Journal of Criminal Law and Criminology

Volume 62 | Issue 3 Article 10

1972

Role of Criminalistics in White-Collar Crimes, The

Quon Y. Kwan

Ponnusamy Rajeswaran

Brian P. Parker

Menachem Amir

THE JOURNAL OF CRIMINAL LAW, CRIMINOLOGY AND POLICE SCIENCE
Vol. 62, No. 3

Printed in U.S.A.

THE ROLE OF CRIMINALISTICS IN WHITE-COLLAR CRIMES

QUON Y. KWAN, PONNUSAMY RAJESWARAN, BRIAN P. PARKER, AND MENACHEM AMIR

Quon Y. Kwan, B.S. in Criminalistics, is presently pursuing graduate studies in the School of Criminology, University of California, Berkeley.

Ponnusamy Rajeswaran, M.Crim.; A.R.I.C., was formerly an Assistant Government Analyst, Ceylon and Instructor in Criminalistics, School of Police Administration & Public Safety, Michigan State University, East Lansing. He was until recently Acting Assistant Professor of Criminalistics, School of Criminology, University of California, Berkeley, and is now Visiting Assistant Professor, Department of Forensic Studies, Indiana University.

Brian P. Parker, J.D.; D.Crim., was formerly Lecturer, School of Law, University of Puerto Rico; a Special Assistant, Bureau of Regulatory Compliance, Food and Drug Administration, Washington, D.C. and until recently Assistant Professor of Criminalistics, School of Criminology, University of California, Berkeley. He is presently Senior Criminalist, Stanford Research Institute, Palo Alto, California.

Menachem Amir, Ph.D., is Director of Research, Ministry of Social Welfare, State of Israel; on sabbatical leave as Lecturer, Institute of Criminology, Tel Aviv University and presently Lecturer in Criminology, School of Criminology, University of California, Berkeley.

The role of criminalistics[1] has been overlooked in the critical area of white-collar crimes. These crimes receive the least publicity in the news and the least attention from criminologists, and yet the President's Commission on Law Enforcement and the Administration of Justice estimates that the economic liability of white-collar crime dwarfs crimes of violence and organized crime. Furthermore, white-collar crimes present perils more alarming than crimes of violence because they are invisible; they undermine the practical fabric of trust within a free society, they portend fair competition and honesty in free trade, and they injure the public welfare. This discussion will deal with the development of criminalistics in confronting the challenge of white-collar crime including the assimilation of the role of other scientists who function more or less as criminalists in these investigations.

A definition of white-collar crime is prerequisite to the discussion of the role of criminalistics in white-collar crime. White-collar crime is defined, in this study, as legal and normative deviation from the violator's occupational role. Controversy still exists as to the definition of this form of illegal behavior, since Sutherland who introduced this concept (1), maintained that it involved mainly violators in high social standing in business occupations. Cressy expanded the concept to include violations of financial trust such as embezzlement (2). Clinard added offenses that violate the well being of the national welfare and economy as exemplified by black-market operations (3).

Quinney extended the concept to cover any occupational deviation and violations of professional ethics which pervade the entire strata of socio-economic classes which are then not necessarily confined to the white-collar class (4). In brief, we define white-collar crime as it is specifically related to criminalistics, as any endeavor or practice involving the stifling of free enterprise or the promoting of unfair competition; a breach of trust against an individual or an institution; a violation of occupational conduct, or the jeopardizing of consumers and clientele.

White collar crime was found to be both legally and sociologically different from conventional crimes. Thus, the controversies over its criminological appropriateness center around the following issues, which will only be mentioned but not elaborated in this paper.

1. The nature of white-collar crimes. The arguments around this issue were settled by defining white-collar crime as both deviations, not neces-

[1] A definition of criminalistics drawn up and adopted by the California Association of Criminalists at its 21st Semiannual Seminar on May 26, 1963 at Ventura, California, which has been accepted by most practicing criminalists is that, "Criminalistics is that profession and scientific discipline directed to the recognition, identification, individualization, and evaluation of physical evidence by application of the natural sciences to law-science matters." This definition will be further amplified later on in this discussion.

sarily illegal, and illegal behavior occurring during the violator's exercise of his occupational role, regardless of his social status.

