In ancient Egypt, a crude scientific knowledge probably existed, and the god Thoth was associated with the genesis of science, arts and magic. Menes and other Egyptian rulers studied plants, chemistry and medicine, and they were conversant with arsenic, opium, mandrake, lead and other like substances. The Egyptians were the first to use distillation to obtain prussic acid from the bitter almond.

The ancient Hebrews called arsenic "Sam," aconite "Boschka," and ergot "Son." The ancient Greeks knew of arsenic, antimony, mercury, gold, silver, copper and lead and recommended hot oil as an antidote to promote vomiting and prevent absorption.

Spotted hemlock or cicuta appears to have been the chief vegetable poison used by the Greeks. This contains the active principle coniine, a powerful nerve poison, and was used for suicide and State purposes. Plato records the details of the effects of this poison when used by Socrates. The absence of vomiting and epigastric pain is noteworthy in this record. The plant is described by Pliny and Dioscorides, and grows readily in Greece and the neighbouring islands. In the case of Socrates, opium was probably combined with the hemlock and this may account for the absence of certain symptoms. A curious custom was practised in the island of Ceos and later in Marseilles, in which old men of no further use to the State ended their lives by drinking hemlock at a banquet. Midas, Plutarch and Themistocles are said to have died by drinking "bull's blood." In all probability the chief ingredients of this mixture were hemlock and opium.

Cicero, Tacitus and Suetonius all give accounts of certain of the post mortem appearances in cases of poisoning and it was generally believed that worms could not generate in the bodies of persons who had so died.

Dioscorides in his *Materia Medica* remains the chief authority on the subject of poisons of antiquity. He mentions cantharides, copper, mercury, lead, arsenic, and includes toads, salamanders, poisonous snakes, honey and ox-blood, poisonous plants such as the poppy (opium), black

hellebore (helleborein), white hellebore (veratrine), henbane (hyoscine), elaterium or squirting cucumber (glucoside purgative), devil's milk or Australian snake weed (euphorbia), and apocynum (Canadian hemp). Arsenic was used as a caustic and depilatory. Wolf's bane or aconite was the most subtle poison known to the Greeks and it was a capital offence to possess the plant.

Livy records an example of wholesale poisoning in Rome in about 300 B.C., and he states that this was the first inquest into a case of poisoning. One hundred and seventy of the noblest ladies were seized and condemned. There was then a halt in poisoning for two or three centuries, but again it became very common in the time of the early Roman Emperors and strangely enough most of these poisoners were women. The notorious Locusta was employed by Nero and held the unofficial appointment of poisoner-in-chief to the Emperor. She experimented with slaves, of which there was a liberal supply. There is some evidence that the Persians and Carthaginians were skilled in the use of some poisons, and Regulus the Roman general is said to have been killed by this means. In Mark Antony's army against the Parthians, there were numerous cases of accidental aconite poisoning through the eating of pot herbs and roots.

Although the death of Alexander the Great is sometimes ascribed to poison, it is probable that he died from cirrhosis of the liver and malaria.

Arsenic has probably been more frequently used for criminal purposes than any other substance. It was known to the Greeks in 500 B.C. and was used by Hippocrates as an external remedy for ulcers and the like. It was known to them as realgar (sulphuret of arsenic) and orpiment (sulphide of arsenic). Orpiment was considered on account of its golden colour to be the key to the philosopher's stone by alchemists. White arsenic was first discovered in Europe in the 8th century by an Arab alchemist, and being tasteless, placed a very powerful weapon in the poisoner's hand.

Possibly the most famous historical cases of the use of arsenic are those of the Borgias. It seems beyond doubt now that this is the poison they employed and which, mixed with subacetate of copper, they called "La cantarella." There is no evidence that they used phosphorus, as stated by Apollinaire. Pope Alexander VI, father of Cesare and Lucrezia Borgia, himself died of arsenic poisoning, either administered in wine or sweetmeats, and, unfortunately for him, intended for other persons. In the Middle Ages the use of poisons became quite a cult in Italy and the Italian school was famous. Conspiracy was rife in Europe and the professional poisoner was fully occupied. Arsenic was very widely used with aconite, powdered glass, quicklime, and prussic acid.

Naples became a centre of distribution and the woman Toffana, the inventor of aqua Toffana or acquetta di Napoli, the most notorious disciple. The active constituent of her solution was arsenic. This woman was responsible for the deaths of hundreds of people, including two Popes and other Church dignitaries. Eventually she was caught, and on the rack, confessed. She was taken and strangled, being thrown into the courtyard of the convent in which she had taken refuge. Many imitators of this woman practised after her death, a similar préparation called acquetta di Perugia being widely sold for cosmetic purposes and also as a poison.

The mania for criminal poisoning spread from Italy to France in the latter part of the 16th century. Many romantic stories of this period have been handed down, but their truth is doubtful. A certain Prior is said to have poisoned his physicians to avoid paying them. Francis II, the husband of Mary Queen of Scots, is said to have been poisoned by Ambroise Paré, but was eventually proved to have died from chronic suppurative otitis.

A novel method often used was to impregnate gloves with a mixture of opium, belladonna, hyoscyamus and other poisons. This was quite ineffective. Catherine de Medici is said to have introduced the Italian methods to France

and soon the sale of poisons became very widespread. Eventually a decree was issued by Louis XIV forbidding the sale of arsenic, sublimate and any poisonous drug to persons unknown to the apothecary, and further that the purchaser should sign the poison book. Later, a judicial committee called the Chamber of Poisons was appointed and sat for three years. Hundreds of people of all classes were arrested and many were condemned and burnt at the stake. It was about this time that the Marquise de Brinvilliers lived and practised. Probably the most infamous of all poisoners, she confessed to having poisoned her father, two brothers, a sister and many other people, simply because she found their existence inconvenient or because they bored her. She obtained her knowledge from one Glaser, an apothecary to the King, and from an Italian, Exili, an authority on chemistry. She first experimented on hospital patients whom she visited in the guise of charity. She used arsenic, sublimate, antimony and opium amongst other substances. She was eventually caught through her lover's carelessness. She really had no great scientific knowledge, but was a murderess of the common type. Even after her execution the wave of poisoning went on, and it was not until the 19th century that it was stamped out.

In England and Scotland, history relates many cases of poisoning, but no details as to the poison used are available in the earlier cases. It is probable that many of these cases were not those of poisoning at all, death being due to violence. Such a one is that of Amy Robsart, wife of Robert Dudley.

During the Middle Ages there were many instances of poison plots, particularly on the Continent and less so in England. Such plots were by no means confined to the Middle Ages, and we find as late as 1917 an attempt to kill the Prime Minister of England and another member of the War Council by means of strychnine and curare, three women and a man being concerned.

In 1921 and 1922, attempts were made on the lives of many well known people, one in particular being the Chief

Commissioner of Police at Scotland Yard, who was poisoned by arsenic in chocolates. The poisoner was arrested and found to be insane.

In India and the Far East, poisons have been used from very early times, both for destroying human and animal life. Arsenic, opium and aconite are the best known, with cannabis indica, datura stramonium, gloriosa superba (colchicine) and snake venom. The Hindus use atropine widely and also powdered diamond.

Arsenic has been frequently used in India, the poison being introduced into sweetmeats generally distributed by a "strange woman" in the bazaar.

Both Chinese and Japanese have paid a great deal of attention to the study of poisons. The Chinese for centuries used gold leaf for suicidal purposes, the leaf being inhaled and obstructing the glottis. The exact composition of many Chinese poisons is still undetermined.

