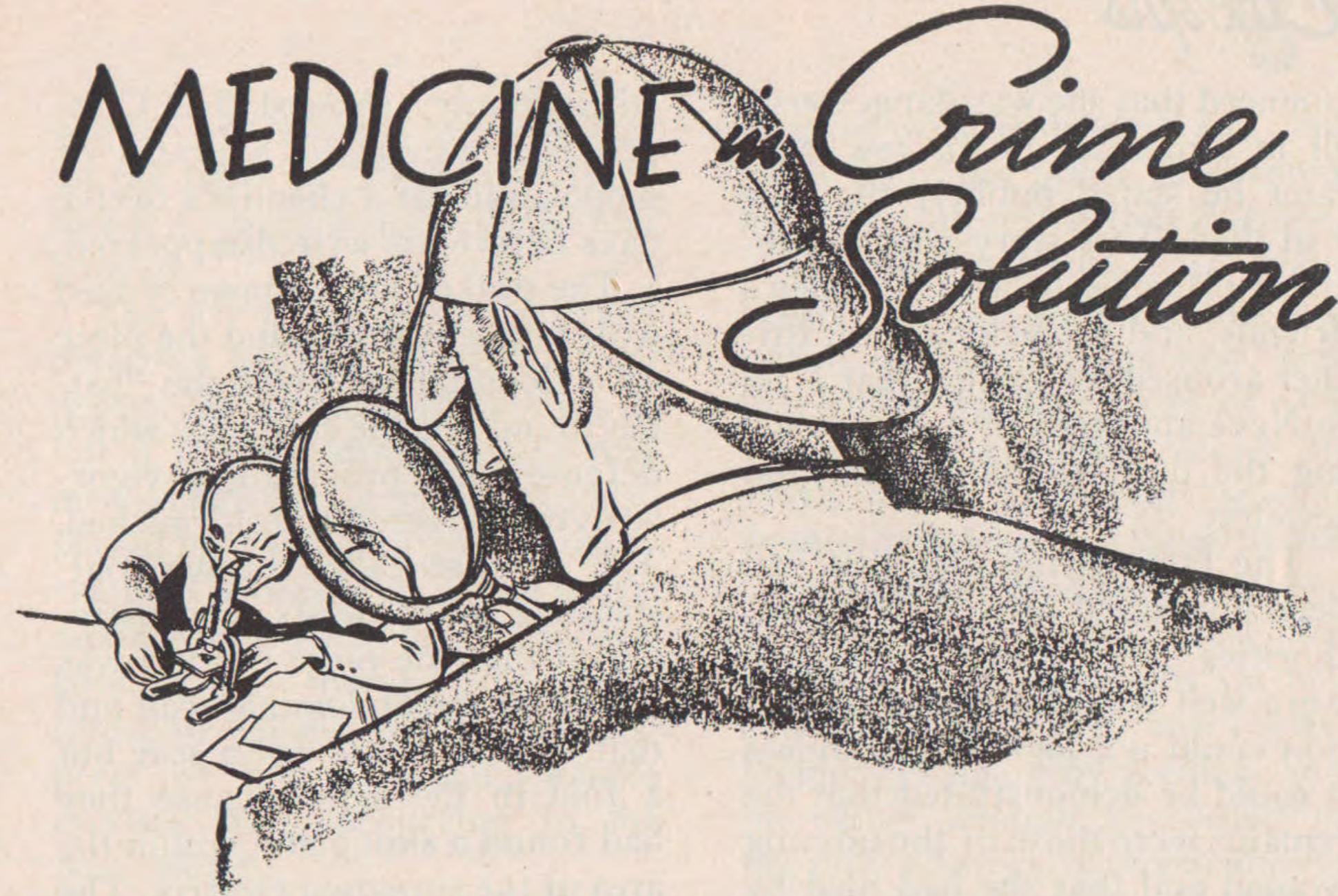




Membership Roll Call Dates: November 11-30

MEDICINE *in Crime Solution*



ON a beautiful spring day in 1910, the first news broke of one of the most sensational murder cases in England's history. Under the flagstones of the cellar floor in the house of Dr. Hawley Harvey Crippen, an American physician living in London, agents of Scotland Yard dug up the soft parts of a human torso which had been almost entirely destroyed by the quicklime in which it had been buried. The head, extremities and bones were not found. Although the parts could not be identified, the police entertained a strong suspicion that they were remains of the body of Mrs. Crippen, who had suddenly disappeared under peculiar circumstances.