2. The legal basis of white-collar crimes. Although the term, white-collar crime, is now a misnomer, it is used mainly as a synecdoche for a class of "mala prohibita," an already defunct or a doubtful classification of crimes. Other legal issues involved, which are beyond this paper, and which differentiate white-collar crimes from conventional offenses are the origin of white-collar offenses i.e. their "mala prohibita" nature; the determination of legal responsibility, or intent especially when corporations or other economic organizations are involved.

3. The issue of the social status of the offender, or can violators of white-collar laws be considered criminals in the conventional sense of such a term. This due to the fact that Sutherland originally described upper-class violators who neither think of themselves nor are commonly thought of as criminals.

4. The issues involving enforcement, trial procedures and sanctions used to "punish" white-collar violators. These issues arise since some of the violators are only deviating from their occupational role which are not legal violations, and if they are defined as legal violators, they are customarily "punished" by civil and administrative action, rather than by the conventional criminal procedure.

The descriptive characteristics and modus-operandi of white-collar crimes makes this type of crime unusual and different from the majority of crimes studied. Most white-collar criminals do not come from destitute backgrounds but are the progeny of good upbringing. In some white-collar crimes, offenders fail to see their victims; their victims are either diffuse or impersonal, e.g. the consumer public or the government. Further, the white-collar criminal believes that his offense involved no physical harm or infliction of injury. It is because of this particular belief of an intangible realm of unseen harm to the victims that society and even some criminologists categorize white-collar crimes as completely separate from the so-called hard core conventional crimes such as murder, rape, or burglary. Contrary to this notion, white-collar crimes do thrive in a tangible atmosphere and have certain similarities to the so-called conventional crimes. There is, indeed, a set of white-collar crimes that do have an element in common with conventional crimes. This occurs when white-collar crimes are committed through the medium of material objects. The overlapping of the set of white-collar crimes and the set of conventional crimes is depicted in the common intersection of the Venn diagram as shown in Figure 1.

The model described above is based on the set theory of mathematical logic. It is perhaps the most lucid means of precisely portraying the role of criminalistics in the solution of white-collar crimes problems where the intersection or the link between criminalistics and white-collar crimes is the physical evidence that may be present. This is in accordance with the definition of criminalistics. The circumstances in which physical evidence arises in the commission of a white-collar crime will be considered in the discussion of contemporary investigations of these crimes as related to criminalistics.

The Etiology of Criminalistics and White-Collar Crime

The role of criminalistics in white-collar crime evolved from the manner in which crimes were classified. Historically, Anglo-American jurisprudence had defined the law in terms of prohibiting acts that were "mala in se" or inherently evil. For example, behavior that was "mala in se" was the infliction of harm or death on fellow citizens or the damage or theft of property. Since the common law dealt with only these types of crimes against persons and property, the investigation of these so-called conventional crimes has and to a great extent dominates the discipline of criminalistics. This concept of crime was revolutionized in 1939 by Sutherland's iconoclastic introduction of "mala prohibita" crime, which specifically referred to what was termed white-collar crime. In this sense, the social injustice and damage of the covert crimes came to be recognized. The methods by which these crimes were controlled—suits for civil torts, civil liability, negligence or malpractice—were futile because of the recividism and prevalence of these offenses. The exigency of white-collar crime induced law, as a means of social control, to apply the stigma and severity of criminal sanctions to these offenses. This resulted in a vast expansion of the law, whose provisions now include the motor-vehicle code, health, welfare and safety codes, building and fire codes and codes of business, and professional ethics. The concurrent trend resulted in the extending of the functions of the natural science criminologist (criminalist) to the detection of violations of these newly legislated codes aimed primarily at white-collar crimes. Where physical evi-

