Meena

UNIVERSITY OF JAFFNA
SRI LANKA

PROF. SIVAPATHASUNTHARAM MAGESWARAN

MEMORIAL LECTURE

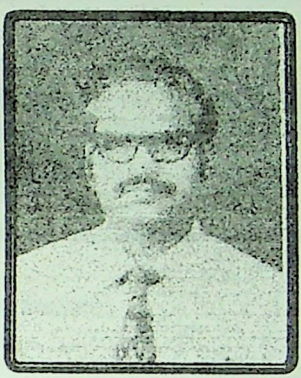
2000

BY

PROF. V.K.GANESALINGAM

PROFESSOR SIVAPATHASUNTHARAM MAGESWARAN

MEMORIAL LECTURE 2000



BY

PROF. V.K.GANESALINGAM

First Edition: August 2000.

Printing & Published: Registrar's Office, University of Jaffna.

Pages: 32.

Computer Printed & Design: R.Ramesh.
Printed & Published By: Mrs. N. Thanikaimohan,
on behalf of the University of Jaffna at Registrar's Office, University of Jaffna, Sri Lanka.

Professor Sivapathasuntharam Mageswaran Memorial Lecture – 2000

As one of the pioneer academic staff and an architect of the academic and administrative spheres of this University, Professor Mageswaran cannot be forgotten in the University of Jaffna for years to come.

In this connection, arrangements have been made by the University to conduct Professor Mageswaran memorial lecture year after year to remember his academic distinction and other services rendered by him.

Today, Professor V.K. Ganesalingam is delivering the memorial lecture on "Some scientific evidence for criminal Poisoning". As usual he is going to deliver it in his own style.

I wish every success for the continued efforts of this nature.

Professor P Balasundarampillai,
Vice - Chancellor,
University of Jaffna,
Jaffna,
Sri Lanka.

1st August 2000

Professor Mageswaran Memorial Lecture 2000

SOME SCIENTIFIC EVIDENCE FOR CRIMINAL POISONING

Late Professor S. Mageswaran

Professor Mageswaran was an asset to the University of Jaffna from the day he was appointed as a member of the academic staff in 1975, until the day of his demise in 1998. During this period he adorned almost all the top administrative positions here, apart from gaining his own academic distinction as the Professor of Chemistry, and in other committees and institutions of national importance. The University of Jaffna has recognized his contributions to a great extent. The University of Jaffna conferred on him the Degree of Doctor of Science and Emeritus Professorship posthumously and named the Chemistry block as " Mageswaran Block". The Faculty of Science of the University of Jaffna has appreciated his dedicated services by establishing the "Professor Mageswaran Commemoration Committee" and conducted a "Professor Mageswaran Science Exhibition". The spontaneous financial contributions from his friends and past pupils have led to the formation of Professor Mageswaran Endowment fund, which provides for memorial lectures and distribution of medals and prizes annually. These are the reflections of

gratitude to the dedicated and sincere services of Professor Mageswaran to the academic and administrative spheres of this University.

The Title of my Lecture

It is gratifying that I have been given the opportunity to deliver Professor Mageswaran memorial lecture-2000, to honour his magnificent contributions to his field, particularly in Synthetic Organic Chemistry. The Organic chemistry has intermingled with all the aspects of Life Sciences and is an integral part in Biology, Medicine and other fields of Science.

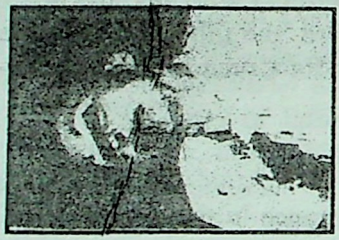
Although, my own field, Zoology involves a lot of Chemistry that is applicable in Medical Science too, I have chosen to elucidate some scientific findings used as evidence of forensic value. It is the forensic specialist, who, with the available evidence, makes the murdered person to "speak out" and let the world know (1)How did the crime happen? (2) Who has done it? (3) Why did it happen? Therefore, the title of my lecture is "Some Scientific Evidence for Criminal Poisoning".

