular pangs are now forgotten; but the black whirlwind of emotion, the horror of great darkness, and the sense of desertion by God and man, bordering close upon despair, which swept through my mind and overwhelmed my heart, I can never forget, however gladly I would do so. Only the wish to save others some of my sufferings makes me deliberately recall and confess the anguish and humiliation of such a personal experience. During the operation, in spite of the pain, my senses were prenaturally acute. I watched all that the surgeon did with a fascinating intensity. I still recall with unwelcome vividness the spreading out of the instruments, the twisting of the tourniquet, the first incision, the fingering of the sawed bone, the sponge pressed on the flap, the tying of the blood-vessels, the stitching of the skin, and the bloody dismembered limb lying on the floor. These are not pleasant remembrances. For a long time they haunted me and, though they cannot bring back the suffering, they can occasion a suffering of their own, and be the cause of a disquiet which favours neither mental nor bodily health."

Of little consolation to the great community of mankind, who suffered in the vast empires of pain, was the method of anaesthesia that the famous author of *The Anatomy of Melancholy*, Robert Burton, suggested, which, he claimed, was used already by the Greek philosopher, Epicurus:

"When a sad and sicke patient was brought to him (Epicurus) to be cured, Hee laid him on a downe bed, crowned him with a garland of sweet-smelling flowres, in a faire perfumed closet delicately set out, and, after a potion or two of good drink, which he administered, he brought in a beautifull young wench that could play upon a Lute, sing and dance."

He adds tartly however:

"Most of our looser Physitians in some cases . . . allow

of this, and all of them will have a melancholy, sad, and discontented Person, make frequent use of honest sportes, companies, and recreations."

Four hundred years before Burton, however, a certain Raymond Lully, when studying the work of one Albertus Magnus on the art of alchemy, discovered that alchemy after all was a pretentious science. He had found that by dipping a knife blade into a solution of blue vitriol, copper sulphate, he had apparently converted it into copper. Experimenting further, he produced a white fluid which, daring experimenter that he was, he must have put to his mouth. Otherwise how else could he have called it "sweet vitriol"? Who knows but if by some chance his elbow had knocked over the flask of sweet vitriol, he would not have found its pain-allaying properties?

Another two centuries passed before the qualities of this chemical were re-discovered by the great Theophrastus Bombastus Paracelsus von Hohenheim (1493–1541). He was the founder of a school of iatro-chemists—the medical chemists who attempted to prepare the elixir of life which promised to cure all diseases and give to mankind the gift of perpetual youth. Despite such ambitions, this Paracelsus was a truly remarkable figure. Like Hippocrates, his heart was torn by the great natural pity of a doctor, and although he professed to seek the elixir of life, it was perhaps his search for the cure of pain which he disguised under this bombastic term. A wandering doctor, he taught that experience was the greatest teacher of the healing art. He watched men and women in all their conditions, studied means by which they tried to attain peace of body and mind.

On one occasion, experimenting with a mixture of sulphuric acid and alcohol, he arrived at the experiment that Raymond Lully had achieved, two hundred years previously. The "sweet vitriol" was nothing more or less than sulphuric ether. More inquisitive than Lully, however, he fed the liquid to some chickens. In writing up his experiment, he said:

"Of all the extracts of vitriol, this particular one is the most important, being stable. Furthermore, it has an

agreeable taste so that even chickens take it gladly, and thereafter fall asleep for a long time, awakening undamaged. In view of the effect of this vitriol, I think it especially noteworthy and its use may be recommended for painful illnesses and that it will mitigate the disagreeable complications of these."

The extraordinary thing, however, is that this remarkable discovery was written down by his faithful friend and disciple, Valerius Cordus. After the death of Paracelsus, Cordus returned to his native town of Nurenberg, and there parted with the priceless notes that he had made of his master's experiments. Poor and anxious to continue his own experiments, he sold the lot for some one hundred gold dukats. The learned medicos of Nurenberg studied the papers and were impressed, and promptly forgot them.

It took another two hundred and fifty years before a German chemist, Frobenius by name, found the priceless manuscripts and gave the preposterous name of ether to this "sweet vitriol". No one thought of giving it to chickens, however, let alone men to allay their pain.

The range of medieval and Elizabethan surgery advanced to a remarkable extent. Complicated operations such as Caesarians, the removal of stones from the bladder, let alone the usual amputations following the battles of the great sea captains, all these were known and practised with good or bad results, depending on the skill of the surgeon.

This was a time of great empire-building. But there was one empire that none could conquer—the dreadful empire of pain. It struck the distinguished and the commoner with a terrible impartiality. Columbus, on his third voyage to the Indies, lay tormented in his hammock by gout. Magellan, discoverer of the unchartered waters of the Southern Atlantic, hobbled a cripple after the Maroccan campaign of 1513. The great humanist, Erasmus, described his pain with unphilosophic detail to his friend Paracelsus. And there was Luther, suffering from renal colic, which gave him pain worse than the torments promised by the Pope in Rome.

The celebrated Elizabethan surgeon, William Clowes, wrote in his *Proobed Practice for all Young Chirurgians*:

"The Yron (iron) is most excellent, but it is offensive to the eye and bringeth the patient to great sorrowe and dread of the burning and smart."

It was he who attended to the wounded and dying during the Battle of the Great Armada. In this passage he does not underestimate the agony caused by the cauterizing with hot irons of amputated limbs of soldiers and sailors who won the Battle of Britain of another day.

This Clowes was a remarkable man. By constant practice he was able to cut pain to the minimum, simply by the speed of his operations. The general state of surgery, however, and especially its practice by all manner of incompetence, was admirably illustrated in one of William Clowes' diatribes:

"And some of them be Painters, some Glaziers, some Tailors, some Weavers, some Joiners, some Cutlers, some Cooks, some Bakers and some Chandlers. Yea now-a-days it is apparent to see how Tinkers, Tooth-drawers, Pedlars, Ostlers, Carters, Porters, Horse-gelders and Horse-leeches, Idiots, Apple-squires, Broom-men, Bawds, Witches, Conjurors, Soothsayers, and Sow-gelders, Rogues, Rat-catchers, Runagates, and Proctors of Spittle houses with such other like rotten and stinking weeds which do in Town and country, without order, honesty or skill, daily abuse both physic and surgery, having no more perseverance, reason or knowledge in this art than hath a goose, and most commonly useth one remedy for all diseases and one way of curing to all persons, both old and young, men, women and children, which it is possible to be performed, or to be true as for a shoe-maker with one last to make a shoe to fit for every man's foot and this is one principal cause that so many perish."

It took many years before finally, in 1745, there emerged the newly-created body of the "masters, governors and commonalty of the art and science of surgery" which displaced the all-united company of barbers and surgeons. Barber-surgeons had in 1462, received a charter of

incorporation. It was only later, in 1552, that new ordnances were drawn up which forbade the company of barber-surgeons to "shave, wasshe a Beard, or tryme any man with any Instrument, or to make cleane teeth, upon the Sondays."

Curiously enough, in order to heighten the respectability and badges of honour of these gentlemen, elaborate rules were laid down which forbade an apprentice from growing a beard longer than one of "fifteen days' growth".

Pain in the meantime, struck down the rich and the poor, the famous and the infamous. Calvin, the great Protestant teacher, suffered violent headaches, so that at times he was completely unable to preach. Duerer, the greatest engraver the world has probably ever seen, drew a sketch for his doctor, showing just where his enlarged spleen drove him to frantic agony. Titian died painfully from the plague in Venice. Ruben's hands were so cramped by gout that he had to abandon his paintings.

The list could lengthen almost indefinitely. Heine, the purest and finest lyric-writer in the German language, complained of spending more than six hundred francs on narcotics. "The cramps afflict me," he said, "night and day, and I can only ease by dulling my senses with morphine."

But no man has so aptly epigramised the reign of a royal victim as Michelet, the famous French historian who, in describing the reign of the magnificent Louis XVI, divided it into two periods: "Before and after the fistula."

Was it a wonder, therefore, if man, finding but temporary relief in drugs and unable to find a satisfactory anaesthesia to meet the surgeon's knife, began to turn more and more to the realms of the mind, since it was here, they said, that pain was finally transmitted? Would it not be possible by dulling the mind, to secure relief from agony? They pointed to the martyrs, to the saints who were stoned, garrotted, boiled, roasted, had their entrails torn out, men who had gazed at the skies in their fervour and could bear the most dreadful torments because of their faith.

CHAPTER IV

SAINT OR CHARLATAN

A PODGY little man, dressed in sober black, with fine ruffles at his neck and wrists, turned into the Rue Montmartre. He had left his carriage in a side turning, where he was making his way indoors through the back entrance.

Only yesterday, he said to himself, they nearly choked me. Popularity is one thing, but why should I be crushed to death?

He had barely stepped gingerly off the pavement into the gutter, prior to making a run for the back door of his house, when a great cry rose up. The crowd which was surging round the house, converged upon the little man with wild cries:

"Monsieur Mesmer, Christ, cher docteur, he has come, he has come!" The host bore down on Mesmer like a black sea. Very soon he was swept off his feet, lying, in fact, in the very gutter over which he had so carefully stepped. His peruke had fallen off, revealing a minute bald patch.

"Please, please," Mesmer shouted, struggling and kicking out with his feet. "*Un moment.* I will attend to you all, my friends. But do not kill me, let me breathe, let me live!"

Barely had he uttered this prayer when a young woman, screaming hysterically, and tearing off the fine chiffon handkerchief from her breast, flopped down upon him, "Touch me, Monsieur, touch me!" she screamed.

"Yes, yes, Mademoiselle, yes," Mesmer exclaimed, pushing her away, "I will touch you all. I will heal you all. But let me get into my house."

"Yes, let Monsieur Mesmer get into his house," someone in the crowd said, and very soon it was echoed down the street. Suddenly the sea parted and Mesmer, very much

worse for his experience, got up, straightened his peruke, and with an agitated flutter of his hands, walked through the crowd into his house.

One man who was standing aside, a venerable enough fellow, slightly bent, with the habit of a lawyer so it seemed, smiled ironically. "This is popularity," he said aloud. "This is Monsieur Mesmer."

Nimbly he followed the Viennese-born miracle-maker into the house, whilst the crowd gasped with astonishment at his audacity.

Mesmer, feeling himself followed, turned round and with an impatient wave said: "Just one moment, please. I must dress. I must regain my breath."

"Certainly, Monsieur," said the old gentleman. "I have a whole eternity to wait. I am Jean Jacques Rousseau."

Mesmer stopped in his tracks. "What, Rousseau, the agnostic? Rousseau of the Contract Social?"

Rousseau bowed slightly. "I have come to the temple of divinity," he said, "I am curious to know of your powers."

Mesmer grinned slyly. "Certainly, Monsieur," he waved Rousseau in. "Perhaps you will talk to me while I dress. I am a very busy man."

Rousseau ignored the mild insult. "You must convince me," he said, "before I fasten the latchet of your shoes."

Monsieur Mesmer's robing-room, for such it was, stood on the ground floor. His valet, a thin cadaverous-looking Frenchman, smelling of pomade, was standing before the door. When he heard Rousseau's name mentioned, his thin watery grey eyes dilated. With a swift motion, he crossed himself piously, as if exorcizing the very devil.

Rousseau noted the man's agitation.

"Tell your valet, Monsieur Mesmer," he said, "that my teeth are too old to bite. I use my pen. And I will pull no quills out of this goose."

The valet, trembling with fear, fled into the robing-room and hid behind a screen.

"Come, Jacques," Mesmer coaxed, "bring me my robe. Monsieur Rousseau is here purely on an inquisitional

Hickman experimenting with animals in an attempt to alleviate agony of the operating table.

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Dr. William T. G. Morton, the "Benefactor of Mankind."

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matter. He has come to laugh at us. Perhaps he will go away convinced."

"It is not my original phrase," said Rousseau, "that France is governed by epigrams, but I trust to see the sick healed by Mesmerism." Rousseau winced slightly and involuntarily put his hands to his stomach.

Mesmer noticed the gesture. "You have pain there, Monsieur Rousseau?"

"I have many pains, my friend," said Rousseau. "Like France, I doubt whether they can be purged, except by blood," he pointed to his wrist. "A leech has taken a pint of me this morning."

"I have only to touch you," said Mesmer, "and the pain will go."

"Monsieur," said Rousseau proudly. "I know my history. Was it not Vespasian, the Roman Emperor, who claimed he could do as much. Do not all the kings of the earth, Philip I of France, even the not so late lamented Queen Anne of England, claim that they can cure the scrofula by one touch of their hand? Did not even that Protestant rascal, Henry of Navarre, who said that Paris was well worth a mass, play at the same game—the king touches thee—God heals thee? What is Paris worth to you, Monsieur?"

Mesmer smiled but did not answer. He solemnly took off his jacket and took the robe which his trembling valet handed him from behind the screen. It was a fantastic affair of livid purple silk, decorated with small stars and other cabalistic signs, denoting the astrologer.

"You may smile at my mummery," he said at last, "but did not the stoics, your ancestors I think, Monsieur Rousseau, believe in the rational repudiation of pain?"

"Oh yes, Monsieur," said Rousseau urbanely, "even in modern times I am told that Descartes and Spinoza thought that pain could be overcome through its permeation by reason. Why, I have even heard that the philosopher, Kant, mutters the name of Cicero in order to divert his attention from the spasms with which he is afflicted."

"Thousands murmur the name of Mesmer," said the

healer, half jokingly, and half in pride. "There are now three hundred people sitting in my cellar downstairs, waiting for me to heal them."

"Were you not a student of divinity?" asked Rousseau.

"Certainly," Mesmer nodded. "Certainly. I studied law as well. But it was Vienna which gave me my doctor's degree. And my playing on the harmonica," he uttered mischievously, "has aroused the compliments of both Mozart and Haydn."

"Music," said Rousseau not to be outdone, "is an ancient inducer of sleep. I do not know your orphic talents, Dr. Mesmer, but I am sure you do not rely on your harmonica to cure your patients."

"Magnetism is the word, Monsieur," Mesmer replied acidly. "In man there is a magnetic fluid, the same which keeps the universe moving. I possess a remarkable store of this magnetic fluid. All I have to do is to pass it on to my patients."

"Ah, yes," said Rousseau, "I have read the same in Paracelsus. And did not Hell, the Jesuit Father, advise the magnet as a remedy?"

"I do not claim," said Mesmer testily, "that I am the discoverer of the magnetic theory. I am only its most constant applier. As soon as I apply my magnets, the healing current flows into the patient's body. Pain disappears."

The valet, emboldened by the tone of his master, appeared from behind the screen. In his hand he held a long black box. At a sign from his master, he opened it reverently. Rousseau lifted one cynical eyebrow.

"The magician has his wand," he said as Mesmer picked up the wooden rod.

Mesmer ignored him. Pulling up the long sleeves of his gown, he made a number of passes over the rod.

"It is now vitalised," he said. "Formerly I used magnets," he explained patiently to Rousseau. "But that was a tedious process. It meant I could cure but a few patients each day. With this rod I can heal a roomful with the greatest ease."

"A time-saver and a calculated money-maker, Monsieur."

"You are at liberty to scoff, Monsieur," Mesmer replied, "but I must go to my patients. They are waiting. Yet I will tell you one thing, Jean Jacques Rousseau, little do you know that I could at this very moment pass on my talent to you."

Rousseau, unable to hold himself any longer, burst out into loud laughter. Sacrilege covered the face of the astonished valet. But Mesmer flushed and, red with anger, walked out of the room and slammed the door. Pulling his robe round him and fluffing out his sleeves as he went, Mesmer regained his composure before he reached the cellar where the large company of patients were waiting for him.

It was noon. The midday séance was the most fashionable at Dr. Mesmer's house in the Rue Montmartre. Ladies in enormous crinolines with hair bunched up to the height of a metre and fops in flowered waistcoats, went into his comfortably furnished cellar to be healed of the excesses brought about by good food, heavy drinking and other unmentionable ills.

Mesmer's entry caused an immediate flutter. The ladies and gentlemen, good courtiers that they were, were anxious to pay their tribute to the friend of the king and queen of France. They rose from their seats and clapped politely. Carlyle has described this scene admirably:

"Or observe Herr Doctor Mesmer, in his spacious Magnetic Halls. Long-stoled he walks; reverend, glancing upwards, as in rapt commerce; an Antique Egyptian Hierophant in this new age. Soft music flits; breaking fitfully the sacred stillness. Round their Magnetic Mystery, which to the eye is mere tubs with water—sit breathless, rod in hand, the circles of Beauty and Fashion, each circle a living circular Passion-Flower: expecting the magnetic afflatus, and new-manufactured Heaven-on-Earth. O women, O men, great is your infidel-faith!"

"You will take your places around the bacquet," said Mesmer after he had bowed politely to the assembly.

The bacquet was an enormous wooden tub which stood

in the centre of the room. In it were a double series of bottles, all charged with animal magnetism. From the bottles stretched wire conductors. The courtiers, long familiar with the scene, picked up these conductors and placed them on different parts of their anatomy. Some put them to their heads, others to their livers, others to their gouty feet. One or two ladies, far advanced in pregnancy, placed them on their laps.

Mesmer waved his wand, ostentatiously over the bacquet. A silence invaded the room. Magic, religion, faith, invaded the atmosphere. Mesmer stood as one transfixed, then turning on his heel, he tiptoed out of the room. The glassy-eyed, stupid faces of the courtiers did not follow him out. They sat in tense silence for nearly an hour, drinking in this vital magnetism. Stories were later told of what they did with this vital energy they had accrued. But these stories might well have been spread by the enemies of Monsieur Mesmer.

A liveried messenger greeted Mesmer when he reached his study. "Monsieur," said the messenger, "the queen summons you to her presence this evening. She would like the magnetised harp you promised her."

Mesmer nodded his head. "Ah, yes," he said, "I must not forget."

"Her Majesty also hopes that to-morrow you will be good enough to magnetise the gardens of Versailles."

The popularity of Mesmer's magnetised harp was such that enterprising harp-makers were paying Monsieur Mesmer huge sums of money to wave his hands over their instruments before they were sold to their patrons. It was not essential to be able to play the instrument to be cured. It was enough to hear it being played.

Mesmer went further, however. He magnetised baths which were guaranteed to heal the sick. Young girls insisted that their fathers should buy them, for their birthdays, a mirror magnetised by Mesmer. They would only have to look at themselves and feel well, no matter how ugly they were. "Mirror, mirror on the wall, who is the healthiest of all?"

Far and wide over the country Mesmer went, magnetising whole parks, statues, trees, in fact copses and woods. The sick would lash themselves to the trees and after an hour depart claiming to be completely healed.

Mesmer, good business man that he was, however, was careful to insist that a tree or a harp or a mirror was liable to become devitalised after many cures. Therefore, it was necessary to keep them vitalised by frequent visits from Mesmer, or at best by the waving of charged wooden wands over the subjects.

It was this problem which particularly troubled the queen, Marie Antoinette. Carlyle wrote of her:

"The soft young heart adopts orphans, portions meritorious maids, delights to succour the poor—such poor as come picturesquely in her way; and sets the fashion of doing it; for as was said, benevolence has now begun reigning."

She was speaking to Monsieur Mesmer over the table.

"Monsieur," she said gracefully, "it is a sad thing to think, but as all things are mortal, France will lose you one day and your precious gift will have gone for ever. The king and I feel that you should accept a pension of forty thousand livres from us and build an institute, if you are willing, to pass on your great powers to those which our Academy of Sciences should nominate."

"Madame, I am willing to accept your gracious offer," Mesmer replied. "There is, however, a humble condition which I must make."

"A condition?" said Marie Antoinette, puzzled by such daring.

"Let us hear it, my dear," advised the king benignly. Fat Louis was always anxious to compromise. "What is your condition, Monsieur Mesmer?" he asked.

"The condition, sire, is that I receive official recognition for my discovery."

The king pursed his lips. Up pipes Monsieur le Comte d'Artois, the king's brother. "That can easily be arranged," he says in his high tenor. "D'Eslon, my physician-in-ordinary and Constantin de Geblin, President of the Paris

Museum, have the greatest faith in your methods, Monsieur Mesmer."

"Do they believe in the scientific veracity of my discovery?" Mesmer pressed.

"Undoubtedly, undoubtedly," said d'Artois. "Why, I must tell you, I must tell you something. I have invented a new kind of breeches—a most fabulous kind. Four tall lackeys have to hold me up in the air so that I may fall into the garment without any vestige of a wrinkle. Think of that! And every night these same exercise more effort to get me out of my wrinkleless breeches. Now I have told my doctor that we could set the fashion for them, if, Monsieur, you would magnetise them for me."

Mesmer smiled sardonically to himself. "Monseigneur, I will gladly magnetise your wrinkleless breeches."

After the dinner d'Eslon, the physician-in-ordinary, was approached. But he was extremely non-committal as to the reception which had been given by the medical practitioners of the day to Mesmer's discovery.

"Monsieur, I believe in your discovery," said the courtier-doctor. "Does not the queen believe in it and Monsieur d'Artois? It is sufficient for me. But as for the others, I cannot say."

"It is up to you to convince them, my dear d'Eslon," interrupted his master. "Otherwise, how do you think I will get my wrinkleless breeches known? What do they want? My wife, the Princess de Lamballe and the Duchess de Polignac, have they not all found relief in Dr. Mesmer's house? Why, I am told that childbirth is becoming a pleasure after a visit to Dr. Mesmer. I am afraid I cannot try it myself." He roared with laughter at his own joke.

At this point, the king interrupted. "We must do something for Dr. Mesmer. I will order the Medical Society to hold an enquiry. I shall nominate the scientists myself. Dr. Guillotine, for example, he is a brilliant man."

"Oh, yes," said d'Artois, "has he not discovered the gentlest killer in history, the guillotine? He should do excellently."

"Then," the king said, ignoring the interruption, "Mr.

Benjamin Franklin, Ambassador of the States of America. And Jussieux, the botanist, and Lavoisier, the chemist."

Poor Lavoisier—one of the great founders of modern chemistry. His part in the Mesmer committee would soon be forgotten. A few years and Carlyle describes his end:

"Lavoisier, famed chemist, shall die and not live: chemist Lavoisier was farmer-general Lavoisier too, and now 'all the farmer-generals are arrested; all, and shall give an account of their monies and incomings'; and die for 'putting water in the tobacco' they sold. Lavoisier begged a fortnight more of life, to finish some experiments; but 'the Republic does not need such'; the axe must do its work."

Jean Sylvan Bailly, "historian of astronomy, ancient and modern", he too was appointed to the investigating committee. Later he was to be the mayor of Paris, and later still, in 1793, he was to be led through the streets and executed.

"There, Monsieur," said the queen, "everything is settled. France will have a Mesmer Institute. Your harps and magnetised mirrors; Monsieur, may be the greatest export articles France will ever know. You will bring honour and riches to France."

Mesmer bowed and retired.

Within a week the investigating committee was at work. Very early in the proceedings they had to face the dilemma that faces all honest men, and scientists especially. They did not wish to incur the wrath of the king and queen and yet at the same time they could not approve that which did not have a sound scientific explanation. A number of them asked to be magnetised. Mesmer complied. In one or two instances, Mesmerism worked. The commission decided on a compromise. In effect they agreed that there was something in Mesmer's art, but they refused to give him his desire—the scientific recognition his heart craved for.

The queen was furious.

"It is impossible," she said. "I will not have it. Monsieur Maurepas, I have heard that the doctor has determined to leave Paris; you must go and see him. You will offer

him whatever he asks for. A peerage of France. Something must be done to correct the 'incredibly foolish verdict'."

Maurepas dutifully repaired to Mesmer's house. Mesmer received him politely.

"I am touched by the solicitude of the queen. Profoundly touched. But there is nothing for me to do but to seek another country, where my scientific discovery will receive the recognition it deserves. The honour and glory of having bestowed on mankind this most important source of healing is worth more to me than estates or money. I will accept no pension, no honour until the Academy pays me what I regard to be my due."

"But, Monsieur Mesmer, we all appreciate your attitude. It is noble. A man who can refuse five hundred thousand livres is an honest man." Maurepas, the Minister of State, gauged his own honesty by the amount of the bribe. "I, together with many of your friends and believers, we have decided to found a body, the Societè Harmonique. Madame Dubarry has agreed to buy three hundred of one-hundred-louis shares already. The money has already been oversubscribed. Monsieur, we are glad to place in your hands the sum of nearly one million louis to form an academy of your own. By this means, you will be able to work without the Academy of Sciences, nay, to rival it, to supersede it. And France, France will share your glory."

Mesmer was hesitating.

"What conditions are attached to my acceptance?" he asked.

"You will place at the disposal of the society a number of the Mesmerised apparatus. You will also instruct the members of this society in your methods. The secret, we give you our solemn oath, will be guarded."

Mesmer, it seems, after much heart-searching, overcame his squeamishness. There was a certain degree of honesty in this man. But Madame Dubarry, one of the subscribers to his society, who had a private apparatus of her own situated by her bed, later wrote in her memoirs:

"The fee demanded by this doctor for explaining the

use of his magnetic apparatus was no less than one hundred louis, and it surprised me, nay, shook my faith that the man who declared his sole object was to serve humanity, should have expected so vast a sum from his supporters."

Unfortunately, rumour began to sap Mesmer's popularity. Bailly is said to have been the man responsible for a morality report which accused Mesmer of allowing his magnetic halls to be used as a meeting-place for all kinds of perverts. Ready wits told stories about his treatment of hysterical young women in darkened rooms. They also noted that perhaps this was the just and the only treatment these women required. Madame Dubarry, the late king's mistress, hurried to put pen on paper:

"His lectures were extraordinarily well attended," she wrote. "But whereas many of the audience gathered the impression that one who could work such miracles must be possessed of super-human powers, others opined that he must have received these powers direct from Lucifer."

Slowly Mesmer's temple of divinity began to empty. The French Revolution had begun. The religion of the State was the goddess of reason. The old faiths were demolished. But Mesmer, cleverer than most of his friends, disappeared. Many of his patients died under Dr. Guillotine's humane killer. But Mesmer kept his head and went to Vienna.

There he was imprisoned and passed two months in incarceration. The Austrians were suspicious of Dr. Mesmer. They accused him of being a hidden Jacobite, an agent of the revolution.

Mesmer retired to his birthplace, Meersburg, on the lake of Constance.

"Let him walk silent by the shore of the Bodensee, by the ancient town of Constance," says Carlyle, "meditating on much. For so, under the strangest new vesture, the old great truth (since no vesture can hide it) begins again to be revealed; that man is what we call a miraculous creature with miraculous power over man; and, on the whole, with a Life in him and such a World around him, as victorious Analysis, with her Physiologies, Nervous-systems, Physic

and Metaphysic, will never completely name (Italics) to say nothing of explaining. Wherein also the Quack shall, in all ages, come in for his share."

Mesmer certainly came "in for his share".

Reviled and completely forgotten, he was selling his secret to any bidder. To one of these buyers, Count Maxime de Puységur, he sold his magnetism for four hundred louis. This young noble, an amateur astrologer himself, hardly believed in the gift he had bought. It was purely by accident that he discovered what amounted to a serious application of Mesmer's method.

According to Mesmer's instructions, this Count Puységur magnetised a tree on his estate. Peasants from all round the district came to be healed. A young shepherd lad, called Victor, had tied himself to the tree and the Count happened to pass. Half credulously the young nobleman waved his hands over the boy. Slowly, in imperceptible degrees, the boy grew heavy and fell asleep.

The Count was frightened by this experiment. He ordered the boy to untie his knots and to his great surprise, the lad, without opening his eyes, did as he was bid.

"Eureka," said the Count to himself, continuing his experiment. He ordered the boy to walk forward, and the boy walked. He ordered the boy to stop and he stopped. After a few more orders of this kind, Puységur proclaimed his discovery as "somnambulism".

"Hitherto," he said, "only drugs had been able to induce sleep. Through Mesmer's method of magnetism, I can induce it."

With an ironic twist of fate it was Puységur's method which was officially recognised by another academy, the Prussian Academy of Sciences, which had dismissed Mesmer's method as unproved.

"Somnambulism" as a method of relieving pain received the close attention of doctors far afield. In France the cancer specialist, Récamier, and Professor of Surgery, Cloquet, both employed it. Scotland, which was to give the world the professor of midwifery, James Young Simpson, put it to the test through two eminent doctors, Elliotson and

Esdaile. True, Simpson later abandoned this form of hypnotism for chloroform, but Elliotson earned a serious reputation for it, in fact so serious that he was asked to resign his position at the University College Hospital. The legitimate doctors would have nothing to do with it. As far as they were concerned, the method was still unproven, although they must have known that in 1829 Cloquet had successfully removed a cancer of the breast from a hypnotised woman.