Generally, most of the substances employed are now known to us, but there are some about which no information can be obtained. The secret of many poisons is still most jealously guarded by many barbaric tribes and is only known to the chief or medicine man. The substances used are both of animal and vegetable origin and include poisonous insects, fish and the venoms and plants used alone or mixed together. Usually the poison is not fatal unless freshly prepared, although Lewin states that he found an arrow poison used by Australian aboriginals still active after remaining ninety years in a Berlin museum.

Poisons used by African bushmen vary according to the district. Livingstone states that the Kalahari natives used the entrails of a small caterpillar, the poison being known as "Nga" and resembling snake venom. Natives in other districts use snake venoms, beetle and spider venoms. The "leaf beetle" of the Kalahari was found by Lewin to contain a toxalbumin which caused paralysis and death. In South West Africa, the seeds of a strophanthus are largely used, while the Pygmies of Central Africa use the poison of red

ants which is so deadly that it has been known to kill an elephant.

In Africa, poisons are still used for the institution of trial by ordeal. The substances vary with the locality. Muavi, which is prepared from the bark of a poisonous tree, is widely used in West Africa. Its action is rapid, with vomiting, convulsions and death. The natives firmly believe in its infallibility and often volunteer to prove their innocence by taking it. Sassy bark mixed with powdered glass is also widely employed. Other tribes use the Calabar bean, which contains the principle physostigmine so widely used in ophthalmic surgery. This bean is known as the ordeal bean and 1-20th grain of the alkaloid may be considered lethal. The composition of many of these poisons used by native and barbaric tribes is still unknown to us, and as the secret of their preparation is jealously guarded by the chiefs and witch-doctors, it is likely to remain so.

In the Malay Peninsula, narcotic plants are frequently used to stupefy victims before they are robbed. Sand, powdered glass and quicklime are used in addition to disconcert any pursuer. The Malay native even to-day uses his poison in a similar manner to that employed in ancient times, namely by mixing it with honey and smearing it on the under surface of a knife with which a water melon is cut, the infected half being presented to the victim. Potassium cyanide is employed in the same way in Trengganu. The Malays are said to have a knowledge of slow poisons which they call time poisons, the victims dying three or six or even twelve months after the administration. The same tradition exists in Persia to this day, but native experts say that the idea is unfounded. They believe that poisoned food can be recognized by various methods such as absence of shadow of the right hand and fingers and the discolouration of the ivory stirring rod. In Perak, a spoon made of the beak of the horn-bill is said to turn black when dipped into poisonous substances. The Malay employs many vegetable poisons for his arrows and blow-pipe darts

which are specially marked—opium, tobacco and henbane are widely used, but the favourite is the sap of the upas tree, the active principle of which is a glucoside allied to strophanthin and called antiarin, an extremely powerful poison causing death in thirty minutes. It is often mixed with the venom of snakes, scorpions or centipedes, and occasionally with arsenic.

North American Indians employ a poison called "Caramari," prepared from the roots of a plant found on the sea coast. These are mixed with species of spider, hairy worms, bats' wings, "teborino" fish, toads and mancanillas, and heated till a paste is formed.

The Colombian Indian extracts his poison from the skin glands of a tree frog.

The Amazonian Indians use a vegetable poison called "Jambi," made from a species of vine. According to de Graff, despite the deadliness of this poison, it is never used by head-hunters.

A curious preparation used by North American Indians is called "Black Poison." This changes the skin to a sooty black and causes hair to grow on unusual parts, and later a severe dermatitis. It is said to be made from poison ivy (Rhus toxicodendron) and the skin secretion of a species of toad.

Californian Indians use "soap root," and "blue curls" or vinegar weed to poison and stupefy fish, after which they are easily caught.

Many tribes of South American Indians use curare which they extract from the bark of the strychnos. This must be introduced into a wound or injected to have any harmful effect and is then very deadly. The Ainus of Japan are said to have used aconite and tobacco, while the natives of the New Hebrides are said to smear their arrows with damp earth containing tetanus bacilli.

Superstitions Connected with Poisonous Plants

The mysterious properties of plants which caused sleep or delirium were attributed by the ancients to a spirit or

demon which dwelt in the roots, and many rites and ceremonies were associated with their gathering. The hallucinations of the witches of the Middle Ages may be compared with those of the medicine men of many savage tribes to-day, and these effects were probably produced by the taking of various drugs. Witches' ointment, which was used for anointing the body in preparation for "Witches' Sabbath," contained mandrake, belladonna, henbane (hyoscyamus) and stramonium (hyoscyamine), and absorption was followed by unconsciousness and sleep. The anointed person was fully convinced that she had visited the "Sabbath." It has been said that mandrake soaked in port keeps a seventy-year-old Russian youthful. "X" tried the port without the mandrake. Although thirty, he looked like seventy the next morning. A great deal of legendary lore and tradition is connected with the mandrake, and between 1500-1800 A.D., no less than twenty-two treatises are known to have been written on the subject. It was known to Babylonians over three thousand years ago and their women carried a root as a charm against sterility. The ancient Egyptians called it the "Phallus of the Field." The Greeks held it in the highest esteem, and in Eastern Europe, Arabia, Palestine and Syria it has been associated with mysteries, rites and customs from time immemorial. It was commonly used in love philtres, and Venus was sometimes alluded to as Mandragoritis, the fruit of the plant being popularly termed "place of love." It is believed that the mandrake is the plant referred to in the book of Genesis, stated to have been found by Reuben and carried to his mother. The usual method of gathering it was by means of a hungry dog to whose tail a rope was attached, the other end being fastened to the plant. This was practised both in Palestine and Greece. The active principle of the plant closely resembles hyoscyamine and is called mandragorine. It is a narcotic and is supposed to have been mixed in the wine offered to Christ on the Cross. It was used extensively through the Middle Ages and is still largely used in China, particularly by the Mandarin class.

In Germany and France, it was associated with witches and criminals, and the root was often carved to the shape of the human form. Joan of Arc at her trial was accused of having a mandrake figure in her possession. The use of it to prevent sterility still survives in Kent, Greece, Syria, and Turkey.

Aconite or Monkshood may be claimed to be one of the most important of the poisonous plants known to the ancients. It has been called the "Queen Mother of Poisons," and has been noted by historians for over two thousand years. The plant has been known as wolf's bane, leopard's bane and women's bane. Its name is derived either from the town Aconal in Greece, or bare rocks called Aconas by the Greeks. Its deadly effects are referred to by Ovid, Virgil, Juvenal and Plutarch. It was used by the ancient Chinese and is still used by some hill tribes of India as an arrow poison. The active principle is the alkaloid aconitine. Several species grow in India, Britain, Alps, Pyrenees, Germany, Austria and Sweden. In India the root is associated with evil spirits which are driven out by the lama before the work of digging it up commences.

Hemlock or cicuta was a classical poison well known to the ancients. It was the State poison of the Greeks, and its active principle is coniine, which resembles nicotine in its action.

Black Hellebore or Christmas Rose is another plant which was surrounded by ancient superstitions. It is called Melampus after Melampus, a traditionary physician who is said to have lived at Pylos about 1530 B.C. It was used to hallow dwellings and drive away evil spirits. It was dug up with many religious ceremonies.

Hyoscyamus or henbane is a herb which has been used in medicine from early times. In early Anglo-Saxon manuscripts it is called henbell and belene. In French literature it is called hanibane. It has ever been used as a sedative and anodyne, but has been known from earliest times to produce hallucinations.