"Professional Poisoners"

Poison is any substance in the form of solid, liquid or gaseous, which if introduced into, or come into contact with a living body is capable of producing ill health or death (Fig .1). The effectiveness depends on the quality, quantity, physical form and mode of administration of the poison, and the health, age and physical condition of

the person poisoned (6). Professional poisoners can make the bitter taste or strange odour of the poison tasteless and odourless(8). An ideal poison should be colourless, odourless and tasteless to prevent suspicion. When added to food or drink, it should not cause any difference. It should be dissipated or destroyed in the body so that it cannot be detected in the body either before or during postmortem examination or after exhumation. The symptoms should resemble that of natural diseases to prevent suspicion.

a. Carbolic acid poisoning
(after Smith & Fiddes, 1955)



b. Caustic poisoning
(after Swanson et al 1996)

Fig: 1. Death by poisoning

A substance can be poisonous during the chemical combination with other substances. Arsenic is not poisonous but its salts are toxic. Lead carbonate and copper arsenite are insoluble in water, but soluble in acid secretion of the stomach and become absorbed in the blood. Silver nitrate and hydrochloric acid are both strong poisons but when combined, they form insoluble salt of silver chloride, which is harmless. Some poisons or toxic substances are used as drugs in medical practice.

The absorption of poison is quicker, if it is dissolved in stomach content and when the stomach is empty. Action of phosphorus is speeded up when oil is taken immediately afterwards. The action of poison will be slow when a person goes to sleep after taking the poison. Poison in minute quantity is not toxic, but when accumulated over a long period it ultimately becomes fatal. The lethal dose to a person is usually ten times or more, than the maximum medical dose. Notably, in some cases, poisoning was responsible by medical practitioners because they deal with dangerous drugs.

Chemicals used for poisoning

The following poisons are commonly used as homicidal agents:

Arsenic	Thallium	Phosphorus
Barbiturate	Hyoscine	Insulin
Antimony	Cyanide	
Chloroform	Strychnine	

In most of the criminal poisoning cases in England, the victim is usually the spouse (Table: 1)(10,11).

Case	Relationship to the accused	Homicidal agent as identified at postmortem examination
Crippon	Wife	Hyoscine
Armstrong	Wife	Arsenic
Seddon	Miss Barrow (friend)	Arsenic
Redford	Wife	Arsenic
Greenwood	Wife	Arsenic
Maybrick	Husband	Arsenic
Wilson	2nd Husband 3rd Husband	Phosphorus Phosphorus
Merrifield	Miss.Ricketts (friend)	Phosphorus
Barlow	Wife	Insulin
Chapman	1st Wife 2nd Wife 3rd Wife	Antimony Antimony Antimony
Pritchard	Wife	Antimony

Table:1 Criminal poisoning in England
(Saravanapavananthan, 1980,1985)

The Chemical agents used in Sri Lanka are:

1. Agrochemical insecticides such as organophosphorus compounds (parathion) weed killers (paraquat) - in farming community.
2. Acetic Acid – in rubber plantation area.
3. Medicinal tablets like phenobarbitone, paracetamol, aspirin, diazepam etc - in medical and paramedical personnel
4. Anti – depressant drugs in psychiatric patients
5. Cyanide & nitric acid – in jeweler's shop.
6. Corrosive acids, alkalies, cyanide and other chemicals, light petroleum gas – in laboratory.
7. Cyanide – in militant organizations
8. Ethyl & Methyl alcohol – in alcohol addicts.
9. Concurrent medication – such as combination of anti-depressant drugs with sedatives, anxiolytics and ethyl alcohol will also enhance toxicity.

Victims

Even the Emperor Nepolean died probably of arsenic poisoning as arsenic was found in his hairs.

All poisoning cases are of great interest because of the use of chemicals intelligently by the criminals, to get rid of the unwanted persons. Cyanide is the usual poison used for this purpose. Potassium cyanide combines with the gastric juice in stomach to produce hydrocyanic or prussic acid that even in minute quantity kills the healthiest person. "Talpe poisoning case in Sri Lanka", is a good example (4).

Robert de Silva Karunaratne was a man of many talents, well versed in jewellery business in Malaysia and Singapore, where he came to know about the potentiality of cyanide used for cutting gold as a poison. Don Charles Samaranayake and Laura Matilda (Hilda) were husband and wife in a rich family. Robert was a close relation of this family. At an occasion Charles died after taking a drink of gin. The crown counsel was of the opinion that Robert planned the murder of Charles to marry Hilda and thereby wanted to assume control of Charles's estate. It was confirmed that Robert removed some potassium cyanide from a jewellery establishment in the pretext that he required it to destroy bugs at home. The circumstantial evidence established beyond reasonable doubt that Hilda had introduced the poison into the bottle of gin that Charles, her husband, drank. Charles started frothing and his jaws were locked and afterwards he was pronounced dead. Staff of the Analyst Department examined the stomach contents and it was confirmed that cyanide or prussic acid was present in the gin, the tumbler and the viscera. The judge passed death sentence on each of the accused. However Robert, the first accused had to face hangman's noose and Hilda, the second accused was recommended to life imprisonment on an appeal to the executive council.