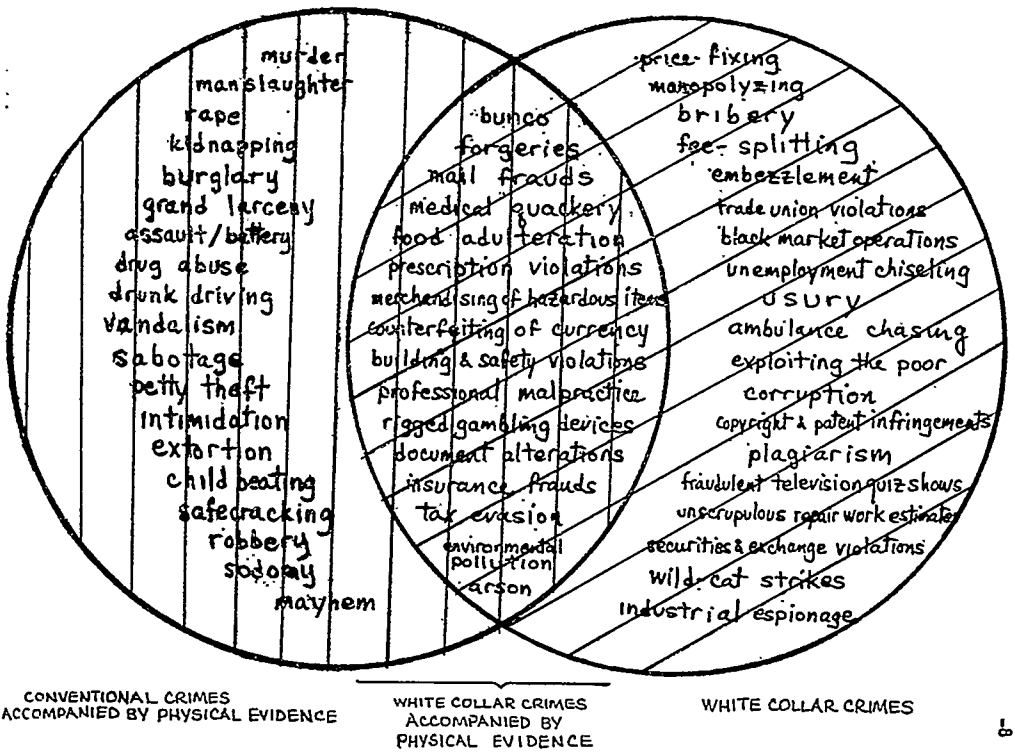

FIGURE 1.

dence emanates from the perpetration of these crimes, the significance of criminalistics lies in the scientific interpretation of the circumstances and recognition of such media in detecting violations that would otherwise evade justice. The fact finding process by the utilization of criminalistics then becomes the most essential part both in law enforcement and the administration of justice.

The contention that criminalistics does have a role in the solution of white-collar crime is substantiated by the employment of criminalists by specialized agencies outside of police departments or general law enforcement bureaus.Those trained in criminalistics and scientists who function as criminalists are found deployed in State and Federal Food and Drug Administrations; insurance companies and independent testing laboratories, for example, Underwriter's Laboratory, the U.S. Post Office, Customs Service Agency, Internal Revenue Service, State Gambling Commissions, Federal Trade Commission, City Fire Departments such as Los Angeles, and other bureaus. These agencies enforce codes regulating white-collar crime and differ from general law enforcement agencies in that they were created for the specific enforcement of *ad hoc* codes. One such *ad hoc* agency—the Michigan State Public Health Department maintains a laboratory which it officially designates as a Crime Detection Laboratory (5). Similarly, the New York State Racing Commission employs a forensic chemist whose function is to investigate unfair competition by the detection of doping of racing horses. These are some of the several examples of the role of criminalistics in white-collar crime.