Upon learning that Scotland Yard was making inquiries, Dr. Crippen suddenly vanished

together with his pretty young secretary, Ethel le Neve, with whom he seemed to be on the best of terms and with whom he had often been seen in public places. An extensive investigation was immediately instituted and a wide search was made for the two, resulting finally in their apprehension. The inquiry showed that Crippen had graduated from the Cleveland Homeopathic Hospital and after marrying Cora Turner, an American girl, he had come to London ten years before in order to take a position as manager of a drug manufacturing concern.

Mrs. Crippen was last seen by friends on January 31, 1910. On February 2 Crippen explained in a note to one of her acquaintances that his wife had been forced to leave for America at a few hours' notice; on March 20 he an-

nounced that she was dangerously ill in America, and a few days later he stated publicly that she had died. This story was not entirely plausible to Mrs. Crippen's friends, and suspicions were further aroused by the fact that Miss le Neve appeared in public wearing the dead woman's furs and jewelry.

The facts in the case that had been unearthed proved to the authorities that their suspicions were well founded, but a conviction could not be obtained unless it could be demonstrated that the remains were those of the missing woman and that she had died by foul means. To this end Professor Augustus Pepper, the leading medicolegal expert of the day, was called in to make a study of the parts. After much labor on a piece of skin and attached tissue which he recognized to be from a female abdominal wall by the arrangement of the muscles, he was able to discover a mark about 4 inches long that was identified as a surgical scar. It was known that Mrs. Crippen had such a scar from an operation, and identity was thus sufficiently established. A prominent toxicologist tested the remains for every known poison and finally identified in them a total of 2/7 grain of scopolamine, a drug only slightly known at that time and never before used as a homicidal poison, but which Crippen, as an expert pharmacologist, would be likely to employ. To the chain of evidence was added another link

when inquiry showed that Crippen had purchased 5 grains of scopolamine at a chemist's twelve days before his wife disappeared.

The trial of Dr. Crippen evoked wide public interest, and the piece of abdominal wall was the "battleground" of the case over which defense and prosecution vigorously maneuvered and skirmished. The defense called in two outstanding pathologists who maintained that the piece of skin was not from the abdominal wall and that the mark was not a scar but a fold in the skin because they had found a skin gland within the area of the supposed cicatrix. The prosecution realized that, if the doubt were allowed to stand that the mark was not an abdominal scar, its case might be completely destroyed, and every effort was exerted to establish the facts. It engaged Dr. Bernard Spilsbury, a then little known expert in forensic medicine, to make a thorough microscopic study and to testify as to his findings. Spilsbury so completely proved on the witness stand that the skin was from the abdomen that the defense experts were later forced to retract their contention to the contrary. The young expert for the prosecution agreed that if a gland were actually found, it would disprove that the mark was a scar, but pointed out that what the defense witnesses had mistaken for a gland was really a piece of adjacent skin which had healed into the cicatrix. The evidence of the defense witnesses was thus thor-

oughly undermined and, largely on the basis of Spilsbury's testimony, Crippen was convicted and hanged.

The use of medicine in crime detection has developed to a high degree during the last thirty years, but it is interesting to note that medicolegal investigation had also played an important role in many criminal proceedings in the previous decades, particularly in England. It may therefore be of interest to review the medical aspects of several other notable murder trials occurring in the past century.

The Brides in the Bath

A few years after the Crippen process, Dr. Spilsbury took a leading part in a murder trial which received wide attention because the accused had evolved an unusually unique method of committing his crimes. In December, 1914, Scotland Yard received two interesting newspaper clippings from two separate sources. The reports contained in the clippings were remarkably similar for in each case a recently wed bride had been found drowned in a bathtub which was in an unlocked room, and in each case the husband had left his wife in the water until a physician was called and had seen her. One of these highly coincidental accidents had occurred to a Mrs. John Lloyd a few days previously in London, and the other in December, 1913, to a Mrs. George Joseph Smith in the town of Blackpool. An inves-

tigation was instituted and the more facts the police uncovered the more interested they became.