A report from England (10,11) states that a doctor once administrated a lethal dose of prussic acid to his five year old and at the same time he took his own life too. In another case, a lady research Chemist murdered her mother who was suffering from cancer by giving her

potassium cyanide and then she too took her life by taking the same poison. In Malaya, potassium cyanide was given mixed with honey to a victim. A watermelon was cut with a knife underside of which was smeared with a poison. The intended victim was given the lower portion of the watermelon, which had a smear of the poison and the parts, which were cut later, did not have the trace of cyanide. In addition to cyanide, some common heavy metals such as arsenic, antimony and strychnine are also used in homicide, but they are easily detectable by modern laboratory methods.

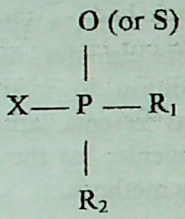
Mode of action

Homicide by poison is less in advanced countries because the poison can be easily detected. But it is more common in developing countries where awareness and detection methods are limited (7). Insecticides used in agriculture are some times used for homicide.

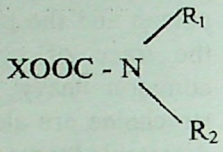
Organophosphates and carbamates (Fig:2) kill by interfering with transmission of electrical impulses at the synapse of the nerve ends (5).

When the nerve impulse arrives at the cholinergic neuron, the synaptic vesicles fuse with the pre synaptic membrane and release the neurotransmitter, acetylcholine (Ach), which binds with a receptor on the post-synaptic membrane. This causes a change, altering its ionic permeability, resulting in the continuation of the impulse.

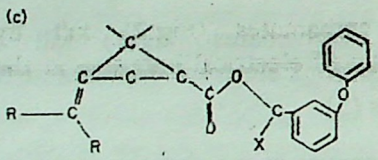
a) Organophosphates



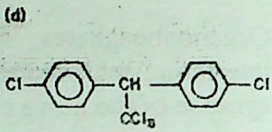
b) Carbomates



c)Pyrethroids



d)DDT



(after Callaghan, 1991)

Fig.2: Basic structures of some insecticides

To prevent repetitive firing, Ach is broken down by the enzyme, Acetylcholinesterase (AchE) into choline and acetic acid. It is obvious that the organaophosphorus compounds act on myoneural junction and synapses of ganglions where, they inactivate the cholinesterase enzyme system (Fig:3). There are many factors influencing and suppressing toxification (Fig. 4),(1).

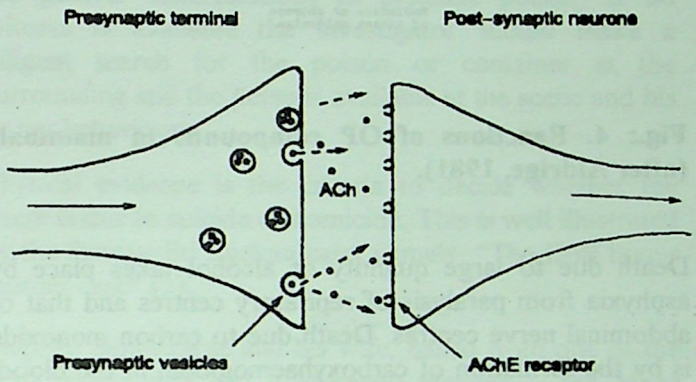


Fig:3. Diagrammatic representation of nerve transmission at a cholinergic synapse. (after Callaghan, 1991)

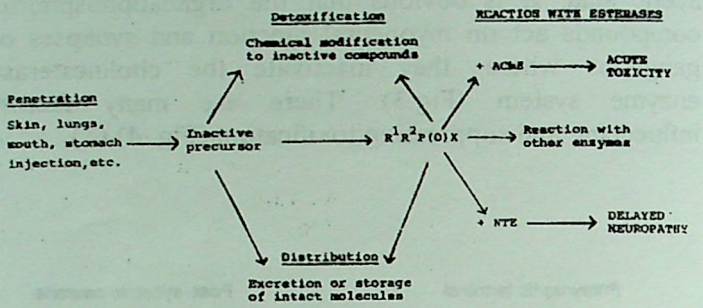


Fig.: 4. Reactions of OP compounds in mammals (after Aldrige, 1981).