Although criminalistics originated as an application of the natural sciences in law enforcement and the administration of criminal justice, criminalists are no longer so confined in their functions and the sole scientists so engaged. The assimilation of other scientists into the area of criminalistics is necessary in confronting the special problems posed in combating white-collar crime. Thus there are textile chemists, wood technologists, nutritional and food scientists, biologists, pharmacologists, metallurgists, medical experts, and many other applied scientists including statisticians engaged in enhancing the role of the natural sciences in law enforcement and the administration of justice either functioning as consultants to criminalists or in the capacity of criminalists offering expert testimony

in a court of law in their particular area of expertise. An example of the utilization of applied scientists and technologists in the legal enforcement of white-collar criminal codes involves toxicologists and engineers. They are encountered in the various county air pollution control districts and state regional water quality control boards who detect and control the illegal discharge of toxic contaminants and pollutants by "white-collar criminals" of the commercial and industrial sectors. Implicit in their role in the detection and control of these violations and in the procedural hearings before a quasi-judicial commission or a court is precisely that of criminalists. The criminalist, for obvious reasons, cannot be expected to be an expert in every technical area where there is a tenable violation of the law or inquiry into the establishment of a fact. Thus, an entomologist may have to be consulted for the identification of a part of an insect that may have infected a stock of food resulting in the illness of consumers or an astronomer may be requested by a court to examine the shadows in a surveillance photograph to verify the time when a bribe was offered. Such novel situations resulting from enforcing codes against white-collar crime necessitates the broadening of the concept of criminalistics. For where a criminalist may be aware of the evidentiary value of an item of evidence, he may not be an expert in the evaluation of that particular item of evidence. In a similar manner, the scientist trained as a chemist, bacteriologist, or whatever the field may be, "must re-orient himself so that he can adapt his abilities to criminalistics" (6). Furthermore, he must be responsible not to a corporation or a governmental institution but to the entire system of the administration of justice. Hence, it must be emphasized here that criminalistics is not limited to the criminal justice system but extends into areas of civil litigations. Thus, criminalistics may be re-defined as a "multi-disciplinary coordination of the natural sciences engaged in the administration of justice" (7). A result of this assimilation has been the propensity to use the term forensic sciences; however, the lack of convention permits the interchangeability of the terminology —criminalistics, police science, forensic chemistry, and forensic sciences. Further, it is extremely difficult to delineate hard and fast boundaries for criminalistics, or for that matter, any other disciplines included in the term forensic science because of the considerable overlap among them. For example, forensic sciences include the specialized areas of forensic medicine, toxicology, and document examination in which criminalistics may share a common basis as in firearms identification; chemical analysis; ink, typescript, and paper identification, respectively. For this reason the term *criminalistics* is maintained for purposes of discussion and with special reference to *white-collar crimes* in this paper. A further justification for this may be that the term originated from the German,"System der Kriminalistik" of Dr. Hans Gross, one of the earliest pioneers of scientific investigation, familiar to all scholars and practitioners of criminalistics in different areas.

The termination of the above preliminary discussion with the assimilation of natural scientists in other fields as criminalists leads to the contemporary investigations of white-collar crimes in criminalistics with reference to five major areas: food and drugs, false advertising, tax evasion, insurance frauds, and questioned documents.

Food and Drug Violations

Food and drug violations are the most flagrant of white-collar crimes because they constitute a direct hazard to the population. Because present day food is processed on a mass production basis, greater opportunities are afforded for exploitation by degradation, contamination, and even poisoning of edibles. Inferior food substitution lends itself to the application of criminalistics in the context of food and drug analysis. The dangers of poisoned foods and unscrupulous drugs had been known from early times and through the leadership of Dr. Harvey W. Wiley, chief forensic chemist for the U.S. Department of Agriculture, the Food and Drugs Act and Meat Inspection Act of 1906 was finally passed. This marked the approach of the end of an era of caveat emptor for the naive public. The establishment of the federal Food and Drug Administration provided the resources for the detection of contamination, spoiled foods, unsafe levels of chemical additives and pesticides, food coloring, toxic cosmetics, drug impurities, and drug counterfeiting.