They learned that "Mr. John Lloyd" was an alias for the Mr. Smith in the previous case, and that Smith was the possessor of a considerable criminal record. In 1910, after marrying several women and deserting them, Smith married a spinster named Bessie Mundy and promptly left her when he had laid hands on her available funds. Two years later, he met her again by accident and incredibly enough succeeded in not only effecting a reconciliation but in persuading his "wife" to make out a will leaving him her legacy of 2000 pounds. As soon as the will was signed, Smith proceeded to establish that his wife was quite ill and subject to fits by inducing her to complain about her symptoms to a local physician and in letters to her relatives. Smith, showing a commendable tendency of cleanliness, purchased a bathtub and a few days later the doctor was called to find the wife lying drowned in the bathtub. The inquest which followed returned a verdict of death by misadventure.

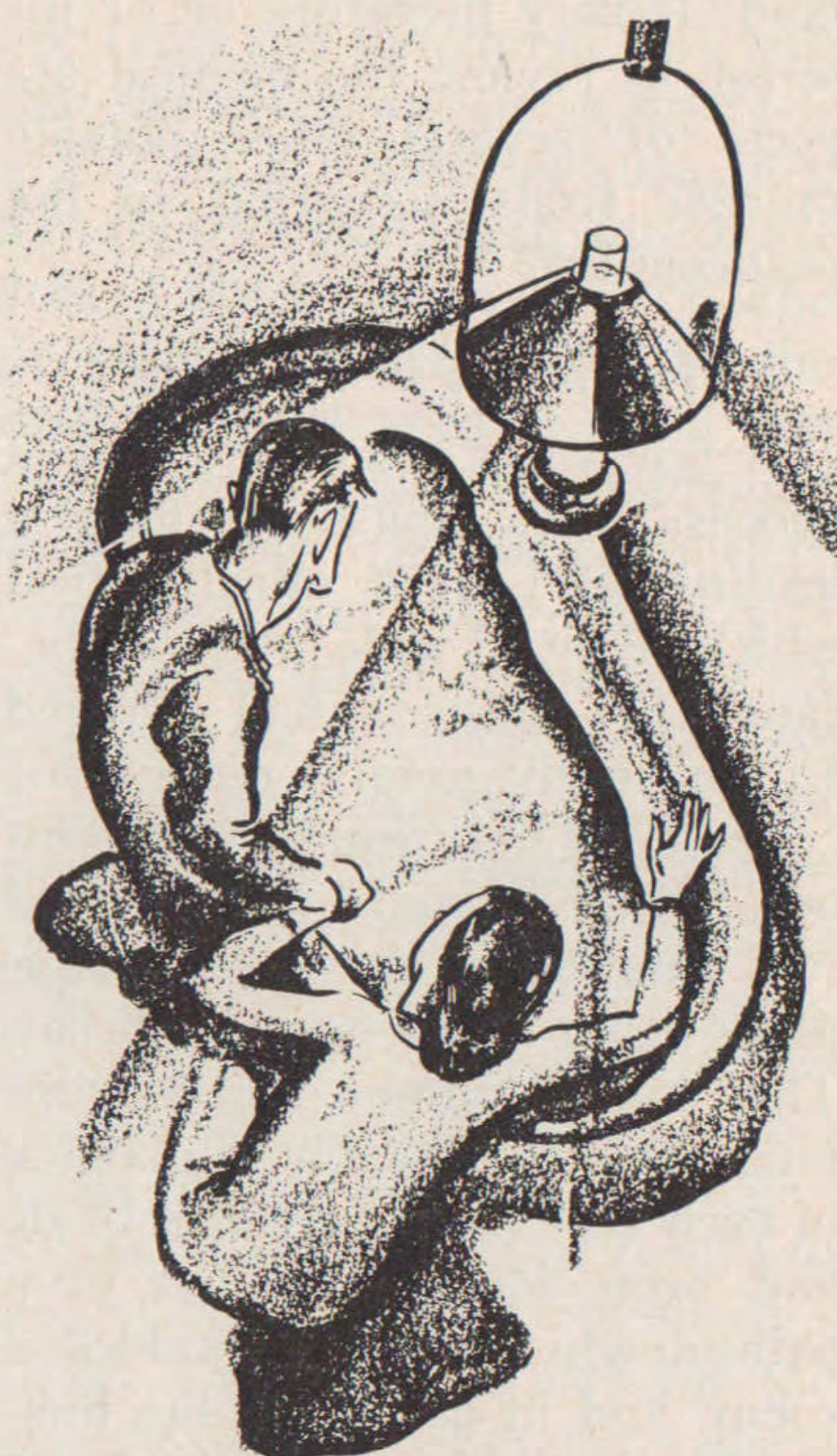
The next year, Smith married a nurse named Alice Burnham and promptly insured her life for 500 pounds. He then traveled with his bride to Blackpool where he hunted for lodgings in a house with a bathtub, a rare thing for England in those days. Again he took his "wife" to a local physician, this time for a headache,