Death due to large quantity of alcohol takes place by asphyxia from paralysis of repiratory centres and that of abdominal nerve centres. Death due to carbon monoxide is by the formation of carboxyhaemoglobin in the blood, which reduces the oxygen carrying capacity. The cause of death by arsenic poisoning is heart failure. Phosphorus poisoing affects liver, kidney, heart and brain. Swallowed cyanide salt interacts with gastric acid liberating hydrocyanic acid, which takes only a few minutes to kill. Lead poisoning produces psychosis, mania and convulsion. Mercury poison causes neurological damage.

Physical evidence of poisoning

Regardless of homicide, suicide or accident the physical evidence of poisoning and symptoms are same, such as vomiting, convulsion, diarrhoea, paralysis, rapid or slow breathing, contracted or dilated pupils, change in skin colour or difficulty in swallowing just prior to death (13). Particularly, skin, vomitus and odour may give some clue for the poison used (Table 2). However, such symptoms are general manifestations of systemic poison. If no witness is available the investigator should make a diligent search for the poison or container at the surrounding and the persons available at the scene and his or her behaviours.

Physical evidence is the criteria to decide whether the death is due to suicide or homicide. This is well illustrated by the famous Sri Lankan case, namely "The Duff house murder case" (2).

Stephen Seneviratne and his wife, hailed from one of the best known rich and aristocratic families, - the Maha Mudaliar Solomen Dias Bandaranayake family. The couple has been leading a cat and dog life and occupied an old fashioned several roomed house with an extensive garden - the Duff house. It is doubtful whether the husband and wife had sexual relationship after the birth of the second child due to Mrs. Seneviratne's ill health as a diabetic patient and on the advice of the doctors .

The husband, who used to amputate buffaloes in his estate, had ampoules of chloroform, which he had handed over to his wife for safe keeping. For a complaint of headache by the wife, her husband gave 25 tablets of Aspirin. According to the evidence, Mrs. Seneviratne died between 6.15 and 6.30 a.m. on Sunday. The crucial question was whether Aspirin or chloroform caused the death. The other question was whether Mrs. Seneviratne was a victim of homicide by her husband or suicide by self administration.

Expert evidence was that the death was not due to Aspirin as there was no salicylic acid in the urine. It was reasonably clear that the death was by chloroform due to syncope caused by inhalation of chloroform. With regard to whether the chloroform was self-administered or not, the evidence was more for the former because there was a definite outline of burn marks on the face. If the chloroform was administered against her will, more extensive burns would have resulted due to struggle.

Poison	Symptom
Caustic poison	Burns around lips and mouth
Carbon monoxide	Skin bright cherry colour
Sulphuric acid	Black vomit and grey skin
Hydrochloric acid	Greenish - brown vomit and grey skin
Nitric acid	Yellow vomit and grey skin
Silver salts	White vomit turning black in day light
Copper sulphate	Blue green vomit
Phosphorus	Coffee brown vomit and onion or garlic odour
Cyanide	Burnt almond odour and cherry red lividity colour
Arsenic, Mercury Lead salts	Pronounced diarrhoea
Carbolic-acid	Greyish white skin
Oxalic acid	Greyish skin
Zinc chloride	Whitish skin
(Mouth, nostrils, rectum and vagina may show presence of signs of poisonous materials. Injection marks or any evidence of this nature may form additional evidence.)	

Table 2: Physical symptoms seen in persons after taking the poisons. (Based on Swanson, et al, 1996 & Reddy, 1997)

The person concerned cannot keep chloroform in contact with the face without loosing consciousness; and due to unconscious state she would have released it off resulting in less symptoms. Homicide was a more probable cause of death due to inhalation of chloroform resulting in cardiac syncope and not asphyxia. The accused was convicted but later the Privy Council squashed the conviction. He started livestock and poultry farm at an age of 65 and died 23 years after his release.

Adelaide Bartlett of Briton was charged with the murder of her husband by pouring chloroform down his throat while he was sleeping. However, this was not proved to the satisfaction of the jury in an English court and she was acquitted (10,11).