The more serious infractions of the white-collar criminal in the food and drugs area is the vending and distribution of biologically contaminated, putrified, or spoiled food. At one time the tomato industry was ignominous for processing tomatoes under unsanitary conditions including the packaging of putrid rejected tomatoes in pastes, sauces, and catsup. Formidable outbreaks of food poisoning by fatal botulism and salmonella have been virtually

eliminated because of inspections made mandatory by public health laws.

A further recurring problem is food poisoning by chemicals. The problem consists of detecting intolerable levels of additives such as pesticides, food coloring, artificial flavoring, leavening agents, and spoilage retardants. In addition, seafoods and different types of meat are treated with additives to tenderize, freshen, and flavor them. While a 100% inspection of all meat, fish and poultry is not practicable, the chemical poisoning often goes undetected until sickness or death results. For example, an innocent-looking compound such as sodium nitrite, very similar in appearance to ordinary common table salt was identified as the toxic agent in a spree of 152 poisoning cases, including one fatality. Sodium nitrite reduces the ability of erythrocytes to carry oxygen throughout the body thereby internally suffocating the victim. In this instance, seafood impregnated with sodium nitrite was traced back to a wholesaler and criminalists reconstructed the sequence of events leading to its presence in the seafood by an examination of the wholesaler's establishment. While it was common practice to clean fishes that were filleted with a simple saline or brine solution, crystals of sodium nitrite were found in the dust on the concrete floors, on the cutting tables, and under the hoops on the brine barrels at this establishment. This was suspected since it was a highly common though illegal practice to freshen spoiled fish with sodium nitrite since it removed its slime and stagnant odor. A record of a chemical warehouse selling sodium nitrite on a rush deliver with the firm's president personally authorizing and accompanying the 400 lb. order of the compound negated any accidental contamination of the brine, leading to conviction of the seafood firm (8).

In another type of white-collar crime, food may be adulterated or mislabelled by the substitution of some of its components without necessarily adding harmful ingredients. In this form of cheating starch may be added to cocoa, vitamins may be omitted from enriched bread or the substitution of a water-sucrose mixture in orange juice and making up for the deficiency from the natural product by adding extra amounts of Vitamin C. The latter involved the crime of orange juice adulteration by the Cal-Tex Citrus Juice, Inc. of Houston, Texas in 1958. In addition to analysis of their product, surveillance of the company's plant revealed the shipment of unmarked quantities of sugar and syrup and a large discrepancy in the amount of fresh oranges entering the plant and the volume of finished orange juice produced. In refuting the firm's contention that the Food and Drug Administration data was derived from analysis of California and Florida oranges, it was shown there was no distinction between oranges grown between these two regions and those of Texas grown in two different seasons. Further, trace analysis showed a high degree of identity between the water content of the orange juice and the Houston municipal water supply with respect to the high fluoride levels present in both. The disposition of the case was the conviction of the firm's executives in May, 1960 (9).

To cite a more recent violation, eclectic criminalists acquired a method species individualization of food products from biochemists in 1964. This technique was formulated by researchers A. C. Wilson, G. B. Kitto, and N. O. Kaplan of Brandeis University (10). Contracted by the Bureau of Commercial Fisheries in Gloucester, Massachusetts, their studies were directed towards employing enzymatic methods of identification to differentiate between closely related fish species. Cod and haddock, both common Atlantic salt water fish belong to the same taxonomic family, Gadidae. Haddock is more expensive and tasty than cod, but when marketed in the form of frozen fillets they cannot be easily differentiated by laymen, one from the other. On the basis of the application of this new technique of individualization and additional tests on enzymes these workers were able to show that enough samples of frozen fish fillets and breaded fish sticks were mislabelled haddock, when they were actually the cheaper cod. On the results of this finding, offending commercial processors were warned of this intentional misbranding of their products. This mode of individualization has now been extended to a total of 26 fish species. Further, it has been adapted as an additional technique to differentiate other zoological species where adulteration of beef hamburgers and pork frankfurters can be detected.