and again the doctor was soon called in to find the bride drowned in the bath, following which the coroner's verdict was "accidental death." The next profitable accident was accomplished in record time. Smith, as John Lloyd, induced a spinster named Margaret Lofty to take out life insurance, and married her the same day; she was found drowned in the bath the next day.

Smith, who had been kept under surveillance, was arrested for murder and arraigned for trial in Old Bailey. The crucial testimony was that of Dr. Spilsbury concerning the medical aspects of the case without which the prosecution probably would have been unable to obtain a conviction. Although Bessie Mundy had been dead for two and one-half years when her body was exhumed, Dr. Spilsbury found that the surface of her skin was marked by "goose flesh" which allowed him to testify that her death was sudden. Spilsbury had taken measurements of the tub and found it so small that it would have been impossible for a person of Miss Mundy's height to slip down accidentally far enough to drown. Smith's parsimony was his undoing for he had hunted until he had found the small bathtub at a bargain. Spilsbury exhibited the tub to the jury, demonstrating that if a bathing woman's legs were abruptly pulled high she would certainly drown, and testified that death could occur in a few seconds if the immersion were sud-

den. On cross examination defense counsel tried to force the witness to admit that, if Smith had drowned the deceased, in the attempt to save herself she would have dropped the soap that was found clutched tightly in her hand. On the contrary, the expert explained, the tightly clasped soap could only be accounted for by sudden death.

In the case of Alice Burnham,



the defense contended that she had drowned during a fainting spell. Spilsbury completely destroyed this with his testimony that water inhaled during the syncope and the resulting coughing would act as strong stimulants which would bring the person out

of the faint. Smith was hanged for his crimes, and the doctor's reputation as a medicolegal expert was considerably enhanced.

More Poisoning Trials

At a time when the science of toxicology was undeveloped, it was frequently necessary to prove a case of poisoning largely or even solely on the basis of the symptoms which the deceased had exhibited. The difficulties involved may be readily appreciated, especially as there was often no physician present when the symptoms were evident. An interesting example of this is a famous murder case which occurred in 1855.