Barbiturates are used widely in the treatment of states of anxiety, sleeplessness and some psychiatric conditions. A six month old boy, Terrance Armstrong died suddenly. At the autopsy there was no any evidence of poisoning. Father and mother were left free,. but later John Armstrong quite often quarreled with his wife , Janet. The wife filed a case in the courts for separation. After the separation, Inspector Gates, who investigated the murder of the boy Terrance Armstrong, asked Janet whether she has anything to tell about the death of her son. She volunteered and gave a statement, which resulted in conviction of John Armstrong for the murder of his son by barbiturate poisoning (10,11).

Additional Symptoms and Signs

The following symptoms and signs may cause to include poisoning as the priority (7): There will be sudden vomiting and diarrhoea in persons who have been poisoned. In children there will be sudden and unexplained coma. In adults there will be coma, in addition to depression. In those who have been poisoned, there will be an onset of peripheral neuropathy such as wrist drop, in addition to the onset of neurological or gastrointestinal illness.

Collecting Information about the Poisoned Victim

It is necessary to find out the activities of the victim for the last three days of the incident. If he had taken any type of medication, it should be studied in detail. Information with regard to the last meal, when where and with whom the meal was taken or shared will give some clue to the cause of death. Was he suffering from failure or frustration? If so, what was the cause? All the utensils and other materials should be kept safe to determine the poison in them or finger marks. Vomitus, dish or any container, medicinal containers, handkerchief etc. must be preserved for further investigation.

Evidence From Internal Organs

All the internal organs, such as brain, mouth, throat, oesophagus, reproductory tract, stomach, duodenum, intestine, liver, kidney, heart, bladder, hair and nail clipping have to be preserved. Part of all these organs and contents

have to be sent to the Government Analyst for toxicological analysis of biological tissues. They should be submitted early for examination to prevent disintegration of the poison.

"Dr. Kularatne poisoning case" in which Dr. Kularatne, his mother and the servant girl were accused of poisoning Dr. Kularatne's wife, was one of the famous cases in Sri Lanka with regard to arsenic (3). Mrs. Kularatne became seriously ill after taking her lunch one day. She continued to vomit and passed stool on bed and had burning sensation and severe thirst. She should have been taken to hospital immediately, but died at home before ambulance arrived. She had all the external symptoms of arsenical poisoning. It was concluded that the arsenic ingested was Potassium arsenite.

The Government analyst stated that he found 730 milligrams of Potassium arsenite in the stomach content of the deceased and this corresponded to the quantity, which matched that of the dispensary of Dr. Kularatne. The main object of the defence was to prove that Potassium arsenite content in deceased's stomach and internal organs did not necessarily come from Potassium arsenite of the doctor's dispensary. However, the evidence of motive, opportunity and subsequent conduct were sufficient to establish the charges against these accused. But the appeal court freed all three accused.

Arsenious oxide, being tasteless and odourless can be given to the victim little by little until it becomes lethal when accumulated in the body. It can be given in chocolate, porridge and any other edible food. Gordon Redford (10,11), a laboratory technician poisoned his ailing wife by

carefully introducing little Arsenic in her food every day. She was proud and fond of her husband who regularly visited her at the hospital and brought the food she liked most every day. However, one day she sent her food to be examined for poison. The Medical superintendent, without knowing that the food had been sent for examination, ate some of them and kept the remaining part to eat it on the next day. Before he could finish eating it he became sick. He found the letter requesting to examine the food only on the following day. On examination it was found that the food contained 3 grains of Potassium arsenite. Mrs. Redford died 3 days after eating the food. Analysis of her hair showed that she had been systematically poisoned for a period of 3 months. Mr. Redford after hearing that he was suspected poisoned himself by taking Prussic acid (10,11).

Analytical Toxicology

Various chromatographic procedures are used to characterize the substance in the sample. Chromatographic methods do not achieve specific identification of the substances.

The first task the analyst has to achieve is to separate and concentrate the poison from the specimen. The method used to separate and concentrate depends on the chemical nature of the suspected poison and frequently involves solvent extraction.

Most substances are readily soluble in solution such as chloroform or ether. If an aqueous solution of the sample is made alkaline and shaken with ether the basic substances

will dissolve into ether. The ether layer can be separated and evaporated leaving the extracted base free substances.

Alternatively ionic and non-ionic reagents may be used to extract the drugs or the poisons. Such methods are useful when qualitative identification is needed.

The methods used for analysis are: spectroscopy, chromatography and immunochemical techniques.