Esdaile went further afield. He went to India but here, curiously enough, what was new in Europe was only too well known under the quaint Indian term of Yar-Phoonk. Vast concords of people came to be hypnotised by Esdaile. Simple and complicated operations were performed under Esdaile's hypnosis in the hospital which was put up at his disposal by the authorities.

Esdaile's method attracted the attention of the West. It had, however, failed in many cases both in Vienna and France and in America, so that the medical profession as a whole did not believe that the anaesthesia caused by it was deep enough to save the patient from the sting of the knife. Consequently orders went out from London that Esdaile's hospital would have to be closed. Had it not been for hundreds of grateful Hindu patients, who subscribed to keep Esdaile in practice, he could not have continued his good work. At home Esdaile was branded as a lunatic, embellished with more serious epithets such as cheat and quack, and his patients were labelled as fools who would swallow narcotics—as if this mattered as long as their pains were relieved.

Despite the fact that Lafayette, hero of America's War of Independence, supported Mesmerism as a "marvellous weapon against illness and pain", the medical profession, some thirty years later, insulted the good sense of Lafayette and would have nothing to do with this fancy-science. Nevertheless, Mesmerism also caught on in the States and was practised there by Charles Poyen. Poyen in his turn influenced Phineas Parkhurst Quinby who, in turn, influenced Mary Baker Eddy, the founder of Christian

Science. Mesmerism had gone a long way. The soul had rebelled against the bottle, against far more suitable devices.

Carlyle had said: "Wherein also the quack shall in all ages come in for his share." Mesmer, labelled "fraud", had stumbled across a partial truth. Modern medicine does not despise the hypnotic method, especially in applied psychiatry. True, it has discovered better and surer anaesthetics. But in an age when there was no relief from pain, Mesmer made a memorable contribution.

CHAPTER V

PRIESTLEY'S MICE

"Do you, Ebenezer, take this woman Chaos to be your wife?" the young preacher's voice resounded through the small, drab Nonconformist chapel.

The faces of the swain, the best man and relatives showed painful bewilderment.

"I beg your pardon," said the young divine, "do you take this woman Charlotte to be your wife?"

"Ee by gum!" said the bride's father, in his broad Yorkshire. "It isn't often that the Reverend Joseph Priestley makes a slip of this kind. Wonder what is brewing on his mind?"

The young pastor's congregation had been noticing of late that the Reverend who served their church was apt to make slips. Another thing. His sermons which used to take a good hour and were a joy to hear, it should be remarked, had abruptly been cut down to a bare ten minutes. He was calling Charlotte "chaos". True enough, she had a bad temper and few thought that she would make young Jack, whose father, you know, was the brewer, a very good wife. But the ways of the Lord were mysterious and the Reverend Priestley should not anticipate events too much.

Everyone agreed, however, that the young pastor made ample amends in the sermon he preached after the wedding. He compared the blushing bride to the Rose of Sharon. The brewer's son became a temple of goodness, manliness and general virtue. This pleased everyone, especially the bridegroom's father, the rich brewer who owned the brewery of Jacks and Nell.

"You must never hesitate to come and taste a pint of my beer," he said benignly to the pastor.

Priestley smiled affably, shook the hands of the happy

bride and bridegroom, and left to return to his small laboratory and books.

"The Lord forgive me," he said to himself as he walked home through the small town. "I should never have called Charlotte 'chaos', but I think it was better than calling her 'gas'." As it happened Priestley had been reading the researches of von Helmont, who had invented the name "gas" as a derivative from "chaos".

A gas, according to von Helmont, was something that could not be kept in a vessel. Priestley refused to believe this. He was determined to "collect" some.

People noticed that Priestley went more and more frequently into the brewery. They were extremely puzzled and wondered whether their pastor was not going too often for that pint of beer which the brewer had promised him. But Priestley's interest in the brewery was strictly academic. He had met a Dr. Black there, a chemist of some repute and he had discussed the question of fermentation with him. He discussed and he disagreed. The bubbles of vapour, for example, which rose to the top in the fermenting vats, had puzzled Priestley for a long time and the best explanation which Dr. Black could vouchsafe him was that these bubbles were nothing more or less than "fixed air".

Profoundly dissatisfied with this explanation, Priestley devised instruments with which he was able to collect and store these bubbles. He began to study their composition and to fathom the mystery which lay behind their fermentation.

"Praise the Lord for beer," he muttered to himself. "It is a soothing drink. But the Lord has sent it to me to lead me into an unknown domain of chemistry."

The small earning which Priestley derived from his post as a Nonconformist pastor went towards the buying of books and the furnishing of his laboratory. His visits to the brewery had little scientific significance now. The beer he went to drink, he drank as a beverage and when pressed to stay to lunch or dinner by the brewer, he never refused.

The fame of Priestley's experiments was bruited abroad.

So much so that one day, after his Sunday sermon, he was stopped by a handsome, fashionably-dressed young man who announced himself as Lord Shelburn.

"Pleased to know you, sir, pleased to know you," Priestley answered his introduction.

"I enjoyed your invigorating sermon," Shelburn told him. "You are a rare man of many parts."

"Grateful to you, sir, grateful to you," Priestley replied, trying to disengage himself from the young man, whom he took to be a fop passing on his way to the North.

But as Priestley hurried back to his laboratory the young man seemed to cling to his heels.

"I say, you are a deuced quick walker," he said amiably.

"I am a busy man, sir," Priestley returned over his shoulder.

The young lord took this remark in good humour. But when Priestley found him pushing himself into his laboratory, he took fright. "This is my sanctum, sir," he said sternly, "I would have you know that you are an uninvited guest. Kindly withdraw."

Shelburn's eyes opened in amazement before the fantastic sight which greeted him. Retorts, tubes, numerous troughs, inverted glass jars, plants growing in a gas, bottles with multi-hued liquids in a state of scientific confusion.

"A veritable alchemist," Shelburn said, "begging your pardon."

Priestley started abruptly.

"I am no alchemist," he said solemnly. "I am a servant of God. You must forgive me," and he stripped off his coat. "I have work to do."

"Then I shall wait before I make my proposition," answered Lord Shelburn.

Priestley slapped his thigh impetuously.

"Oh, I beg your pardon," he explained, "perhaps it is a marriage or a burial or baptism which you require. Do forgive me, my head is very full of an experiment which I have just completed."

Shelburn smiled dryly.

"I seek none of the comforts of the Church," he said.

"I seek one Joseph Priestley, a chemist whose renown has spread in scientific circles. I am myself a writer of a kind and a curious man, and I have come to offer you my country house at Calne where, undisturbed by worldly care, and supplied with ample funds, you may continue your researches."

Priestley's first glance was to heaven. He then looked at the young man without the least surprise. "You have come, sir, at the very right time. I have just succeeded in isolating carbonic acid gas."

"Wonderful," said Shelburn.

"Since you do not know what this is," Priestley replied, "why do you say wonderful?"

"I consider all discoveries wonderful," Shelburn corrected himself quickly. "Come, let us have lunch! I am starving."

"That is something which I have not been able to discover," Priestley answered with a smile. "I partake your hospitality gladly."

The two men shook hands and laughed.

Priestley's reception at Calne was magnificent. Shelburn treated his new friend like the protégé that he was. He compelled his very servants, nay, his guests to put on velvet overslippers when they came to the house.

"Priestley is at work," he would announce solemnly, putting a finger against his lips.

Despite the inconvenience caused to domestic arrangements, Priestley was assigned the enormous hundred-feet hall, where he put up his apparatus. The gentry and nobility of the district flocked on Sundays to watch Priestley at his work. Lord Shelburn, when he was free from his duties as Secretary of State, acted the part of commentator on Priestley's experiments. There is no doubt that the noble lord was vastly proud of his protégé. Priestley would smile good-humouredly at the numerous errors and scientific banalities which Shelburn uttered to his guests. But the reverent silence placated his spirit and the fact that he had money to spend on his beloved apparatus soothed his temper.

"Dephlogisticated air," Shelburn would pronounce with an air of wisdom, pointing at a jar which looked quite empty.

"Remarkable," was the chorus.

"Sulphrous oxide, fluorine."

"Remarkable."

"This, Mr. Priestley calls different kinds of air," Shelburn would say.

A murmur of approval would go round his guests. They were suitably impressed and Lord Shelburn was happy. Generally he would lift up the jar tops to let his friends take a sniff at the various concoctions, very much to Priestley's annoyance. But Shelburn blossomed when he saw the expressions of ecstasy on his friends' faces. They were in the presence of mystery, in the presence of novelty.

Priestley knew very well what they had come for.

"But it is a healthy amusement," he said to himself.

There was, however, a more serious side to Lord Shelburn's character. He took Priestley on visits to Germany, Holland and France, and there his great name and ministerial status opened the doors of all the noted chemists of those countries. Priestley was able to discuss with them and to exchange experiences and to widen his knowledge.

On his return from these journeys, Priestley wrote six enormous volumes entitled, *Experiments and Observations concerning the different kinds of Air.*

In one of these books he unfeignedly rejoices like an overgrown schoolboy at his acquirement of a good convex lens or burning-glass. It had been given to him by his friend Warltire. He heated substances by focusing sunrays on them and small phials filled with and inverted over mercury. He wrote:

"Having procured a lens of twelve inches diameter, and twenty inches focal distance, I proceeded with great alacrity to examine, by the help of it, what kind of air a great variety of substances, natural and factitious, would yield. . . . With this apparatus, after a variety of other experiments, on the 1st August, 1774, I endeavoured to extract air from mercurius calcinatus per se; and I presently found

that, by means of this lens, air was expelled from it very readily. Having got about three or four times as much as the bulk of my materials, I admitted water to it, and found that it was not imbibed by it. But what surprised me more than I can well express, was that a candle burned in this air with a remarkably vigorous flame. I was utterly at a loss how to account for it."

It was at this point that Priestley carried his experiments into the field of physiology. He found, for example, that a mouse lived twice as long in the new air as in the same confined volume of common air, and revived after it had been taken out:

"From the greater strength and vivacity of the flame of a candle in this pure air," he wrote, "it may be conjectured that it might be peculiarly salutary to the lungs in certain morbid cases. I had a fancy for trying its effect upon myself, and inhaled a considerable quantity of it through a tube. This gave me a remarkable sense of freedom and lightness in the chest. Who can tell, but that in time, this pure air may become a fashionable article of luxury? Hitherto only two mice and myself have had the privilege of breathing it."

Little did Priestley know that the oxygen which he had discovered would become more than a "fashionable article of luxury". He had discovered a new principle. Prior to him the medicines which doctors were able to prescribe operated through the stomach. Once swallowed, these medicines were beyond the control of the doctor. It was difficult to gauge the physiological vagaries of each patient. A normal dose for one could be poisonous for another.

Medical substances pass far quicker through the lungs into the blood stream than through the walls of the stomach. Moreover the fact that they could at the same time be eliminated as well as absorbed by the breath, enabled the doctor to control the dose given and to give only the exact amount necessary.

Oxygen treatment to-day is familiar to every doctor and surgeon, especially in the treatment of gas poisoning and pneumonia.

Priestley, however, was not content to rest on his laurels. One day in his laboratory he treated some damped iron filing with nitric acid. On heating the mixture, he produced nitrous oxide. It was with this nitrous oxide that he made his first trials of anaesthesia on animals. The two mice which had breathed his oxygen breathed for the first time the pain-allaying qualities of nitrous oxide.

But the whirl of life had come to interfere. Priestley, who had left the Church for chemistry, suddenly entered into the religious and political fray. The liberal influences which were sweeping over Europe had affected England. Priestley allied his destiny with the new movement. He left Shelburn's house and went to serve as a pastor in a dissenting chapel at Birmingham. Here he became a member of the Lunar Society. Among his friends he counted Erasmus Darwin, the poet and scientist who was to become the grandfather of the more famous Charles Darwin; the manufacturer of steam engines, James Watt, was his good friend. Murdock, discoverer of gas-lighting was another acquaintance.

In such society, in the breadth of new minds, Priestley prospered spiritually. Never lacking in courage, he took the side of the French Revolution against the Conservative elements. But the strength of Conservatism was such that very soon Priestley's church was empty. Even the accustomed civility paid to a pastor was denied him. He was ignored in the streets and little children were set on his heels to shout : "Priestley be damned, damned for ever, for ever." The churchwardens sided with the congregation. His stipend was taken away.

"If I cannot serve this generation, I will serve the next," was Priestley's consolation. "Perhaps it is the Lord's way to send me back to my chemistry."

From experiments on animals to men was but one stage. In the house in which he lived, he set up a new laboratory. Shelburn graciously let him have the apparatus which he had collected at Calne.

A fortnight had barely passed of tranquil research when a friend one evening came running into his laboratory:

"Flee, your reverence," he begged him. "Flee for your life. They have heard that you are experimenting with animals. A mob is on its way to set fire to your house."

"But my apparatus, my books, I cannot leave these. They have taken me years to acquire. Do you expect me to abandon the fruits of my discoveries?"

His friend threw up his hands helplessly. "You can reconstruct these things," he said, with despairing logic. "Save yourself. They will tear you to pieces."

Priestley picked up his hat and then, stuffing a few of his more recent notebooks into his pockets, he and his friend ran out by the back door just as the lighted tar flambeau came crashing through the window. The whole of the laboratory—the first to be equipped with modern apparatus—was soon converted into a charred ruin. All his books and his notes were in ashes.

But these reverses only strengthened Priestley's spirits. He moved to Hackney and opened up a new laboratory. But once again crowds gathered and his effigy was burned before his house as a violent revolutionist. The man of progress was to have no peace. The country to which he was an ornament was bent on persecuting him.

From revolutionary France came the news that he had been made an honorary citizen of the Republic. He was in good company. The French Assembly had summoned him, together with Heinrich Heine (friend of humanity), to taste their hospitality. This only helped to infuriate his enemies further. This was all the proof they needed. Priestley was a traitor and should be hanged, they clamoured.

Priestley fled to America. As many thousands of others, less distinguished, he found a haven and what is more, recognition. He was offered a professorship but, exhausted by his misfortunes, he refused the honour.

Like many another discoverer, Priestley failed to grasp the significance of his own discoveries. But who can blame him? In tearing away the debris and accumulation of past ages, it is hard for the planner to see the new house he is erecting. He is too near the foundations, too near

the elaborate back-breaking work of shovelling mortar on to bricks.

Despite Priestley's belief in religious guidance, his work was profoundly scientific and unbiased. In the history of Man's struggle against pain, he has a real and enduring place. He died in 1804 at the age of seventy-one. It was still too early for him to see that the inhalant which he had administered to himself and two mice had opened the way to a new and formidable discovery.

. . . . .

Unrelenting, despising and obtuse as humanity often is, it has never lacked faithful servants who, in the face of bitterest disappointment and opposition, have never hesitated to seize the torch which falls out of the hand of the scorned, martyred scientist.

Fate, with an ironic twist, very soon brought Priestley's gases or "different airs" as he called them, into crazy familiarity. Very soon doctors were using pneumatic medicines to cure a fantastic variety of ills, ranging from paralysis to cancer. There were some even who, in unscientific enthusiasm, were prepared to announce it the "new elixir of life".

Oxygen, followed by the discovery of hydrogen and nitrogen, were applied with fantastic enthusiasm by practitioner and quack. But the "anaesthetic gas", the gas which proximated nearest to anaesthesia as we know it to-day, Priestley's nitrous oxide, this was held as an abhorrent and dangerous poison. Experimenters with little talent and no knowledge of how to apply it had tried it on animals and had killed them. It was not remarkable therefore that in the whole medical profession there was not to be found one who would try the experiment on himself.

But humanity threw up its hero in the character of Humphry Davy who, in the very year 1795 when Priestley was fleeing to the hospitable shores of America, was apprenticed to a certain Dr. Borlase, a surgeon with a considerable practice in the small township of Penzance, Cornwall.

Dr. Borlase was a good soul—a man of wide practical experience but little imagination. Nevertheless, he was capable of some enthusiasm, even though it led him to negate Priestley's discovery.

"Young man," he would say to Humphry, "I will not have your talk of Mr. Priestley's nitrous oxide. It is a poison. To touch it means death."

"But, Dr. Borlase," Humphry would remonstrate.

"I will hear no argument," Borlase reprimanded him. "Dr. Cooke and many other eminent colleagues, even Dr. Lantham Mitchell, who is an American and may be thought to be attracted to new-fangled ideas, has pronounced it as positively dangerous. I will have nothing to do with it."

Humphry Davy, however, was not a youth to be discouraged. At a time when adolescence barely permits the thought of death, Davy was profoundly intrigued by the effects of Priestley's "dangerous gas". Moreover, he had already, without Dr. Borlase's permission, of course, made a considerable number of experiments with this gas. He had read and re-read Priestley's accounts of his experiments and observations. From his treatises had first learned how to make the dangerous gas. But the final test, he said to himself, is to try it on oneself.

He had thought at first of emulating Paracelsus by trying the gas on some chickens but the only chickens within reach belonged to Dr. Borlase and since, to say the least, the results of the experiments would be profoundly uncertain, he reasoned thus:

"If I die no one will be the poorer but I. But if I slay the doctor's chickens, then he will curse me every Sunday when he falls to thinking of his roast fowl. I could, of course, find some trusting female."

This romantic idea appealed to the boy of seventeen. But there were no trusting or even suspicious females to hand. There was only a little Irish serving-girl called Molly O'Shane. She was adamant on the point. He had rather untactfully explained to her his dilemma with regard to Dr. Borlase's chickens and the young lady refused to

grasp the laurels which the enthusiastic boy chemist promised history would hold over the head whether she lived or died. In fact, it cost him a kiss to buy her silence.

With an amazing scientific zest and thoroughness, young Davy decided to sit down and put pen to paper during every phase of the experiment. After a particularly heavy Sunday dinner, when Dr. Borlase with an eighteenth-century appetite had finished the better part of a succulent cockerel and had retired to bed, Humphry went down to the laboratory and prepared his dose of nitrous oxide.

He was not quite sure whether he would inhale it through his mouth or his nose. His heart was beating a frantic tattoo inside him. Perhaps, after all, the American Dr. Mitchell was right. What would Dr. Borlase do if he discovered a corpse in his laboratory the next morning? Well, he will sell me to the resurrectionists and I will find my way on to some dissecting-table in London, Humphry thought.

But Humphry Davy brushed away his morbid thoughts. Nevertheless, the first sip of the gas which he took, he took cautiously. Just a little sniff. Then he waited. Finding himself alive, he took another and then yet a third. More and more successive gulps were inhaled before he began to sense the delightful feeling of lightness which was coming over him. The faint feeling of numbness gave way to an acute sense of hearing and then quite suddenly he found a desire to laugh. Slowly and by degrees he involuntarily found his body shaking with laughter. So much so, in fact, that the flask dropped out of his hand and splintered into a thousand pieces on to the floor.

"What an excellent gas," he giggled to himself, "this laughing gas is!"

Then picking up pen and paper, he decided to describe his sensations. But instead of writing a profound scientific analysis as he had hoped, he found himself writing a poem. The words came trippingly to his tongue and with a bold and graceful hand, he outlined the following:

"Not in the ideal dreams of wild desire
Have I beheld a rapture-wakening form:
My bosom burns with no unhallow'd fire,
Yet is my cheek with rosy blushes warm;
Yet are my eyes with sparkling lustre fill'd;
Yet are my limbs with inward transport fill'd;
And clad with new-born mightiness around."

Having concluded his little song, he decided not to leave it on the desk for Dr. Borlase's inspection but pocketed it, determined on the next night to repeat the experiment.

But impatience got the best of him. Whilst he was mixing some medicines for Dr. Borlase, he would frequently go over to the little bottle which he had marked as an innocuous preparation of oxygen. Cautiously he would drink in the gas as if he was sipping a delicious wine. But the importance of the discovery only dawned on him later. I will give the story in his own words:

"The power of the immediate operation of the gas in removing intense physical pain I had a very good opportunity of ascertaining. . . . In cutting the unlucky teeth called dentes sapientiae I experienced an extensive inflammation of the gums, accompanied with great pain. . . . On the day when the inflammation was most troublesome I breathed three large doses of nitrous oxide. The pain always diminished after the first three or four inspirations; the thrilling came on as usual . . ."

Dear Dr. Mitchell is a fool, Humphry thought. If my laughing gas is capable of saving me from the toothache, surely it is capable of saving others from pain also. The problem was to perfect his experiments. But in this he suffered a most unfortunate set-back.

One night the door-bell of Dr. Borlase's house jingled wildly some time past midnight. It was, of course, young Humphry's job to open the door to the clamorous patient. Clad in voluminous nightgown with a warm woollen cap on his head, Dr. Borlase cursed the young laggard. Then he smiled to himself.

"The boy is young," he said kindly. "He must have his sleep. I will go and open the door myself."

The bell-ringer turned out to be the son of one of Dr. Borlase's patients. His father had complained of a severe stomach-ache. Could the good doctor give some powder or better still visit the unfortunate in his cramped, agonised bed?

Dr. Borlase, putting his finger to his mouth, counselled silence, for he was a considerate man and disposed kindly towards his assistant. "Let him sleep!" he thought to himself.

But the noise of the bell had apparently disturbed Humphry, who calmly emerged from the laboratory guffawing and cheerfully slapping his sides.

"What, pray, sir, is this exhibition?" asked Dr. Borlase. "Do you presume to laugh at me at this unreasonable hour?"

The youngster who had been sent on the urgent errand by his pain-wrought father, was also perplexed by Davy's behaviour and burst into tears. Humphry did not desist from laughter. He walked up and down the corridor and roared for all he was worth.

The patient's son fled from what he imagined to be a lunatic, without waiting for the powder which would give his father relief.

This performance was too much for the tender-hearted Borlase.

"To bed with you, sir," he commanded. "Have you gone mad?"

On the next day the patient with the stomach-ache called himself and, to Dr. Borlase's outraged wonder, Humphry once again emerged from the laboratory laughing for all he was worth.

"I will not stand this treatment," the patient said. "The same thing happened to my son yesterday. I can understand a young man to get drunk once in a while. But on two consecutive days, that is too much." He slammed the door as he left the house of mocking laughter behind him.

Dr. Borlase threw up his hands.

"If you were a full-grown man, sir," he said to Humphry; "I would tell you a thing or two."

In his heart, good Dr. Borlase liked Humphry and he entreated him to explain the cause of his laughter. But all that Humphry could do was to laugh even more outrageously.

Dr. Borlase was perturbed. Was the lad going to lose his mind? That would be bad for his practice. He had lost one patient already. Who knew, more patients might follow his example.

But Dr. Borlase kept his own counsel. The youngster was brilliant. He already knew more chemistry than Dr. Borlase himself. This Borlase admitted. Why, only yesterday, he had discussed Lavoisier's *Traité Elementaire de la Chimie* and Dr. Borlase had hummed and hawed and run to Nicholson's dictionary of chemistry to find the right answer.

Every Friday in Penzance there was market-day. Farmers, their wives and children would come to town and, besides conducting business, they would come to Dr. Borlase's surgery for the usual remedies of chills and aches. It was principally to help him out on patients' day that Borlase had taken Humphry as an assistant.

On this particular Friday it happened that the surgery was full to overcrowding. There were medicines to prepare. But where was the assistant?

Borlase called once. He called twice. At last with an exasperation which was not common to him, he decided to rout Humphry from the laboratory. But on opening the door, he was shocked to find his young assistant grinning like an idiotic Cheshire cat at him.

Dr. Borlase withheld his anger with a remarkable display of self-control. Humphry had tried him to endurance. He would have to go.

That same afternoon, Borlase again entered the laboratory but this time with the solemn resolve to sack his apprentice. There was Davy still grinning as cheerfully as ever.

"Have you lost your senses?" Borlase shouted at him. "What the devil have you got there in your hand? Give it to me!"

Humphry good-humouredly handed him the bottle. As Borlase was the shorter of the two, the bottle seemed to rest precariously under his nose. And what should happen but that Dr. Borlase should inhale at that very moment?

Laughing gas was no respecter of persons and the irate Borlase also broke out into a soft giggle. Very soon he was bursting his sides with laughter. The surgery bell might ring till doomsday. But Borlase and his assistant were slapping each other on the back and roaring their heads off.

At last, linking their arms, Borlase and Humphry walked out to greet the new arrivals.

Their appearance, however, was received with extreme frigidity. People who had always seen the doctor decorous and solemn, were pained at the way that he listened to their explanations that old Aunt Mathilda had died only the day before, or that the complaints which they made, pointing to their rheumatic joints were airily dismissed by an impetuous young man who seemed to regard the whole as an enormous joke.

Dr. Borlase was extremely glad on this occasion to be rid of his patients. He immediately began to cross-question Humphry.

"Now what, pray," he asked, "do you have in this remarkable bottle which reduces me to laughter?"

Humphry explained. He went further than that. He admitted that he had ignored Dr. Mitchell's advice against the use of nitrous oxide. But more important still, he told Borlase of the relief he felt from the severe bout of tooth-ache after the inhalation of this gas.

Dr. Borlase crabbed, conservative and cautious as he was, readily took up the idea of Humphry's prompting.

"Young man, we shall form a partnership," he said. "We will be the first doctors in the land to use such a mixture."

But the good Borlase had not counted on the long tongues of his patients. Very soon hair-raising rumours spread of a devilish gas which Borlase was beginning to use. Patients, new and old, stayed away. Ruin faced the doctor, and in such circumstances he could do nothing but renew his long-forgotten intention of giving Humphry the sack.

Humphry, quite unperturbed and not in the least discouraged, shook hands affably with his erstwhile master and departed for the house of his foster-father, Dr. Tomkin.

Dr. Tomkin, although he was Humphry's official guardian, had no knowledge of the kind of pranks which Davy had determined to perpetrate under his roof. Indeed, he had barely been settled in a day or two when he was opportuning Mrs. Tomkin for old tobacco pipes, disused surgical instruments, wine glasses, pots, tea cups and pans. The lady charmed by the youngster's manners gave away a variety of culinary instruments which Humphry promptly took up to his attic to reconstruct the laboratory which he had abandoned at Dr. Borlase's house.

For over three months Humphry worked, noting the effects of the gas on himself, and trying to develop a system which would give the best results. But disaster came to his efforts in the shape of an explosion which very nearly took the roof off the house, or at least that is what Dr. Tomkin said.

Mrs. Tomkin, however, was far more considerate and pitied the boy, although she concurred with her husband's opinion that experiments and especially explosions were not to disturb their nocturnal rest again.

Undeterred, Humphry decided to look for a patron who would have no objection to an occasional explosion. He found him in the shape of a Dr. Beddoes, the head of a pneumatic institute at Clifton, not far from Bristol. A certain Dr. Giddy, who was afterwards to become President of the Royal Society, had heard of Humphry's experiments in Borlase's surgery and had decided to interview him.

"For a dangerous experimenter," Giddy told him, 'you have the shrillest voice imaginable. And you will

have to hold yourself better, sir. Otherwise your round shoulders will become a perpetual disgrace to Dr. Beddoes' establishment."

Letters followed. Beddoes was apparently fascinated by the young man's evident knowledgability and although he had not finished his apprenticeship to Dr. Borlase, he offered him nothing less than the position of superintendent at the Institute.

Dr. Borlase, in the goodness of his heart, proved co-operative. Though he had been forced to give Davy the sack, he esteemed him highly:

"I am not willing to stand in your way," he told Humphry. "You are a promising youth who has every chance of gaining fame and fortune."

These words he later set down in a testimonial which he gave Humphry.

Dr. Beddoes turned out to be a short, stumpy man but with an amiable and generous character, and his imagination, though frequently uncontrolled, was capable of appreciating Davy's ideas. When Davy arrived, Dr. Beddoes led him round the laboratory. He conducted him twice over, simply for the joy of seeing the light which had entered into Davy's eyes.

"Paradise, this is paradise, Dr. Beddoes," was all that the youngster could say.

"You may explode as many bottles as you like here, Mr. Davy," Beddoes assured him with a twinkle in his eye.

"With all this expensive apparatus about, Dr. Beddoes," Humphry replied, "I shall take every care to prevent explosions."

One other delight was in store for Humphry Davy. Dr. Beddoes, who had taken a general liking to the young fellow, very soon unfolded his new plans to him.

"So far we are only on the brink of the discovery. But now, with you here, we can begin to experiment your nitrous oxide on our patients."

It was just this that Humphry wanted to hear, but had not dared to hope for. Beddoes' Institute was comprised of a chemical laboratory with a hospital wing of ten beds

and an out-patients' department. There was only one thing that Davy was not certain of. Beddoes had used pneumatological means for the treatment of various kinds of bodily and even mental ailments. He had even confessed to Humphry that because of his own inordinate obesity, he had taken various mixtures of gases to rid himself of it.