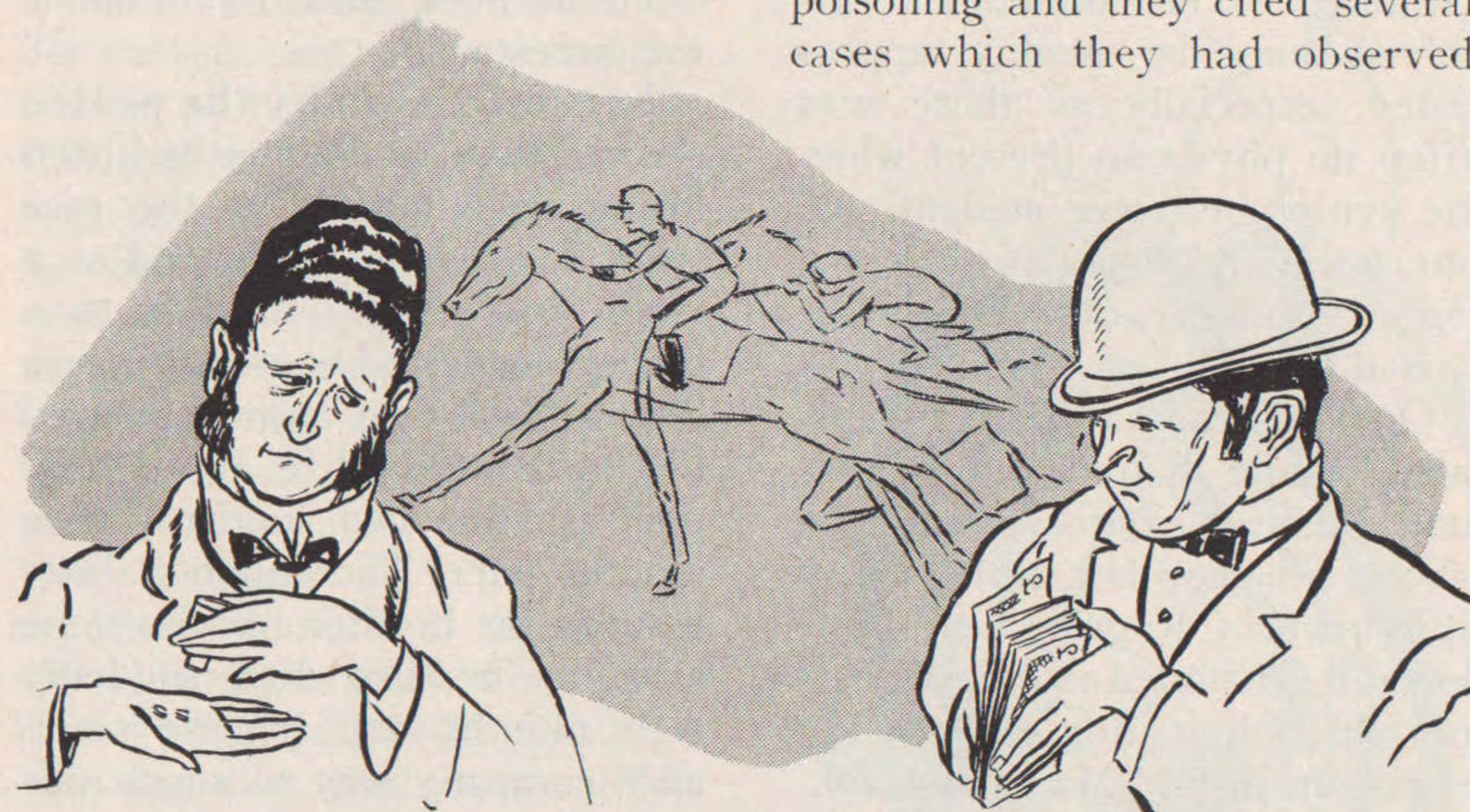
One day in that year an agitated, white haired old gentleman bustled excitedly into the office of the coroner in the sleepy little town of Rugeley near London and demanded an official post-mortem examination on the body of his son-in-law, Mr. John Cook, who had just died under unusual circumstances. The request was granted but nothing suggesting death due to other than natural causes was found on the body; as poisoning was suggested, the blood and various organs were subjected to a toxicologic investigation, without result except traces of antimony. However, one of the witnesses at the autopsy behaved in a peculiar manner. While one of the assistants was holding the stomach, he was violently jostled by Dr. William Palmer, a local general practi-

tioner and close companion of the deceased, which spilled some of the contents so that they could not be recovered. Later, this medical gentleman was discovered cutting the covering of a jar holding organs set aside for analysis, but he was stopped before he could remove anything. At the inquest held shortly thereafter, a verdict of willful murder was returned because of the suspicious circumstances, and Dr. Palmer was arrested.

Investigation by the police showed that Dr. Palmer had been losing very heavily at the race track for several years, and as a result was deeply in debt to a money lender. About two years before Cook died Palmer insured his own wife's life for 13,000 pounds; she died suddenly nine months later. Thereupon Palmer insured his brother for the same amount; he also died suddenly eight months later, but the insurance company was so suspicious that it refused to hand out a penny. Palmer's creditors were becoming more insistent upon payment of the large sums owing them when Palmer and Cook, who was also a race track follower, entered into a transaction during which the doctor embezzled several hundred pounds without informing his companion. Immediately after Cook won a large sum at the races he began to have spells of sickness which became gradually worse until the patient went to bed altogether, Dr. Palmer being his medical at-