The spectroscopic techniques used are: ultraviolet spectrophotometry; infrared spectrophotometry; florescence spectroscopy; spectrographic methods and mass spectrometry.

The chromatographic techniques used are: column chromatography; high-pressure liquid chromatography; paper chromatography; thin layer chromatography and gas chromatography.

Instruments used for Toxicological Analysis.

Toxicological analysis of biological tissues involves separation of poison from biological tissue, purification, analytical detection and quantification of the poison. Some of the instruments (13) used for this purpose are briefly discussed below (Fig: 5):

Emission Spectrograph: This is used to identify the elements from the light that produced. This instrument can determine a rapid analysis of all metallic constituents from an unknown substance.

Mass Spectrometer: This is used to analyze a wide range of forensic specimens such as drugs, poisons, biological specimens, explosive residues etc.

Visible Spectrophotometer: This is used to study the colour and colouring agents such as dyes and pigments in any material.

Infrared Spectrophotometer: By passing a narrow beam of infrared energy through the substance concerned, the " finger print" of such material can be studied.

Atomic Absorption Spectrophotometer: This is used to determine the quantitative analysis of the vapour state of the substance concerned.

Gas Chromatograph: This is used to separate and identify the gases or liquids from complex mixture of solutions.

X-ray Diffraction Spectrophotometer: This is used to identify and compare unknown crystalline substances.

Neutron Activation analysis: This is a laboratory-sized nuclear reactor that bombards the samples with neutrons to cause the elements of the sample to become radioactive.

The above instruments are sophisticated and sensitive to chemical analysis of materials obtained from the place of poisoning and other crimes.

Immunoassays: Radioimmunoassay, enzyme immunoassay and fluorescent immunoassay can be used to analyze extremely small volume of specimens.

Evidence during Putrefaction and Postmortem Examination

During decomposition, many poisons present in tissues undergo chemical change and cannot be detected. Most volatile compounds would be lost during putrefaction. In an embalmed body it is not possible to detect and identify any volatile poisons. In Mercury poisoning mucous membrane of stomach and duodenum show cracks and multiple fissures, enlarged kidneys and liver, and heart shows fatty degeneration. Carbolic acid, hydrocyanic acid, aniline etc. may be recognized from their smell (12). Vomitus, faeces bile and urine are examined for poisons.

Poisoning by Hypoglycaemic Drugs

It is not suprising that intelligent people use the hypoglycaemic drug, which reduces the glucose level in blood, in homicide, as the sign or symptoms of poisoning cannot be detected.

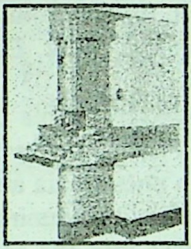
The first record of homicidal poisoning by hypoglycaemic agent, insulin was that of a state registered nurse Barlow from the United Kingdom (10,11). Barlow lost his job when his wife was expecting a baby. On one night his wife was found dead in the bathroom. According to Barlow his wife went with pyjama for a bath at about 10.00 p.m. and when

(a) Spectrometer interfaced with gas chromatograph

(b) Gas chromatograph

(c)Scanning electron microscope

(d) Flameless atomic absorption instrument



(e) Electron microscope

(f) Mass Spectrometer

Fig:5. Instruments for toxicological analysis (after Swanson et al)

he woke up at 11.00 p.m. he found her face down in the bath. Postmortem examinations confirmed that death was due to drowning as no poison could be detected in the internal organs. The body was again examined. There were four punctures of injections observed at the buttocks. There was no other person in the house other than the couple. Barlow had insulin with him and he knew all about the effects of insulin. He also has explained others sometime back that the insulin was the best drug to commit a perfect murder. In this case after his wife became unconscious in the bathroom, he had injected insulin in her buttocks and so arranged to believe that it was an accidental death. Barlow was found guilty and committed to life sentence due to the fact that the four punctures indicated the injections of insulin.