"What they really need," he would say, "are air-tight rooms where they can spend many hours in carefully modified atmosphere."

Humphry was not at all convinced that this was necessary. But he was anxious that Beddoes should try out his nitrous oxide, and therefore he did not disagree with him.

Beddoes was determined to try out the new gas. He proceeded to do this extremely cautiously.

Beddoes himself was a man of wide learning. His studies had taken him as far as Paris, where he had met Lavoisier. At Oxford his public lectures on chemistry had brought him a good measure of fame, and although among his many attributes he may also have been considered as a predecessor of Freud's, his psychological theories about dreams were not treated with the great respect which they deserved. The width of Beddoes' learning often suggested to Davy the Hippocratic philosopher and indeed, in matters of philosophy and literature, Beddoes could more than hold his own.

To Beddoes' house repaired such eminent poets as Coleridge, Southey and Wordsworth. He was a friend of Erasmus Darwin. Thus the atmosphere at Clifton was in every way ideal for Humphry's developing eager spirit.

Of Clifton, Davy wrote:

"This is the loveliest spot in the world. Our house is spacious and pleasant; my rooms are large, prettily decorated and comfortable; and, above all, I have a splendid laboratory."

What a contrast for young Davy to work in this expensively equipped laboratory, after Mrs. Tomkin's tea cups and old cooking utensils had to serve for the same purpose.

Before applying his nitrous oxide in the institute, Davy and Beddoes decided to perfect the experiment. Beddoes

himself had volunteered to inhale the gas in varying doses to discover the amount most suitable for anaesthetic purposes. But Humphry would not hear of it.

"Can it be that you are jealous of your experiences?" Beddoes asked jocularly, not guessing the reason for Davy's resistance to his proposal.

There was not much jealousy in Humphry's insistence that Dr. Beddoes should desist from these trials. He did not tell him, but on at least two occasions Humphry had secretly in his laboratory nearly died because of inhaling too much of the gas. He was fortunate enough before losing complete consciousness, to push the pipette mouth-piece of the gas bottle which he had constructed from him. Humphry did not dare to tell Dr. Beddoes of this experience, lest he might reconsider his proposal to try out the gas on his patients.

Experimentation, however, went on. By April 11th, 1799, Humphry Davy had produced chemically pure nitrous oxide. On the very next day he decided to try out this pure nitrous oxide on himself. He had adapted a new container, a kind of silken bag—the predecessor of the present-day appliance.

Dr. Beddoes and his junior assistant, Dr. Kinglake, watched the proceedings with palpitating hearts. But Davy was quite unperturbed.

"I propose to breathe in three quarts and then follow it by breathing in four."

Kinglake was by far the most sceptical of the three. He liked Humphry Davy, and watching the proceedings he thought: "Hope nothing happens to the lad. It would be a pity."

When Davy had succeeded to inhale without any evident misfortune, Dr. Kinglake embraced him feverishly.

Davy noted down his particular impression, not in the restrained, coldly-analytical manner of the scientist, but once more with the lyric inspiration of poetry which had marked his first introduction to laughing gas. The following is what Davy wrote on the experiments he performed on this 11th January, 1799:

"A thrilling extending from the chest to the extremities was almost immediately produced. I felt a sense of tangible extension highly pleasurable in every limb; my visible impressions were dazzling, and apparently magnified, I heard every sound in the room, and was perfectly aware of my situation.

"By degrees as the pleasurable sensations increased, I lost all connection with external things; trains of visible images rapidly passed through my mind, and were connected with words in such a manner as to produce perceptions perfectly novel. I existed in a world of newly-connected and newly-modified ideas: I theorised, I imagined that I made discoveries.

"When I was awakened from this semi-delirious trance by Dr. Kinglake, who took the bag from my mouth, indignation and pride were the first feelings produced by the sight of the persons about me. My emotions were enthusiastic and sublime, and for a minute I walked about the room perfectly regardless of what was said to me.

"As I recovered my former state of mind I felt an inclination to communicate the discoveries I had made during the experiment. I endeavoured to recall the ideas: they were feeble and indistinct; one collection of terms, however, presented itself, and with a most intense belief and prophetic manner, I exclaimed to Dr. Kinglake:

"'Nothing exists but thought! The universe is composed of impressions, ideas, pleasures, and pains'!"

The Lake poets were invited to participate in these experiments and Samuel Taylor Coleridge in particular, an old addict of opium, took to it with a dangerous passion.

"I experienced the most voluptuous sensations," he said. "The outer world grew dim and I had the most entrancing visions. For three and a half minutes I lived in a world of new sensations."

There was another opium eater, however, the young essayist famous for his "*Confessions of an English Opium Eater*," De Quincey, who was a contemporary of Coleridge. His essays are interesting from many aspects. His was an age when man pinned his faith on opium as an analgesic.

He himself had reached the fantastic dose of 8,000 drops of laudanum per day. Indeed, he reveals how extensively the pain-killing properties of opium were employed:

"Reader, I am bound to say, a very numerous class indeed. Of this I became convinced, some years ago, by computing at that time the number of those in one small class of English society (the class of men distinguished for talent and notoriety) who were known to me, directly or indirectly, as opium-eaters; such, for instance, as the eloquent and benevolent William Wilberforce; the late Dean of Carlisle, Dr. Isaac Milner; the first Lord Erskine; Mr. . . . the philosopher; a late under-secretary of State (viz. Mr. Addington, brother to the first Lord Sidmouth) who described to me the sensation which first drove him to the use of opium in the very same words as the Dean of Carlisle,—viz. 'that he felt as though rats were gnawing at the coats of his stomach'; Samuel Taylor Coleridge, and many others, hardly less celebrated. Now, if one class comparatively so limited, could furnish so many scores of cases (and those within the instant reach of one sudden and brief inquiry), it was a natural inference that the entire population of England would furnish a number that, on first starting in such an enquiry, would have seemed incredible. The soundness of this inference, however, I doubted, until some facts became known to me, which satisfied me that it was not incorrect. I will mention two. First, three respectable London druggists, in widely remote quarters of London, from whom I happened to be purchasing small quantities of opium, assured me that the number of amateur opium-eaters (as I may term them) was at this time immense; and that the difficulty of distinguishing these persons, to whom habit had rendered opium necessary, from such as were purchasing it with a view to suicide, occasioned them daily trouble and disputes. This evidence respected London only. But, secondly (which will possibly surprise readers more), some years ago, on passing through Manchester, I was informed by several cotton manufacturers, that their work-people were rapidly getting into the practice of opium-eating; so much so, that on a Saturday

afternoon the counters of the druggists were strewed with pills of one, two or three grains, in preparation for the known demand of the evening. The immediate occasion of this practice was the lowness of wages, which at that time would not allow them to indulge in ale or spirits; and, wages rising, it may be thought that this practice would cease; but, as I do not readily believe that any man, having once tasted the divine luxuries of opium, will afterwards descend to the gross and mortal enjoyment of alcohol, I take it for granted.

"'That those eat now who never ate before;
And those who always ate, now eat the more'."

It is interesting to note how ardently De Quincey attacked Coleridge for his use of the same drug;

"Most truly I have told the reader, that not any search after pleasure, but mere extremity of pain from rheumatic toothache—this and nothing else it was that first drove me into the use of opium. Coleridge's bodily affliction was simple rheumatism. Mine, which intermittently raged for ten years, was rheumatism in the face combined with toothache."

Coleridge, according to De Quincey, "Had come to taste the genial pleasure of opium." But he did not know of Davy's laughing gas, and of the relief which Coleridge had found for his "mere rheumatism".

In the meantime, Davy was not content to devote his experiments to the male sex alone. He was known for his way with the ladies, and one anecdote is told of his administering laughing gas to a young lady on whom his intentions had been fixed but of whose marriageable qualities he was uncertain. The conversation in her trance which revealed the innermost secrets of her small limited little heart, a heart which clamoured for finery and carriages and servants and little else, persuaded Davy to abandon her.

But Davy conquered the female sex in another sense. They all became enthusiastic about Mr. Davy's "silk bags" which "held the key to paradise".

The reputation of the institute advanced by leaps and bounds. Asthmatics in particular, rich ones at that, came

in their dozens to be soothed by Davy's "paradise bags". Letters of recommendation travelled the country announcing, that men had been "born again" after their treatment with nitrous oxide.

Davy, however, had not gone so far as to consider the application of this gas for purposes of surgical operations. He was still calling it "the pleasure-producing air". But he notes the application of this gas in the case of the most obstinate diseases in a letter to his brother in which he wrote:

"My discoveries with regard to nitrous oxide, the pleasure producing air, are attracting attention everywhere. The Professors of Edinburgh University have taken up the matter with much enthusiasm, and have repeated my experiments. I have also received letters of thanks and praise from some of the most highly respected English authorities. Our patients here grow in numbers from day to day, and the institute is regarded with respect by the great trading city of Bristol. I shall soon be able to send you proofs of the successful way in which, recently, we have been able to handle some of the most obstinate diseases. We have, indeed, found laughing gas useful in the most varied illnesses."

Davy followed up his researches by writing a book called *Chemical and Philosophical Researches Mainly Concerning Nitrous Oxide and Its Inhalation.* In this book a note of healthy scepticism seems to creep in. He is still groping in the dark. His first enthusiasm for "pneumatic chemistry" does not prevent him from approaching it with healthy criticism:

"Pneumatic chemistry," he writes, "is, as far as medical applications are concerned, still in its infancy; but it has great development possibilities. If these possibilities are to develop, they must be confirmed by additional facts, derived from additional experiments; and the caution of reasonable scepticism must dominate them throughout."

Significantly, however, Davy did recognise the importance of the lungs as an absorber of anaesthetic properties as compared with the stomach. When only twenty-two,

he was appointed assistant lecturer of chemistry to the Royal Institution and in his very first address, he said:

"Nitrous oxide produces the same sort of cheerful intoxication when administered by the lungs as alcohol does when absorbed by way of the stomach."

Curiosity, it seems, seized not only the imagination of the public on this occasion, but also a certain Mr. Underwood. This gentleman volunteered to inhale, there and then on the lecture platform, Mr. Davy's pleasure-producing gas. Davy handed him the bottle and it appears that Mr. Underwood sucked in so much of the gas and was enjoying it so much, that he was reluctant to part with the bottle. It took Davy and two assistants some five minutes before they could disengage the obstinate Mr. Underwood's jaws from the mouth-piece. Davy's popular fame was now ensured.

One writer of the time says:

"The sensation created by his first course of lectures at the Royal Institution, and the enthusiastic admiration which they obtained, is scarcely to be imagined. Men of the first rank and talent, the literary and the scientific, the practical and the theoretical, blue-stockings and women of fashion, old and young—eagerly crowded the lecture-room. Compliments, invitations, and presents were showered upon the lecturer; his society was courted by all, and all appeared proud of his acquaintance."

The very patients that had left Dr. Borlase's surgery in protest, speaking of the "abominable young man" and had thus forced the kind doctor to give Humphry Davy the sack, now boasted to their friends that they had known the great Davy before he had become famous, and that they immediately had recognised the genius in him.

Davy, however, was not interested in being a social lion. He realised the importance of his work, and his faith in the pain-allaying properties of the laughing gas was bringing about certain conclusions in his mind. He notices, for example, that "a headache from indigestion was immediately removed by the effects of a large dose of gas, though

it afterwards returned but with much less violence. In the second instance a slighter degree of headache was totally removed by two doses of the gas."

The dawn had broken upon Davy. In his book *Medical Vapours* he was able to write:

"As nitrous oxide in its intensive operation appears capable of destroying physical pain, it may be used with advantage during surgical operations in which no great effusion of blood takes place."

He was not to know, of course, that this transient state of intoxication which he had noted in his experiments, was not sufficient to be called a true anaesthesia. It was merely a very primitive and early stage of its artificial manifestation. What he had to find was something which would produce durable narcosis.

Priestley before him was about to study the effect of nitrous oxide, when his laboratory was destroyed over his head. And now Davy, the one man whom fate had elected, so it seemed, to pursue the road which Priestley had to abandon, he too was to fall by the wayside.

Whether it was rumour or the rock obstinacy and conservatism of the profession or perhaps the fact that the drug in less expert hands did not give the same results as Davy had been able to produce, we do not know. Giddiness and decreased pulse followed its administration in the hands of less experienced physicians. Perhaps this was the cause that, only a few years after the great acclaim which had followed Dr. Beddoes, it came to be said in medical circles that "only quacks and fee snatchers treated patients with gases."

The attack was so persistent, that very soon the very use of laughing gas as an inhalant was prohibited by law, and poor Dr. Beddoes in 1780 at the very moment of his death was writing to Davy:

"Greetings from Dr. Beddoes, one who has scattered abroad the Avena fatua of knowledge, from which neither branch nor blossom nor fruit has resulted."

Was it lack of courage in Davy, was it disillusion or an outcrop of cynicism and mysogenism, which prompted

him to abandon his researches? Perhaps it was none of these things. Perhaps it was because his genius was so all-embracing that frustrated in one field he turned with equal interest to another. Did he not after all, give his name to a lamp for miners—the "Davy lamp", which enabled them to work in coal mines without risk of explosions from fire-damp?

Rewards piled on him—but not for the unesteemable gift of anaesthesia. Knighthood was bestowed on him in 1812; in 1818 a baronetcy. Had he not manufactured a new kind of gunpowder, more formidable and devastating than any other known before?

The pleasure-giving gas was forgotten. Mankind was to wait nearly another fifty years to ensure millions of centuries of pain if all the moments of agony of the millions had been added.

Not only must we add the patients' centuries of pain. What of the doctors?

There was Cheseldon, the famous British surgeon, who said he "felt physically sick every time he entered an operating theatre".

A story is told of another surgeon, William Cooper, who was waiting to perform an amputation. The unfortunate victim limped into the theatre and was laid upon the operating table. As soon as the amputation was to begin, his usual four porters would lay their hands on the patient and truss him up. The unfortunate could see the assistant preparing the terrible array of knives, saws and other instruments. He watched with terror when the surgeon took up his place at the end of the operating table, and then, with a small birdlike cry, the patient propelled himself from the table, and ran, limping away as quickly as he could. The porters made a dash to seize him but William Cooper made a sign to them. "Let him go," he said, "by God, I am glad he is gone."

Then there was John Flint South of St. Thomas' Hospital, he would go down on his knees like a mediaeval surgeon and pray for the Lord's mercy and assistance. The methods he used were slightly different it is true. Better and quicker

amputations were possible, but the pain was the same, its degree as bitter.

Another surgeon, Abernethy, would regularly be sick just before or just after an operation.

If this is how the surgeons felt, what of the patients? Let a doctor describe it. A young surgeon, writing to Professor Simpson, says this:

"Before the days of anaesthetics, a patient preparing for an operation, was like a condemned criminal preparing for execution. He counted the days till the appointed day came. He counted the hours of that day till the appointed hour came. He listened for the echo in the street of the surgeon's carriage. He watched for his pull at the door-bell; for his foot on the stair; for his step in the room; for the production of his dreaded instruments; for his few grave words, and his last preparations before beginning. And then he surrendered his liberty and, revolting at the necessity, submitted to be held or bound, and helplessly gave himself up to the 'cruel knife'."

In the year 1800 one may calculate that out of every two patients who went into the operating room, one was sure to die. Covering a hundred years, say the last half of the eighteenth century and the first of the nineteenth, the death rate stood over 80%. Pain and lack of antiseptics did their work. Two great barriers had to be overcome. The men who were to overcome them were only just being born.

CHAPTER VI

THE LAUGHING POPPY

THEY took the little lad who had made it a habit to hang round the printing shop into the book-binding department. He was a dirty ragged little rascal it is true, and his father and mother, it is said, bullied him to extract the few pennies he earned selling newspapers, so as to get drunk.

But Faraday had curiosity and a live cockney wit. Very soon he was an adept journeyman bookbinder. Not that he especially enjoyed the task. What he wanted, was to read, and every book that came in hand for binding, he would insist on reading before he elaborated the covers. By this means he learned to read and think.

It happened that one day fate thrust a number of unbound folios into his hands. They dealt with a chemical subject, but the youth was brave enough to try anything. It was a new experience, anyway. He happened, however, to be a slow reader and did not manage to bind the books by the time contracted.

Mr. Dance, the gentleman who had sent the books to be bound, wrote a caustic letter to the bookbinders and on receiving what he considered to be an unsatisfactory explanation, arrived in person at the shop. The senior bookbinder apologised profusely, for Mr. Dance was a member of the Royal Institution and his patronage was much desired.

"The fact is, Sir," he explained, "we have given your books to one of our apprentices, a very competent young fellow, mind you, and able to do a job well. Only he is rather slow."

"Perhaps you could bring the boy to me and I could impress on him the urgency of the work," said Mr. Dance, who was a man of even and kindly temper.

The lad was brought to him. Not a little worried, clutching the unbound folios in his arms.

"What," said Mr. Dance, "not one book bound yet?"

"No, Sir," said Michael Faraday, "not one."

"And he gives no explanation," said the senior bookbinder, hopelessly. "The boy must go."

"Now there is no need to tremble so," Dance patted Faraday on the head. "You seem a bright little fellow. Tell me why is it that you have not bound these books? Have you been busy?"

"Well, yes, Sir, no, Sir," stammered Faraday.

The senior bookbinder interrupted. "He has already bound three books this week," he explained. "But somehow you cannot persuade him to put yours in the presses."

"I am reading them," Faraday burst out petulantly.

"Oh, so you are reading them," said Mr. Dance, good-humouredly, as he burst out laughing.

"Reading them, goodness gracious me," exclaimed the bookbinder, "What ever next?"

"Yes, I am reading them," said Faraday obstinately.

"And you understand them?" asked Dance with an air of amused patronage.

"Certainly. Otherwise why should I bother to read them?" Faraday answered.

Dance's sense of humour must have been touched, for he said: "If you bind these quickly for me, you can have one of them. Which would you choose?"

"This one," said Faraday quickly, picking out a work by Sir Humphry Davy.

"Very well, my bright fellow. If you choose a work by Sir Humphry Davy, you might like to come and hear one of his lectures,"

What followed is best told in the words of Faraday. He wrote the following in a letter:

"When I was still a journeyman bookbinder I was already interested in chemistry and averse from trade. Then it happened that Mr. Dance, a member of the Royal Institution, took me to hear one of Sir Humphry Davy's lectures. My desire to escape from trade, which I thought

vicious and selfish, and to enter into the service of science, which I imagined made its pursuers amiable and liberal, induced me at last to take the bold and simple step of writing to Sir Humphry Davy and asking whether he could help me to carry out my ideas. When, at a personal interview, he agreed to comply with my wishes and take me to work at his laboratory, he thought it necessary to point out that science was a stern mistress, who brought little financial reward to those consecrating their lives to her."

The interview, it is true, had been very severe. Davy had grown pompous with age and perhaps somewhat embittered by disappointment.

"Science is a stern mistress," he repeated to the lad who stood with his hands politely at his side, and nodded every time in profound assent. "I do not offer you any hope. Your apprenticeship will be hard. You have still much to learn, although I must admit that you have remarkable native talent. I will provide you with fifty pounds per annum on which I trust you will be able to lead a clean and well ordered existence. I expect you to be in your quarters by ten every evening, not to frequent loose houses or to be an inordinate bibber of wine, or porter for that matter," Davy added in an afterthought. "The fifty pounds should also," Sir Humphry continued, "be enough to support you in decent clothes."

Faraday looked down at his tight ill-fitting breeches and blushed. "Yes, Sir," he said.

Faraday did not have much time to assimilate his new surroundings. Sir Humphry had married but recently, and was intent on making what was very fashionable in those days, a grand Continental tour. Honours had been promised him in the great capitals of Europe and it did not need his wife's prompting to persuade him to make the journey. Faraday helped to pack a portable chemical laboratory which Davy had designed.

"I propose taking you with me," Davy told Faraday. "Are you capable of writing?"

"Why, yes, Sir," said Faraday brightly.

"Very well, then, you will attend to the bottle washing

in my laboratory. You will serve me as a valet and secretary."

"Yes, Sir."

There was nothing insulting in the offer that Sir Humphry had made to young Faraday. He was indeed but a beginner and apprenticeship in his day was notoriously difficult. Davy, however, did not anticipate the great natural capabilities of his assistant, and very soon he found that Faraday had not only become a well-equipped chemist, but was entering into the field of experimentation with a great vision and boldness.

Lady Davy, a practical arrogant woman with a certain metallic beauty about her, was the first to notice that Davy had come to treat Faraday not as an inferior, but as an equal.

"You must keep that young man in his place," she insisted.

"But there is no keeping him in any place," said Davy. "The lad has genius, and he must be given his proper chance."

"Isn't it chance enough for him to work with you? Why, you could ask a thousand pounds for each apprenticeship, and probably collect a crowd large enough to stand in Piccadilly."

But despite Lady Davy's bad will towards Faraday, scientific men who came into Davy's laboratory were quickly struck by Faraday's remarkable knowledge. De la Rive, the physicist, quite innocently one day suggested that Sir Humphry should bring the lad to dinner, so that they might discuss Faraday's theory of electrolysis which he was only just beginning to develop.

Quite innocently that same evening Sir Humphry spoke to Lady Davy of the invitation.

"De la Rive really is impressed with that young fellow. I must say that I have never seen anyone like him. To be quite honest, I think he knows just as much as I do. He wants him to come to dinner to-morrow evening, I think."

"You never think, Humphry! I don't know why you allow yourself to be so insulted." Lady Davy remarked.

"Faraday is nothing but a servant in your house. Do you expect me to sit at the same table?"

"But, my dear, De la Rive," Sir Humphry interposed.

"The devil with De la Rive. I will not allow myself to be humiliated." Lady Davy swept out of the room and immediately went into the laboratory where Faraday was working.

"Mr. Faraday," she said ironically, "will you be good enough to brush my husband's clothes? Dinner will be served at seven, and you have made no effort to prepare him for it."

Faraday, bent on his experiment, did not hear her. Furiously, Lady Davy walked over to the table where he was working, and with one sweep of her hand brushed the elaborate apparatus which he had built, on to the floor.

Faraday was taken aback, but his mind was still dazed with the experiment.

"The first cell to contain water acidulated with sulphuric acid, the second a solution of copper sulphate, and the third, fused stannous chloride," he said. A shy thoughtful smile passed over his face.

"How dare you stand there grinning at me," she demanded. "I don't know why my husband keeps you here. From to-day kindly confine yourself to the servants' quarters."

The next day, of course, Sir Humphry overruled his good spouse's orders, and Faraday was again at work in the laboratory. But he did not go to De la Rive's house with Sir Humphry and Lady Davy. That same evening, Faraday wrote to a friend:

"I am so delighted at the chance of enlarging my knowledge of chemistry and sciences. That is why I continue this journey. But I have to make considerable sacrifices to secure the advantages for Lady Davy's behaviour often makes it very difficult for me to get on with her and Sir Humphry."

Matters worsened when a year and a half later, Faraday returned with Davy to London. Lady Davy had during this time managed to poison Humphry's mind against his

assistant. She made all sorts of stupid insinuations. Not the kind that would be expected of Potiphar's wife, but of a kind which she knew would be more effective on the touchy and jealous nature of her husband.

"You know, my dear, he has to thank you for what he knows. You are simply killing yourself to educate him. Every new idea of yours he seizes and exploits."

There were mitigating circumstances, it is true, for Humphry Davy's bad behaviour towards his assistant. One of the reasons was a severe nervous breakdown. Faraday's energy in contrast annoyed Sir Davy.

"Your electrolysis," he told him one day, "has been stolen from Wollaston. And as for the liquidation of gases by cold pressure, I hope you bear in mind that I was the first investigator in that field."

"Yes, Sir Humphry," answered Faraday.

Faraday, however, continued with his electrolysis and his breaking up of various compounds. During one of his researches into the differences between the vapours given off by substances that are fluid at a normal temperature and the true gases, he quite accidentally discovered or rather re-discovered the sleep-giving properties of ether. True, another chemist before him, Paracelsus, for example, had made the discovery. And Raymond Lully before that. Ether, indeed, was known also to Beddoes who had offered it to asthmatics. It was the temporary relief of pain given by ether which was known, not its anæsthetic properties. In the *Quarterly Journal of Science and Arts*, in the year 1818, Faraday noted:

"When the vapour of ether is mixed with common air and inhaled, it produces effects very similar to those occasioned by nitrous oxide. By the incautious breathing of ether vapour, a man was thrown into a lethargic condition, which, with a few interruptions, lasted for thirty hours."

This was something which Davy's laughing gas could not achieve. But curiously enough the medical profession as a whole ignored Faraday's research into the qualities of ether. Like Paracelsus, Faraday's attempt to rescue this

gas from oblivion failed. His interests were wide and he returned to his beloved electro-chemical researches. There was only one thing which pained him. When it came that his name was put up for the election for Fellowship of the Royal Society, the President of that society did all he could to prevent his election. That President was Sir Humphry Davy. Sir Humphry failed in his machinations and Faraday was elected. There was only one ballot against him, and that was the man's whose wife and whose jealousy had compelled Faraday to "make considerable sacrifices to secure the advantage of studying under his great contemporary."

One is tempted to wonder what would have happened if, at this particular stage when Faraday was noting the narcotic nature of ether, the two men had clasped hands and united their researches for the benefit of suffering mankind.

. . . . .

But there were other men, young men it is true, who were fighting on the common battlefield against pain. A youth, not unlike Humphry Davy and Michael Faraday, self-educated, was experimenting with crude opium. His name was Friedrich Wilhelm Sertuerner. He was an apothecary's assistant in the town of Paderborn, Westphalia.

Sertuerner had read the old histories. Opium, he knew, had been used since the very dawn of human history. All you had to do was to grow a field of poppies under a hot sun and then when the capsules formed, make a little incision with a knife. The sticky juice oozes out. Dry it and it forms a brown solid mass. The taste is sharp and bitter.

"My boy," said Kramer, the chemist for whom Sertuerner worked, "there is no remedy for pain. Crude opium is too uncertain. Do not bother me about it."

A friend of Wilhelm's had developed a terrible abscess on the left shoulder and Wilhelm had come pleadingly to Kramer asking him to give him something which would allay the pains of the operation which he knew his friend would have to endure. He suggested opium.

"Alcohol perhaps, but not opium," Kramer went on. "On one man it will work with a small dose, on another with a big one and one may even be killed by it."

"But surely," Sertuerner insisted, "it is possible to find some constant dose."

"If it were possible we would have found it," answered Kramer. "You are not the first one to be interested in its properties."

Sertuerner did not want to appear to be insolent but he decided there and then to find out how he could make opium "more certain", so that the doctor would be able to regulate the dose.

Kramer did not discourage the young man.

"Your point about the active principle may be right," he said. "Perhaps there is a pure active principle of opium as well."

The line of research which Sertuerner followed was paralleled this time by Sir Humphry Davy and Michael Faraday, only that they were using electrolysis to break up chemical compounds into their elements, whereas Sertuerner was trying to discover the active principle of plants by the use of solvents.

Week after week he applied distilled water to crude opium. Then he tried alcohol. But the "pure principle" continued to escape him.

It was only after he had poured liquid ammonia over the opium that crystals appeared before his eyes. Was this the pure element? Had he discovered the secret? He would soon find out.

Sertuerner went to the butcher, bought an incredible number of bones and, taking them back to the laboratory, he carefully salted them with these crystals. Then late at night he went out into the dark alleys of his native town and put the bones in conspicuous places. He also prepared baits for mice, delicately powdered with these opium crystals. The next day he visited the site of his "crimes". The dogs he found wandering in the streets were perfectly happy and yapping as loudly as ever before.

He bought more bones and more cheese he stole from

his master's larder. For over a fortnight he continued his experiments, increasing the doses on the bones and on the cheese. The mice proved especially co-operative. Like Priestley's mice they were tasting morphine for the first time. They gave him a rough indication of the dose which could not be exceeded without causing death.

"But the experiment remains unconclusive," said Sertuerner as he lectured three of his friends.

They had listened to him in silence and with great excitement. Budding chemists, they were ready for anything. They were ready, those four young heroes, to test out the "pure principle" on themselves.

"We will begin by swallowing each half a grain," said Sertuerner.

Solemnly they sat round a table and swallowed their share.

"How do you feel?" he asked the man nearest to him after half an hour.

"Fine," his friend replied.

"Just as if I had drunk a bottle of brandy," said another.

"My brain is so clear," said the third.

"Very well," said Sertuerner, "now we will take another half a grain. I'll take a whole grain and you watch and see if anything surprising happens to me."

"Oh, we will, don't you fear. There is an emetic here if things go too badly with you."

"Perhaps an enema would be better," the third one joked.

Within half an hour of their swallowing the second dose, a terrible sense of tiredness descended on the three friends.