Opium is a drug which figures largely in history, in

romance and in crime. It was known and used by the Egyptians about 1550 B.C. and by the Greeks in 300 B.C. The nepenthe of Helen of Troy had opium as its chief ingredient. The method of collection was described by Scribonius Largus, Dioscorides and Pliny. Latin authors called it "Poppy tears." Arabs introduced it to the Persians and then to other Eastern nations, including China. In India, its use is connected with the spread of Mahommedanism. The East India Company and the Portuguese handled a large trade in opium with China, eventually leading to the Opium War and the Treaty of Nanking, after which five ports of China were opened to foreign trade. Opium smoking does not appear to have begun in China until the 17th century, but in a hundred years its spread was enormous, and the sale in China rose from 2,300 chests in 1788 to 17,500 chests in 1836. Opium production is a very large industry in India and is now Government controlled, the sale being restricted to licensees.

The use of opium by Eastern races it said to have followed the prohibition of wine by the Moslems, but more likely followed its use as a remedy. Opium smoking is more injurious than eating, and is more prevalent in China. It is taken in pill form, in milk and in rosewater. It is regularly given to poor native children as a preventive against enteritis and to keep them quiet. The Indians and Persians use opium as the European uses tobacco, and moderate use in these peoples does not appear to be deleterious. The word laudanum—tincture of opium—is said to have first been used by Paracelsus, but the word was first applied without doubt to the gum of the cistus which was probably used with opium by him.

Mexican Indians use the fruit of Anhalonium, which they call mescal buttons, to produce intoxication and stimulation during their religious ceremonies. The intoxication is accompanied by visions. This cactus is treated with great veneration and is gathered with solemn rites. Mescal wine is highly intoxicating and a powerful poison, and it is

estimated that 90 per cent. of the crimes perpetrated in the ranches and villages are due to its use.

The Poison Lore of Toads and Spiders

The toad has always been suspected of having poisonous properties and the death of King John of England was attributed to the presence of a toad in his wine. Undoubtedly some species of toad are poisonous and powerful principles have been isolated from the skin and parotid gland. The South American toad, *Ceratophrys ornata,* will bite anything from man to horse and death has followed. The people of Brazil believe that the milky secretion of the common toad possesses wonderful curative properties. In cases of shingles, they apply a living toad to the affected part. "Senso," a poisonous drug used in China and Japan, is said to be composed of the dried poison from a species of toad and contains cholesterol, bufagin, which causes a rise in blood pressure and diuresis, and bufotenine, a local anaesthetic allied to picrotoxin, and a base resembling epinephrine.

Numerous species of spider are poisonous and in our own country the funnel-web spider (*Atrax robustus*) and the red-back spider (*Latrodectus hasseltii*) are prominent. Spiders were used by witches and possibly are still used by witch doctors of native tribes in Africa and South America. Little is known about them.

Classification

It is almost impossible to classify poisons on a scientific plan. They may be classed according to their origin or according to their physical properties. There are many objections to both methods.

Leschke uses a simple classification of inorganic and organic substances. Taylor uses a convenient grouping in ten parts.

1. Corrosives, strong acids and alkalies (including phenols).
2. Metals and their salts.
3. Non-metallic elements.

4. Gaseous poisons.
5. Anaesthetizing agents, sedatives and antipyretics of artificial origin.
6. Other artificial organic articles.
7. Substances of direct origin from the living vegetable kingdom.
8. Substances of animal origin.
9. Foodstuffs.
10. Miscellaneous—mechanical, e.g., glass, coffin dust, patent medicines.

Peterson and Haines' classification is rather more compact. They have classified the poisons into five groups.

1. Inorganic.
2. Alkaloidal.
3. Non-alkaloidal.
4. Gaseous.
5. Food poisons.

Food and drink seem to be the chief media for the conveyance of poison to the victim, and through the ages the poisoned cake and wine recur with frequency. Impregnation of cups and goblets, boots, gloves and other articles of clothing has been widely practised, corrosive sublimate, arsenic and cantharides being most frequently used. The method was often ingenious. The poisoned shirt would induce a violent dermatitis with ulceration, and the victim would take to his bed. His physician would call, diagnose the case as syphilis and prescribe mercury, killing the patient in his innocence. Evidence tends to show that the deaths of many famous people in India were caused by poisoned robes.

Recently there occurred a case of accidental poisoning by a poisoned boot. Death was due to poisoning by nitrobenzene which was present in the boot polish with which the deceased cleaned his shoes, the poison having penetrated to the skin and been absorbed while dancing. Nitrobenzene poisoning has also occurred in America during the prohibition period, when it was added to bootleg liquor. It occurs occasionally in Australia in those employed in the

manufacture of high explosives, perfumery and soaps, and also in methylated spirits addicts who drink the Fitzroy cocktail, which consists of methylated spirits laced with boot polish.

The *"annelo della morte"* or "death ring" was widely used by the Italians in the 16th and 17th centuries. It still often figures in the modern novel. The Roman Emperors and nobles carried such rings, usually to save the wearer from torture or imprisonment.

The love philtres of the ancients soon became poison philtres. Often the ingredients of love philtres were revolting and filthy as well as grotesque. The mandrake root was commonly used and is still worn in some parts of France. Many other plants were employed, such as carrot, pansy, cyclamen, crocus, anemone, and strangely enough male fern, which is at present used as a vermifuge. Human skulls, toads, urine and faeces from animals, genital organs of different animals and the clippings of a black cat were amongst many of the ingredients.

Widespread accidental poisoning has occurred from drinking beer. In the north of England in 1900, there were nearly one thousand cases of arsenical poisoning with many deaths, the glucose which was used in the manufacture of the beer being contaminated with arsenious acid. The arsenic was traced to the iron pyrites which came from Spain and which was used for making sulphuric acid. The arsenic in this instance provided a good temperance argument.

Outbreaks of food poisoning have occurred particularly in America, where so much tinned food is used. Some cases are due to the toxin of bacillus *Botulinus*, which is rare in this country and England.

During prohibition in America, much synthetic alcohol was manufactured and wood alcohol was largely used. Numerous cases of "bootleg" blindness occurred and deaths were fairly frequent.

In modern times, wholesale poisoning by noxious gases has been elaborated, the principal gases being chlorine,

mustard gas, phosgene and di-phosgene. Attempts have also been made in modern times to infect populations with virulent bacilli by means of contaminated food, tetanus and typhoid being the chief organisms.

Criminal poisoning with bacteria is not common, probably owing to lack of scientific knowledge and difficulty in obtaining the material. The most famous of these cases is that of O'Brien de Lacy, who used diphtheria toxin to kill his brother-in-law, a high Russian official, the toxin being injected by a rascally Russian doctor named Panchenko on the pretence that it was anti-cholera vaccine.

Poisons exert their actions in several ways. They may damage the part with which they come in direct contact, they may enter the blood and destroy its functions, or they may be carried by the blood to the tissues and organs of the body and there impair their functions. They therefore act locally, remotely, or both locally and remotely. The action may be greatly influenced by the circumstances under which the poison enters the body. It may enter by the mouth, hypodermically, intravascularly, e.g., snake bite, by absorption through the skin and the mucous membrane of the rectum, vagina, bladder, or by the lungs, e.g., gases and anaesthetics. The rate of absorption is important and is influenced by various factors. The same applies to the rate of elimination. Many poisons given within prescribed limits produce beneficial effects and are used as medicines. In larger doses, they may kill. In medico-legal usage, a fatal dose is the smallest quantity of a poison which has been authentically recorded as having caused the death of an average adult. The operative dose is not the total amount ingested but only the part present in the blood and acting on the tissues. The slowest route of absorption is through the skin, and the most rapid by injection into a vein or through the lungs. Idiosyncrasy, age, habit and state of health all have an important bearing on the dosage and effect of the poison administered.