In Sri Lanka, Fr. Mathew Peiris was a man of high intelligence worked in several capacity from psychiatrist, theologist,engineer and finally ended up as an Anglican priest, the Vicar(9). Russel Ingram, the husband of Delerene Ingram died on 10. 08. 1978 at an age of 32. Eunice Peiris, the wife of Fr. Mathew Peiris died on 19. 03. 1979. Both died due to the same cause, the hypoglycaemia that reduced the glucose content of blood and caused irreversible brain damage and eventually ended up in pneumonia and death. Fr. Mathew Peiris was responsible for introducing Euglucon tablets in crushed form or otherwise into the food or given directly which reduced drastically the blood sugar level causing hypoglycaemic conditions in both the people. Fr.Mathew Peiris convinced everyone that they were suffering from an islet cell tumour or insulinoma where insulin was secreted by tumours occuring in the beta cells of

pancreas. He showed that he knew all about the medicine and flouted all the hospital rules and regulations. The reason why he wanted to kill his own wife and the husband of Delerene Ingram was obvious. Delerene also shared the views and deeds of Fr.Mathew Pieris. The high court Trial at Bar had sentenced on 15. 02 .1984 both to death. The death sentences were commuted to life sentence on 28.06.1985. But later the court of appeal acquitted Delerene on 12.02. 1988. Fr. Mathew Pieris, after being imprisoned for 18 years and 5 months secured freedom on 25.10.1997. He died in his home at Moratuwa on 12.05.1998 at an age of 85. The use of hypoglycaemic drug, especially Euglucon tablets for homicidal purpose is new in Sri Lanka. Examination of the available documented major homicide cases of poisoning in Sri Lanka it was found that insulin drug plays an insignificant role.

Homicide was committed for sex need, greed, jealousy and competition. They are the main motives of homicidal activity for which poison was also used as a weapon. Sex played an important part among the two partners for a cooperated effort in executing murders by various methods; but ultimately the murderers were trapped to face the consequences (Table 3).

Partners	Victim	Homicidal Method	Sentence (final)
Ven. Budharakkitha thero, Vimala Wijawardena,	Mr, S.W.R.D. Bandaranayake	Shooting	Ven. Budharakkitha thero -life imprisonment. (Vimala wijawardene - freed by Magistiate court)
Sathasivam, Yvonne Stephenson,	Mrs. Sathasivam	Strangulation	Not proved
Dr.Kularatne,	Mrs. Kularatne	Arsenic	Dr.Kularatne -aquitted.
Kirambakanda, Pauline de Croose,	Mas. Gothabaya	Drowning	Pauline de Croose -life imprisonment. (Kirambakanda acquitted in appeal)
Anandagoda	Mrs.Adeline Vitharane	Running over by car	Hanged
Fr. Mathew Peiris , Delrene Ingram,	Mrs. Peiris Mr. Ingram	Euglucon	Fr.Mathew Peiris - life imprisonment. (Delrene Ingram aquitted in appeal)
Velupillai, Kohilakambal	Kasilinga Sarma	Cutting, burying	Both Velupillai and Kohilakambal -life imprisonment

Table.3: Fate of some male and female partners in homicidal activities in Sri Lanka.

Poisonous Plants

There are poisonous plants that are used for suicide or homicide. The plant poisons are alkaloids, glycoside, resin or unidentified chemicals. Particularly, the yellow oleander, *Thevetia peruviana (Manjal alary)* is a common poisonous plant. The seed contains alkaloid similar to Cardiac glycoside. Its effect is responsible for death. *Gloriosa superba (Karthikai poo)* tuber is poisonous containing colchicine. *Datura fastuosa (Poomathai)* has thorny fruit that is poisonous, used for suicidal purpose. These plants and plants of this nature are available in Sri Lanka and locally, and are used in suicidal and homicidal poisonings.

Conclusion

Poisoning may be to commit suicide or homicide. The criminal poisoning is to terminate the life forcibly the unwanted persons. The poisoners make every attempt to execute their target by several sinister moves. They execute such crime meticulously and diligently. They confuse the law authorities by their expertise. However they cannot stand against the scientific evidence which is accurate and explicit. Experts using appropriate equipment subscribe the evidence. The scientific evidence of criminal poisoning is derived from knowledge of clinical, laboratory findings, sign and symptoms, postmortem appearance and isolation and

identification of poison from internal organs. Scientific methods have developed in forensic field to that extent that culprit cannot escape from the claws of law. Although this has developed well in the west, we ourselves should develop to that extent to execute the best administration of justice, particularly in the local cases of criminal poisoning.

Therefore, I wish that the University of Jaffna takes some steps for such investigations in order to contribute towards scentific evidence in crimes.

Acknowledgments

I am much thankful to Dr.C.S. Nachchinarkinian, Acting Head, Department of Forensic Medicine and Dr.S.V. Srirajeswaran, Acting JMO Jaffna Teaching Hospital for reading the manuscript and making useful comments and encouragement.