Another major responsibility of food and drug analysts, toxicologists or criminalists in the investigation of white-collar crimes concerns the testing for control or purity of pharmaceutical preparations for consumer protection. For the same rationale that the consumer expects unadulterated and properly labelled food, a medical patient expects guaranteed quality in the drugs sold to him. However, some pharmaceutical companies either by accident, negligence, or even deliberate action,

manipulate or contaminate the ingredients of their drug products. Such an accidental incident occurred in San Francisco recently where isonicotinic acid hydrazate tablets were administered to hospital adolescents to cure them of tuberculosis. The strange appearance of certain feminine traits in the boys was brought to the attention of field forensic drug chemists. Analysis indicated that the drug was contaminated with stilbestrol, a potent female hormone. The contamination was traced back to New York where it was discovered that the same items of equipment in the factory were used to manufacture different drugs. Faulty dust control and insterility accounted for not only intracontamination but also cross-contamination with botanicals, insecticides, and penicillin. (Penicillin, itself, although once hailed as a miraculous antibiotic has been found to be fatal to many people who are allergic to the drug.) Through analogous procedures, more than fifty companies were compelled to destroy contaminated, impure, and insterile stocks of drugs in August 1965 (11).

Another problem in the drug area that falls within the scope of criminalistics investigations of white-collar crimes is the detection of counterfeit pharmaceuticals. Encountered here is a combination of black market activity, grand larceny, misrepresentation, and also the vending of dangerous drugs. This kind of white-collar crime is viable because of the willful complicity of the interstate cafe owner and especially the street corner druggist in their distribution. The pharmacists are offered the "high quality" counterfeit pills at bargain prices, whereas it is well known that high quality pharmaceuticals cannot be merchandised at such low prices. In defying their ethical obligations to suspect the nature of these drugs, these pharmacists are accomplices in white-collar crime.

While the source of raw materials and sometimes the finished drug is a diversion from the legalized channels of production and distribution, e.g. pilferage and embezzlement, some white-collar criminals are able to crudely manufacture their own preparations with the aid of unethical chemists, and without the required stringent controls required for legitimate drugs. Patients may therefore be purchasing a counterfeit drug whose pharmacological effects little resemble the genuine drug prescribed with the tragic consequences that the physician may be misled in his management of the case. The commonest counterfeited drugs are imitations of amphetamines and barbiturates and bear a counterfeited trademark of a reputable pharmaceutical company in order to mislead the purchaser as to its origin. Tablets and capsules are distinctive for different pharmaceutical companies for their preparations. Further, they have distinctive stamped punch marks including registered trademarks. The identification of these characteristics is within the realm of criminalistics, when the source of the preparations can be traced, and the question as to their authenticity resolved.

The most notorious of drug violations is quackery. Unorthodox drug remedies and panaceas are promoted by charlatans who prey on those afflicted with, terminal, incurable, or painful diseases such as cancer and arthritis. An estimated $250 million is taken from arthritis sufferers alone by these quacks (12). Senior citizens are the predominant targets of these white-collar criminals. Nevertheless, the suffering patient is always prone to try any remedy to save his life or alleviate his pain. The tragedy lies not in the wasted money but in believing these drugs are effective, where the victim lingers and does not receive adequate treatment until it is too late. Hundreds of such preparations have been evaluated and some purported to induce such impossible feats such as longevity. The old-fashioned quack drugs were no more than concoctions of simple chemical compounds and medicinal herbs. The more ill-famed tonics were Hoxsey's formula and Mill rue (13). The latter drug falsely asserted to counteract almost all diseases including phocomelia in newborn babies who were prescribed thalidomide, (which, further, was also banned by the Food and Drug Administration).

While the Food and Drug Administration documents what may be a prototype service of a local crime laboratory in the detection of white-collar criminality, recently, the Phoenix Police Laboratory uncovered that a variety of "mineral salt tablets" alleged to cure cancer was a quack. Analysis revealed that the tablets contained almost 99% lactose with only traces of minerals stated on the label on the bottle. This led to the prosecution and conviction of the promotor of the quack cancer curing tablets for practicing medicine without a license by the State of Arizona in April 1965 (14).