Symptoms are an expression of disordered function of the body and may be caused by poison, disease or injury.

Consequently the effects of poison may be attributed to disease and conversely. Poisoning may be accidental, suicidal or homicidal. So far as diagnosis is concerned the third class gives rise to much more trouble than the first two. The diagnosis is of great importance in that remedial measures may need to be applied immediately to save the life of the patient. Briefly, in cases of poisoning, the symptoms appear suddenly during a state of health and soon after some kind of food or medicine has been taken. The poison may be discovered in the food, in vomitus or in the excretions.

Treatment is directed to emptying the stomach, to neutralizing what remains in the stomach, to applying physiological antidotes, to the relieving of general symptoms and to aiding elimination.

Antidotes

Homer in 900 B.C. refers to an antidote in the Odyssey, probably a herb called moly, a species of allium (garlic bulb). Many Greek writers refer to the same antidote.

The Hindus had an idea of the universal antidote and called it "Agada." The Greek physicians called their antidotes Alexipharmics or Theriacs.

Nicander (185-135 B.C.) treated bites of venomous animals by sucking the wound, cupping, cautery, leeches and stimulants. His remedies were drugs such as birth-wort, alkanet, ginger, cinnamon, myrrh, iris and gentian. He used warm oil, warm water and mallow or linseed tea to promote vomiting.

Galen used large quantities of strong wine in opium poisoning. According to Pliny and Galen, the formula for the first Theriac against the bites of all venomous animals was inscribed on a stone in the temple of Aesculapius on the island of Cos. It contained wild thyme, opoponax, aniseed, fennel, parsley, meum and ammi. These were beaten up with meal of fitches, sieved, kneaded with wine and cut into lozenges of weight of half a denarius (30 grammes), one to be taken in three cyathi (five ounces) of wine.

Mithridates VI (132-62 B.C.) daily took small doses of poison with his antidote to render him immune. Pompey, who defeated him, is said to have secured the formula, which contained fifty-four ingredients, all of which were really useless as an antidote.

Zopyrus, a Greek physician, named his formula "Ambrosia." It contained frankincense, galbanum, pepper and other aromatics and was boiled with honey. It was taken with wine. Philo of Tarsus had a famous Theriac which contained the "red hair of a lad whose blood had been shed on the fields of Mercury," possibly symbolic language for suffering, and certain drugs whose names are disguised in mystic language. The Theriaca Philonium survived for one thousand seven hundred years, and reaching Western Europe, remained in the London *Pharmacopœia* until 1746. It was composed of opium, pepper, ginger, caraway, syrup, honey and wine. It was known as "Philonium Romanum" and later as "Philonium Londonense," and was probably originally intended for a form of epidemic colic prevalent in Rome when Philo flourished there.

The Theriac of Andromachus, physician to Nero, eclipsed all others in fame and popularity. It was copied from that of Mithridates, but contained seventy-three ingredients, including vipers. Andromachus dedicated it to Nero and claimed that it would "counteract all poisons and bites of venomous animals, all pain, weakness of the stomach, asthma, difficulty in breathing, phthisis, colic, jaundice, dropsy, weakness of sight, inflammation of the bladder and kidneys, and plague." It can be seen that it was not unlike many of our advertised modern remedies, a cure for all ills. Galen tested it with fowls successfully and this Theriac was very popular throughout the Middle Ages. It is still made and sold in the drug bazaar of Constantinople and in some parts of Italy.

Democritus and other physicians improved on this Theriac by adding fresh ingredients. The zenith was reached in the 16th century when Matthiolus published another

formula containing two hundred and fifty ingredients, amongst which were dried vipers, pearls, red corals and emeralds. This in a modified form was also in the London *Pharmacopœia* until 1746. Several cities became celebrated for the manufacture of Theriaca, including Cairo, Venice, Florence, Genoa and Bologna. Often the mixing was carried out with great ceremony and sometimes under medical supervision. Many of these Theriaca or "treacles," as they were known, were dumped in England, until in 1612, the College of Physicians of London was asked to supervise a locally-made product guaranteed to be pure. Their use in England, however, went back to the time of Alfred the Great, to whom it was recommended by Helia, Patriarch of Jerusalem.

In the New World in 1750, the governing body of Carolina authorized the publication of "Nigger Caeser's cure for poison." This consisted of roots of plantain and wild horehound, boiled and strained, to be taken fasting on three consecutive mornings.

In the Far East antidotes are prepared by the "bomor" or medicine man, and a well known one in use in Malaya consists of the ashes of a cat's whiskers mixed with liquid opium.

In ancient times, charms were worn as an antidote or preventative. The most famous of these was the "terra sigillata" or "sealed earth," which dates back to Herodotus and which continues in use in Turkey and the East to-day. The ceremony of preparation was originally associated with the worship of Diana. The reputation of this clay was so great that a poisoned liquid drunk from a cup made from it was believed to be harmless. It was not long before similar valuable clays were found in other countries. A recent analysis of "terra sigillata" showed it to be composed of oxides of iron, aluminium and magnesium with some silicates. The whole is astringent and absorbent. The earth was worn as a charm and taken by mouth.

Toadstones, round and long, and grey and red, were also used frequently as preventative charms. They were usually

set in rings so that the back of the stone could touch the skin, the presence of poison being indicated by sensation of heat at the point of contact. The stones were better when obtained from the living toad which was placed on a scarlet cloth, the stone being cast out of the head. A 17th century specimen is in the Wellcome Historical Museum.

The horn of the unicorn—in reality the tusk of the narwhal—has been associated with mysterious properties since the time of Aristotle, Pliny and other ancients, the horn drinking vessel being the popular form of protection against poisons, convulsions and epilepsy. Touching the poisoned wound by the horn was thought to cure it. These horns were of great value, and in 1553 one brought to the King of France was said to be worth £20,000. Often a piece was sawn off for medicinal purposes. Ambroise Paré wrote a treatise on the unicorn's horn and its remedial properties, and in 1678 Thomas Bartholinus published a work, "Observations on the Unicorn's Horn and its medical uses." The best horns were long, fine and white.

In very ancient times, the Chinese fashioned beautifully carved horns from the Indian rhinoceros into cups, the horn being said to sweat and change colour when any poison was placed in it. Several of these are in the National Museum at Copenhagen.

"Assay" cups made of rhinoceros horn were used in the 15th century in England and were so called because of the habit of all food and drink being tasted before use. It is interesting to note that the rhinoceros was adopted as the crest of the Apothecaries' Society of London on its foundation in 1617.

The Indians used light greenish pottery bowls called Gherian ware. These were supposed to break into pieces if touched by poison. Another antidote venerated in the East, particularly in Persia, Malaya and China, is the bezoar stone, a calculus found in the intestines of Persian wild goats, cows and a species of apes. Gimlette gives a detailed description of the stones used by the Malays, and Pomet says that the finest of these was usually olive in

colour, but of any shape. It was used widely by the Arabs and had the name "pad-zahr," an expeller of poisons. It was known to the ancient Hebrews as "Bel Zaard" or universal cure for poisons. The best stones are the Oriental or Persian variety. They are largely composed of calcium phosphate round a central nucleus of hair or fruit stone. The Occidental variety is obtained from the llamas of Peru, and a European variety from the Swiss chamois. Many of the Indian bezoar stones were hog's gallstones. The stone was given internally in doses of 4-16 grains for poisoning, fevers and skin diseases. Three of these stones were sent by the Shah of Persia as a royal gift to the Emperor Napoleon. Ambroise Paré performed an autopsy on a palace cook who was given sublimate and bezoar stone, which showed that the antidote had no effect at all, after which Charles IX, King of France at the time, commanded that "the stone should be thrown into the fire."