I thank the Faculty Board of Science for giving me an opportunity to deliver the Professor Sivapathasuntharam Mageswaran memorial address.

I am grateful to Mr. T.Eswaramohan for giving his assistance in typing this paper diligently by using modern computer techniques.

My thanks are also due to Miss. Thiruchelvi Kandiah for assisting in preparation of the illustrations.

Prof. V.K. Ganesalingam

References.

1. Aldrige, W.N., (1981). Organophosphorus compounds. Molecular basis for their biological properties. Sci. Progress, 67,137-147
2. Alles, A.C. 1977. Famous criminal cases of Sri Lanka Frewin & Co. Ltd., Colombo 1, pp. 113
3. ---------- 1980. Famous criminal cases of Sri Lanka. Caxton Printing works Ltd., Colombo 12, pp. 155
4. ---------- 1982. Famous criminal cases of Sri Lanka. Frewin & Co. Ltd. Colombo 1, pp. 92.
5. Callaghan, A. 1991. Insecticidal resistance: Mechanism and detection methods. Sci. progress 75, 423-438.
6. Chandrasri, N. 1999. Textbook of clinical forensic medicine and forensic pathology. Upali Industries, Galle. pp. 457.
7. Knight, B. 1992. Simpson's forensic medicine. Edward Arnold, London. pp. 324.
8. Reddy, N.K.S., 1997. The essentials of forensic medicine and toxicology. Om Sai Graphics Hyerabad-27. pp. 530.
9. Sameer, F. 2000. Interesting account of the vicarage murders. Sunday Obsever Sri Lanka. Feb. 27. 2000 p29.
10. Saravanapavavananthan, N. 1980. Homicidal poisoning. Jaffna Medical Journal 15 (2) 44-49.

11 Saravanapavavananthan, N 1985. Homicidal and accidental poisoning.
Jaffna Medical Journal 20 (1), 45-54.

12 Smith,S and Fiddes, F.S.,1955 Forensic medicine- A text book for Students and Practitioners. J & A Churchil Ltd. pp. 644.

13. Swanson, C.R., Chamelin, N.C. and Territto, L.1996. Criminal Investigation
Mc Graw Hill, London. pp. 801.

Professor V.K.Ganesalingam is a Senior Professor of Zoology in the University of Jaffna, Sri Lanka. He entered the Faculty of Science of the University of Ceylon, Colombo in 1958. After completing B.Sc.(Hons.) in Zoology he joined the same university as a Demonstrator in 1962. In 1965 he was awarded an East-West Center Scholarship to study at the University of Hawaii (U.S.A.), where he earned M.Sc, and he joined the University of Ceylon, Peradeniya as an Asst. Lecturer in Zoology. He proceeded to University College London (University of London) and completed Ph.D. in 1970. He was appointed as the founder Professor of Zoology in the University of Jaffna on 1st August 1975 and became a Senior Professor in 1985. He is a renowned teacher and a good researcher. We are proud to state that all the academic staff of the Department of Zoology are his past pupils.

He was awarded a Commonwealth Universities Fellowship for Postgraduate research in 1998/99 at the University College Swansea (University of Wales). He took part in workshops in Baroda (1984) and Nairobi (1986). He was a recipient of Nuffield Commonwealth Fellowship for doing research in the Imperial College at Silwood Park (University of London) in 1986/87.

He was the Dean, Faculty of Science for the period of 1988-1991. He was awarded a British Council Fellowship in 1990 for his research in the Natural History Museum, London. He authored and co-authored a good number of research articles in local and foreign journals.

He was elected as the Dean, Faculty of Science again for a period of 1996 - 1999 On several occasions he served as the acting Vice Chancellor of the University of Jaffna. He was in the Board of Governors of the CISIR and IPS.

His interest extended beyond the academic field. He was the Deputy District Governor of Lions International (306 B). He was the President of the Jaffna Science Association, Consumers Society of the Jaffna District and, NGO Consortium of the Jaffna District.. He is presently the President of Sri Lanka Red Cross Society, Jaffna Branch and the Vice-President of Sri Lanka Red Cross Society, National Headquarters, Colombo.

25.04.2000

Dr. (Mrs.) P.Krishnarajah,
Head / Dept. of Zoology,
University of Jaffna.

GANGAI
Offset computer print
(Near Brown Road) Navalar Road, Jaffna