The gamut of radio therapy, neuro-linometers, microdynameters, electronic wands, Electron-O-Rays, and other devices of the "electro-magnetic era" constitute another form of therapeutic quackery in which the criminalist engages in demonstrating the spurious nature of these devices and exposing another area of white-collar crime. These fake medical devices are purported to diagnose or

heal by producing a weak magnetic field or emitting short-wave radio frequencies. A pseudo-religious center or pseudo-scientific institution is often used as a cover for practicing this kind of electronic therapeutic quackery. While such devices were known to have an earlier origin, in 1900 the Spectrochrome was promoted by D.P.F. Ghadiali and claimed over thousands of devotees. A forensic examination revealed that it consisted of an ordinary light bulb whose rays were focused through pieces of colored glass. The colored rays were supposed to be attuned to the body's "radioactive forces" when rays of a particular wavelength, depending on different phases of the moon, were expected to cure specific ailments. A device called the "Radioscope" followed in 1924 which supposedly measured "emanations" associated with different diseases of the body and thrived until the 1960's. By turning several knobs on these worthless electrical machines, the instruments "can tune into any human body in the world." In 1963, a criminalist for the California State Public Health Department was instrumental in securing evidence that a Hollywood radio-therapy center known as Drown Laboratories was using such spurious devices. Operated by a chiropracter and her assistants, the contrivances were used to diagnose different ailments, especially cancer, even in the absence of the patient (15).

False Advertising

The second major area in white-collar crime in which criminalistics has played a key role is in the detection of false advertising in consumer production. Through a host of clever pseudo-scientific statements, half-truths, innuendos, hyperboles, and some scare tactics, wholesalers and retailers have been able to deceive many a customer into purchasing their products. When purchasers are induced into buying misidentified goods, their desires are effectively thwarted. The notion that the dissatisfied customer will punish the producer by not buying his product again is no remedial or punitive answer. Not only has the misrepresentation achieved its unjustified reward in the initial purchase, but many products are *not* based on repeated purchases for profitable production. In addition, by the time that product is replaced, the misdescription is forgotten. It is the function of criminalists and other investigators in the Federal Trade Commission to detect such criminal misrepresentation in trade and commerce.

Firm principles of deceptiveness cannot be established because of the lack of adequate standards. In appellate challenges by businessmen against the Federal Trade Comission, the standard of deceptiveness determined by the model consumer is lowered by whatever variables existing in this unwary person and also by giving the businessmen the benefit of the doubt. However, when a more comprehensive audience passes along an assertion to those less knowledgeable, the standards of deceptiveness are not the same. For example, a product description is understood by the retailers but not by the consumers.

So far, scientific evidence has provided the best criteria for judging deceptiveness. Serious infractions are considered to have occurred when an advertisement ascribes a quality, ingredient, or effectiveness to a product which, ipso facto, it does not possess (16). While an assertion may be ambiguous in meaning of which the less common is used to deceive the consumer, the same assertion may also convey useful information to a segment of consumers and a misleading impression to another. Illustrative examples of each type resolved by scientific evidence are cited below.

The case of Federal Trade Commission vs. Algoma Lumber Co., became renowned because it was appealed to the U.S. Supreme Court, exemplifies the ascription of a quality to a product which it did not have. A forestry expert for the Federal Trade Commission identified a stock of cheap pine wood as yellow "pinus ponderosa" when it was described in the East as "white pine" and sold as such (17). Botanically, there are two groups of the genus of pine trees—yellow ponderosa and white ponderosa. The former grows in California and is accepted in the Western markets as "white pine." However, the defendant sold the same yellow pine in the East also as "white pine," which conflicted with the native Eastern white pine, to which it was basically inferior. The ruling of the Court was that the designation of quality was deceptive since it denoted a superior product in the contested region.