In modern medicine, antidotes may be distinguished as chemical, mechanical and physiological, and in modern medical practice the treatment of cases of poisoning employs all three if possible.

Alkalies will neutralize acids and conversely. Common salt decomposes silver nitrate. Examples of a physico-chemical reaction are seen in the use of albumen to precipitate mercuric chloride, dialysed iron to neutralize arsenic, tannic acid to precipitate strychnine, charcoal to absorb morphia and other alkaloids, and potassium permanganate as an oxidiser. Murrell has attempted to concoct one of universal application. It contains a saturated solution of iron sulphate, calcined magnesia, charcoal and water.

The application of physiological antidotes is based on the principle of antagonism. The actual process is obscure. The most complete case of antagonism known is that of atropine versus physostigmine. Chloral, morphia and aconite depress the respiratory centre, while strychnine stimulates it. Aconite depresses the heart action, digitalis increases it. Ergot and adrenalin constrict the blood vessels and nitrites of amyl and sodium dilate them. In

practice the principle is used only to a limited extent. There are many cases of false antagonism, the best example being that between curare and strychnine.

Poison Habits

The habit of taking drugs applies chiefly to the narcotic group. The onset is usually insidious and the drug is most often taken in the first instance for the relief of pain or for sleeplessness. The drug in small doses becomes ineffective and the dose is gradually increased. Eventually a tolerance is established and the patient craves for the drug which is now his master. The moral character is sapped, and the chances of cure and relief of the habit become more and more remote.

The alcohol habit is too well known to need any further reference, though it is difficult to understand addiction to methylated spirits and even petrol. Opium eaters and smokers are numerous and some idea of their experiences can be gained from De Quincey's *Confessions of an Opium-Eater*. Morphia addiction is common, often, sad to relate, amongst the medical profession and nurses. A tolerance to morphia is soon acquired, some addicts taking up to 20 and 30 grains a day. Chloroform and ether are also used fairly widely, both by injection and inhalation. The habit usually results in death. Cocaine is a notorious drug amongst drug addicts. The coca leaves are very widely used by the natives of Peru and Bolivia for their stimulating effect, and for many years cocaine has been the chief drug concerned in the traffic. It is more subtle than other narcotics and cure from the habit is practically unknown. The cocaine habit is widespread throughout the world and without exaggeration there are probably millions of addicts. It is taken by inhalation as snuff, by ingestion and by injection. The chief sources of supply are Germany and Switzerland, and this trade has millions of pounds tied up in it. Hashish eating is well known in India, China and Egypt, but does not seem to have extended to Western peoples. Arsenic is another drug in which habit is well

known. It occurs chiefly in Styria and the Tyrol and addicts have taken up to fifteen grains a day without apparent damage.

The question of habit is rarely advanced in homicidal cases, but such did happen in the Maybrick case. The evidence, however, was inconclusive.

Industrial Poisoning

Next to iron, no metal is more widely used industrially than lead and its compounds, and none can compete with it as a cause of illness and death. Next to lead, arsenic is used in industry more than most other metals and cases of industrial poisoning by it are not uncommon. Workers with mercury are frequently affected and, less commonly, workers with manganese, zinc, chromium, copper, cobalt, nickel, radium and silver. Occasionally, cases of industrial poisoning by gases from acids and alkalies occur.

The possibility of carbon monoxide poisoning is common in industry, since the gas is formed in every incomplete combustion, and is frequently present in coal mines after blasting as well as after fire-damp explosions. Cyanide poisoning is not unknown, especially during fumigation of ships and houses, in tanneries and in metallurgical trades. Wood alcohol or methyl alcohol when used as a diluent in America during the prohibition period caused hundreds of fatalities and thousands of cases of severe intoxication.

Trinitrotoluene and nitrobenzene poisoning were common during war years usually from bad conditions of work and perhaps to some extent from carelessness. Fat solvents such as carbon bisulphide, carbon tetrachloride and trichlorethylene often cause poisoning during their use. Mild cases of poisoning by ethereal oils as turpentine, eucalyptus and linseed oil are not unknown.

Poisoning by skin irritating plants such as anemones, ranunculi, rhus, primula and chrysanthemums occurs in workers amongst these plants and similarly in workers engaged in using the exotic timbers such as satin-wood, boxwood, teak ebony, rosewood, nutwood and red cedar.

It is possible that hypersensitivity may be present in some of these cases.

There are many other substances employed in industry which may and do cause illness, and occasionally death.

Occupational poisoning assumes a special importance nowadays since there is hardly a craftsman or factory which does not make use to some extent of dangerous chemicals.

General protective measures in industry include rational construction of the plant, adequate ventilation, regulation of hours, hygiene and protectives such as goggles and respirators. These are controlled by the Health Authorities. In spite of these measures, cases of occupational poisoning still occur.

Law and Poison

The first recorded trial for poisoning is that stated by Livy to have been in the year 329 B.C. Criminal poisoning at that time was a capital offence. The first law to regulate the sale of poisons was enacted in Siena, Italy, in 1365, where it was illegal to sell red arsenic or corrosive sublimate to any slave, person or servant under twenty years of age. A law in Perugia states that poison could not be obtained without express permission of a doctor. The same is stated in the Statutes of Genoa in 1488.

In 1531, a Statute of Henry VIII ordered that convicted poisoners should be boiled alive.

In England, the Offences against the Person Act, 1861, sections 11 to 25, covers the unlawful administering of poisons and stresses the intention to kill or injure. Without defining the word poison alternative terms are used — "destructive or noxious thing," "stupefying or overpowering drug."

A schedule in two parts is included in the Poisons and Pharmacy Acts 1868-1926, and substances in these lists are legally poisons and can be sold only subject to certain restrictions. Further legislation was necessary to curb the traffic of dangerous drugs such as raw opium, Indian hemp,

morphine, dimorphine and cocaine, and this was enacted by means of the Dangerous Drugs Acts 1920-25 and further Orders.

There is no sharp demarcation between a poison in one Act and a dangerous drug in another and in varying circumstances the same substance may be a poison or a drug. Speaking generally, the question is one of dosage and of intent.

In Victoria, the unlawful administering of poisons is covered by the Crimes Act 1928-1929, Section 8 (1) and (2), and the sale, storage and control of poisons and narcotic drugs by the Poisons Act 1928 and 1930. Included in this act are seven schedules in which are listed not only poisons, but many substances not generally recognized as poisons. These schedules are very similar to those under the English Act. The fifth and sixth schedules cover the drugs which are listed in the Dangerous Drugs Acts of England.

Notable Cases of Poisoning

Arsenic has figured largely in criminal poisoning and famous cases include those of Armstrong, Madeleine Smith, Madame Lafarge, Maybrick, Seddon and others.

Antimony also has been widely used but latterly has gone out of favour. One recalls the cases of Dove, Smethurst, Pritchard, Chapman and the Bravo mystery. Strychnine was used by Dove, Palmer and Cream.

Lamson used aconite to poison his brother-in-law. Devereux, a chemist, used morphine to poison his wife. Crippen used hyoscine.