"Keep awake, keep awake," Wilhelm prodded them. "Everything depends on this." He pushed them and prodded them and pinched them, but their eyelids were growing heavier and heavier.

"Quickly," Sertuerner said, "let's take the third half grain. Here, Heinrich, you take it, and you, Fritz. Come, Hans, try to swallow it. Please try." They pushed away the dose. They were too weak and, who knows, perhaps unwilling to continue the experiment further.

Wilhelm noted their protests down on paper. He noted his own reactions. He had actually taken this powder before, so that he was able to resist the effects better. But with the fourth dose all sensibility failed him.

Ten hours must have passed before the friends began waking one by one. They awoke only to be sick, only too horribly sick. Their heads were splitting. They could barely walk home. Fortunately it was still dark, otherwise they would have certainly been arrested for drunkenness. The explanation was simple. They had taken twice the amount of morphine regarded by modern medicine as the maximum dose.

Sertuerner, however, was not satisfied. "We are only beginning," he told his friends. "To-morrow evening we'll try once more with a smaller dose."

But Sertuerner's scientific zeal was not shared by his three wretched friends, who moaned miserably.

"I thought you said you tried it out on dogs," said Hans.

"And I thought you discovered the exact dose with your guinea-pigs," said another.

"Yes, yes," said Sertuerner impatiently. "I have tried it on every animal I could get hold of, friends, not only of the animal kingdom but also of the human. Now, lads, come! Agree that we have another session to-morrow."

But the lads were either too sick or too frightened of complying. "Never again!" was their verdict.

There was nothing to do but to try it out again, this time on himself. Three or four experiments brought Sertuerner to the conclusion that the overdose had been exceeded by the third half-grain. There was, however, much to be done in discovering just for how long the influence of the drug lasted and the intensity of the effect which followed the precise dose.

Sertuerner was already a flourishing chemist in Inbeck, Hanover, that is to say, fourteen years after he had first discovered the "pure principle" of opium when he received recognition for his achievement.

Curiously enough, the pain-relieving quality of morphium

he found, like Davy, in self-application. Like Davy, too, he took it to cure himself from a severe attack of toothache. He discovered also that not only did his preparation allay pain, it also induced a deep and restful sleep, fragrant with pleasant dreams, and it was out of this latter experience that he named the drug "morphium", after the Greek god of dreams, Morpheus. Later this morphium was to be called, for brevity's sake, morphia or morphine.

In the year 1817 the German Mineralogical Society at Jena, under the Presidency of the great Goethe, bestowed on Sertuerner an honorary membership. Honours descended upon him from the universities of St. Petersburg, Paris, Berlin, Lisbon.

The details of his discovery Sertuerner set out in his "Ueber das Morphium als Hauptbestandteil des Opiums".

Every good modern chemistry text-book will carry this synopsis of Sertuerner's work:

"Now that the pure active principles of the plants have been extracted, the dose can be carefully regulated, whereas previously, a large dose of the plant itself or an extract, containing an indefinite amount of the alkaloid, had to be given."

In the year 1831 Sertuerner was awarded the Montyon Prize and given the distinction of being known as one of the "benefactors of humanity". We are to hear of this award often. Little did Montyon, a wealthy Frenchman who instituted this award in 1821, know that one day that title would serve not so much as an honour but as a pathetic brand.

So the world had honoured Sertuerner, praised him and bestowed on him two thousand francs for his discovery. But what the world had done to Priestley, to Davy and Faraday, it was destined to do as much for Sertuerner. The innate conversation of doctors, not exclusively English by any means, but Continental as well, began to nibble at the pillar on which fame had raised Sertuerner above his fellow-doctors. Whisper, malice, rumour and in a few years not only France but also Germany was ringing with the cry that morphia was a fraud, the device of an amateur.

"Herr Sertuerner! Why he is nothing more than a swindler, a mere quack."

Tragically Sertuerner was driven from his own town of Inbeck. He fled to find new associations and a new home in the town of the Pied Piper, Hamelin. But he had no magic pipe. He had only a few crystals in a bottle. And now no one wanted them, no one, that is to say, who could apply and use his discovery, for he had no friends in the medical profession.

Slowly Sertuerner's faith, the milk of human kindness in him, turned sour. From a lover of mankind he became one of its haters. Perhaps that is too strong. He certainly was indifferent to its fate, to its cries of anguish from hundreds of operation wards where men still suffered brutal mutilations, attacked by agony and sepsis.

But Sertuerner is honoured again; this time for his patriotic deeds by the Government of Hanover. Sertuerner had produced an alloy of lead and antimony which greatly increased the range of firearms. He also invented a new and more developed breech-loader.

But dedicated as he was to aid in the destruction of mankind, Sertuerner could not even take pleasure in his revenge, for in his heart he was a bitter and disillusioned man, having lost the power of pity and contempt. To add to his misfortunes, he was stricken in his old age by a gout which racked and tormented him as much as the instruments of death which he had devised, racked and tormented the enemies of the State.

Morphia he took, for he knew the soothing qualities of his own invention. But his stomach was too weak to contain it. (As yet the hypodermic syringe had not been invented).

Sertuerner died with none of the prospects, none of the aurora of greatness which surrounded Davy. It was a harsh reward for the benefactor of humanity.

Was it remarkable that Sertuerner failed when we have surgeons such as Alfred Armans, Louis Marie Velpeau, saying: "To escape pain in surgical operations is a chimera which we are not permitted to look for in our days. A

cutting instrument and pain in operative medicine are two ideas which never present themselves separately to the mind of the patient and it is necessary for us surgeons to admit the association."

But Velpeau was not a sadistic man. Indeed he was a great surgeon, who could perform complicated operations within the space of sixty seconds. Sixty thousand centuries of agonies these seconds must have represented to his patients, but it had always been so and always would be so—that was the attitude of Velpeau and his associates, the attitude which broke Sertuerner's heart.

Another well-known doctor went so far as to say that it was unworthy of the human race to resort to artificial sleep. "Why make a body into an insensitive corpse?" he pronounced.

But perhaps the most preposterous of all arguments advanced belongs to one Copland, noted in his time, who said:

"Even were the reports of persons who felt no pain during an operation credible, this would not be worth the consideration of a serious-minded doctor."

But it is not only of the famous and the noted that the history of discovery takes account. Whilst Sertuerner's enthusiasm was being damped, there was a young doctor in England who was devoting himself to the propagation of another pain-allaying substance, the same laughing gas which Priestley and Davy had abandoned.

He was an ordinary enough young doctor but with a brave heart. He had completely dedicated himself to the service of ailing humanity. He was unique in that he set himself up not as a doctor exclusively for the rich but one who was prepared to operate without fees for those in need. On the door of his surgery was pinned this notice: "At home every Tuesday from ten o'clock until four; for the purpose of giving advice gratis to the poor and labouring classes."

Hickman's practice was thus not surprisingly large. Moreover he was frequently called to operate either for such common ills as stone or hernia, or perhaps even to perform more complicated amputation.

Since his student days, Hickman had been appalled by the lack of progress made in the struggle against pain. The very first operation he witnessed, he pronounced as "medieval". The surgeon who was operating at the time overheard his remark.

"Did I hear you call my operation medieval, sir?" he demanded.

"I did," Hickman retorted, although he knew that he was under the penalty of expulsion.

"You are right," answered the surgeon sadly. "We are all savages armed with a knife. But there is no help for it."

"There must be," replied Hickman. "There must be a way out."

Mesmerism attracted him from the first but he abandoned it as inconstant. But the patients that crowded his surgery had a simple faith in this young doctor. They allowed him to make whatever experiments he considered necessary on them. Alcohol, narcotics, all these Hickman tried, but with no success.

One day he happened to visit Shifnal. He had come here to act as a locum tenens. "The fact was," he confided to his friend, T. A. Knight, the eminent horticulturist and botanist, "I was in need of money. My surgery was not paying its way, so I decided that instead of taking my annual holiday, I would come up to Shifnal to help one of the doctors out here. It would prove a change and perhaps earn me enough to cover my needs for the next half year at Ludlow."

By a freak of chance, Shifnal was the birthplace of Dr. Beddoes, the same Dr. Beddoes who had earned fame as the founder of pneumatology and who was later to die of a broken heart. Old folks remembered Dr. Beddoes and spoke warmly of him to the young locum tenens.

"Yes, he was a fine man, was Dr. Beddoes. And his gases, why, they could cure anything. And as for his young assistant, Davy, the Sir Humphry Davy of to-day, you know, his gas was a rare pleasure. You could never have enough of it, especially if you had a toothache or perhaps a bit of lumbago. It was cheerful stuff."

A few weeks later, Hickman went down to Clifton. The stories he had heard of Dr. Beddoes' Institute had inspired him with an interest and a desire to study gases. But in Clifton, Hickman was disappointed. There were few who had a good word to say for Dr. Beddoes.

"A quack, a charlatan. Why should you, a proper doctor, be interesting yourself in his trash?"

When he returned to Ludlow, Hickman gave up all his spare time to the study of the science of Priestley, Davy and Faraday. Very soon we was making experiments on his own. A reading of Paracelsus had inspired him to use the inevitable chicken. He tried out mice and dogs. These experiments on animals were very successful, yet at the same time Hickman was aware that something was missing. Let him describe his own experiments with carbonic acid:

"A mouse was confined under a glass, surrounded by water; by means of a small tube a foot long I passed carbonic acid gas very slowly prepared into the glass; respiration ceased in the minute. I cut all its legs off and plunged it into a basin of cold water. The animal immediately recovered . . . apparently without pain. . . . Later I took a fully-grown dog and plunged him in an atmosphere of the same gas. Within twelve seconds he was completely insensible. He remained so for seventeen minutes. Meanwhile I amputated a leg without his giving any sign of pain. . . . Next day I filled a glass globe with the gas exhaled from my own lungs; into it I put a kitten. In twenty seconds I took off its ears and tail, there was very little haemorrhage and no appearance of pain to the animal."

In actual fact it was after this experiment that Hickman observed that what he had induced was not anaesthesia but asphyxiation. He found that better results were obtained when he administered carbonic acid, followed by pure laughing gas. Indeed, he felt he had reached such a stage that now his experiments could be applied in practical surgery.

He wrote to his friend Knight, who was a Fellow of the Royal Society and a very good friend of Davy and Faraday. He begged Knight to enlist the support of the scientists.

"Having made experiments on various animals," Hickman wrote, "I feel perfectly satisfied that any surgical operation might be performed with quite as much safety in an insensible state, for the performance of the most tedious operation . . . I believe there are few if any surgeons who could not operate more skilfully, when they were conscious they were not inflicting pain. . . . I certainly should not hesitate a moment to become the subject of such an experiment, if I were under the necessity of suffering any long or severe operation. If by my labours I could add a grain of knowledge to what has been ascertained about the means for dulling pain, I should be amply rewarded."

Knight immediately took the letter to Davy and Faraday. But the truth was that both these distinguished men were busy with their own interests. They did not have a moment to spare for the country doctor, Hickman.

Knight approached others but they only said: "What does Sir Humphrey Davy and Michael Faraday think?"

Knight had no reply and neither had Hickman.

A still greater disappointment occurred when a year later Hickman had the opportunity of delivering a lecture before the Medical Society of London. Politeness but not interest was in the air when he had reported on his researches. There was nothing but silence.

"What on earth have the reactions of mice and chickens got to do with human beings?" was the only question that was asked.

"A country bumpkin," somebody commented.

But Hickman was not a man to be slain by ridicule. If London laughed at him, well, there were other places in the world. There was Paris, for example, Paris with as great a medical tradition as London's. Hickman decided on a bold step. He could write to Charles, King of France. Although Charles was by no means politically progressive, he had shown a considerable interest in promoting scientific discovery. Here is the letter which Hickman sent:

"To His Most Christian Majesty, Charles Tenth, King of France.

"Sire—In addressing your Majesty upon a scientific subject of great importance to mankind, I feel a properly humble but a firm confidence in Your Majesty's universally known disposition to countenance valuable discoveries. . . . Permit me, Sire, to state that I am a British Physician, Member of the Royal College of Surgeons, London, who has visited Paris in part for the purpose of bringing to completion a discovery, to which I have been led by a course of observations and experiments on suspended animation. This subject has engaged my practical attention during several years; it appears demonstrable that the hitherto most agonising dangerous and delicate surgical operations, may now be performed, with perfect safety, and exemption from pain, on brute animals in a state of suspended animation. . . .

"Paris the great Metropolis of Continental Europe is the place, above all others, where the profound studies of humanity are, with the utmost facility, carried to their higher extent and perfection, and, Sire, I feel confident, that I do not say too much, with a due regard for the scientific distinction of my own Country, in avowing that these facilities have deservedly conferred on your Majesty's Chief City, the eminent title of the Centre of Science to the civilised world. . . . Should my labours meet with the approbation of Charles Tenth, I shall ever enjoy the grateful satisfaction of believing that I have devoted myself to my profession to a distinguished and to a happy end. . . ."

Hickman's friend, Mr. Knight, managed to get the letter conveyed to the King, who passed it on to the French Academy of Medicine. A meeting was convened for December 28th, 1828.

Hickman when he heard the news was overjoyed. He was young and full of hope. But the greybeards of the French Academy were as reactionary as his own colleagues in England. The young doctor's paper was read out aloud. Every now and again there were guffaws.

"Who has ever heard of an operation under laughing gas?"

"The man is a fool."

"We are wasting our time."

"I regard it as nothing more or less than criminal."

"Does this young gentleman think we are going to expose our patients to such perils?"

Only one lone voice stood up for Hickman. Its possessor was Baron Dominique Larrey. He alone perhaps of all the men present, knew the anguish which soldiers suffered after battle. He had followed Napoleon to Moscow. He was his chief army surgeon, and although an old man, comfortably pensioned, he was prepared to speak in Hickman's defence:

"Gentlemen," he said, "it has been my misfortune to look upon fields of pain and blood. I would not be so ready to close my eyes to any suggestion, be it ever so small, which might prove of some use to suffering humanity. Let me say this: I, Larrey, I myself am willing for Mr. Hickman to administer laughing gas to me, and see what would happen."

But this noble speech had no effect on the mandarins. Larrey's was the only vote cast in Hickman's favour and Hickman, after pressing his hand in gratitude, returned home.

Eighteen months later, at the age of twenty-nine, young Henry Hill Hickman was dead. He had died in the midst of his dreams. He was younger than Sertuerner, than Davy, than all the others who had entered on the thankless task of helping humanity. It was a premature death—perhaps the most merciful one.

CHAPTER VII

A SERIOUS JOKE

IN the year of grace 1844, typical of many advertisements which plastered the walls of American cities, was this one:

"A grand exhibition of the effects produced by inhaling NITROUS OXIDE, EXHILARATING OR LAUGHING GAS! will be given at Union Hall this (Tuesday) evening December 10, 1844.

"TWELVE YOUNG MEN have volunteered to inhale the gas to commence the entertainment.

"EIGHT STRONG MEN are engaged to occupy the front seats to protect those under the influence of the gas from injuring themselves, or others.

"N.B. The gas will be administered only to gentlemen of the first respectability. The object is to make the entertainment in every respect a genteel affair."

A grand exhibition of the effects produced by inhaling nitrous oxide! That is what the experiments of Davy, Faraday, and Hickman had been converted to. Humanity so long as its body was whole wanted to laugh, and did not this nitrous oxide hold the secret of artificial laughter? What did its pain-allaying property matter when the whole regiment of professionals said that it was wrong to reduce the human body to an "insensitive cadaver"?

Forty years had elapsed since Dr. Beddoes and Davy had operated their pneumatological institute. Scientifically they had been scoffed at. Laughing gas and Faraday's ether would now go on exhibition, would *now* become popular, familiar things for mountebanks and hucksters. But no one, no one it seems, would have the foresight to apply it for better purposes.

In the same way that fireworks and practical jokes of every kind have an ever-green appeal to youth, so too the

use of laughing gas became a familiar instrument of amusement for university students. Professors found that it broke the monotony of a lecture, if one could demonstrate its effects—mildly. But the 1840's was a moral age. The Puritan tradition hung like a black cloak over New England. But in their hearts, men, women and children, were as curious as ever. They loved exhibitions and ceremonies and circuses and fun fairs, with a deep and ancient love older than their sour-faced ancestors.

So travelling showmen, clever enough to exploit the craving for "sensible instruction", would toot on their horns as they moved from village to village and town to town. Solemnly setting up their booths, and lecturing in high white collars and top hats, in a manner which even the most upright citizens would find little to complain of. Some would construct a portable laboratory, nothing more than a large box fixed to a handcart. Shouting in a loud voice, they would call on the citizens to try the "latest New York novelty".

For 25 cents a man or a woman was given enough gas to make them tipsy. Their movements, their hysterical laughter, and the pricked balloon dignity of some pompous citizen who had been lured to partake in the fun, added greatly to the popularity of these nitrous oxide "lectures".

There were others of course who, having tasted the pleasure of laughing gas, queued up when the lecturer yelled through his megaphone: "Would any gentlemen who would like to inhale the gas in private, oblige me with their names and addresses?"

Laughing gas, it is true, was popular in the streets. It was the joke of the moment. The amusement derived from ether, on the other hand, was confined almost exclusively to the universities.

At one particular ether party a student, by the name of Wilhite, was bent on showing off how much ether he could take without getting drunk. Suddenly he noticed that his performance was being watched by a little negro boy who was peeping timidly through the window. The half tipsy student flung himself at the boy, seized him by the scruff

of the neck, and amidst laughter, proposed that they should experiment on the youngster.

"Oh, massa, massa, let me go," wailed the child.

But Wilhite was obdurate. "Give it to the beggar," he said as he held the ether flask under the black lad's nose. Then, to hurry the effect, he took out his handkerchief and sprinkled ether on it, and pressed it against the lad's mouth and nostrils.

Soon the boy's cries grew weaker and weaker. His muscles relaxed.

"Why doesn't he dance?" someone said.

It was usual after a mild inhalation of ether for the victim to perform a capering or chasing after the other guests, in a state of intoxication.

Wilhite pricked the boy with his tie-pin. Another fellow kicked him. The little negro child lay quite still. The women crowded round and remarked on his pallor.

"He is dead," said Wilhite. "We have killed him."

"Then fetch a doctor, fetch Mr. Ware," someone cried.

Wilhite and the others were prepared to flee. It was only when another doctor by the name of Reese entered the room and began throwing cold water over the lad and, that having failed to restore him, proceeded to box him sharply on the ears, that the boy awoke.

"Very odd," said Dr. Reese, "very odd," after they had explained the prank to him.

That was all he said. He did not grasp the profound significance of this complete loss of consciousness and sensibility. Humanity's cloak had three more years to go.

The itinerant hucksters took over demonstrating ether just as they had "lectured" on laughing gas. The sensation caused by ether was profounder, the state of elevation far more acute. They went north, west, east. But it was in the deep south, down in the village of Jefferson, somewhere in Georgia, that one of them chanced to stray. This was the land of cotton and slavery. The men were gallant and the women gentle. The black man, of course, was nothing but a slave.

The whole village, or more accurately it would be to say,

anyone of any account had gathered to attend the demonstration.

"Where is the handsome Dr. Long?" asked Caroline Swain. She was considered to be the belle of Jefferson, and the twenty year old Dr. Long was already marked down as her victim.

"Hush," said her mother. "You really must not chase that young man. Not so obviously at least."

"But this is something he would not want to miss for anything in the world, mama," said Caroline.

However, it appeared that Dr. Long had been summoned to a patient who was lying sick at a distant plantation. The itinerant gave his lecture and concluded with a practical demonstration which pleased every one. Naturally, when the popular young doctor returned home, his friends were very full of the evening's entertainment.

Long, a tall, handsome, blue-eyed fellow dressed with southern elegance, listened patiently to the overwhelming conversation of the girls. "Let me see now," he said, "do have a little patience. You must give me time to find a full explanation. Excuse me."

He hurried off to his surgery, and then returned with a bottle. Saturating his handkerchief, he poked it under the nose of a few of his friends. Caroline was a victim, and so was her mother.

An extraordinary scene occurred. Everyone began to talk at once. Laughter reverberated through the room. Old gentlemen who had previously walked decorously on their malacca canes, now threw them away and began to caper. Others quarrelled or sang.

When it was all over the elder folk were furious, "Really, Dr. Long, most unbecoming of you, most, sir."

But the young folk enjoyed the practical joke, especially Caroline Swain. "What fun," she said when Long disengaged himself for a moment from his friends to speak to her in the orangery. "You must have one of these ether frolics every day," she said. "How do you like the name by the way; I shall call you the ether frolic-Long from henceforth!"

"Now, my dear," said Long, "of course its very amusing, but I really must restrict this to men."

Caroline was disposed to argue, but at that moment her mother entered, and with a sharp glance at Dr. Long, dragged her daughter away.

Three weeks or so passed. Long's house was invaded every Saturday and Sunday with the fashionable jeunesse d'or of Jefferson and the surrounding plantations. The young women of the district, however, had heard fabulous tales at second hand from their brothers, and it was Caroline Swain who led the attack on Long's surgery. They came in their prettiest bonnets and their most frilled panties peeping under their crinolines.

"Please, please," they begged.

"Oh, you charming irresistible women," said Long. "You will have your ether party on Christmas Eve."

Dr. Long must have used up most of his ether, because a week or two before Christmas he wrote to a friend of his who ran a drug store not far from Jefferson:

"Dear Bob," he said, "I am under the necessity of troubling you a little. I am entirely out of ether, and wish some by to-morrow night, if it is possible to receive it by that time. We have some girls in Jefferson who are anxious to see it taken, and you know nothing would afford me more pleasure than to take it in their presence, and to get a few sweet kisses."

Such then were the young rascal's fell plans. He set an elaborate stage just for a few sweet kisses. When the girls had gathered in his surgery, he said to them: "I have just sent for a new supply of ether, ladies. But I am afraid I cannot make up my mind to inhale the stuff."

Loud groans greeted this announcement.

"No," said Long with a delicate wave of his hand. "It cannot be. I cannot answer for what I might do under its influence."

"Oh!" crowed the well-bred young ladies. This was just the sort of sport they would enjoy on Christmas Eve. Caroline Swain spoke up: "Rest assured, Dr. Long, that anything you might do, we will ascribe solely to the ether."

"Very well," said Long gleefully, "but one thing, let's lock the door."

Long was living with two of his sisters, both nearly twenty years older than himself. These religious old ladies had been packed off early to bed. But the cheers and the giggling of Long's fair visitors had undoubtedly disturbed them.

Long sniffed melodramatically at the bottle. He then proceeded to twirl round the room and kiss every girl with remarkable accuracy, never omitting one. The girls in their turn believed in his intoxication, but insisted on trying it themselves. The fashion became a rage.

Long, however, for all his interest in kisses, suddenly became aware of the properties other than exhilarating in the ether which he handed round at his frolics. He noted, for example, the following:

"On numerous occasions I inhaled ether for its exhilarating properties, and would frequently, at some short time subsequent to its inhalation, discover bruised or painful spots on my person which I had no recollection of causing, and which I felt satisfied were received whilst under the influence of ether. I noticed my friends while etherised received falls and blows which I believed were sufficient to produce pain on a person not in a state of anaesthesia, and on questioning them they uniformly assured me that they did not feel the least pain from these accidents."

Surely, Long began to reason, if people bruised themselves accidentally under the influence of ether intoxication and felt nothing, why should they feel the pain of a surgical operation, providing they could be got to the right pitch of ether elevation?

Dr. Long, however, was a cautious man. He did not confide his thoughts to any other doctor who happened to be visiting Jefferson. He decided to try out his experiments first on one of his patients.

Such a man came along in the shape of a young student fellow named James Venable. He came along to the doctor's surgery one day and pointed to his neck: "I don't

know what these are, doctor," he said as Long inspected the neck. "But they have been hurting a lot lately."

"Tumours, nothing much," Long said with a beating heart. "It's quite simple, Venable. I can take them out without you feeling the slightest bit of pain."

"I have heard that before," said Venable wryly. "Are you going to use a blunt knife on me?" he joked.

Dr. Long pointed to the flask on his desk. "Ether," he said.

"What's ether got to do with it?" Venable demanded.

"Just this," Long explained. "Pull up your right trouser leg."

Venable obeyed.

"Hm, I thought so. Bruises. Do you know when you collected them?"

"Certainly," Venable replied. "Knocking about at one of your ether frolics. Quite a lot of fellows have them. Some as large as saucepans."

"As large as saucepans, eh? Well, then, you must remember getting them?" Long questioned.

"Remember? I don't remember a thing. Why you could cut me open and I wouldn't feel a thing with that ether of yours."

"Precisely," said Long, "you've just said it yourself."

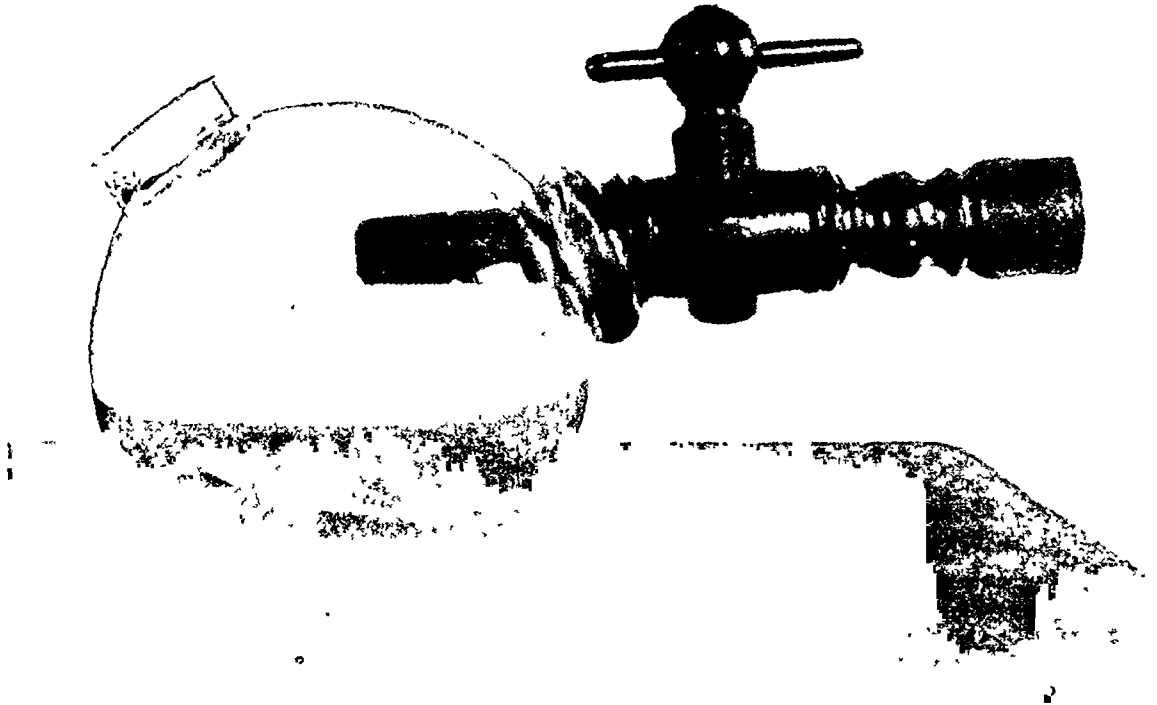
"Eh, but that's different," Venable protested.

"There is no difference at all, my good fellow. I promise you you won't feel a thing. If you do, give a yell, and I'll stop immediately and we'll do it the old way. Because done it must be. Those tumours can grow to a pretty nasty size."

Venable did as he was bid. He lay down on the operating couch, and breathed the ether vapour from a saturated handkerchief. After a few seconds, Long gave him a pinch. Venable howled like a banshee.

"All right, all right," Long said, "I know you are awake. It was just to show you that I was as good as my word."

He waited another minute. Then, picking up a surgical needle, Long pricked Venable's hand. His friend did not utter a sound.



The original Morton inhaler used in the operations at the Massachusetts General Hospital.

[Face page 128

Morton extracts the tooth of the musician Eben Frost painlessly by administering ether.
(From The Trials of a Public Benefactor.)

The operation was completed uneventfully. The tumours were taken out, and after a short period, Venable woke up.

"Well," asked Long triumphantly. "And what do you say to that?"

Venable shook his dazed head. "Not a prick," he answered. "It's amazing. I think you are a genius, and your ether is a heaven-sent gift. But how do you account for it?"

"I don't know," answered Long honestly. "I don't know what it is. I think it is half ether and half me."

"Half you? What do you mean?"

"Well, you have heard of Mesmerism, haven't you? I think I have discovered a mesmeric elixir, that's what it is."

"You mean to say," said Venable, "if some one else tried to do the operation with this ether, it wouldn't work?"