tendant. The physician managed to lay his hands on everything his patient owned, and the next day purchased 3 grains of strychnine. The following evening he purchased more strychnine; he gave 2 pills to the sick man, who immediately vomited them. When the patient became violently ill an hour later, Palmer administered 2 "ammonia pills" for the attack, whereupon Cook went into con-

strychnine but it had no easy case. Dr. Taylor, England's leading toxicologist, had studied the organs of the dead man and testified that strychnine had not been found, but that it was never possible to detect the poison in a body a day or two after it had been administered. Half a dozen prominent experts swore that Cook's symptoms during the fatal attack could only be those of strychnine poisoning and they cited several cases which they had observed



vulsions, screaming loudly, and gasped, "I shall be suffocated." The convulsions continued for fifteen minutes, during which the sick man asked to be rubbed and turned over, and after going into opisthotonos with spasm of the jaw muscles, he finally died.

Palmer was put on trial, which was marked by the complications in its medical aspects, and by brilliant work of both the prosecutor and the defense attorney. The prosecution sought to prove that Palmer had poisoned Cook with

and in which the symptoms were almost identical with Cook's. It was anticipated that the defense would attempt to establish that the patient died of tetanus. To forestall this, the prosecution's experts testified that they knew of two types of tetanus, idiopathic and traumatic, and that there were important differences between Cook's symptoms and those of tetanus. In the traumatic type, they stated, there is a gradual development and a progressive course, and the patient dies of ex-

haustion after days of spasms. A sore or worms are always found in idiopathic tetanus, and it never terminates fatally within twenty-four hours or after a twenty minute attack such as happened in Cook's case. In both types, lock-jaw occurs before spasms of other muscles and there is always a tetanic grin, which Cook did not exhibit.

The defense also put a number of medical witnesses on the stand, most of whom tried to show that Cook's symptoms were those of some disease other than poisoning. But they had not reckoned with the prosecuting attorney, who had read everything that he could find on poisons and so knew almost as much about them as the experts. The first doctor for the defense, as was expected, maintained that Cook had died of tetanus but his evidence was torn to shreds in the cross examination. Another defense expert stated that Cook died of epilepsy with tetanic complications, but he was forced to admit that he had never known of a man in an epileptic fit who retained consciousness the entire time as had Cook. The next defense witness set up the theory that the disease was arachnitis, basing his hypothesis on three petechiae found on the dura of the spinal cord, but this testimony was quickly discredited. Another doctor for the defense tried angina pectoris, which theory was the most difficult to attack, for what was known about this condition seemed to be compatible to

most of Cook's symptoms. The prosecutor was at first at a loss how to attack the hypothesis, but he succeeded in reducing its value by obtaining the admission from the witness that he would analyze for strychnine in his next case of angina.

The defense had failed to account for the strychnine purchased by Palmer. Although there seemed to have been some doubt that the homicide was committed with strychnine, the jury believed the evidence conclusive that Palmer had murdered his companion. He was found guilty and hanged.

About the end of March, 1859, Dr. Julius, a physician in the town of Richmond near London, was called in to attend the sick wife of a colleague, Dr. Thomas Smethurst. The principal symptoms from the start of the illness were vomiting and diarrhea, and despite all of Dr. Julius' efforts, the patient rapidly became worse. She did not react to his therapy as expected, and after two weeks on the case Dr. Julius concluded that the patient was receiving some irritant poison, two other physicians on consultation concurring in the suspicion. When $\frac{1}{4}$ grain of arsenic was found in the stool, the police were notified and they placed Smethurst under arrest. The next day, the patient died of "exhaustion." Investigation showed that the deceased was actually not the wife of Dr. Smethurst, as he had committed bigamy in marrying her. Postmor-

tem examination revealed that the patient was pregnant and some antimony was found in the tissues, but no arsenic.

At the trial, the problem of the prosecution was to prove that the woman was poisoned; once that was established, it would be easy to show that the poisoner could only be Smethurst. On the witness stand, the physicians in attendance and other experts for the prosecution testified that the symptoms exhibited by the deceased were those of poisoning with an irritant toxic agent, probably arsenic or antimony. The defense contended that the deceased had died of "dysentery aggravated by her pregnancy," and its medical witnesses maintained that the vomiting was due to the pregnancy and that the diarrhea in that condition often turned to dysentery, which, according to them, would explain the postmortem appearances.