In Victoria, although accidental and suicidal poisonings are not uncommon, homicidal poisoning is rare.

Arsenic was used by Martha Needle, and in several other instances where the evidence pointed to homicidal poisoning, but where the juries were not satisfied.

Strychnine was used in one case, being administered in jam.

Potassium cyanide placed in beer was presented to some

gardeners in the Carlton Gardens some years ago. One victim died.

There are few poisons in use to-day which cannot be detected by the chemical expert. In some instances, even after the passage of years, poison has been detected in the remains and the cause of death established. The chance of evading discovery is now remote.

We are fortunate in living in an age when it is not necessary to use poison to rid one's self of one's most hated rival, and it is a happy state of affairs that poisoning with intent to destroy is now a rare event.

The contrast between the conditions under which we live to-day and those of mediaeval times is strikingly illustrated in Browning's poem "The Laboratory," from which these verses are taken.

THE LABORATORY

Now that I, tying thy glass mask tightly,
May gaze thro' these faint smokes curling whitely,
As thou pliest thy trade in this devil's-smithy—
Which is the poison to poison her, prithee?

He is with her: and they know that I know
Where they are, what they do: they believe my tears flow
While they laugh, laugh at me, at me fled to the drear
Empty church, to pray God in, for them!—I am here.

Had I but all of them, thee and thy treasures,
What a wild crowd of invisible pleasures!
To carry pure death in an earring, a casket,
A signet, a fan-mount, a filigree basket.

Quick—is it finished? The colour's too grim!
Why not soft like the phial's, enticing and dim?
Let it brighten her drink, let her turn it and stir,
And try it and taste, ere she fix and prefer!

What a drop! She's not little, no minion like me—
That's why she ensnared him: this never will free
The soul from those masculine eyes,—say, "no!"
To that pulse's magnificent come-and-go.

Is it done? Take my mask off! Nay, be not morose;
It kills her, and this prevents seeing it close:
The delicate droplet, my whole fortune's fee—
If it hurts her, beside, can it ever hurt me?

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DISCUSSION

The President: The discussion will be opened by Mr. Sproule.

Mr. Sproule: I preface my remarks by saying that there is nobody here that knows less about poisons than I do. Dr. Wright-Smith's address to-night has given us seriously to think. He has raised a lot of matters upon which we will have to ponder most deeply. He has cleared up one important point in that he has shown that at no time even as far back as prehistoric times was there any nation so uncivilized that it did not understand poisoning! Wherever you go in the world and at any period of the world's history apparently there was a poison and it is quite clear that the removal of the "inconvenient" was well-established, and that the medical man was necessary and useful.

Apparently poisoning is much older than cooking, and a very respectable series of cooks is exonerated from being pioneers in poisoning.

Human nature has remained the same from the earliest times. Dr. Wright-Smith mentioned various races who used poisoned weapons—most unsporting fellows! I am afraid, however, he may have based that charge entirely on the authority of their opponents. The Romans and the Greeks are responsible for the statement that the outlying people with whom they warred used poisoned weapons. It really has persisted throughout the ages to attribute the use of poisons, dum-dum bullets, or other poisoned weapons, to your opponents.

There are two things which struck me from the medico-legal point of view, and one of them is this, that although the methods of analysis and diagnosis have so improved of recent years (using the word in a wide sense), it is rather disturbing that almost all cases of poisoning that come up and are successfully brought home to the poisoners show that there are certainly many that have not been discovered. It is almost universally the case that a poisoner has apparently got away with three or four cases before being finally caught. That makes one wonder how many poisonings are undetected. A man after his third successful poisoning might have the sense to drop it. Palmer, Cream and Chapman did quite a lot of poisoning before being caught. All those cases of earlier poisoning were very useful to the poisoners because it tended to make the thing a certainty. With regard to Chapman, mentioned by the lecturer, I believe in five years he got rid of three young women whom he had induced to pose as his wife. He gave them a twelve months' run and then all the antimony they could take! He got away with the first two quite successfully; but it was found that their bodies, on exhumation, had remained in a beautiful state of preservation. It was found that they were simply soaked in antimony, both of them were attended by medical men and no suspicion arose at all, and certificates were given, and he would have got away with the third but for a suspicious mother-in-law. Through the mother-in-law's inquisitiveness Mr. Chapman paid the penalty. The earlier cases were perfectly successful in spite of the patients having medical attention.

Poisons have not only been applied to human beings for gain, but to animals also. There was a case fifteen years ago of a gentleman who, being in want of money, and having a stallion, insured the stallion and then gave it enough strychnine to enable him to collect. Shortly afterwards he wanted money again, but he had not a stallion; so he tried to think of something else of value which he might reasonably look upon as something that he could insure for a large sum, and, even as you and I, gentlemen, he thought of his wife! He insured her and then, differing from you and me, gentlemen, he proceeded to combine business and pleasure. He gave her strychnine, as he did the stallion, but he was too liberal to his victim and more than suspicions were aroused. The woman's life was saved, and except so far as time is money, he showed no profit!

Another point which struck me very forcibly is this: how one does feel for a doctor who attends a man perhaps in

the bosom of his family and suspects poisoning? I think it really must require the very highest type of moral courage for a doctor, who is only suspicious and cannot be certain up to that stage, to take the step of challenging poison, and saying "I suspect poisoning"; because it must mean that he must be charging somebody in the family. It may be that a husband is administering poison to his wife or that a wife is administering poison to her husband. Then you may get other people who may have ill-will to the patient; so it does seem to me that the doctor's position is most invidious, because, if he is right, if it can be proved, then the doctor is all right and he gets a pat on the back; but if he cannot prove himself to be right, or if he is wrong, his position must be a horrible one, because he is going to annoy at least one of his patients and might have a terrible row. That is the most awkward predicament that can confront a medical man.

Another point is, I understand, that the effect of almost every poison may really be the result of something other than poison.

Those are the points that strike me as being very interesting regarding poisoning from the medico-legal point of view.

I have enjoyed Dr. Wright-Smith's lecture very much and I think we are all anxious to hear how certain other aspects appeal to the other gentlemen here.

Dr. Murray Morton: Mr. President and Gentlemen: I am not a toxicologist but there is a reason why I have been asked to contribute to this discussion, and it is because I have had years ago in my practice to settle this problem which Mr. Sproule has just mentioned. I suspected poison and I realized then what a terrible position the medical man is in who feels that he is dealing with a case of poisoning. He has to be very sure of his ground. He may be suspicious to the point of certainty in his own mind but the physician has no means of probing those suspicions and the only thing he does is to sign the certificate. My case was rather an interesting one. The people with whom I had to deal were not of a very high class and they were a peculiar sort of household. The household consisted of an elderly man named Robbins; he had married a widow and she had had a large family of twelve, ten of whom were dead and two survived; one was stone deaf and sub-normal and the remaining one, a girl, lived with Robbins and his wife. She was what is known as a dwarf, 3½ feet high, with a stunted body. In this peculiar deformity the