"I suppose so," said Long, "that must be it. I am Mesmeric."

"I don't care what you are," said Venable. "I'd bet you could cut my head off if necessary. People ought to know about it. There is Dr. Lamont at Athens, Georgia. I am going right off to him, to tell him the whole thing."

Long shrugged his shoulder modestly. "Oh, I wouldn't make too much of it," he said, "but it's a good thing if you know how to apply it."

Venable dashed off to Athens. But the reception awaiting him by Lamont was by no means the one he expected.

"So you say Dr. Long can make people go to sleep: can make them unconscious, eh?" asked Lamont. "Well, I don't believe you and if I did I'd think it was dangerous. Look at you now, you are so excited you can hardly talk."

"But I tell you, doctor," Venable protested, "I didn't feel a thing, not a thing."

"You stop talking nonsense, young man." Lamont pretended to be angry. "And you had better come in my surgery for a sedative. You are so excited that you might burst a blood-vessel."

Venable did not take any sedative but rather broken-hearted, left his friend Lamont. No sooner, however, had

the latter remained alone, he hurried as fast as his legs could carry him to his friends in Athens.

"Have you heard?" Lamont pretended to be excited. "Have you heard that the play-boy Long possesses a liquid that can make people unconscious without telling them it is a dangerous poison and it can deprive people of their reason?"

People were very eager to spread this malicious rumour and evil tongues wagged incessantly for weeks to come. The story about the dangerous poison spread like wildfire and aroused so much alarm that even the young people that came to enjoy themselves in the boisterous parties began to avoid Dr. Long and refused to submit to the ether inhalations.

Long did not despair at the beginning at such unexpected reverses. "Surely," he told himself, "providence will bring the right case to me and then, when it comes, I'll show them—the gossipers."

Soon enough, the case did come in the person of a little negro boy who had his fingers badly burnt.

"Dr. Long, sir," said the despairing father. "Here is the rascal who has given me nothing but trouble since his birth and now—look at him. He is only eight but the mischief he does is enough for a grown-up person."

Long examined the boy. It was no mistake, the fingers were so badly burned that at least two of them had to come off. Long prepared his instruments.

"Look here, boy,"—he pretended to be calm, although the colour of his face showed great excitement. "I am going to give you something nice to smell and then you will not feel a thing—not a thing."

The boy looked at the doctor, terrified, but did not answer. He nodded his head in assent. Eager for the experiment, Dr. Long gave his famous ether to the boy and was able to amputate one of the fingers without the boy as much as stirring. Then, like a cool, scientific investigator, he removed the heavy bag from the mouth of the negro boy, waited a while, then took up the scalpel again. No sooner had the knife cut into the second finger than the boy jumped from the table, yelling at the top of his lungs.

The father thought the doctor had gone mad, because instead of being sorry, he was grinning from ear to ear. Dr. Long had succeeded in his experiment. He knew now that the ether alone, and not his mesmeric powers, were responsible for the painless amputation he had performed. Now he would surely succeed in convincing the villagers and his colleagues of the truth and importance of his discovery. The name "Anaesthesia" was still unknown. Long called it the "ether sleep". He was soon, however, to be bitterly disappointed. His friends and patients were not only convinced, but started a religious campaign against the evil doings of Dr. Long. On street corners and in houses, evil voices spoke of the danger hanging over Dr. Long's patients.

"It won't be long, and you mark my words, this young irresponsible rascal will kill someone and then, by jove, we'll hang him for it." "We must banish him from here before he kills somebody," others were saying.

"He either puts a stop to his evil doings, or else he goes," was the final verdict. And Dr. Long found himself ostracised and despised. The only person who believed to the last in him was Caroline Swain—now Mrs. Long. A wife's evidence, however, was not enough; even she found that her old-time friends were avoiding her. And as for the practice, that was going to pieces. People were afraid to consult Dr. Long: they thought that in his madness, he might give them the poison without their consent.

What a pity that Dr. Long had not the courage to persevere and stick to his guns. All great men have had reverses; were ostracised, were ridiculed but they persevered in what they believed. Dr. Long was not made of the same stuff. He became afraid of what would happen to him and his family—he became afraid of not being able to earn his livelihood. "Well, my dear Caroline, there is nothing else for us to do but to bow to the opinion of our friends and patients. We must discontinue this accursed ether practice. After all, other doctors do well without it."

"If people want to be hurt, let them be hurt," answered Caroline in tears.

And people did let themselves be hurt. They submitted to painful operations, strapped to the table, writhing in agony rather than inhale the deadly stuff that made the operation painless.

Humanity was not ready for the advent of anaesthesia, and a few more years had to pass and thousands of people had to be tortured under the surgeon's knife before it realised the significance of the new drug.

. . . . .

Once more humanity was given a chance to rid itself of the agonising pains that accompanied every operation, and once more it refused to accept it. This time it was in the person of Dr. Horace Wells. He had been attending one of the mountebanks' performances with laughing gas, the name that was given to Nitrous Oxide. It was a grand exhibition in the open air and men and women from the audience were summoned to experience the unusual effects of the laughing gas. Among those who submitted that particular evening, was a young man who was so enraged at the laugh he provoked that, instead of laughing himself, he became belligerent and started fighting with one of the audience. During this fight he knocked the shin of his left leg and although a deep, gaping wound resulted, he never as much as uttered a cry, but went on jumping among the rows of seats.

Horace Wells, who was a dentist, saw this and some peculiar curiosity overcame him. After the performance was over, he approached and introduced himself to the particular young man and all the way home, whilst walking together, he asked him about the wound on his shin.

"No, doctor," the young man assured him, "I never felt a thing; I don't even know when I did it."

That decided Dr. Wells. The moment he reached his own home he went straight to his study and wrote the following letter to one of his colleagues:

"My dear John, I would appreciate it very much if you would kindly come to-morrow to my surgery and pull out one of my teeth that has been giving me a lot of

trouble. I want you to come to me because I am going to experiment with a new stuff which I believe is going to numb the feeling of pain."

Dr. John Riggs, with the letter in his pocket, arrived next morning, and although slightly sceptical, agreed to extract one perfectly healthy tooth of Dr. Wells's. As a matter of fact all Dr. Wells's teeth were perfectly healthy, but he pretended otherwise. Being a cautious fellow, he could not risk an experiment with the laughing gas on one of his patients. He had to try the effect of the gas upon himself beforehand. Hence the experiment with Dr. Riggs.

As soon as the extraction was over and the effect of the gas disappeared, Wells jumped from the dental chair and embraced his friend. "John, old boy, you have witnessed a new era in tooth-pulling. From now on I am going to be rich, I am going to be famous, because no patient of mine is going to feel pain while I extract his teeth."

Dr. Wells did adopt the laughing gas for his patients and with quite a good success. From an unknown dentist, his fame spread overnight in the little town of Hartford. Patients flocked to him and it might have been that Dr. Wells's experiments could have succeeded and he himself hailed as a benefactor of humanity, but for his impatience. Wells was so eager to show the great discovery to a wider circle, to Boston itself, where he qualified very humbly some years previously, after only a few months of successful experiments in Hartford, he wrote to another friend of his, Dr. William Thomas Green Morton. In fact he went to Boston to see him personally. The two old friends closeted themselves in Morton's surgery and for two hours Wells tried to persuade his friend as to the enormous possibilities of the laughing gas.

"Well, Horace," Morton said, "if half of what you say is true, you are going to be a great man. I am going to use all my influence to let you experiment in front of the Dental Society of Boston. I will do that if it is the last thing I do."

Morton kept his word. It was quite easy for him to secure permission for Wells's experiment. An eager audience

at Harvard University waited one morning for the two young dentists. Even the patient was not lacking. A student who had passed sleepless nights from terrible toothache was more than willing to have his tooth extracted, and painlessly at that.

The hefty young fellow sat in the dental chair. Pompously Dr. Wells approached him with his gas apparatus in his hand. "Now, young man, you are going to be the first person in Boston to have his tooth out without pain. Breathe quietly, inhaling the stuff."

The breathless audience was watching every movement of the performance. History could have recorded this experiment as the first use of anaesthesia, if only Dr. Wells had done more experiments and had been cleverer than he was in reality. He did not reckon with the strong constitution of the student; at the same time he was frightened to give too much gas, because many of his patients in Hartford had nearly died when they inhaled by mistake more than the usual dose of laughing gas. Bearing that in mind, Wells gave the patient only a few seconds to inhale and then, removing the mask, applied his forceps and started pulling. What followed next was pandemonium—the patient started yelling his head off and gesticulating wildly, nearly knocking Dr. Wells on the floor. The two dentists tried vainly to restrain him, but he was too strong for them, and pushing aside the chair and instruments scattered on the floor, he went for Wells, bent on revenge for the hoax that had been played on him. And the audience followed suit. "Humbug, swindle," they shouted, "throw him out. This is a university and not a circus."

Humiliated and unhappy, Horace Wells left the university and Boston itself. As a matter of fact he abandoned dentistry altogether. But for this unhappy incident, the use of anaesthesia might have come sooner.

CHAPTER VIII

ANAESTHESIA

"GENTLEMEN, words fail me on this solemn occasion, to express my innermost feeling. But I am convinced that this Friday, the 16th of October, 1846, will remain as unique in the annals of surgery." Dr. John Collins Warren, Senior Surgeon of the Massachusetts General Hospital, wiped his brow with trembling hand. It was obvious to the assembly that the great surgeon was in a state of emotion, unseen before. "Gentlemen," he continued, "this is no humbug." Thereupon the words of Dr. Warren were drowned in a tumultuous uproar from the audience which had witnessed the first painless operation performed under deep sleep, induced by a liquid yet unknown to the doctors present. Warren had to wait for a few seconds before silence was established again.

The clock on the wall of the operating theatre of the General Hospital struck half-past ten. Silent, in the corner of the theatre, stood Egyptian mummies. To the right and to the left human skeletons, rigid and unemotional, were the only unimpressed witnesses of a great event. Perhaps they knew that they had no need to rejoice. Their bodies had suffered pain and perhaps had died from it. But the spectators who filled all the tiers in the operating room, could not restrain their wild joy. It had been a memorable day. Some time previously an obscure Boston dentist by the name of William Thomas Green Morton had approached timidly the senior surgeon of the hospital. It had not been easy for Dr. Morton to gain admission to the hospital. To begin with, he was told by the porter that he certainly could not see Professor Warren—not without an appointment. If he wished, perhaps, he could be allowed to see one of the assistants. When the latter appeared, Dr. Morton, politely but firmly, explained that

he could only speak to Professor Warren, as the matter was very urgent and of great importance.

The assistant was slightly vexed: "Surely you don't expect me to disturb Dr. Warren at this very moment, when he is about to begin an operation?"

"That is quite all right, doctor, I will wait," Morton replied firmly. And Morton did wait, for the whole of the day, because when Warren finished his operation, he went calmly round the wards to visit all his patients. About midday, the same assistant who had previously spoken to Morton, came and apologised again, and told him in not indefinite terms that Warren was not to be seen to-day at all. It was only wasting Morton's time, perhaps he had better come to-morrow.

"No, doctor, I am going to see Dr. Warren if I have to wait the whole day and the night." Morton's eyes flashed with determination. "He will be finished sometime or other and I have time to wait." The assistant shrugged his shoulders in despair: "As you wish: you are your own master, and you know best how to waste your time."

Morton waited patiently in the ante-room of the operating theatre until the porter unceremoniously told him to clear out. The room had to be cleaned, he was told. Morton moved further, the hospital corridors were free; he could wait there. And wait he did. The clock ticked slowly the half-hours and the hours and the day faded into late afternoon. At length Professor John Collins Warren alighted in the corridor, wearing hat, and coat, eager to leave.

"Dr. Warren, sir, I wish to talk to you about an important matter." Morton bowed slightly, but without giving time to the surgeon to answer, breathlessly went on telling him about his wonderful discovery which could make a surgical operation painless. "Please, Dr. Warren, give me a chance to show my method. You are the only man who can do it. And I promise you that you will never regret it."

The tall, lean man sniffed rather impatiently. His sharply-cut features became sterner, only in his eyes was a spark of interest and curiosity unmistakable. Professor Warren was annoyed at being detained still further after

a heavy day's work, but somehow he sensed that the man in front of him was not an impostor. Perhaps he was a misguided idealist: perhaps his so-called great discovery was nothing but humbug. Perhaps all that and more, but one thing Professor Warren was sure of—that Dr. Morton was sincere in his belief. For a moment the two men looked at each other—Dr. Morton was emotionally gasping for breath after the hurried speech he had just delivered, whilst Professor Warren, cool and reassuring, was smiling at him encouragingly.

"It sounds very convincing, doctor, and I believe you are sincere." Then, pausing for a moment, "Very well, I will give your method a trial. Ever since I performed my first operation I have been longing for some such means as you describe. Day and night my brain is pierced by the agonising cries of the victims that I torture." The two men shook hands with a firm grip.

"Good evening, sir," Morton was able to blurt out.

"Good evening to you," smiled Professor Warren—and was gone.

That was a few days before the momentous morning of the 16th October, 1846. Three days previously a tall young man by the name of Gilbert Abbott, entered the Massachusetts General Hospital under Professor Warren. It was a case with a definite history of tuberculosis. Both his parents were in advanced stages of the disease and Gilbert had inherited the family curse. Professor Warren examined the emaciated young man carefully. On the right side of his neck he saw a large vascular tumour which, although it had existed probably since birth, had recently grown into an alarming sight. "There is nothing to worry about, young man," Warren said in his usual brusque manner. "It will need to be operated upon. Are you willing to submit to it?"

"Yes, Dr. Warren," answered Abbott, "I am in such an agony that I am willing to go to any extent of torture to get rid of it."

Dr. Warren did not answer at once. Mentally he was saying to himself that this was the man to be submitted

to Morton's method. Then glancing at the patient he said loudly: "Listen carefully; a young dentist of our city has discovered a method of preventing pain during operations. I don't know how far this is true, but I would like to try out this method on you. Do you consent?"

"You mean, Professor," stuttered Abbott, "you mean I can have the tumour taken out without pain?"

"Yes, that is the idea."

"I agree," Dr. Warren." Thereupon the operation was fixed for Friday, 16th October.

On 14th October Dr. Morton received in his morning mail a letter from the House Surgeon of the General Hospital:

"Dear Sir," it read, "I write at the request of Dr. J. C. Warren to invite you to be present on Friday morning at ten o'clock at the hospital, to administer to a patient who is then to be operated upon, the preparation which you have invented to diminish the sensibility to pain. Yours respectfully, C. F. Haywood."

The excitement that possessed Dr. Morton is hard to imagine. A fragment of his wife's diary found in his papers testifies very vividly.

"The night before the operation my husband worked until one or two o'clock in the morning upon his inhaler. I was nearly beside myself with anxiety, for I had been told that one of two things was sure to happen: either the test would fail, and then he would be ruined by the world's ridicule; or he would kill the patient and be tried for manslaughter. Thus, I was drawn in two ways. For while I had unbounded confidence in my husband, it did not seem possible that so young a man could be wiser than the learned and scientific men before whom he proposed to make his demonstration."

As to what Dr. Morton had been feeling, we have no record. One thing is certain—that he never slept a wink on the night before. And early in the morning he hurried to the instrument maker suggesting some last-minute changes to the inhaler. Whilst the dentist was explaining what he wanted done, he dropped from his shaking hands

the instrument, which was shattered to pieces. In despair the two men started to prepare a new one. Perspiring profusely, Dr. Morton looked at the clock, which said ten to ten. "For God's sake hurry up, or I will never arrive on time." He snatched the still unpolished instrument and rushed off to the hospital.

The Massachusetts General Hospital had never seen greater excitement since its foundation. The moment the doors of the theatre were flung open at the stroke of nine, the assistants began their preparations and the theatre filled to capacity. Among the audience one could see the leading lights in surgery of Boston: W. J. Bigelow, S. D. Townsend, Samuel Parkman, J. G. Pierson, Drs. Wellington and Gould and others had already arrived, eager to watch the operation. They were given the two front tiers while the students and the lesser fry occupied the others.

At quarter to ten Gilbert Abbott was taken from the ward and wheeled into the theatre. Removing his shirt, he was placed on the table and his neck prepared for the operation. The huge red tumour was shining like a beacon. Dr. Warren's chief assistant, George Hayward, was busy with the preliminary preparations, while Professor Warren was walking to and fro, obviously in great excitement. He faced the audience: "Gentlemen, before beginning the operation, which might prove to be of the greatest importance to the art of surgery, I wish to say a few words. For forty years I have been practising surgery in Boston and on every occasion when my knife was cutting through live tissue there was agonising pain. I feel sure that every one of my colleagues has had the same distressing experience. That is why, gentlemen, I think that this operation might prove to be the turning point in surgery. Some time ago, Dr. Morton, a dentist of this city, approached me with the request to give him an opportunity to test this new invention which he claims will enable us to perform operations without pain. I was so impressed that I took the liberty of asking him to be present this morning in order to administer his pain-alleviating liquid. The patient has been told about the experiment and he is in full agreement."

Tense silence followed Dr. Warren's oration. Everybody's eyes were fixed on the clock. It was nearly ten. Dr. Warren looked nervously at his watch. He clasped and unclasped his hands, adjusted his coat tails, smoothed his trousers. At this very moment the clock struck. The surgeon grasped a knife firmly from the tray. "Since Dr. Morton has not appeared," he said sarcastically, but not without disappointment, "I suppose we have to be deprived of a new experience." Then as an afterthought, "I presume he is otherwise engaged." A roar of laughter greeted this last sentence. "What else was to be expected. It is all humbug, like all miracle workers whose miracle will not come off."

Warren waited for the silence to establish itself again. Then he raised his right hand with the glistening knife in it. At this very moment the door burst open and a panting man with a little box under his left arm, rushed in. Close on his heels another gentleman was following, just as breathless as himself. For an instant everybody looked at them in amazement. Then the first man spoke: "I apologise, Professor Warren. The finishing of the apparatus delayed me—I hope I have not inconvenienced you unduly."

"That is quite all right," sighed Professor Warren with relief. "I understand." Then, with a sweep of his hand over the patient: "Here is your patient."

The young man looked at Dr. Morton imploringly. "Are you afraid?" the latter asked. "I brought a man with me who can testify that he has already breathed the liquid." The companion of Dr. Morton was about to begin a great oration as to his experience under the sleep-inducing liquid, when the patient stopped him abruptly: "It isn't necessary, doctor. I feel confident, and I will trust you and Dr. Warren. I will do exactly as you tell me."

Everybody watched the performance spellbound. After seating himself on a high stool behind the head of the patient, Dr. Morton applied the inhaler. It consisted of a glass globe, connected with a mouthpiece that resembled a tiny tube. Half the globe was filled with a colourless

fluid and no one present had an inkling of what it was, except Dr. Morton. "Please breathe deeply and regularly," he admonished to the patient while putting the tube into the patient's mouth. In a few moments the air was filled with a strong but pleasant odour. Abbott did not stir, but went on breathing quietly and regularly. Now and then he muttered some unintelligible word. Warren took a needle from his lapel and pricked the patient's arm: "Did that hurt you?" he asked in a loud voice. "No," was the barely audible reply. A few more moments elapsed before the patient had completely lost his consciousness and sensibility. He lay prostrate in profound sleep.

"You may begin the operation, Dr. Warren," said Morton, stepping back a little from the table. "Your patient is ready." Doctors and students watched Professor Warren's able hands. With quick and assured movements the surgeon cut through the skin, through the underlying tissues and separated the muscles cautiously. A few clamps stopped the bleeding and barely five minutes elapsed when the whole of the tumour was cut away. The patient still lay motionless, breathing deeply. A faint smile flickered on his lips as if he was enjoying himself and having a pleasant dream.

Operation and dressing was finished in silence. Gradually the patient came to life again—his lips began to move and he began to utter incomprehensible words. A few more seconds and he was fully awake, looking round in astonishment. Dr. Warren put his hand reassuringly on his forehead. "Did you feel any pain?" he asked. "No, sir," came the answer. "On the contrary I hardly believe that everything is finished. For a second I felt that somebody was pressing on my neck, then I went to sleep, dreaming." The patient smiled: "Wonderful, beautiful dreams. That's all I can remember." The slow, clear words of the patient pierced the silence of the theatre and were plainly heard by everybody present. Doctors and students alike were also like men slowly awakening from an enchanted dream. They looked at each other bewildered. The clock struck half-past ten, and they realised that, for the first time in

their lives, they had witnessed an operation which was not accompanied by groans and moans and cries of agony. Something wonderful, incredible, had happened before their very eyes. "Gentlemen, this is no humbug," Warren was repeating again, emotionally.

A tall, imposing man rose from the audience. Everybody turned their eyes upon him, because W. J. Bigelow was the respected professor of Harvard University. He smoothed his chin: "No, gentlemen, this time we have not been deceived by a trick of the imagination. I am sure you noticed throughout the operation that the patient's eyelids were closed, his head heavy with sleep and his mouth relaxed. What else but a profound sleep and complete insensibility can produce these signs. Gentlemen, we have to-day witnessed something of the utmost importance to the art of surgery. Once and for all surgery has been robbed of its terror. Never again shall we witness the heart-rending cries of agony from our victims. I for one thank God that my life was spared to witness such a miracle." Dr. Bigelow sat down amid an outburst of great enthusiasm. Many had come to witness the operation sceptically. They had heard often of charlatans and quacks pretending to have found something wonderful that could alleviate pain. And Dr. Morton being only a dentist, did not improve upon their belief. But now, when the success of the painless operation was unmistakable, they all and sundry surrounded the young dentist and were eager to shake his hand in congratulation. The man was overwhelmed with questions, which he, trembling with emotion, was trying his best to answer.

Later on, Dr. Morton would record in his memoirs that this was the happiest moment of his life. The glory also was shared by his companion. He too was surrounded by eager listeners and he definitely had a story to tell. Feeling through his pockets, the man extracted a piece of paper which looked like a copy of a document. He began to read:

"This is to certify, that I applied to Dr. Morton at six o'clock this evening, September 30th, 1846, suffering under

the most violent toothache; that Dr. Morton took out his pocket handkerchief, saturated with a preparation of his, from which I breathed for about half a minute, and then was lost in sleep. In an instant more I woke and saw my tooth lying on the floor. I did not experience the slightest pain whatever. I remained twenty minutes in his office afterwards, and felt no unpleasant effects from the operation." Signed "Eben Frost."

The man finished reciting from the document. He looked triumphantly at his listeners: "That's me, gentlemen, I am Eben Frost." The men wanted to know more and Frost told them that he was a music teacher with a very good practice and living a quiet life. That is, until the evening of September 30th. On that particular evening, one of his molar teeth began to ache with excruciating pain and in despair he sought the help of a dentist. That is how they met, Dr. Morton and Eben Frost.

The man told the dentist that he was suffering great pain and wished to have his tooth extracted. But, he added, he was afraid of the operation and hoped that he would be mesmerised and not feel the pain. Dr. Morton explained that he had something better, the only thing that the man had to do was to inhale from the doctor's handkerchief. Thereupon the dentist took out his handkerchief, sprinkled it profusely with a liquid from a bottle he had on the table, and applied it to Frost's nose. The patient began to inhale and in a few moments became unconscious. In the dark, Dr. Hayden—one of Morton's assistants—held the lamp while he, Morton, extracted the strongly-rooted molar tooth. Eben Frost did not even move, but continued to breath quietly, his pulse and muscles completely normal. A few moments later Frost, dazed from the experience, looked at the tooth that was lying on the floor, looked at his mouth in the mirror as if to ascertain it was his tooth, and muttered: "It is amazing, Dr. Morton."

There and then, the three men went to see the editor of Boston's *Daily Journal*, with the patient describing thrillingly his unusual experience. On the following

morning, October 1st, the paper carried the following news-item:

"Last evening, as we were informed by gentlemen who witnessed the operation, an ulcerated tooth was extracted from the mouth of an individual without giving him the slightest pain. He was put into a kind of sleep, by inhaling a preparation, the effects of which lasted for about three-quarters of a minute, just long enough to extract the tooth."

It was a new era in tooth-pulling and it was bound to benefit greatly the inventor. Originally Morton planned to have this invention patented, thus ensuring that all the money accrued from it would be his, and already on the same day as the news-item appeared, he was seen at the Boston patent office. The time passed and his surgery was filled to overflowing with patients eager to have their teeth extracted painlessly. A new feeling overcame Dr. Morton. He realised that money was not the goal he was striving at. In his selfless mind he visualised the possibility of all pains being removed from any operation, under his discovery. Hence was his approach to Dr. Warren for the trial at the hospital.

Eben Frost was glorying in his recital to the eager listeners and it was obvious that his life had been profoundly affected too. From the very moment that his tooth was extracted, he became the chief witness of Dr. Morton. He, time and again, had to testify that the discovery was genuine and free from risk and danger. Taking out of another pocket several newspaper cuttings, Frost showed that his name was in every one of them and he told how everyone wanted to see him to hear his story, and learn what he thought of Morton. And Frost, of course, thought plenty. "You see," he was smiling, "I am the leading exhibit of Dr. Morton, and our discovery is bound to benefit humanity. It will soon relieve mankind from all pain." Nobody laughed at this boasting; somehow they all felt that Morton and Frost belonged together. They

felt that one without the other was unthinkable and Frost reached the height of his glory with his oration in front of the medical faculty on the 16th October, 1846.

Another person whose life became profoundly affected was, of course, Morton's wife, Elizabeth. She was the only daughter of Edward Whitman—a respectable and rich citizen of the town of Farmington. It was there that William Morton opened his first surgery, after qualifying at the dental college in Baltimore. There was nothing particularly brilliant in Morton's study. He was an average student, impatient to start practice and willing to undergo any privations in achieving his aim. The practice, however, he started in Farmington was not lucrative and soon he began to despair of his prospects.

Among his patients was an old spinster sister of Edward Whitman, who took pity on the young dentist because she believed in him and willingly advanced him a thousand dollars for him to start in practice in Boston, together with another school friend of his, Dr. Horace Wells. With this money the two men put up their plates at 19 Tremont Row, Boston, but they were soon to be disillusioned if they expected quick success. As a matter of fact, Horace Wells soon lost courage and returned to Hartford, while Morton persevered and was eager to prove worthy of old Miss Whitman's confidence. That he managed to do, and by the spring of 1844 he paid a visit to Farmington and was able to pay to the last dollar the money borrowed. On leaving the house his eyes beheld the most wonderful creature he had ever seen in his life. This was Elizabeth Whitman, the niece of his benefactor and the only daughter of Edward Whitman. Morton was enchanted by Elizabeth's grace, by her voice and her blue dress, which enhanced her beauty in such a way that he was unable to take his eyes away from her. Elizabeth, too, was impressed by the handsome bearing of the young dentist and a correspondence sprang up between these two that ripened in sincere and profound love.

It was not long before Morton visited Farmington again and asked Edward Whitman for his daughter's hand.

"Dr. Morton," the man said politely, "I am afraid I have to ask you whether you will be able to support a wife. Particularly when it concerns my own daughter." Morton had to be honest and told him the exact amount of his income, not omitting, of course, to add that his practice was increasing. Apparently Edward Whitman regarded that as not satisfactory and not wishing to have his daughter married to a poor man, he bluntly refused. The father had reckoned, however, without the daughter. Elizabeth, if anything, had inherited the perseverance and strong will of her father, so she took the matter now in her own hands and together with her aunt, who was already Morton's admirer, they gave no peace to Edward Whitman until the latter broke down and gave consent. The marriage of Dr. William Morton and Elizabeth Whitman took place on May 29th, 1844.

Morton, in his happiness, did not forget his ambition; on the contrary, if anything, his marriage gave him a new spur and when a year later Elizabeth presented him with their first son, he was determined that no matter the cost, he must become famous, if not for his, for Elizabeth and his children's sake.

Then the unhappy episode of Dr. Wells's experiment with laughing gas came to give a jolt to his ambitions. He was very disappointed, but at the same time he learned a lesson that he must be cautious and whatever he did, he must be well acquainted with all the hazards and pitfalls. Morton could not afford to become the laughing-stock of the medical world, as Horace Wells had become before him. But the idea stuck; surely, he said to himself, there must be some liquid or some other chemical besides laughing gas that could be inhaled safely and yet produce insensibility to pain.

Chance brought together Dr. Morton with another contemporary of his, a certain Dr. Charles Thomas Jackson. If ever a man had an evil genius, this was Morton's. Jackson was a qualified medical man, combining great intelligence, remarkable scientific knowledge and most utter unscrupulousness. Certainly it would have been

better for Morton if he had never met the man. But he was not to know. When he approached Jackson, he approached him as a chemist who could be helpful to him. By Jackson's suggestion, Morton started using ether for local alleviation of toothache.