In spite of the contradictory testimony, Dr. Smethurst was found guilty, but was later granted a full pardon because there was reasonable doubt that there was any poisoning at all.

The Maybrick Case

Between 1889 and 1904 the continued imprisonment of an American woman in England assumed importance as an international *cause célèbre* arousing great feeling and interest on both sides of the Atlantic. The lady in question, Mrs. Florence Maybrick, was a member of a prominent

Southern family with high social standing, and before her marriage had been a vivacious and beautiful favorite in New York and abroad. Although she had been imprisoned for the murder of her husband, President McKinley, the wife of President Harrison, and successive American ambassadors appealed to the British government to release her; the Lord Chief Justice of England wrote that she should not have been found guilty; every juror and nearly every person connected with her trial signed a petition for her pardon; and hundreds of prominent people on both sides of the Atlantic worked unceasingly for her.

Mr. James Maybrick was a prominent Liverpool merchant who was noted for his love of fast horses and fast women. For years before his death he was in poor health, suffering from dyspepsia, headaches, coated tongue, etc. He consumed large amounts of medicines, including strychnine and arsenic as stimulants; in fact he was a confirmed arsenic eater, having acquired a tolerance to several times the minimum fatal dose. It was known that the marriage had become unhappy and that Maybrick was jealous of his wife.

On April 27, 1889, after severe exposure, Maybrick became ill with a chill followed by vomiting, pain and burning in the abdomen, thirst and great prostration. As was the custom in those days, his physicians dosed him with large

amounts of potent and inert drugs including Fowler's solution of arsenic. On May 11, Mr. Maybrick died, his physicians attributing his death to some grave indiscretion of diet away from home.

On the suspicions of Maybrick's brothers, Mrs. Maybrick was arrested for murder of her husband, and a search for arsenic in the house revealed a large amount of the poison in the deceased's room and personal effects. Investigation brought out that Maybrick had purchased 150 grains three months previously. A cursory autopsy performed on the body revealed nothing abnormal except traces of arsenic in the intestinal walls and 1/50 grain of the poison in 6 ounces of liver, there being no arsenic in other tissues or in the contents of the stomach or intestines.

At the trial, the prosecution sought to prove that the deceased died of arsenic poisoning and that the poison was administered by Mrs. Maybrick. Dr. Carter, one of the physicians in attendance, and another medical expert gave it as their opinion that Maybrick died of arsenic poisoning, but cross examination brought out the fact that the attending physicians did not suspect poisoning until after the death, when the prisoner was accused of the alleged crime. Further cross examination revealed that the physicians considered the Fowler's solution which they administered to be of benefit, but that Mrs. Maybrick stopped its

administration because the patient complained of burning in his throat. Three other experts called by the prosecution could not say that the deceased died of poisoning with the drug, and in fact one of them, the pathologist to the Royal Infirmary, declared that death was due to acute inflammation of the stomach caused by an irritant poison which might be contained in several types of food.

Two expert witnesses for the defense testified that it was not a case of arsenic poisoning and, further, that the amount of arsenic found in the liver could have been a residue from arsenic previously consumed by Maybrick. They declared that, if arsenic is taken in powdered form, it may be found imbedded in the thick mucus of the stomach and that the toxicologist could expect to detect it at autopsy in all the tissues.

The judge took two days to sum up, being reserved in his manner on the first day, but on the second, his charges to the jury were of such prejudicial nature against the accused that he could not have been improved upon by the prosecutor himself. He was so emphatic that no one could doubt that he believed Mrs. Maybrick to be guilty. On conclusion of the trial, the prisoner was found guilty and the judge sentenced her to be hanged.

This decision aroused a storm of protest in England and in the United States, and upon instructions from the Secretary of State,

the American Minister to Her Majesty's Government petitioned for the prisoner's pardon or reprieve. Mrs. Maybrick's sentence was commuted to life imprisonment but the campaign for a full pardon continued unabated.