dwarf is affected in the long bones and the limbs and the trunk of the body, but the bones of the skull are not affected; consequently these people, though they may be very repulsive in appearance, may be of quite high intelligence. Robbins was a sort of worker, a carpenter in a factory, and he had a workshop in his house. He was a man who was very fond of reading. He used to go up to the public library a good deal and we had reason afterwards to believe that he read some of those authorities that Dr. Wright-Smith has quoted! I had been to Sydney for a holiday and when I returned my locum said "I have seen a Mrs. Robbins; you had better call there." I went there and saw Mrs. Robbins and she was very sick and in bed; she was bilious and she was vomiting and suffering from pains in her epigastrium, and I thought perhaps it was gastritis or gall bladder trouble. Next day she was no better, and, just from the fact that the household was such a queer one I thought there might be something unusual. I might say there was another member of the household, an illegitimate child of this dwarf, who was also a dwarf and who had been delivered from her mother's body by a Caesarian operation. Mrs. Robbins being no better in a day or two, I said to the old man, "You had better get somebody in to look after her." He said "Yes, whatever you like." I did not get a trained nurse but I got a sensible woman more suitable for that class of people. I did not tell her what my suspicions were but I said she had to take complete control of the patient's medicine. I said "You understand?" She said "Yes, I understand." I said "If anything unusual occurs let me know." She said yes, she would. Two days later when I called she said she had something to report. I said "What is it?" And this shows upon what slender and filmy evidence crime can be found out. This woman happened to be a married woman, and it happened that she was left-handed. I said "Well, what have you to report?" She showed me her wedding ring, which she said had turned from gold to silver. I said "How did that come about?" She said "I took my medicine glass that had a heavy bismuth sediment in it to wash it. I had it in my right hand, and being left-handed I turned on the tap of running water into the tumbler and put in my left hand to get the scum off the glass. When I was drying the glass with my hand I found that my ring had turned from gold to silver." I said "That is very interesting." Now, but for those two little scraps of evidence, the woman having been married and being left-handed and not right-

handed this evidence would not have been brought out.. I said "There is something else?" She showed me the bed slipper, and lying in the bed slipper there was a globule of metallic mercury. I said "What is the story of that?" She said "When I was rinsing this out those little globules fell back." Then I saw the old man and told him I was not satisfied with his wife's progress and I would like a consultation. He said "Certainly." I said I would like to call in Dr. William Boyd, who had had experience in local cases about the same district. He agreed. When Dr. Boyd came he said "You had better get her into the hospital straight away." She was placed in the Melbourne Hospital and she died two days later. I attended the post mortem made by Dr. Mollison. It was rather interesting. It was found that her stomach did contain poison. Dr. Mollison took a few of the organs of the body away for analysis and it was clear that the woman had been given three things which had caused her death and the assumption was that the corrosion disclosed was caused by spirits of pure muriatic acid with zinc filings thrown in, and she had also been given metallic mercury, and where that came from it was never found out. Now, metallic mercury is quite innocuous and it was the one thing that gave the show away. After a while the daughter was charged with the murder of the woman. She was defended by the late Mr. David Gaunson. I thought he would plead mental incapacity because her stunted body might suggest an inferior mind, but he went for "Not Guilty," and she was found not guilty. The detectives were pretty certain that the old man was a party to it and they arrested him, and when he was charged with murder, Rosina Hubbard, having been found not guilty of that offence for which she could not be tried again, confessed that she had murdered her mother; so the old man escaped. That is the story of the one poisoning case which comes to my mind at present.

There was a case in New Zealand some years ago where I think a medical man on good grounds refused a medical certificate to a family of repute, and it ruined him. It caused a deal of scandal amongst these people, but after the lapse of several years it was proved that the doctor was quite right and that there had been poisoning. It is a terrible position and a most unenviable one for any medical man to be placed in.

Then, of course, as Mr. Sproule says, very few of those cases are found out at the first time. Most of them get

confident afterwards and they fall down on the third, fourth or fifth or sixth poisoning.

That leads me to express some divergence from Dr. Wright-Smith's opinion that nowadays poisoning is not necessary. I think possibly it is very extensively practised and much more so than we have a suspicion of. It may be that it is unnecessary to get rid of undesirable people, but very few of those crimes come out, and there is no greater fallacy than the statement that "murder will out."

I must express admiration for Dr. Wright-Smith's encyclopaedic lecture and the splendid example of service he has given.

Dr. Weigall: Without entering into the broad general subject of toxicology, I had a case in my own practice which seems to be sufficiently interesting to be worth recording. I was called in to see a man of 45, a law clerk, who had been working hard and who was of a nervous and weak temperament. His wife sent for me, and told me he had come into the room where the family were gathered and took up the carving knife with which they were going to carve the mutton, waved it round him two or three times and then fell down on the floor and had convulsions. When I arrived I found him in what was a typical epileptic convulsion. He had never had convulsions before, and while I adopted the simple method of waiting for the patient to begin to get better I had him removed to bed and packed up with hot bottles and told him to keep quiet, and all those various things that we tell them, and I then went home. At 4 o'clock in the afternoon I was very surprised to be rung up by this man. He said he was perfectly all right. He said "It is all right, Doctor, you need not come down to-morrow, I will be all right." I was so interested that I went to see what the story was, and he told me that he had awakened in the morning with a bad cold and he went into the bathroom with the intention of taking some castor oil, and that he had taken one ounce of camphorated oil in mistake for one ounce of castor oil, and it had produced the most curious mental symptoms which he could recall. He started to write a letter to a man who had died, and he described other symptoms of a peculiar nature. There are many gentlemen in the room to-night who do use camphor for inducing convulsions in certain cases and it will be interesting to them to know that those convulsions can be produced through the mouth, but I never heard of anyone else being poisoned by camphorated oil taken through the mouth. That man took an ounce dose

of camphorated oil and he recovered more by the act of God than by what the medical man did. I was quite unaware of what had happened.

There was another case of a man who was a perfectly respectable business man and a teetotaller who came home from business on one occasion behaving in a very peculiar manner. He was talkative, garrulous and silly. A medical man, who happened to be my brother, was sent for. He tried to find out what was the matter with the man. The position was complicated by the fact that he had lost one eye and the other eye was widely dilated, and his face was contorted. The doctor thought he had better go to bed, and in putting him to bed he saw a belladonna plaster on his back which he had applied because he had a cold, and he had never had a belladonna plaster on before. The plaster was removed and he was put to bed and was perfectly right again. Those were two cases which cropped up in general practice and may be of interest to the meeting.

Dr. Latham: Following on Dr. Morton's references in regard to Rosina Hubbard, a couple of years afterwards she was taken to the Melbourne Hospital and was under my care, and a similar suspicion was aroused in regard to her own illness. She was visited persistently by the man Robbins and after his visits she would always be found to have intestinal disturbances, and these were her leading symptom. The suspicion was that he used to bring her some irritant poison with fruit, and the question to be decided was whether there was such a poison being introduced with the fruit, and a very close watch was kept, but actually it came to nothing. She died. The suspicion was held to by some of the physicians at the hospital but on investigation it was found that her death was due to natural causes. There was a case of suspicion which was solved because she was in a public hospital and it was easy to follow up the suspicion; and that was all that came of it.

Dr. Farran-Ridge: I have very much enjoyed listening to Dr. Wright-Smith's excellent historical survey. I think there are a few advantages or disadvantages in common poisons. I will only refer to coal gas, as one of them. The active constituent of coal gas is carbon monoxide, which occurs in four to ten parts in coal gas. Coal gas is an excellent poison that can be strongly recommended, but, like every other method of "the happy despatch," it requires a certain amount of foresight and care. After having locked the room and pasted it up with paper and turned on

the gas, and having sunk back into one's arm chair to await the inevitable end, one should never light a cigarette! Another important point is that a person should make absolutely sure that he is not likely to be interrupted for some hours after he has turned on the gas because it is very disastrous to be found prematurely and to be only partially poisoned with carbon monoxide because of the terrible sequelae which are not sufficiently known. Carbon monoxide poisoning when a person has taken just sufficient carbon monoxide, will keep him comatose for days, and that is not all, he is very likely to suffer from various injuries in the ganglia at the base of the brain which produce terrible effects. A person may become permanently demented and left in a condition indistinguishable from dementia praecox, and may give rise to all kinds of speech disturbances and other bad results.