He started pouring a few drops of the ether on the tooth to be extracted and noticed that some insensibility was achieved, but was of very brief duration. The idea was born, however. Morton determined to try the ether for inhaling and felt sure than it would produce a deep sleep. The only thing he lacked were patients to experiment with. He could not certainly risk the lives of his patients, and therefore he decided on a compromise. Thus the first patient to inhale Morton's ether was his wife's dog. Without telling Elizabeth he lured Nig into his study and, saturating a piece of cotton wool with ether, he put it in a tin saucer, holding Nig's nose over it. The unsuspecting dog inhaled the ether vapour freely and in a few short seconds fell in deep, profound sleep. Slightly alarmed, Morton did his best to revive his wife's pet, because he knew what would happen should the dog die.

Following this came the goldfish, with which Morton went on to experiment. He was surprised by Elizabeth one day when she saw in horror the goldfish lying on the table, dead, to all appearances. Elizabeth burst out sobbing: "How could you do it, William? How could you kill my goldfish, knowing how much I love them?" Morton soothed her and with a smile picked up the goldfish and threw them back into the bowl. Elizabeth didn't know whether to laugh or cry, something unbelievable had happened before her eyes. Curiosity, however, prevailed, and she wanted to know all—how was it that the goldfish that were dead revived in the water? Morton explained everything and Elizabeth left the study happily, but not before she extracted a promise from her husband that he would never experiment again upon her dog or goldfish. Morton kept his promise, that is for a while, and soon he was to be seen in the nearby stream with his trousers rolled up above the knees, trying to catch fish with his bare

hands. He was obviously lucky, because he succeeded in catching several live fish, which he put in a bowl of fresh water prepared for the occasion.

In the evenings Morton would shut himself up in the study giving his ether to the fish he had caught. Is it surprising that Elizabeth thought her husband was eccentric, to say the least? Certainly not. She was frightened out of her wits the night of her wedding when she woke up after midnight and found that her husband was no longer in bed with her. Entering the adjoining room she found him immersed in studying a human skeleton that he had taken along with them on the honeymoon! You could expect anything from a man who took a human skeleton on his honeymoon. So Elizabeth was quite prepared to find now that her husband experimented with goldfish, beetles, caterpillars, worms and any other crawling creatures he could lay hands on. Other women might have made a scene if they thought they were neglected by their husbands, but Elizabeth was different. She knew she could not help personally in her husband's work, but at least she determined not to interfere. Yes, William was a queer fellow, but she remembered that as a child she had read that all great inventors and geniuses were queer. Her own father told her that genius and madmen are very alike. She only hoped that William was a genius and not a madman. And if any proof was needed of Elizabeth's belief in her husband, October 16th supplied it.

Let us read from Elizabeth's diary:

"I saw nothing of him for twelve hours. How they dragged along as I sat by the window, expecting every moment some messenger to tell me that the patient had died under the ether and that the doctor would be held responsible. It was not until nearly four in the afternoon that Dr. Morton walked in, with his usually genial face so sad that I felt failure must have come. He took me in his arms, almost fainting as I was, and said tenderly 'Well, dear, I succeeded'."

Morton's triumph was unmistakable and while it gained him countless admirers, it certainly brought him also

implacable enemies who would not spare themselves anything to discredit him or to hurt his feelings. To start with the medical society held a meeting, expressly to discuss Morton's discovery. They unanimously decided that something must be done forthwith to put an end to such proceedings, which would be a scandal to the medical traditions. "We cannot allow Professor Warren, in his credulity, and out of the kindness of his heart, to become a tool of a vicious little dentist."

Thus the minutes of the meeting recorded. Their decision was sent to Professor Warren, forbidding him to perform any further operations under the influence of an unknown liquid. The great surgeon had to obey and bow to the rules of the society. Reluctantly he had to cancel all his operations scheduled with Dr. Morton. Warren wrote accordingly, and received the following answer:

"Dear Sir, As it may sometimes be desirable that surgical operations should be performed at the Massachusetts General Hospital under the influence of the preparation employed by me for producing temporary insensibility to pain, you will allow me, through you, to offer to the hospital the free use of it for all the hospital operations." Signed, "William Morton."

Warren was delighted and as he had an urgent case of leg amputation, he fixed eagerly the operation for November 7th. The old morons of the medical society, however, were not to be put off that easily. On the morning, one hour before the operation, a dramatic incident took place in the anteroom of the operating theatre. Everything was ready for the operation. The young woman whose leg was to be amputated, lay on a couch ready to be taken to the theatre. When, all of a sudden, the vice-president of the Massachusetts medical society entered pompously.

"Are you acquainted, Dr. Warren, with the composition of the remedy with the aid of which you intend to perform this operation?"

"No, sir," came the answer. Then Dr. Warren continued: "If I have undertaken the responsibility of adopting Morton's methods, you must rest assured, sir, that I had convinced

myself sufficiently that the remedy is free from any risk. If Dr. Morton desires to keep his remedy secret, that is his own affair, and I have no right or reason to ask him to disclose it to me or to anybody else."

"I am very sorry, Dr. Warren." The vice-president was adamant. "By the unanimous deliberation of the medical society of which I have the honour to be vice-president, we have decided to protest against your performing operations with the help of Dr. Morton's mysterious liquid. We all are of the opinion that Dr. Morton's willingness to let his apparatus be used gratuitously by the General Hospital is not enough. We, as medical men, have the right to know, and must know, the composition of all the remedies and chemicals we use in our practice. There are strict rules against the use of secret liquids and they are not worthy of our professional tradition. We must uphold, Dr. Warren, and resist against quack remedies, and I forbid you, as a member of our society, to have anything to do with it."

Dr. Warren shrugged his shoulders in despair—it was obvious that the unfortunate woman had to have her leg amputated without the help of Morton's liquid. She had to suffer intolerable pain, writhing in agony, because he, Dr. Warren, member of the medical society of Boston, had to abide by the rules of the society. He glanced with pity and understanding towards the theatre where the patient was waiting.

Many doctors were present and heard this conversation. Amongst them was Dr. Bigelow who had come specially to witness the operation. In his heart he was hoping that Dr. Warren would defy the medical society. He thought of the unfortunate young woman who could be saved intolerable pain. Was she to be deprived of this god-sent remedy because of the stupid considerations of medical etiquette? That must not happen. It can't happen. Surely medical men are not that callous to allow patients to suffer unnecessarily. Dr. Bigelow leapt to his feet and shouted angrily:

"Dr. Warren, sir. Surely you will not allow such a thing to happen. Have you all lost your minds? Don't

you understand that this is not a matter of medical etiquette? How can you be so cruel and look at your fellow human beings undergoing tortures and dying in agony?" The irate man almost choked in his emotion. He pointed to the door behind which the patient waited. "Is it not enough," he asked, "that the woman will be mutilated and crippled for life? Can you sit there and watch her being tied to the torture table? Can you listen to her piercing cries while her leg is being cut off? The theatre is full of doctors and students eager to witness your operation. Go there and show them how cruel you can be. How can you torture your fellow creatures without as much as a tear? That was forgivable when we had no other means. But now, we have the means of sparing the patient the horrible pain attendant upon the amputation. Is it conceivable that you would deny this blessing to her?" Dr. Bigelow was interrupted by the pompous vice-president.

"May I remind you, Dr. Bigelow," he said sternly, "that we are not quacks, but reputable medical practitioners. We cannot, we must not, allow the use of secret remedies. For the sake of the dignity of our medical profession I must forbid such practices."

"The dignity of our profession, indeed," replied Dr. Bigelow scornfully, "No, sir, it is base arrogance, not dignity, it is inhumanity, not pride, that makes you become blind to a new discovery. False pride forbids you to be a human being, let alone a doctor. We are supposed to help our fellow creatures. To spare them needless tortures and pains. Not proud, but we all ought to be ashamed of belonging to a profession that allows such things to be." Then Dr. Bigelow faced Professor Warren. "You, sir, were the first man to give humanity the benefit of the new discovery. Your hand did not tremble when you took up the knife a few days ago and performed the miracle. For the first time in your and our lives we witnessed a painless operation, and now you can really shirk your duty because of the threats of this bigoted medical society? Your conscience will remind you one day of the agony and pain that you inflicted upon this patient when you knew full well

that you had at hand a remedy which could spare her all this."

The incident threatened to become one of personal abuse because Dr. Bigelow had now lost control of his temper. Professor Warren intervened. Turning towards the vice-president of the society, he asked whether there was any way out. "If Dr. Morton discloses the composition of his liquid beforehand, then you, Dr. Warren, will be able to proceed with the operation."

Hearing this, Bigelow himself offered to go and speak to Dr. Morton. The operation had to be postponed for another hour.

William Thomas Green Morton had witnessed himself, in his practice, the agonising pains of toothache and teeth extractions. How much more distressing would be agony inflicted by the surgeon's knife was easy to imagine. He turned towards Dr. Bigelow: "If the disclosure of my secret means the sparing of needless pain to thousands of sufferers, then I have no right to withhold it. I am prepared to divulge to all medical men the composition of my liquid. I will come with you, doctor, to the hospital."

At this moment Morton became worthy of his great discovery; he was not the small unknown dentist bent upon increasing the income from his practice. No, when he entered the hospital he was the great man, the benefactor of humanity. "Gentlemen," he addressed the surgeons, "I have no right to withhold a remedy which I feel sure is of great benefit to suffering humanity. And because the objection is only about its secrecy I have the honour to inform you that it is nothing more or less than pure sulphuric ether." Morton smiled at Dr. Warren and a deadly silence followed this simple statement. The difficult situation was broken by Dr. Warren's orders for the patient to be taken into the theatre. From that day onwards the sulphuric ether that could put patients to sleep became the property of medical science.

As usual, Dr. Morton administered the liquid and Dr. Warren proceeded with the amputation. The following is a report given by Dr. Angell.

"Not a muscle in the patient's face twitched. The assistants completed the operation. Just as it was finished she turned her head a little to one side and gave a groan. Dr. Warren took hold of her sleeve and called her name. She looked up at him in a dazed manner and said 'Sir'. 'I guess you have been asleep, Alice,' he said. 'I think I have, Sir,' she replied. 'Well, we brought you here for an amputation; are you ready.' 'Yes, Sir,' she said, 'I am ready.' He reached out, picked up the amputated leg, showed it to her and said, 'It is all done.'"

The scene which followed was one of pandemonium. Men were beside themselves with joy. They clapped their hands: stamped, and yelled. During this demonstration the patient was carried into the ward and put to bed. Dr. Warren continued to walk to and fro on the stage. Finally, turning to the audience, he said in a voice shaking with emotion: 'Gentlemen, this is no humbug.'"

This is the description of the first amputation ever to be carried out painlessly on a human being while asleep under the influence of ether. From now on, hundreds of other hospitals would adopt the same procedure and ether inhalations would always be administered wherever a surgical operation was to be performed. America in general and Boston in particular had the right, indeed, to be proud of having been the starting point of the new era of surgery. Oliver Wendell Holmes, reputed physician and poet, was heard to exclaim: "Nature herself is working out the primal curse which doomed the tenderest of her creatures to the sharpest of her trials, but the fierce extremity of suffering has been steeped in the waters of forgetfulness, and the deepest furrow in the knotted brow of agony has been smoothed for ever."

The era of painless operations had started, but the medical profession had not yet found the proper name for the sleep during which operations were performed. Some called it "sleeping-gas operation"; others suggested names like "mixture", "preparation", "gas", "new discovery", or "Morton's fluid" for the ether that was used for inducing sleep. Finally, Morton himself, together with his friends

came upon the name of "Letheon", which was derived from the river Lethe known in Greek mythology. They thought "Letheon" was a proper name because of mythological belief that a draught of the water of Lethe could expunge all painful memories. "Letheon" might have remained as a name, but for the intervention of Oliver Wendell Holmes. On November 21st, 1846, he wrote to Morton: "Dear Sir, Everybody wants to have a hand in a great discovery. All I do is to give you a hint or two, as to names, or the name, to be applied to the state produced and agent. The state should, I think be called 'Anaesthesia', The objective will be 'Anaesthetic'. Thus we might say 'the state of anaesthesia', or 'the anaesthetic state'. I would have a name pretty soon, and consult some accomplished scholar, such as President Everett or Bigelow, Snr. before fixing upon the terms which will be repeated by the tongue of every civilised race of mankind. Respectfully yours, Oliver Wendell Holmes."

Anaesthesia remained as the name adopted by all medical men and by laymen alike for the sleep induced by ether. It brought relief to thousands of sufferers. Only its discoverer, Dr. William Thomas Green Morton, whom the French Academy of Science called the "Benefactor of Mankind" for his heroic achievement, would be made miserable and unhappy by his enemies. They would try to take away the glory from him. They would accuse him of stealing the invention from some other unknown doctors: they would even rob from him every financial help that the State wanted to grant. While mankind would benefit from his discovery, Dr. William Morton would die a broken and ill man, too poor even to provide the bare necessities of life for his own family.

CHAPTER IX

THIS NETTLE DANGER

ELIZABETH Morton passed hours of uncertainty waiting for her husband to return. When she beheld him returning, morose and depressed, slowly crossing the front porch of the house, her feeling of forboding did not improve. It seems both of them felt that a great calamity hung over their heads. Should they have guessed the endless worry and limitless agony that it would cause them, they would most certainly have wished that the discovery had been made by anybody but William Morton. Some years later, Elizabeth Morton records her gloomy thoughts on the day of her husband's discovery of anaesthesia:

"Dr. Morton's gloom of manner and evident depression made it impossible for me to believe the good news. It seemed to me as if he should have been so highly elated, at having accomplished one of the most splendid achievements of the century, and yet there he was, sick at heart, crushed down, one would have said, by a load of discouragement. This was due, not only to bodily fatigue, and the reaction after his great efforts, but to an intuitive perception of the troubles in store for him. It is literally true that he was never the same man after that day; his whole afterlife was embittered through this priceless boon he had conferred upon the human race."

Speaking of William Morton as being crushed down by a load of discouragement, was definitely an understatement. His troubles began the very day after he demonstrated successfully the property of ether in inducing anaesthesia. Prompted by envious medical colleagues, some American daily papers were induced to print front-page items referring to the discovery of anaesthesia as humbug and lunacy. Even medical papers took up the challenge, and a strong article appeared in the *Medical Examiner* of Philadelphia.

After reviewing critically the favourable reports from medical circles in Boston, it becomes downright impertinent, calling anaesthesia a swindle and a quackery. It forearms readers that they should not consider themselves entitled to take the least notice of what Boston medical journals have been printing. It tells them that the medical profession of that city has been taken in, lock, stock and barrel, by the fabrications of a dentist. For a whole year afterwards, leading surgeons of Philadelphia boasted that in their hospitals no operation had ever been performed under the influence of ether. Judging by to-day's standards, one is at a loss to understand such narrow-mindedness and such an attitude in representatives of the medical profession. For the sake of their own art they should at least have given trial to this wonderful discovery, instead they preferred to torture their patients, to witness endless agonies, yet refusing for the sake of their pride, to acknowledge the superiority of a colleague.

New York, too, found sufficient ignorance among the medical profession, who fought tooth and nail against anaesthesia. A few days after the memorable 16th October, a New York daily paper splashed across its front page that . . . "the last special wonder has already arrived at the natural term of its existence". Practitioners of the art of dentistry did not allow themselves to be outdone by their medical colleagues. In Baltimore, the seat of the most famous dental college, one of the teachers wrote the following: "I protest against the whole business because I verily believe the great discovery to be utterly useless. If we are to induce insensibility, I very much prefer whisky punch to ether, because it is more certain and more permanent in its effects. It is less dangerous; and lastly, it will be easier to persuade patients to take it." The best answer to this nonsense is the report that the dentist concerned lost practically all his patients inside a few months. Perhaps he had no chance to try whisky on them, or he preferred to use it for his own consolation and get drunk while waiting for patients that never came.

The popular saying is that you cannot keep a good man

down. So is it with a good and real discovery. Anaesthesia was the greatest discovery so far bestowed upon a suffering, if undeserving, humanity. Not even the objections that religion could bring forth against it, could prevent its victorious march. Worshippers listened to sermons against anaesthesia; they listened to priests telling them that pain was the work of Providence, and God had ordained that man shall suffer; they heard, too, that to suppress pain would be an act against God. Nevertheless, they flocked into the surgeries and hospitals where they knew that, should they have to be operated upon, they would be given the benefit of Morton's discovery.

On the other hand, voices that grew louder day after day, began to sing the praises of anaesthesia and of painless operations. "God bless the inventor of this last gift to man. It is the most glorious, nay, the most God-like discovery of this or any other age." Thus an article in an influential New York journal began. Other leading American cities followed suit, and unstinted praises filled the air across the continent from Buffalo to St. Louis, from Chicago to Boston. Dr. Bigelow who witnessed the first painless operation was heard to exclaim: "I have seen something to-day that will go around the world." And he was more than a prophet.

In December of that year a leading London surgeon, Robert Liston, practising the art at University College Hospital, performed the first major operation ever seen in England under the influence of ether. The annals of the Royal College of Surgeons record the date as being December 21st, 1846. This surgeon, too, had his opponents, and when the day was announced of his experiment, the whole of London's leading lights in surgery turned up, not to watch the new miracle, but to have a chance to ridicule such a gullible fellow. "It is too good to be true," was the popular saying among them. "Wonder how old Liston let himself be convinced so easily? Surely a man of his experience should know better than that." Yes, Robert Liston knew better than that. He had the courage to perform an operation on a middle-aged man. It was the

case of an amputation and considering the weak general state of health of the patient, he most certainly would have died if submitted to the agony invariably accompanying an operation of this kind. After the man slumbered peacefully under the influence of ether, Liston dexterously severed his limb. Not a stir, not a movement occurred during the whole of the performance. And when, following his recovery of consciousness, the patient was shown his amputated leg, he fell back overcome and speechless. Only his unrestrained tears showed his profound gratitude. At the sight of all this, Robert Liston for once lost his composure and threw his hands in the air shouting: "Hurray, rejoice! An American dentist has used the inhalation of ether to destroy sensation in his operations. In six months no operation will be performed without this previous preparation." And Liston was right. Two centuries previously Sir Francis Bacon wrote: "So long as a thing has not been achieved, people are surprised when they are told it is possible; but as soon as it has taken place, they wonder why no one ever thought of it before." Little did Sir Francis know that this would apply admirably to anaesthesia as well.

No one remembered, however, that if the English surgeons of only twenty years previously had not been narrow-minded and obstinate, the honour of anaesthesia would have gone to an Englishman. Because it was Dr. Hickman who begged his English colleagues to adopt his method of painless operation under laughing-gas. Then he was, of course, ridiculed, but now, when the discovery of ether came from across the water, the whole of England rejoiced. After the successful operation carried out by Robert Liston, medical and lay press alike took up the praises of the gift that ether anaesthesia bestowed upon humanity. "Hail, happy hour," a leading article began in the *People's London Journal*. "This is indeed a happy hour that brings the glad tidings of another glorious victory. Oh, what a delight for every feeling heart to find the new year ushered in with the announcement of this noble discovery of the power to still the sense of pain and veil the eye and memory from

all the horrors of an operation. This is, indeed, a glorious victory—the victory of knowledge over ignorance, of good over evil. Benevolence has its triumph. It is a victory not for to-day, nor for our time, but for another age, and all time; not for one nation, but for all nations, from generation to generation, as long as the world shall last."

This is, indeed, a tribute from the generous heart of the English who could always appreciate good things. Price or nationality had no place in a discovery that knew no frontiers. The discovery of William Morton had quickly warmed the English hearts, and it was not long before it crossed the Channel and warmed the heart of Paris as well. At that time the Royal Academy of Science of Paris was renowned for its conservative ideas. It was there that Hickman found his final rebuke by the authority of Louis Velpeau. "Searching for painless surgery is like searching after a thing that does not exist," he had declared at the memorable sitting of the Academy when Hickman's discovery was once and for all pronounced as the madman's dream. Other leading surgeons, too, were insisting that as long as operations were performed, there would always be pain. When the wind swept over the Continent the happy tidings of Morton's anaesthesia, the medical world of France turned its eyes to the great Velpeau. Would he approve of the new method, or would he condemn it as useless? Only a few years previously he had said that pain and the surgeon's knife were inseparable companions. Velpeau proved definitely to be the great man that he really was. "This is a glorious victory for mankind." He praised the method unstintingly when witnessing the first operation performed under anaesthesia. Later on, in a short essay published in a Paris medical paper he ended thus: "Even the most incredulous must bow before the power of facts. We have seen them with our own eyes and must believe what we have seen. It was left for the new world and for the city of Boston to demonstrate something which had been believed forever impossible—to confront us with an accomplished fact."

The other great nations of Europe remained not unimpressed. In the little town of Erlangen—Germany—the first painless major operation was carried out, and forthwith acclaimed enthusiastically as the miracle of modern times. The date was January 24th, 1847. Before leaving the operating theatre the surgeon was heard to remark: "The splendid dream of conquering pain has become a reality. Pain, our intensest consciousness, our keenest assurance of the imperfection of the human body, has had to retreat before the power of man's mind, before the advance of ether vapour. This discovery has gone far to rob death of its terrors, for we dread the pain of death more than we dread death itself. Does not our imagination lead us to fear the agony of a major surgical operation more than we fear death, so that we would do our utmost to avoid it? Now we can avoid this agony, to our wonder and admiration."

Vienna, the city of waltzes and dreams, the city that slumbered on the shores of the Blue Danube, possessed, too, its great surgeon, Josef Weiger. When the old man beheld the wonders of the new method of painless operation, he was unable to restrain his tears. Tears of joy and gratitude that the Lord had spared his life to see such a miracle. "If nothing else our century accomplishes, it will still remain as the greatest century in the history of mankind because of the advent of anaesthesia. I say the greatest discovery, for, even though slowly, we could fulfil our other wishes though steamships and the electric telegraph had never been invented, what will be gained by the prevention of pain in surgical operations can only be understood by those who have had to watch operations performed without anaesthetics."

From the Blue Danube the news was taken up by the wind and flown over across the Russian Steppes. There lived at that time, a great man—the famous surgeon, Pirogoff. He was destined to become the champion exponent of anaesthesia. In his true Slavonic fashion of romantic soul, he cried out that, "the greatest blessing, a gift from heaven, one for which we owe the utmost gratitude to the

Prof. John Collins Warren, chief surgeon of the Massachusetts General Hospital in Boston. He performed the first painless operation.

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Sir James Young Simpson. He fought the Biblical curse of painful childbirth by using chloroform to ease the pangs of labour.

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discoverer, is the gift of anaesthesia bestowed upon us across the ocean". One would tire of enumerating the richly deserved praises that swept across the entire world. From distant Korea to the shores of the Baltic, from the capital of the celestial Chinese empire to the warm Mediterranean, men kneeled at the font of our Saviour and thanked the Lord for His blessing.

And what about the humble discoverer—William Thomas Green Morton? Would he become the most famous of all men? Would he become the richest and the happiest citizen of America? Men have discovered gunpowder, bombs, machine-guns, and they all have been honoured by their nations and by mankind. They all have become rich, famous, and have been inundated with honours and titles. Then surely William Morton, the greatest discoverer of all time, would have all these and more. His was the only discovery that knew no frontiers, no nationality, no race. It did not kill, but it saved; it did not produce pain, but alleviated it; it did not torture mankind, but it nursed its wounds. If ever a man could have prophesied what Morton's destiny would be after his discovery, the Gods would have laughed at his incredulity and simplicity of heart. Let us not anticipate the sorrow, agony and disillusion that Morton was subjected to by ungrateful and selfish humanity. Let us instead see the man the day after his success.

Morton and his wife remained on the night of the discovery alone in their home, and Elizabeth was already tortured by forebodings of the future. Providence was swift to strike. The first man that began to cast his shadow across Morton's path was his erstwhile partner, Horace Wells. The latter had for a long while abandoned his profession as a dentist, and was earning a precarious living by exhibiting paintings and other objects of art. His travels brought him to Paris on the very day that Morton's name was on everybody's lips. That might have provoked Wells's jealousy and anger. All of a sudden he remembered that he was the man who first thought of painless operations. He was the one that experimented with laughing gas, and now Morton, his best friend, was robbing him of his due. Of course, Wells forgot

the ridiculous performance he gave in Boston. He forgot his unsuccessful attempts in giving laughing gas to his patients—all this he forgot but the jealousy and envy against the successful man. His brain began first to record facts that never existed before. He began by saying that Morton might have stumbled on his discovery after witnessing his—Wells's—experiments. Later this thought changed into the conviction that the discovery was really his and Morton simply stole it from him. "It was I who discovered that pain could be allayed by the inhalation of gas. It is I who deserve the fame and the benefit of such a discovery." The evolution of Wells's thought went further. He saw himself martyred and robbed of the only possession that was worth while. Morton appeared in his mind's eye as the callous, selfish, utterly unscrupulous thief who would not stop at anything to swindle him. From there the next steps were more or less automatic. Already in Paris, Horace Wells lodged a protest with the Academy of Science, claimed the discovery of anaesthesia as his own. Gullible people and sensation-seeking individuals are always to be found, and Paris was not lacking in them, either. A little known scientific journal published a long article by Horace Wells. There the properties of ether anaesthesia were described, how it acted upon the patient, what were the dangers, and so on. Horace Wells introduced even dates which were far in antecedence of Morton's experiment at the General Massachusetts Hospital. This article was later on going to be responsible for a Diploma issued by the Scientific Academy of Paris to Horace Wells, bestowing upon him the title of "Benefactor of Humanity". For this incredible step, one is at a loss to account, and the diploma itself was as undeserved as useless for Horace Wells. When it reached America, or better, his native city, Horace Wells was already dead.

America, too, refused to acknowledge unreservedly one of its greatest sons. Small people were jealous of Morton's glory, and eagerly took up Horace Wells's claim of priority. A noted newspaper of Hartford published the following letter by Horace Wells:

"As Dr. Charles T. Jackson and W. T. G. Morton claim to be the originators of this invaluable discovery, I will give a short history of its introduction, that the public may decide to whom belongs the honour. When I was deciding what exhilarating agent to use, it immediately occurred to me that it would be best to use nitrous oxide gas, or sulphuric ether. I conferred with Dr. Marcy of this city, and by his advice, I continued to use the former. If Drs. Jackson and Morton claim that they use something else, I reply that it is the same in principle, if not in name. After making the above statement of facts, I leave it for the public to decide to whom belongs the honour of the discovery."

Later on, Horace Wells called at the General Massachusetts Hospital where he advanced his claims. The Hospital surgeons, however, were solidly behind Morton. Not only because they liked the man, but mostly because they had witnessed for themselves both the unsuccessful experiment with laughing gas given by Horace Wells, and the wonderful success of Morton with ether anaesthesia. No wonder that they cold-shouldered Wells almost immediately. "You say that you are the originator of ether anaesthesia," one of the surgeon's addressed Wells.

"Yes, sir, that is so."

"And have you ever inhaled yourself sulphuric ether?"

"No, Doctor, I have not inhaled ether, but I have experimented with nitrous oxide."

"Have you ever performed operations yourself under the influence of ether?"

"No, sir," was the meek reply of Horace Wells. And with that ended the unsuccessful interview and claim at the General Hospital at Boston.

From now on, Horace Wells was to be one of the most embittered of men. Defeat after defeat followed him implacably. To the scorn of his fellow men, nature added its own persecution and revenge. Horace Wells heard of tidings from distant Scotland, that a Scottish surgeon had adopted a new agent for anaesthesia, chloroform, and praised it as being far superior to ether. In the already

troubled brain of Wells, a new idea formed, that he must be the first to introduce chloroform in America.

"I will show the thief, Morton, who is the master," he told himself. "I will force the medical world of America to adopt chloroform instead of ether, and then the glory will be mine." Practice followed theory, and, equipped with a couple of gallons of chloroform, Horace Wells started to experiment; this time he was going to be cautious. Not only just a few experiments as with laughing gas, but he would go on experimenting for a long time, until he was sure of results, and then nobody could rob him of a success so richly deserved. Horace Wells could not experiment on patients, because he had no practice of his own, and the only man on whom he could try the chloroform was himself. Day after day he slumbered under the influence of chloroform vapour, and the result was inevitable—he became a chloroform addict. Soon all his grand ideas of becoming a benefactor to humanity were clouded in his brain by the mere craving for chloroform. He found that under its influence he forgot the injustice done to him by humanity. He forgot his mental and physical agony, and slipped into oblivion and a false sense of happiness and joy. Again and again, he returned to this state, and chloroform became indispensable to him. It sapped his strength, both moral and physical, and it was not long before Wells was seen as a vagrant tramp, roaming the dark streets of New York. The only companions he could find were the prostitutes of the city, the beggars and the drunkards of the obscure underworld. Soon even these began to shun him which, of course, made matters worse. Horace Wells was toppling head over heels into the realm of madness. One day, believing the whole world was against him, particularly the despicable outcasts and prostitutes, Wells bought a bottle of vitriol and threw it upon two girls who happened to pass by. Amidst screams of pain and agony, a great multitude assembled, and it was a wonder that Wells was not lynched there and then; the police managed to rescue him with great effort.