The arsenic in Maybrick's liver had been identified through the characteristic octahedral arsenic crystals formed in Reinsch's test. A few years after Mrs. Maybrick's trial, the eminent Professor Wormley of the University of Pennsylvania gave as his opinion that crystals could be formed from antimony which could be easily confused with the arsenic crystals. As Maybrick had been given quantities of antimony in his medicines just before death, doubt was raised in the minds of

medicolegal experts whether there had been any arsenic in the liver.

Many authorities in medical jurisprudence made a study of the case and publicly announced their convictions that there had been insufficient evidence to convict Mrs. Maybrick. After conducting an investigation, the Medico-Legal Society of New York took a leading part for many years in the campaign for the prisoner's pardon, stating in a resolution in 1897, "We are of the opinion that the verdict of the jury was not supported by the evidence in the case." Finally, in 1904, Mrs. Maybrick was released, partly because of the doubts that had been raised as to her guilt and partly as a result of reduction in the sentence due to good behavior.

STILBESTROL: SYNTHETIC ESTROGEN

IN 1938 Dodds and his associates¹ reported on a new synthetic preparation, $\alpha:\alpha'$ -diethyl-4:4'-stilbenediol (4:4'-dihydroxy- $\alpha:\beta$ -diethylstilbene) which has pronounced estrogenic properties. The compound is known in scientific literature as stilbestrol or diethylstilbestrol, the latter name having been adopted as the common nonproprietary designation by the Council on Pharmacy and Chemistry of the American Medical Association.

Numerous clinical and labora-

tory studies reported in the American and foreign literature indicate that stilbestrol possesses estrogenic activity comparable, if not superior, to natural estrogens. Dodds (et al.)² found its action on the uterus of ovariectomized rats, on the mating reaction, vaginal mucosa and uterus of immature rats and rabbits, and on the feathers of capons similar to that of estrone. Other investigators have demonstrated that stilbestrol inhibits the anterior pituitary gonadotropic and growth

hormones, lactation in rats, and suppresses the progestational action of progesterone. In human beings stilbestrol stimulates the vaginal mucosa, producing an adult type of cornified epithelium, promotes uterine growth, induces endometrial proliferation followed by "estrin withdrawal bleeding," promotes growth of the breasts with pigmentation of nipples and areolae, inhibits lactation, and suppresses the secretion of milk when it has begun.

Certain pharmacologic differences between stilbestrol and the natural estrogens exist, the most striking being the fact that stilbestrol suffers relatively little loss of activity when administered orally. Thus, for stimulating growth of the vaginal epithelium in human beings the required dose, perorally, is only one or two times the intramuscular dose, whereas, with the natural estrogens an oral dose of from fifteen to twenty times the intramuscular dose is required in order to produce an equivalent effect (Shorr, Robinson and Papanicolaou³). From the study of MacBryde (et al.)⁴ in human subjects, stilbestrol would seem to be from 50 to 66 per cent as effective by mouth as by injection. One milligram of stilbestrol perorally is approximately equivalent to one milligram of estrone, by injection. Stilbestrol appears to be more than twice as active per milligram as estrone when given intramuscularly. Observations in 4 cases led the authors to conclude

that stilbestrol is approximately from one third to one half as potent as estradiol when given by intramuscular injection.

Stilbestrol appears to be metabolized somewhat differently than the natural estrogens. While the latter are largely destroyed in the liver, stilbestrol is apparently less affected by this organ and is eliminated to a much greater degree in the excreta, particularly the urine. Stroud⁵ found that the urine of rabbits treated with estrone contained only about 1.5 per cent of the activity of the injected material, while the urine of animals given stilbestrol contained about 20 per cent of such activity.

Two studies on human excretion have been published. Mazer and his coworkers⁶ gave stilbestrol in a single dose, by injection, to 8 castrated women. The first day following the administration of 2 mg. the estrogenic activity of the urine varied between 67 and 900 "rat units," and the excretion diminished rapidly thereafter, reaching minimum quantities on the third to fifth day or later. Von Haam (et al.)⁷ injected larger quantities (from 12 to 15 mg.) into 3 patients and found that excretion began at once, but with these doses did not reach its maximum until the third to fifth day, after which excretion fell off rapidly.

Clinical Observations

Menopause.—In the treatment of disturbances of the menopause