In regard to the effects of carbon monoxide, a German expert, Letch, refers to two cases; one was that of a ship's captain who had a charcoal brazier in his cabin and under the influence of carbon monoxide cast off by the brazier he passed into a state of mental confusion and when the cabin boy entered the cabin, the captain promptly shot him.

There was another case of a signalman who absolutely unexpectedly murdered his wife and seriously injured his sister-in-law, and it was only after the discovery of carbon monoxide in the blood of his wife when she came to post mortem that the murder, or rather the killing, was satisfactorily explained.

Dr. Ostermeyer: I think the subject of Dr. Wright-Smith's lecture to-night is of world-wide importance as it affects every nation on the face of the earth. Poison gas and chlorine gas were introduced by the Germans in 1915. It was then liberated in cylinders and depended upon the direction of the wind; but there were instances where gases so liberated under the influence of the wind were turned back on the Germans themselves. Developments since then have been enormous and Dr. Wright-Smith's lecture has dealt with the subject, to a great extent, from the industrial point of view. But this is not merely an industrial question but a chemical question. Recently I was astonished at the number of synthetic poisons which are being produced in the world to-day, which render ordinary poisons merely trivial.

I received from the Pharmacy Board a list of poisons. There is no aconite or henbane or anything so simple as that about that. Here are a few of them which are men-

tioned in the Schedule to the Poisons Acts: dihydrocodeinone and its salts, etc.; dihydro-oxycodeinone and its salts; dinitro-phenol and dinitro-o-cresol; and then there are glucosides—all poisonous glucosides not specifically included in this part of the Schedule. There are, in fact, 67 different synthetic poisons in that Schedule which is the Second Schedule to the Act. Imagine what the Russians are doing in the laboratories! Imagine in the case of a post mortem what the chemical analysis would be to establish the identity of dihydrocodeinone! Imagine what is happening now on the Continent of Europe. Mustard gas, phosgene and other gases are there in reserve for use when the time arrives, and probably will be released in the next war. It staggers the imagination.

What is a poison? Dr. Wright-Smith himself says that it is difficult to give a definition. The Poisons Act provides that "all preparations listed in the Second Schedule shall be deemed to be poisons within the meaning of this Act." There is a certainty about the law on the question, but when we come to the medical question of "What is a poison?" it appears that we have started at the wrong end. I think the question should read "What is a poisoned body?" and that is ascertained from post mortem results.

Dr. Farran-Ridge referred to carbon monoxide. We know that carbon monoxide acts on the blood corpuscles so that they cannot take up oxygen, and you die of oxygen starvation. That is blood poisoning by carbon monoxide, and it is physiological and definite. It is established by physiological examination and chemical analysis. A glance at the list of these synthetic poisonous preparations is very interesting. The Poisons Act of 1928 is entitled "An Act to Consolidate the Law Relating to the Sale and Use of Poisons, Poisonous and Narcotic Substances and Preparations, and Potent Drugs."

In the Schedule to the Act is insulin. There are tens of thousands of patients in Australia who are giving themselves insulin, and they need only give themselves three times the dose and thereby commit suicide in a very simple manner. The blood is examined and the amount of sugar in that blood is far below what it should be, and that causes death just as much as if there was an excess of it.

Digitalis is another example. It is taken by tens of thousands of people in Australia. I have a number of patients who are taking digitalis and I visit them very regularly. I tell them "I am going to see you in a fortnight's time," and I give them a fortnight's supply, but I

take the precaution of putting on the prescription "Not to be repeated." You can kill yourself with digitalis as easily as with anything else.

Therefore I say that the use of insulin and digitalis should be watched with the utmost care because they can be easily turned into poisons.

Dr. Kingsley Norris: I would like to thank Dr. Wright-Smith for his paper. I think it is impossible for anybody in this room to realize the amount of work that lies behind a paper such as this. It represents a tremendous amount of work. It is a very big subject and of very great interest to us all. I think it is a matter of pride to us that most of the examples in the earliest years of poisoning did not belong to Britain. Poisoning is not a British crime; it really ranks with the stiletto very largely. I think one of the earliest recorded poisoning trials involving a doctor was the trial of Richard Westwood for the murder of Sir Thomas Overly. Richard Westwood was executed on the very doubtful charge of poisoning Sir Thomas. Possibly Sir Thomas was not poisoned but suffocated; nevertheless Westwood was the first doctor to suffer for poisoning a patient.

As Dr. Wright-Smith pointed out, doctors, because of their connection with drugs, have become prominent in the list of poisoners. Early in the last century the practice of poisoning was revived by the father of medical poisoners, Pritchard, that odd, strange man with a marked inferiority complex who boasted and dressed extravagantly, and behaved extravagantly, and who died extravagantly and was executed in white cotton gloves, a very odd costume for execution.

Then came the "Prince of Poisoners," Palmer. Palmer's career supports what Mr. Sproule said; though he was charged with the murder of Woolf, Palmer is definitely known to have poisoned at least thirteen people. He had innumerable illegitimate children who disappeared when they came to his surgery for attention.

Then came that strange man Dr. Neil Cream. It was very doubtful whether he was a doctor. He associated with unfortunate women and then poisoned them.

The last instance was that unfortunate man Crippen. I think anybody who has thought of Crippen is very sorry for him. I think every one of us must be very deeply indebted to Dr. Wright-Smith for bringing forward this subject in his most able way.

The President: I will ask Mr. Hamer to propose, and Dr.

Ernest Jones to second, a vote of thanks to Dr. Wright-Smith.

Mr. Hamer: I have the very pleasant duty of moving a vote of thanks to Dr. Wright-Smith for his most interesting paper.

Dr. Wright-Smith has mentioned many things of great interest. I remember reading De Quincy's *Opium Eater* and I made a calculation—whether I am right or not I do not know—that he drank a tumblerful of laudanum each day. I also remember, when a small boy, reading with great interest an old number of a paper containing the account of Palmer's trial, which was important from a legal point of view as well as a medical one, and I agree, as Dr. Norris said, that he must have been a real prince of poisoners.

I join with the other speakers in congratulating the lecturer on the vast amount of research which he has made and which is obvious from the paper he has given us, and I have very much pleasure in moving a hearty vote of thanks to Dr. Wright-Smith.

Dr. Ernest Jones: In seconding the vote of thanks to Dr. Wright-Smith, I desire to congratulate him upon the excellent paper he has presented to the Society this evening. I should like to recommend him to read a novel which I read recently called *Murder in the Hospital.* It exploits quite a new method of getting away with one's subject. Dr. Wright-Smith must have put a tremendous amount of labour into a lecture which could almost be described as a textbook, and I think we should express our thanks to him for his very excellent treatment of a particularly difficult subject.

The President: It has been moved and seconded that the thanks of this meeting be accorded to Dr. Wright-Smith for his most interesting and informative paper. (Applause.)

The vote of thanks was carried with acclamation.

South Australian Visitor

The President: We have with us this evening a visitor from South Australia, Colonel Burston, who is a member of the recently founded Medico-Legal Society of South Australia. I am informed by our Secretaries that the Society has a long and useful and successful career before it because it has been formed upon the model of this Society. (Hear, hear.) I welcome Colonel Burston as a visitor to this Society. (Applause.)

The meeting then terminated.