A quick Court procedure threw Horace Wells into prison,

where aimlessly he lingered his last few days of life. One morning the warder looked through the spy hole of the cell and saw Wells crumpled into a peculiar position. He hastily opened the door, but it was too late—Horace Wells was dead. After taking a large dose of chloroform, which he had managed somehow to conceal, he had severed one of the femoral arteries with a razor and bled to death. The day was January 24th, 1848.

No possessions were found on Wells's body except two letters. One was addressed to his wife and read: "My dear, dear Wife, Before twelve o'clock this night I am to pay the debt of nature. Yes, if I were to go free to-morrow, I could not live and be called a villain. Oh, my dear mother, brother and sister! What can I say to you? Believing that God, who knoweth all hearts, will forgive the dreadful act. Oh my dear wife and child, whom I leave destitute of all means of support—I would still live and work for you, but I cannot, for were I to live, I would become a maniac. I feel that I am a little better than one already, and now, while I am scarcely able to hold my pen, I must bid you all farewell. May God forgive me."

Perhaps it was only his wife who forgave him in the little graveyard in Hartford. Letting her tears fall unrestrained, Mrs. Wells uttered: "My husband's great gift, which he devoted to the service of mankind, proved a curse to himself and to his family."

On the following morning, the diploma from the Paris Medical Society reached Wells's home. He was pronounced the "Benefactor of Humanity". It was too late to help Horace Wells in any way, but not too late to embitter still further, the already unhappy William Thomas Green Morton. Nobody bears a grudge against a dead man and, as a rule, he who dies becomes a saint and his deeds are praised. So it was with Horace Wells. One paper wrote the following: "While a young, unhappy man, who had done so much to free mankind from the curse of pain, perished by his own hand with a clouded intellect in some corner of the new world, another, undeserving of the fame he had snatched, was enjoying the credit

which properly accrued to the prematurely deceased Wells."

The enemies of Morton readily took up this outcry, and they held him responsible for Wells's suicide. It was hard to fight a living man, no matter how unjust his claims, but it was impossible to fight against the shadow of a dead man. From the gloom and misery of Horace Wells's life there arose after his death, a shadow of a great martyr, of a man unjustly treated, which was to continue to embitter Morton's life for ever.

If Morton imagined, or at least hoped, that the trouble brought upon him by Horace Wells would be at an end, he was greatly mistaken. The real evil genius was still to come, in the shape of Dr. Charles T. Jackson. Never was a man born who combined intelligence and almost genius with complete unscrupulousness and wickedness as Jackson. He dedicated the rest of his life to the sole purpose of ruining and embittering Morton's existence. Providence brought these two men together by chance. Dr. Charles Jackson was well known as a chemist and a medical man. He was lecturing at the University of Boston at the time Morton applied for admission as a medical student, and it is quite reasonable to assume that the great oratory power of Jackson must have inspired young Morton with awe and respect for his knowledge.

Early records do not say whether these two men struck up any great friendship. It is quite unlikely, considering the modest and unassuming character of Morton, and the boisterous and snobbish figure that Jackson always cut with his contemporaries. Both in America and elsewhere, Jackson's name was well known as a scientist, and his papers were widely read and greatly admired. But his character was already tinged with unsavoury rumours that should have been a warning to Morton not to have any dealings with him. Some years previously, Jackson's name was on everybody's lips and practically all newspapers gave long sensational reports about a Court case, involving him with the discoverer of telegraphy—Samuel Morse.

During one of his ocean crossings, Jackson met Morse on the same ship. In those days, sea voyaging was no pleasure, and day after day had to be spent in enforced idleness. It is quite likely that Morse, working on his telegraphic apparatus, showed it or discussed it with Jackson, who always showed keen curiosity for any kind of discovery. Two years after this voyage, Morse published his invention, and it was such a success that Congress took it up and rewarded Morse generously for his services. Almost overnight, he found himself the possessor of wealth undreamed of, and one can imagine his astonishment on reading a certain paragraph in a Boston newspaper. In a most brazen manner, Jackson claimed that he was the real discoverer of the electro-magnetic telegraph, and that Morse had stolen the idea from him during a voyage they made together some time previously. We can imagine the angry protest of Morse at this monstrous falsehood, and it is not surprising that during the Court procedure that followed, Morse referred to Jackson as a lunatic and an intolerable nuisance. Nevertheless, the latter stuck to his guns with such perseverance, that it took Morse seven years and half his wealth to clear his name and get the well-deserved priority of being the inventor of the telegraph. This occurred during the year 1839, and Morton must have seen some reference of the court proceedings in his daily papers. Other men might have been forewarned to stay away from such a dangerous man—not so Morton. He did not possess the virtues of caution and prudence. So it was that when he decided to experiment with ether, the first man he thought of for advice was Dr. Charles Jackson.

On the 30th September, 1846, Morton called at Jackson's office and asked him what he knew about the property of ether. To which the latter replied that, what he did not know about sulphuric ether was not worth knowing. Boisterously he said that he had himself inhaled ether vapours solely for experimental purposes. "It is dangerous stuff, Morton," he said in warning. "It can put people to sleep, but if one is reckless with it, it can quite easily kill a man. If I were you, I wouldn't have anything to do with it."

Morton thanked his erstwhile teacher for his advice, but the moment he left the office, he went straight to the nearest chemist and bought two gallons of ether.

No doubt Jackson had forgotten all about this meeting until the memorable October 16th, when Morton demonstrated successfully, the property of sulphuric ether. It is easy to imagine the envy and anger that consumed Jackson's heart on hearing the news. As with Morse's invention, Jackson must have believed that he had again been cheated of becoming a famous scientist, and it was not long before he went to call on Professor Warren at the Massachusetts General Hospital.

"Dr. Warren, I have the honour to inform you that the idea of using ether in surgical operations is mine. I taught William Morton how to use it, and he acted upon my instructions."

"And why, may I ask, did you wait two weeks before coming with such important news to me?" Warren snapped. He still remembered how Morton had waited for him in the hospital corridor and implored him to use ether. In his heart, Dr. Warren knew that Jackson was lying, and cunningly he decided on a trick that he felt sure would expose Jackson.

"To-morrow I have a few operations on my list, and will be more than delighted, Dr. Jackson, if you will kindly come to administer ether yourself, instead of Dr. Morton."

The cunning chemist realised the trap was set. "I am terribly sorry, Dr. Warren," he smiled ingratiatingly, "I would love to help you, but as I have made arrangements to start upon a geological expedition, it is much to my regret that it will be impossible for me to administer the ether."

Many sleepless nights Jackson must have passed following this rebuke at the hands of Dr. Warren and, as was to be expected, it steeled his determination to destroy Morton. What Boston thought of Morton's discovery was of little importance to him. He, Jackson, must train his guns in other directions. What better target than the Paris Academy

of Science, where he was known personally to many leading scientists.

"I ask leave to communicate through you to the Academy of Science a discovery which I have made . . ." Jackson's letter began to one of his colleagues in Paris. "I have latterly put it to use by inducing a dentist of this city to administer the vapours of ether to persons whose teeth he was extracting. I then requested this dentist to go to the General Hospital in Massachusetts and administer the vapour of ether to a patient about to undergo a painful surgical operation."

The more Jackson read about Morton's fame, which was rapidly spreading, the more jealous he became. Remembering all his acquaintances in distant Europe, he wrote to each one a letter, describing at length his discovery of ether anaesthesia and how an impudent unknown dentist was trying his best to steal it. Surgeons in Germany and Russia, France and England, received this cleverly worded epistle, and were at a loss to decide who was the true discoverer of ether. The medical and lay press got wind of Jackson's claim which, unfortunately, was supported by very influential surgeons in Europe. On every occasion, Jackson's friends did not omit to describe him as the real discoverer of ether anaesthesia, and Morton as merely the Boston dentist who was commissioned by the great man to try out his discovery. It seemed that Jackson was the man who originally decided to try anaesthesia in the General Hospital of Boston, and Morton carried out his instructions.

One can imagine the disgust and anger that Morton felt when this atrocious lie spread all over Europe. With newspaper cuttings and letters in his hand, he rushed to Jackson's home and the two men faced each other as two deadly enemies.

"What is the meaning of this utter nonsense, Dr. Jackson? How could any man be so utterly false and selfish as to try and steal something that does not belong to him?"

"I've no idea what you're talking about, Morton," replied the chemist, in a most gullible and innocent way.

"You know very well what I'm talking about. You

have cheated me by pretending that you are the discoverer of ether anaesthesia. You've written to the Academy of Science in Paris."

"Nonsense, my friend, nonsense," answered Jackson. "Far be it from me to cheat and rob a young deserving scientist of his due. I'm sure there must be some misunderstanding."

"How could there be!" Morton angrily thrust some letters from friends in Paris into Jackson's hands. "Here, read for yourself."

Jackson read the reports and, shaking his head, said: "It seems incredible that such a travesty of facts could occur." Then looking at Morton most innocently: "I assure you, my friend, that the only thing I wrote was to further your own claim. I told my friends in Europe that you are a great man and the discoverer of the miracle of modern times."

Jackson certainly must have been very persuasive and convincing, for, when the dentist left the office he felt quite reconciled and sure that there had been some mistake. But his wife, Elizabeth, could not believe or trust the cunning Jackson.

"You are too credulous, my dear William," she said to him after hearing what had happened. "It's as clear as daylight that you have been twisted round his finger like a stupid child. Don't believe him, William, I beg you. Don't you remember what a dirty trick he played on Morse? If ever there was a man you should not trust it is Jackson."

"But, dear, the man can't be that deceitful. He even promised me he would write to Paris a full report of my discovery, acknowledging that he had nothing to do with it."

That Elizabeth was right and Morton wrong was to be proved before a few days had elapsed. Jackson sent neither the report to the Press, acknowledging the merits of his friend, nor did he write to Paris, correcting the so-called misunderstanding. But a report Jackson did write. It was a lengthy description of a meeting of the Medical Society of Boston. In great detail, the reception of Dr. Jackson

by eminent surgeons was given, and how they all acknowledged that he, Jackson, was the true discoverer of ether anaesthesia. Even Professor Warren was quoted as congratulating Jackson for his gift to humanity. Needless to say, nothing in the report was true; it was a concoction of the evil brain of Jackson in every detail. He had induced one of the editors of a Boston daily to print the report as the true proceedings of the meeting.

Morton rubbed his eyes. He could hardly believe what he read on March 1st, 1847. It was all so utterly incredible and bewildering that it seemed a nightmare. Jackson had seen to it that hundreds of copies of the newspaper had gone to Europe, and the Paris Society, acting upon this report, decided to award the title of "Benefactor of Mankind" to Dr. Charles Jackson. This would have been the last stroke of injustice had it not been for the intervention of Professor Louis Velpeau. This man alone remembered that when he performed his first painless operation it was Morton's apparatus and Morton's technique that he had used. The records of the proceedings of the Academy of Science showed the outcome of the lengthy debates as to who was the real discoverer. Jackson must certainly have had powerful friends in Paris, or his false report in the newspaper must have been so convincing that finally the Academy decided to reward both Morton and Jackson.

The resolution read as follows: "Dr. Charles Jackson and Mr. William Morton were both indispensable. Had it not been for the persistency, the far-reaching vision, the courage, nay, the audacity of Mr. Morton, Jackson's observations would probably have passed unnoticed and unapplied; but for the observations of Charles Jackson, on the other hand, it is likely that Mr. Morton's ideas would never have been crowned with success. The Commission therefore recommends that the Montyn Prize of 5,000 francs shall be divided, 2,500 francs being allotted to Dr. Jackson for his observations and experiments regarding the anaesthetic effects of the inhalation of ether, and 2,500 francs to Mr. Morton for the application of the method to practical surgery."

In far away Boston the enmity of the two men grew stronger. Each of them began to consider himself the injured party and they both thought how unjust the Academy award had been. Jackson's greed prevailed and he decided to accept the money, while Morton, in rightful indignation, wrote the Academy that the decision was a most unjust and undeserved insult to him and he forthwith refused to accept his share.

For two years the bitter controversy went on unabatingly; finally the Academy decided to use Morton's share of the prize for making a gold medal in his honour. A magnificent gold medal was cast, one side of which bore the head of Minerva, with the words "National Institute of France", and the other the inscription: "Academy of the Sciences—Montyn Prize for Medicine and Surgery—year 1847–1848—William T. G. Morton, 1850." The medal itself, surrounded with laurel relief and enclosed in a beautiful leather case, was despatched with a diploma of honour to Boston. Jackson raved furiously for days like a madman after hearing of the event. And instead of abating, his determination for further fight and the utter destruction of Morton increased.

Now that he could not do anything officially, he decided to attack Morton in his private and social life. Bribing one of the maids of Morton's household, Jackson got hold of all patients' records and, in a devilish design, issued writs for unpaid bills, purporting to be from Morton himself. He saw, of course, that the writs were sent to patients who had already paid their accounts and, as may be imagined, the results were disastrous. During the following days Morton was faced with irate patients and was called a scoundrel and opportunist. At that time it was considered unethical for any doctor to bring his patients to court for unpaid accounts, let alone try and get his fees twice. This was more than any self-respecting citizen could stand. Morton's protestations of innocence were not believed; nay, they were ridiculed as childish. Who on earth, people said, could have sent the writs but the man who hoped to profit from them? A whispering campaign started that

was to ruin socially Morton's reputation. Only a few weeks elapsed before Morton was to find an empty surgery with no patients to wait on him. This naturally brought further consequences. The lengthy quarrels between the two men caused Morton to squander his small savings and now, when all his patients had left him, he was faced with utter ruin. Calamity came sooner than he expected. One afternoon on returning to his home, dejected and embittered, he found bailiffs taking all his possessions in order to pay creditors' bills. His house, too, would have to be sold. In fact, it was sold by auction, but kind friends bought it and allowed Morton, his wife and five children to live there rent free. A small deed of mercy amid undeserved calamity, yet because of it Morton at least was spared the final agony of finding himself and his family without a roof over their heads. And that was only one of the "rewards" that mankind bestowed upon its benefactor.

CHAPTER X

NEMESIS

"GENTLEMEN." The President of the Medical Committee of the Massachusetts General Hospital cleared his throat as he fidgeted with the agenda papers in front of him. "Gentlemen, it has come to our knowledge that one of the most deserving sons of our city, Dr. Morton, is practically on the verge of starvation. It is incredible that the man who has done more for humanity than any man living should be let come to such a pitiable plight."

It had been a tumultuous meeting of the General Hospital. Men like Professor Warren and Dr. Oliver Wendell Holmes still remembered the day when William Morton brought his invention of ether anaesthesia to their notice. They had later lost sight of him and more than three years had elapsed before they learned from friends that matters had gone so badly with William Morton and that he, the Benefactor of Mankind, was in danger of death from starvation unless something was done immediately. All the trustees of the hospital were unanimous in their agreement that a petition should be lodged with Congress in Washington for help, but as things went very slowly in Washington, the present danger had to be faced.

"It is a pity to see a man going to his inevitable doom while we wait for Congress to act. Gentlemen, poverty does not wait. We cannot allow such things to be and if we are to save this man we must act—and act now."

While this deliberation was going on in far away West Needham, Dr. Morton was gloomily facing another day. It had gone very hard with him and this morning he found himself penniless. He looked round the barren room which contained only a rickety chair, an iron bedstead and a little writing-desk. Everything else had been sold by creditors. William Morton put his hand to his forehead as if to

suppress the cries of his wife and children. In the adjoining room Elizabeth and the children were sobbing desperately. His wife, who had been his constant and inseparable companion in all his misfortunes, looked with anguish at her under-nourished children. She thought of her husband, also under-nourished, oppressed by misfortune, and then she stared apathetically out of the window. She looked at the familiar hills and green fields; she contemplated wearily the beautiful landscape and then her eyes rested upon the neglected garden that once belonged to them, but now, taken away by creditors and neglected, was overgrown with weeds. She let her unrestrained tears roll down her emaciated cheeks.

"Mother," the eldest child begged. "Mother, please stop crying. There's somebody coming. There's a carriage outside."

The child had been looking through the window and had seen an imposing carriage, drawn by four horses, draw up at the gate. Elizabeth dried her tears with the corner of her apron and hurried to her husband's room.

"William!" She shook his shoulder, noticing that he did not even turn when she entered. "William," she repeated, "somebody has come to see you."

Automatically Dr. Morton went into the hall and opened the front door. Six men stood facing him. No formal introduction was necessary. William Morton recognised them instantly. The visitors were none other than the trustees of the Massachusetts General Hospital. Silently he invited them to follow him and ushered them into a barren square room that obviously had once been the drawing-room. On the old faded walls clean patches showed where the pictures had been. William Morton made a gesture as if to invite them to be seated, then realising there was no furniture, restrained himself. This made the situation more awkward. Both visitors and host looked at each other silently for a few seconds. The trustees were evidently moved at the sight of Morton's poverty. They had heard of his plight but they had never imagined he had come to such a desperate pass. The President of the trustees

wanted to say something. His lips moved but no words emerged. He wanted to say how sorry he was to see Morton in such a plight. He wanted to say they would have come earlier had they known, but on second thoughts decided not to mention it. Words would not have helped. Silently he thrust a silver box into Morton's hands, saying, "Dr. Morton, sir. We have come as representatives of the Hospital Board. We have much pleasure in handing you this small token of our appreciation."

With trembling hands, Morton took the beautiful silver box. On the lid in large letters the following words were engraved: "For William Thomas Green Morton, who has become poor in a cause which has made the world his debtor." With still shaking hands he opened the box and his unbelieving eyes rested upon ten hundred-dollar notes. Before he could say anything, two large tears fell on the notes as if to mark the comfort and gratitude they would bring to the starving man. The situation was becoming unbearable. They all realised that no further words were necessary and that the longer they stayed the greater would be the embarrassment of the unhappy man. Silently they shook his hand and filed one by one like ghosts from the empty house. Only their footsteps resounded on the empty floor.

By this time Morton was weeping unrestrainedly and did not realise that his wife had come near him, utterly at a loss what to do. At last he pulled himself together and looked at her.

"Elizabeth, look." He held the notes in his hand. "Elizabeth, now we can get our few possessions out of pawn. We don't need to leave the house. We can at least rent it and stay here where we have been so happy. . . ." Words failed them. The couple embraced each other in deep gratitude for the unexpected turn of fortune.

The news of Morton's misfortune and his predicament had spread like wildfire. Voices of indignation were heard all over the country and in Washington itself one of the greatest senators of that time, Daniel Webster—a man renowned for his eloquence and oratory—took up the case.

The day was March 4th, 1849. It was a day memorable also because a new president of the United States was elected—Zachary Taylor.

Amid profound silence Daniel Webster started his oration. "Gentlemen, our Congress has devoted huge sums of money in the past year for arms and ammunition. It is obvious that we are willing to pay heavily for new weapons with which to destroy life. But, gentlemen, when it is the case of mitigating human suffering, then we are reluctant to do anything. At this very moment a man is dying from starvation—a man on whom humanity bestowed the title of Benefactor. Are we to let such things be? It would be unworthy of our greatness as a nation to ignore such a man, who is a glory of science and who will remain our pride throughout the ages. America cannot, it must not, ignore one of her most worthy sons. Gentlemen, I propose that the sum of one hundred thousand dollars be granted to Dr. William Green Morton."

Tremendous applause greeted the last words of the senator. Not a single vote of dissension was cast. Unanimously the Senate of the United States of America granted the sum of one hundred thousand dollars as a testimonial of gratitude.

At the personal invitation of Daniel Webster, Dr. Morton was summoned to Washington where he was received as a national hero. Multitudes thronged the route from the station to Daniel Webster's house. Everyone wanted to shake his hand and to say a word of encouragement and joy. In his honour, Daniel Webster gave a dinner party, and Dr. William Morton took up the honoured position of the Hero of America and the Benefactor of Humanity.

Late that night, William Morton wrote a touching letter to his wife and children, telling them of the joy and happiness he had experienced. Many a smudge on the letter marked the tears of unrestrained joy. At last Providence had smiled on the unfortunate couple, and Dr. Morton would have received his monetary reward but for his evil genius—Dr. Charles Jackson.

This man in his evil design to ruin Morton sent spies to Washington, and when he learned how the latter had been acclaimed and fêted as a hero, he writhed in envy and, without losing a moment, travelled to the capital to visit some of his senator friends. Some people are always ready to listen to evil designs, and Jackson's plausible plot did not remain unheeded. The thirty-third Congress of America was just on the point of voting the award to Morton when, neither too soon nor too late, Jackson's claim as the sole discoverer of ether anaesthesia, accompanied with strongly worded accusations that Morton had stolen the glory from him, was lodged by one of his friends. Voices of protest were heard, but Congress could not ignore the signature of influential senators. The senators came to a compromise and a committee was formed to investigate the claims of the two men. Once more Morton was on the point of receiving a fortune and once again it was snatched from him just when he thought it was in his grasp. In far away Boston his implacable enemy was giving a banquet to his friends to celebrate his victory over Morton.

Days, weeks and months elapsed, and while the Committee was engaged in tedious and long investigations, Morton and his family were again faced with hunger and destitution. It would have been too much for any man to stand, and Morton was no exception. His health was gradually sapped and even his eyes lost their lustre, and the dreaded shadow of death could be seen in them. Elizabeth, heart-broken, implored the surgeons of the General Hospital for help and she was not disappointed. Professor Warren and Dr. Bigelow sent a detailed report to Congress on the discovery of ether anaesthesia. They said that they had never heard of the use of ether by inhalation as a means of preventing pain in surgical operations until October 16, 1846. On that particular day Dr. William Morton administered the first ether anaesthesia and Professor Warren performed the operation. They both repudiated all claims of priority made by Dr. Jackson, in fact, Professor Warren emphasised that he himself had asked Jackson to give an anaesthetic to a patient of his and he had refused.

"It is our opinion," the letter concluded, "that Dr. Jackson is an impostor. He might have known of the property of ether, but had neither the courage nor the ability of putting it to practical use. The discovery belongs to Morton and Jackson's claim has the same value as the claim of English dairymaids of having discovered Dr. Jenner's vaccine."

The report of the Congress Committee gave the same impression, and once more the senators assembled to decide to whom the award should be given. In their Annals, Congress reports that: ". . . in their opinion Dr. William T. G. Morton first proved to the world that ether could produce insensitivity to the pain of surgical operations, and that it could be used with safety. In their opinion, his fellow men owe a debt to him for this knowledge. Herewith it is agreed that Congress recognises William Morton's service to his country and to mankind." Appended to this report was an instruction by the National Trust for the payment of the sum of one hundred thousand dollars to William Morton.

Now, surely Morton would get his reward. He might have been spared further humiliation if Jackson took his defeat like a man. He was not a man, however, but the devil incarnate. The very day that he was told by his friends that nothing further could be done in Morton's case, he took the train for Hartford. In this little town the widow of Horace Wells lived, the unhappy erstwhile partner of Morton. Late in the evening Jackson knocked at Mrs. Wells's front door. For half an hour the bewildered lady listened to the strange visitor.

"I was your husband's great friend, Mrs. Wells," Jackson began. Then looking round the room, he pretended to be appalled by the existing poverty, shaking his head in pity, he continued: "You, the wife of the greatest man that ever lived in America, living in such poverty and sorrow! America has forgotten your husband, his services to mankind; no one troubles to remember one who is dead and buried. Everybody has forgotten, but I have not. I know that your husband was the real discoverer of

anaesthesia and I am going to see that justice is done." He banged his fist on the table as if to emphasise his determination. "If anyone is to receive the reward of one hundred thousand dollars, it is certainly not the thief Morton, but you and your children."

Tears welled into the good lady's eyes as she listened to the unselfishness of Jackson. It was easy for Mrs. Wells to be persuaded by Jackson's argument. When Horace Wells died in prison, she and her child were left penniless, and the shadow of poverty and privation had always been at her door. In her eyes Jackson appeared as the angel sent from heaven.

"We will never be able to repay your kindness, Dr. Jackson," were the parting words of Mrs. Wells when the man left her house. With the address of Senator Truman Smith in his pocket, Jackson was knocking at a second door that same evening. Before midnight struck another person listened to the unselfish desires of Jackson and how he wanted to see justice done. Truman Smith, himself a lawyer, had always been jealous of the popularity of his colleague Daniel Webster. For a long time he had been waiting such an opportunity. To expound the lost cause of man unjustly treated by society. The senator visualised his case, and smiled at the opportunity it presented. Everything was in his favour. The honour of his native town, Hartford; the poverty of Horace Wells's widow, the unhappy circumstances that led to his death; all these were in favour of Truman's case. How well he knew his power.

"Gentlemen." He cleared his throat. "I'm here to speak on behalf of a dead man, a dead man who, but for my help, would remain defenceless." The solemn words echoed through the majestic hall of Congress. Truman Smith's voice vibrated with emotion. "While a young and unhappy man, who had done so much to free mankind from the curse of pain, perished by his own hand, another undeserving of the fame, snatched the glory of his invention and is now enjoying the respect and honour of our land. No, gentlemen, as long as I live I will not allow that the dead man, Horace Wells, be robbed of his just reward."

Hushed protests were heard here and there but no senator dared to rise against the ghost of a dead man. No one dared to attack a person who could not defend himself. Truman Smith concluded: "I feel sure that Congress will allow me to defend the interests of a dead man and his family, and will not hastily decide this matter before the widow and orphan of Horace Wells are heard."

And Wells's widow and child were heard indeed. For another year, Morton's reward was deferred while Congress appointed committees and sub-committees to investigate the rightful claims of Horace Wells.

The reports, however, proved unsatisfactory and although they ran into hundreds of thousands of words, all coached to make a glaring account of Horace Wells's sacrifices for science and humanity, they ended by emphasising that Morton after all, was the true discoverer of ether anaesthesia. Once more William Morton was notified that the next session of Congress would definitely decide on the reward to be given to him.

Another victory for Morton and another enemy for him, too. Senator Truman Smith was angry, and he decided to join forces with Jackson. Scanning the medical reports, they came upon a notification in the *Medical Journal of Georgia*, which stated that a doctor from Athens, by the name of Crawford Long, had performed an operation under ether anaesthesia in the year 1842. The two men did not need further proof. They travelled to Athens in Georgia, meeting people, interrogating left and right, bullying, cajoling. At last they found what they wanted—a negro slave who, as a child, had his two fingers amputated by Dr. Long while he slept under ether anaesthesia. Later they met Dr. Crawford Long himself. They found a broken, disillusioned man, who, after serving for many years as a military doctor, had returned to his native town to earn a precarious living.

"It is a pity, Dr. Long," Jackson consoled him, "that you did not publish your experience at that time. But, my friend, we are here to help you. We are going to see that you receive the reward and be acclaimed the rightful

discoverer of ether anaesthesia. I wish I had heard before that you were the man. I am so well known, both in Europe and here, that I would consider it my duty to bring to the notice of all the important men of the world your rightful claim to priority. Even now I will try my best to get you the reward, if it is the last thing I do."

Jackson paused for a moment and, like the actor that he was, surveyed the effect of his words on Dr. Long. The other man hesitated. For a long time Dr. Long had relinquished his desire for fame. Gone were the days of his youthful boisterous parties and now, with many years military service behind him, he had settled with his wife Caroline, to an unobtrusive and simple country life.

"Thank you, sir," he said. "It is good of you to take such trouble, but I think it best to let matters rest as they are. I have no real claim, I know it."

Caroline, however, was of a different opinion. She had never forgiven her husband his lack of ambition, so she seized this, her last opportunity. How easily she played into Jackson's experienced hands. Where his persuasion failed, Caroline's tears succeeded. "Think of it, dear, we will become famous and you will be summoned to Washington to receive honours and rewards." Caroline put the best of herself forward and let her tears run unrestrained.

"You must let me help you," said Jackson, hammering the iron while it was hot. "My only desire is to see that justice prevails. I personally have no interest in the matter, Dr. Long, but you have a duty, not only to yourself, but to your wife and to your country."

From then on, the life of Dr. Long and the life of the whole city of Athens changed as if by magic. The quiet and simple surgery became a beehive, with people going to and fro, journalists begging for interviews, and Dr. Jackson beaming in his glory. All the citizens of Athens were agreed upon one thing—that Dr. Crawford Long was the rightful discoverer of ether anaesthesia, and that the glory belonged to their little town, where the first painless operation was performed. Senator Truman Smith was also eager to oblige, and he took it upon himself to be

the champion, expounding the rightful cause before Congress. The representative for the State of Georgia, Senator Dawson, was in full agreement, and the two senators concocted a new application to Congress for the reward to be given to Dr. Crawford Long. Forgotten was the widow of Horace Wells, and all agreed that Dr. Morton did not deserve any attention at all.

Henceforth the drama took a comical turn. From different States of the American Continent, unknown claimants sprang, who were eager to prove that they were the rightful discoverers. There was a time when not less than eight claimants lodged petitions, each one supported by some senator or other, eager to show his ability in oratory, and eager to obtain the honours for his native town. Each claim, of course, had to be investigated, and the reward that would have saved Dr. Morton from dire poverty, was postponed further and further. England, too, joined in the general mêlée, and claims arrived for the rightful ownership of the reward by Dr. Henry Hill Hickman.

In the meantime, Dr. Morton lived in complete seclusion, struggling for mere existence. Disappointment upon disappointment, one disillusion after another, piled up in continuous succession. Nobody thought of helping Morton as a man, they were all so eager to obtain the reward for themselves, or to get some honour or other, so that the man Morton and his family were completely forgotten. Soon it was impossible for the family to live anywhere; no door would open to them, and they were not even sure whether to-morrow's meal would be denied them. It looked at last as if Dr. Jackson was succeeding in his evil designs. Malicious tongues wagged all over the country, presenting Morton as a scoundrel and a thief trying to rob honest people of their due.

One morning the youngest of Morton's daughters was looking through the window, and turning her pale face towards her father who was musing in a chair, shouted in terror:

"Papa, papa, come and see. People are coming to the house."

Tired, Morton rose and approached the window and he, with his little girl, looked upon something almost beyond description. A great collection of slum children and ne'er-do-wells were shouting and carrying a scarecrow dressed in an old tail coat and a bowler hat. A huge placard was hanging round the neck, bearing the following inscription: "Dr. Thomas Morton, thief and scoundrel."

The air was filled with hissing and shouting, which at any moment would break into violence. The little girl drew closer to her father, holding him tightly and screaming: "What are they going to do to us, Papa? Don't let them hurt us."

"Don't be frightened, darling," said Morton, caressing the lovely fair head of his daughter. "They cannot hurt us any more. Nothing can hurt us."

In the meantime the hooligans had erected a huge pile round the effigy and lit a bonfire, to the delight of the assembly. On the following day Dr. Thomas Morton had a nervous breakdown, fits of crying and despair were shaking his feeble body. Even Elizabeth, his faithful companion in all his misery, could see that the end would not be long. No human could stand more than her husband had endured. This was December 1st, 1862. Memorable also because on this very day Congress, by a majority decision, annulled the reward granted originally to Dr. Morton. Thus ended the tragedy that would forever remain one of the blackest records in the annals of civilised history.

Later on, in a little pawnshop, an old shrivelled man was offering a packet. With trembling hands he reluctantly unwrapped the paper and handed the contents to the pawnbroker. The gold medal shone in all its brilliance.

"How much would you give me for this?" the old man enquired.

"I will pay you the value of the gold in weight." Then the pawnbroker scrutinised the medal. On one side was the inscription: "To the Benefactor of Mankind T. W. G. Morton."

"What right have you to sell this object? Where did you steal it from?" the man asked fiercely.

"I have not stolen it. It was given to me by the Academy of Science in Paris. I am Dr. Morton."

Utter silence fell. The two men did not speak for a few moments. In an uncertain voice the pawnbroker enquired: "Are you really the man who is referred to as the Benefactor of Mankind? It seems almost incredible." Then more sympathetically: "Are you obliged to sell the medal?"

"Yes. I'm afraid if you don't buy it from me, I and my family will have nothing to eat to-morrow."

The pawnbroker opened his desk and without a word took out a handful of banknotes. Then, without meeting the gaze of the other, he said. "Here, take this and allow me to give it as a loan. Please keep the medal."

When during the following winter, Professor Edward Warren was told of the incident by a commercial traveller, he could hardly believe his ears.

It would appear that Providence had certainly been unjust to the benefactors of mankind. Dr. Horace Wells committed suicide in a prison cell, leaving his widow and child starving. Dr. Crawford Long died from heart failure while examining a patient, and Caroline's ambition to see her husband proclaimed the discoverer of ether anaesthesia was unfulfilled. She passed the last years of her life uneventfully in a little house in her native Georgia. And what about Jackson? He went on plotting to ruin the man who was beyond being ruined. One sunny day in July, 1873, he was strolling through the park towards the Mount Auburn Cemetery, when a beautiful shining monument caught his eye. He stopped to read the inscription upon it:

> "William T. G. Morton
> Inventor and revealer of anaesthetic inhalation
> By whom pain in surgery was annulled;
> Before whom in all time surgery was agony,
> Since whom Science has control of Pain."
>
> *Erected by the Citizens of Boston.*

Dr. Charles Jackson did not see the beautiful sunset, nor the green meadow that surrounded the monument. The

one thing he saw was that William T. G. Morton had robbed him of his honour and his due. He uttered a piercing cry and flung himself onto the statue, trying with his fingers to tear it to pieces. Soon an assembly gathered round, staring at the unusual sight of the raving maniac. An ambulance arrived and took Dr. Jackson to the McLean Asylum for Lunatics in Somerville. There he lived for a few more years, and death came to relieve him on August 28th, 1880.

Dr. William Morton died on the morning of July 15th, 1868, at the age of forty-nine. Unknown and forgotten, he was taking his morning stroll with his wife, when a sudden pain seized his heart, and in front of the bewildered and horrified Elizabeth, he passed away. A man despised and rejected by humanity, a man who never found peace on earth, a man who suffered to the last. A man who, after his death, the world recognised at last as the benefactor of humanity, and erected a monument to him.

When Morton's death became known to the world, S. Weir Mitchell, famous poet and novelist, wrote the following:

How did we thank him? Ah, no joy-bells rang,
No paeans greeted, and no poets sang;
No cannons thundered from the guarded strand
This mighty victory to a grateful land!
We took the gift so humbly, simply given,
And, coldly selfish—left our debt to Heaven.
How shall we thank him? Hush! A gladder hour
Has struck to him; a wiser, juster power
Shall know full well how fitly to reward
The generous soul that found the world so hard.

CHAPTER XI

THE ORIGINAL CURSE OF EVE

"Unto the woman he said: I will greatly multiply thy sorrow and thy conception. In sorrow thou shalt bring forth children." Thus in no uncertain words, the Lord pronounced His curse as atonement for original sin. From then onwards, women had to bear children in sorrow and pain; nobody ever dared to alleviate their suffering. Jews and Gentiles alike went on regarding woman's pain as an atonement for sin, and democratic Hellenes, in spite of their great advance in humanitarian feelings, never altered their opinion of woman's labour. It was sinful to conceive. To be a woman was a sin in itself, and the least that such accursed creatures could do was to propagate the human race in writhing agony.

Sixteen centuries passed since the birth of Christ, and woman's lot remain immutable; that is, till the year 1569. Persecuted by religious hatred, a Huguenot by the name of William Chamberlen crossed the Channel and found sanctuary in hospitable England. This man had four sons, and each time he must have listened with trepidation to the agony of his wife while bearing him these children. Or perhaps he found that in England helping mothers to bring forth their children could be a very remunerative business, for he decided that all his four sons should become accoucheurs of patricians. Often genius and knavery go hand in hand, but never was this more expertly combined than in the four Chamberlen brothers. The creative side of their brain must have realised that something could be done to alleviate pain in protracted and difficult labour. Often they beheld their patients losing their life in agony, and were unable to help them. So combining their intelligence, they devised the first midwifery forceps, with which they could extract a live child, thus saving not only human

lives, but also shortening the agony of the mother. At the same time their avarice and unscrupulousness got the better of them, and induced them to turn this humanitarian discovery into a quick and unprecedented source of wealth. The idea of relieving woman's pain and saving infant lives was forgotten. Otherwise we cannot explain their refusal to help poor women, but they were invariably eager to help the well-to-do. A complete ritual was devised by these shrewd scoundrels. Through their own whisperings and campaigning, a myth sprang up about the unusual instruments that they possessed which could bring people back to life from the grave. Nobody ever saw the instruments; some said it was a kind of devilish contraption; others asserted that it was a powerful magnet which drew the child out of the woman's body. Yet others said that it was the devil himself who was in league with them. The ritual comprised the most fantastic ceremonies. The brothers used to arrive in a special carriage, dressed solemnly for the occasion. In a huge wooden box, adorned with gilded carvings, they carried their famous and mysterious instruments. The box was of such dimensions, and invariably carried by two of the brothers, as to give the impression that inside was some heavy machinery or apparatus.

Nobody was allowed to be present in the room when the Chamberlens performed their operation. The woman herself was blindfolded, lest she should see and disclose their secret. Outside awe-inspired relatives listened to mysterious bell-ringings and other sounds intermingled with the agonizing cries of the suffering woman. This went on for an hour or so, then solemnly the door would open and one of the Chamberlens in god-like appearance would bring out a live heir and present it to the grateful father. The reward for this operation was so high that it has never been surpassed even in these days. Naturally very few husbands could pay in cash for the Chamberlens' services. But these goodly men were shrewd business men and accepted in lieu of cash, mortgages, precious fields of crops and suchlike. It is reputed that a rich farmer in Sussex, for the

delivery of his first boy, was compelled to sell to the Chamberlens the five years' harvest of all his fields.

Other generations of Chamberlens arrived and the secret was handed from father to son and to grandson, and, incredible as it may seem, they managed to keep the secret of the midwifery forceps for two centuries and nobody in the world knew what type of instrument they used. No wonder that the Chamberlen dynasty became one of the richest in England and still many mothers continued to bear their children in pain and the wretched poor continued to die in labour.

Only at the close of the seventeenth century one of the Chamberlens was induced to sell his secret to a Dutch doctor for a fabulous sum. The latter, however, when he tried to use the instrument in Holland, had his first patient die in labour without being able to help her. Only later it was found out that, true to tradition, this Chamberlen had cheated the Dutchman and sold him only one blade of the forceps. Not being a genius the Dutch doctor tried to use it, with disastrous consequences, as one can imagine. Now, cheated people are reluctant to admit that they have been taken for fools, so this one decided to cheat somebody else and he in turn sold the instrument to another doctor, who in his turn sold it to the Medical Faculty of Amsterdam. Incredible as it may sound, the faculty in turn refused to divulge the secret of the instrument and offered it at an exorbitant price to any practitioner who was willing to try it out.

For how long this deceit would have gone on it is impossible to say, but by a fluke in 1813, a complete pair of midwifery forceps belonging to one of the Chamberlens was discovered in one of the houses he had occupied. At the same time providence apparently relented and decided to help suffering women. Like a flash from the blue, the real secret of the midwifery forceps was revealed to humanity. The lightning came in the guise of a poor barber who dabbled in surgery as a pastime. One day he accidentally beheld the one blade sold to the Amsterdam Faculty of Medicine and, racking his brain, he realised that the

instrument pointed to some kind of grip. The rest was easy: he devised an opposite blade and by closing them together the secret was divulged. What an opportunity for the poor to become rich! But he had a heart—a better and more merciful one than the medical profession of that day. On foot, John Palfyn, the barber, journeyed to Paris and disclosed the reconstructed instrument to the French Academy of Science. His task was fulfilled; he did not wait for a reward, neither did he ask for one, but returned again on foot to his native Ghent, there to die a few years later in obscurity and poverty. Half a century later, grateful humanity erected a statue of a weeping woman over the tomb of John Palfyn in the St. Jacques Cemetery in Ghent.

Thus part of woman's pain was wrested from her, but it was only a small proportion, however; women went on dying and painfully begetting their children, until one day a son was born to a poor baker in Edinburgh by the name of Simpson. This man had seven children and the last of these was James Young Simpson. It appears that James's mother nearly died in giving birth to him. One day he was called by his father and reprimanded for being such a troublesome little boy to his mother. "Listen, laddie," the old baker said. "You should never hurt your mother like that. D'ye know that she nearly died when you were born. Aye, her screams were heard by all the neighbours and we all thought that you would kill her, but God ordained otherwise. So remember that, lad, and be an obedient son."

"I'm sorry, father," young James muttered amid tears.

This conversation must have made a great impression on James Young Simpson. The cries of his mother seemed even now to ring in his ears. He could not help that. His mother had suffered to give him life and it was his duty to help other mothers to bring their children into the world without pain. The course was obvious—he would become a doctor, an obstetrician.

James Young Simpson was born on June 7th, 1811, and being a poor lad, he had to accept the sacrifices of the

whole of his family so that he could go to Edinburgh University and study. At the age of fourteen he was already enlisted as a student; he qualified quickly and a few years later was already assistant to Professor Thompson. In 1839 the Chair of Midwifery at Edinburgh University became vacant and, convinced, like all Scots, of his own ability, James Young Simpson applied for the position—his age being twenty-eight. He had already a few years of brilliant research work behind him, so his name as a candidate did not provoke ridicule. One rule, however, could not be overcome. The University was under the influence of John Knox, a very puritanical and uprighteous man. No man could do midwifery without himself being married. There remained only five weeks to the election day, but that did not deter young Simpson. Promptly he gave himself a few days holiday, travelled to Liverpool as self-invited guest to a Mr. Grindlay. To avoid misunderstanding, he despatched beforehand the following letter:

"Dear Mr. Grindlay,

"May I have the honour of asking the hand of your daughter Miss Jessie in marriage. I am self-sufficient enough to think that I am as well off as regards station in my profession as any who started here in the race of life with me. They have all, I believe, been aided by friends or private wealth. I have had no such advantage but have worked and stood alone. I have accumulated for myself a library and museum, worth £200 at least, amidst these difficulties. These I have won by my pen and my lancet, and these are my only fortune.

"Yours very truly,
"James Young Simpson."

Such a sincere letter could not but produce a sincere answer and reception. When the few days' holiday were over Simpson returned with his newly-wed bride, the future Lady Simpson. His friends delighted in his prompt action; his opponents were furious, and they had reason to be. On the election day the Committee, by a majority

of one, elected James Young Simpson a professor of midwifery at the University of Edinburgh. It was a memorable election and the day that all mothers the world over should be thankful for.

While the lectures of James Young Simpson became the event of the Medical School of Edinburgh, and crowded audiences hastened to listen to the brilliant young professor, the fateful year of 1846 was approaching. In far-off America, William Morton discovered anaesthesia and while Providence treated abominably the discoverer, the discovery itself marched with gigantic strides throughout the wide world. It came to Edinburgh and in the hands of Simpson, found prompt use in midwifery. Soon, however, Simpson began to be disappointed not with anaesthesia itself but with ether. It smelled disagreeably and for a successful delivery an enormous quantity was needed. But that would have been overcome had ether not produced irritation of the lungs and coughing which often, in debilitated mothers, caused pneumonia. It was certainly substituting one evil for another, thought young Simpson. There surely must be another chemical that can do the trick. And sure enough there was one—chloroform, a curious liquid described already in 1831 by French and German chemists. Some properties of producing sleep were attributed to this liquid and James Young Simpson decided to try them out.

Following the steps of his predecessors, the first experiments were carried out by Simpson on animals—on his mother's favourite dog, to be precise. The animal was lured into the drawing-room with some succulent morsel and was promptly seized by Simpson, who, with one hand, tried to uncork a bottle of chloroform. In the struggle the bottle was upset and the liquid soaked into the carpet. Undismayed at this calamity, Simpson deftly took a penknife out of his pocket and cut out a piece of the carpet soaked in chloroform and applied it to the dog's nose. The little fellow wriggled for a while and then lay prostrate. When Mrs. Simpson entered, instead of being amused, she beheld with horror the hole in the beautiful carpet and her orders

were unmistakable—no more experiments in her drawing-room. But experiments had to be carried out, so Dr. Simpson used a little room off the kitchen, in the basement of the house.

One evening Simpson invited some guests, determined to persuade them to try out his chloroform. In his haste before the party arrived, he left one of the bottles uncorked and the fumes of the chloroform penetrated through to the kitchen. The unsuspecting cook cheerfully went on preparing her dinner, when suddenly she felt her hands becoming limp; she dropped the ladle she was holding and fell to the floor. The butler, who saw this accident, rushed into the drawing-room shouting: "Damn it, Doctor, you've poisoned the cook."

Simpson, realising that something must have happened, betook himself to the kitchen and burst out laughing when he realised what had occurred. The whole of the company became merry on hearing of the incident and to Simpson's surprise they all wanted to try the chloroform. Even the stern Mrs. Simpson agreed. There were present a naval officer, two colleagues of Simpsons and his niece, Miss Petrie. It was certainly a godsent opportunity for the professor. Sure, he would try them all out, including himself.

After the meal was over, instead of coffee, they retired for a chloroform orgy. To each guest a tumbler containing chloroform was handed and instructions given as to its use. Simpson surveyed the surrounding company: "Ready!" he commanded. "One, two, three, go!" He clapped his hands and each one applied the tumbler to his or her nose and began breathing deeply. Silence for a few seconds and then a shrill voice began to chant: "I'm an angel. Oh, I'm an angel." It was the voice of Miss Petrie. Next the two medical friends burst into infectious laughter, holding their stomachs. Mrs. Simpson, remembering her upbringing, cupped her hands over her face and started giggling. The naval officer began imitating the crowing of a cock. All were in great merriment, while Dr. James Young Simpson, leaping from his chair, stood on his head in the middle of the room with his feet waving

in the air. Only the butler, in his Scotch imperturbability, stood enframed in the doorway pondering upon the futility of life. For three hours afterwards the whole party snored soundly in merry slumber. When they awoke each recounted their beautiful dreams and the freshness they felt.

"This is the stuff for my mothers," James Young Simpson concluded.

It was definitely the stuff for Simpson's pregnant mothers and he did not lose time in using the chloroform for painless delivery. It would be better to quote his own report on the first painless delivery in history.

"The lady to whom it was first exhibited during parturition had been previously delivered in this country by perforation of the head of the infant, after a labour of three days' duration. In this, her second confinement, pain supervened a fortnight before the full term. Three hours and a half after they commenced, and ere the first stage of the labour was completed, I placed her under the influence of the chloroform. The child was expelled in about twenty-five minutes after the inhalation was begun. The squalling of the child did not, as is usual, arouse her; and some minutes elapsed after the child was removed by the nurse to another room, before the patient woke. She then turned round and observed to me that she had enjoyed a very comfortable sleep."

This is the memorable report of Simpson that marked a new era in the history of medicine. Science had at last triumphed over pain, over the ageless scourge of humanity; the glory was English, or Scottish to be more precise, and the eternal city of Edinburgh could put another feather in her cap.

One would have thought that the whole country would rejoice and be proud, but, alas! how different were the reactions. Scotland was in the grip of the puritanical Calvinists. They took up a cry that rent the air against this devilish invention. "Beware, Edinburgh!" they cried. "Shame on you that you were chosen to be the Gomorrah of the world!" Special sermons were scheduled for Sunday services. "Citizens of Scotland, beware of this satanic

invention," was the opening sermon of a famous preacher. "Do not go against the Almighty who Himself pronounced this primal curse of pain during childbirth. It is God's will and woe to him who opposes it," was another famous utterance of the Scottish zealots. And what about Simpson? He certainly did not remain unpunished; he was branded as a shameless heretic.

What might have happened to this great invention and to the inventor nobody knows. Only a few years previously people had been burned at the stake for such heresies. One thing, however, the opponents of Simpson forgot. England was ruled by a queen—Queen Victoria. It is said that she was a good queen but she was not amused, and one reason for her not being amused was that she was bearing so many children. At the time of the great controversy and the ravings of the Scots against the heretic and charlatan Simpson, Victoria was aware that her womb was bearing another child—the seventh. When the day came for delivery the Queen felt that the pains were more severe than previously. Perhaps she was growing older and weaker.

"Your Gracious Majesty," timidly suggested her own Scottish physician, "shall we call Young Simpson to see you? He delivers babies painlessly. But, Your Majesty," the pious man added as an afterthought, "he is a heretic and the Church is against him."

"Heresy be damned," said Victoria in her blunt way. "Call James Young Simpson."

Two days later Her Majesty was delivered of her seventh child, Prince Leopold, the first royal child to be delivered painlessly. This put a stop to all controversy. The people in their hearts wished a speedy recovery for the good Queen and prayed for the Lord's blessing. "What is good for the Queen is good for us," said the expectant mothers, and the clergy did not dare to utter a curse or anathema against their Sovereign. Victoria was definitely a good queen and could not be accused of blasphemy and for the first time in her life she, too, was amused.

Humanity benefited to an extent more than ever before

by Simpson's invention. Honours were poured upon him from all over the world, ending in Her Majesty creating him a Knight of the Realm. Sir James Young Simpson thus broke the curse overhanging all inventors of anaesthesia. He is the only man up to that time who was rewarded for his labour. He was rich, honoured, and a respected citizen of the world.

CHAPTER XII

THE BROKEN CURSE

LIKE sand chased by a strong wind, the fame of Simpson spread all over the world and while it brought honours and wealth to the inventor, it helped in no less a degree the firm establishment of anaesthesia. Medical men the world over rose to the height of their majestic stature and said, "Thou shalt not suffer". No more operations would be performed without anaesthesia. At last the people, the humanity that had been forgotten for centuries, were delivered from their agonies. For all the wars and massacres that they had suffered throughout the centuries they got this one reward—the conquest of pain.

To the layman the advent of anaesthesia was a miracle. To go into oblivion, to sleep while inhaling the vapours of ether or chloroform, to submit to operation and not shrink in horror from the knife, was indeed a blessing. Surgery leaped in giant strides forward and men from Vienna and Berlin, from Petersburg and London, performed operations that would have been deemed impossible before the advent of anaesthesia. Later on other humble research workers stumbled on the idea that it might be possible to have painless operations without general sleep. This presaged the birth of local anaesthesia. To be awake and have a painless operation was not only a miracle but a pleasant experience as well. Chemists came to the aid of medicine and the first local anaesthetic was discovered in cocaine. By using a very weak solution of this potent drug and making use of the syringe that was invented by Dr. Pravaz some years previously, one could infiltrate the tissues upon which operation was contemplated. The human nerves absorbed this cocaine solution and became insensible to pain. Of course, cocaine was a dangerous drug and could not be used in unlimited quantities, but

science had already started a new era and it was not going to be thwarted by any unforeseen complications.

It is quite true that deaths from chloroform and ether and cocaine were reported, which gave now and then fuel to the fire-eaters and opponents of anaesthesia, but it was not enough. Well, science seemed to say, if one drug is dangerous we will find another that will do the job without injury. No sooner was the challenge issued than men began to search for new remedies. Cocaine started the chain that was followed by a string of chemicals known as novocaine, percaine, stovaine and so on. That was only one chain of one chemical group. New researches in other fields brought other chemical substances that could induce sleep or numb pain. Finally, when we entered the field of substances known as the barbiturates, the final stage and triumph of anaesthesia was reached.

One of the crowning successes was the invention of spinal anaesthesia, performed for the first time in Germany by August Bier in the year 1899. After experimenting on animals, Bier decided that he could not risk the lives of his patients, but the only man over whom he had complete control was himself. Ordering his first assistant to administer spinal anaesthesia to him, he nearly lost his life. Bier used a strong cocaine solution and had to pay heavily for his experiment. For three months he lay between life and death, his legs paralysed. Providence, however, from the time of Simpson had taken kindly to these benefactors of humanity. Bier's life was saved and with it the famous spinal anaesthesia. Later on this method was rightly placed as one of the most innocuous and simple forms of anaesthesia.

The world entered the twentieth century. Wars and more wars shattered the happiness of millions of people, but the surgeons and physicians worked incessantly. Another birth was announced, the birth of intravenous anaesthesia. This is again a solution of the barbituric products which, when injected into the vein, induces simple sleep that lasts for over a quarter of an hour. The awakening is beautiful and uneventful. Other substances were brought into

the human body in other ways. The enemas were taken up as a vehicle for anaesthetics and a substance was discovered by the name of Avertin which, given an hour prior to the operation, induces the patient into peaceful slumber. At last medical science has literally scores of methods and chemicals from which to choose and by the clever combination of one or other of them, suffering humanity is given the opportunity to be cured of festering wounds and tumours painlessly.

And what of the future? The time is not far off when the new atomic energy and radium will be employed as a means of anaesthesia. Music, too, will be harnessed for the benefit of suffering humanity. The author himself has witnessed an unusual experiment. A man had to undergo an operation for gall stones, and because his heart and lungs were weak, no anaesthetic of any kind could be used. By a stroke of genius, which often happens, the surgeon decided on an unusual procedure. Connecting a loud speaker under the metal operating-table, with which the bare back of the man was in close contact, several gramophone records were tried. Surprisingly, the low, mournful tunes began to exercise an unusual influence over the man's nervous system. It is a well-known fact that the nerves are like live electric wires; they can be stimulated to pain or numbed through electric vibration. It was obvious that the melodious waves of the tune coincided with the reception of the nerves, thus bringing a slow, gradual numbing. Hardly fifteen minutes elapsed when the patient's snoring signified that he had fallen into a profound sleep.

Would it be possible to operate during such a sleep? The question had to be answered there and then. The surgeon took the forceps and carefully began pinching the skin, testing for painful stimuli. The man did not waken but moved slightly whenever the painful sensation was felt. Obviously the anaesthesia was not complete. Medical anaesthesia was still imperfect. But, then we could use it, the surgeon thought, as a basic sleep. In his brain he visualised the new combined anaesthesia of musical waves and local infiltration. It would not be necessary to use

strong solutions. A mere fraction of novocaine or other substance in ordinary distilled water is in itself completely harmless if injected into the human body and suffices to induce anaesthesia when combined with the nervous numbness induced by music.

"Say it with music", has been the stock-in-trade of music-hall artistes. One day the surgeon's motto will be "operate painlessly with music", or "drive away pain with music". What better ending to centuries of long fighting against pain? A conquest over an enemy that will be not only complete but even sweet and pleasing. This, of course, must not bring any false hope that everything can be done under music anaesthesia; no invention can displace the already established methods. There will be no discarding or exclusion of one or the other, but a clever and harmonious combination of all of them selected for the individual requirements of the patient. No more blind adherence to one method because we were taught to use it, but a careful selection or combination of methods which are most appropriate for the kind of operation in progress and for the state of health of the man concerned. This indeed will be the conquest of pain.

EPILOGUE

It is difficult, nay, impossible, to write an epilogue to a story that has no end. Anaesthesia is a science that will progress and will evolve new methods and find new ways to benefit humanity. Things that we consider complete to-day are but the beginnings of to-morrow and are discarded altogether the day after. A century ago, the great surgeon Lisfranc announced proudly to the French Academy of Science, that surgery had reached its zenith, that from now on no advance could be made in any way. Only a century ago and only ten years before the advent of anaesthesia. At that time he was right. Without anaesthesia and without the modern technique of asepsis and cleanliness no man could have hoped to advance surgery more than Lisfranc had already done. Yet, when we think that modern abdominal surgery, the miracle of plastic reconstruction, the latest techniques of obstetrics and gynaecology have come after his death, we wonder to what lengths the future surgery will go.

To-day I am convinced more than ever that no man living can say that surgery has reached its final stage. Up till now surgery has been mainly destructive in order to save life; we had to cut, to mutilate, to make people permanent invalids because life was sacred. People cling to life even when their body is half complete. The surgery of to-morrow will not be satisfied with this state of affairs. It will not be content to amputate or to cut away an internal organ in order to preserve life. No, the aim will be to preserve life, yes, but life in a healthy, sound, complete body. This will be the aim of the men who take the knife in hand and who dedicate themselves to the science of healing. Anaesthesia and surgery will march hand in hand into the future; while the one will find better and simpler methods of administering beneficial painless sleep,

the other will be able to preserve the human body and its organs in their entirety.

One final hope. What will happen to the men who dedicate their lives to the benefit of humanity? If one glances flittingly at the rewards that men of science have received in comparison with the evil geniuses of destruction, one shudders to think of the discrepancy between the two kinds of gratitude received from ungrateful humanity. While men of destruction, in the inventors of bombs, poison gases, automatic guns, are honoured and respected by all and sundry, the humble men of medical science, the men who gave anaesthesia, antisepsis, discovered germs and cured scores of human ills, were ridiculed, burnt at the stake as sorcerers, put into prison, or at least forgotten and left to die in darkness from starvation and poverty. Will the men of to-morrow receive the same reward? I sincerely hope not. If humanity is to survive, if the world at large is to find a peaceful means of settling its affairs, and love its neighbour, then its attitude to medical science must change for the better. Let this be our paramount aim for the future.

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