The age of spirits has also been the subject of misleading advertising. Forensic chemists of the Alcohol and Tobacco Tax Division of the Treasury Department, which is responsible for enforcing the Federal Alcohol Administration Act regulating liquor ingredients, bottling, and labelling, developed a partial solution with the application of nuclear chemistry utilizing a tritium dating technique. Large quantities of tritium had been discharged into the atmosphere following experi-

mental detonation of hydrogen bombs beginning in 1952. Tritium combines with atmospheric ozone to form an isotope of heavy water and returns in this form through precipitation into the Earth's water cycle. An age or vintage verification of say, bourbon whiskey manufactured after 1952 could be made by characterization of its tritium content.

Another classic white-collar criminal violation involving false advertising concerns the clothing industry. Criminalists, like textile chemists are also able to differentiate between natural and synthetic fibers, and identify animal fibers. Dr. Henry Harap in his *Education of the Consumer* made a careful forensic scientific survey of the major forms of mislabelling in the clothing industry where inferior textiles and furs are substituted or blended with the real material and advertised as the latter. For example, "Irish linen" handkerchiefs are often found to contain only 50% linen. Similarly synthetic rayon is substituted for silk. The chief furs in the U.S. are limited to a small group of skins in which the terminology of the retail trade is hardly ever mentioned. "This is because furs are clipped, dyed, and pulled in such a way as to resemble those which are superior in wearing quality and warmth. The pelts of animals from warmer zones, such as woodchuck and oppossum are sold under the names of animals in the colder climates. Such furs are inferior in suppleness and durability of leather, denseness, and silkiness of under hair, fullness of protective hair, and because dyed, are brittle and less durable in general" (18). Expert testimony introduced in the the "Truth in Fabrics" hearings in the 1920's prompted the Federal Trade Commission to reveal that 90% of the fur sold domestically was not marketed under its correct name (19). One cause for misleading consumers as to fiber content and durability of wearing apparel is the attempt by industry to sell at lower and more moderate prices and broadening the market base.

By way of variation, a more interesting example of false advertising may be cited in the motion picture industry. In 1933, the Federal Trade Commission was engaged in verifying the authenticity of the celebrated film "Ingagi." (Ingagi was alleged to be an African word for gorilla.) This film was produced by Congo Pictures, Ltd. of Los Angeles and was advertised as a true record of an African Safari expedition by a renowned scientist Sir Hubert Winstead and Captain Daniel Swayne, American hunter and collector of rare museum species (20). The scientific investigation of the film challenged the zoological existence of an animal new to science called a "tortadillo" and strange anthropomorphic beasts that were partly simian. A lexicographic survey revealed that the title of the film, "Ingagi" was fictitious as no such word existed in any of the African languages. Corroborative field investigations proved that both men were also fictitious; the "tortadillo" was fabricated by equipping a turtle with wings, scales, and a long tail; human beings suitably attired in skins represented gorillas; the pygmies and strange anthropomorphic beasts were enacted by costumed Negroes of various ages. Further, the background of the Griffith Park Zoo in Los Angeles was featured as the scenery for the jungle shots.

Another form of gross misrepresentation and false advertising in more subtle forms involves the ascription of a non-existent effectiveness to sundry and non-prescriptive remedies. They are differentiated here, from medical quackery as mentioned earlier, because of their semi-medicinal nature and their innocuous effects if consumed (as opposed to adverse drug effects). In this form of misrepresentation the seller informs the buyer that his product is in a position to treat an illness or malady without medical supervision. It is broadly insinuated, rather than blatantly asserted, that the product has extensive curative powers. Misleading advertisements of this type have been used in the "Geritol" commercials which purported to cure people who feel tired and worn out by supplying iron to their iron-deficient blood. Similarly, Caldwell, Inc. advertised and marketed a laxative to cure unmanageable children of constipation (21). While self-diagnosis could be hazardous and often misleading, submissions made before the Federal Trade Commission indicated that lethargy is not necessarily a condition of iron-deficiency, nor is constipation a disease but a symptom of an ailment (22). These few illustrative advertisements reveal that in many instances the consumer of such products is misled into believing that a cause is cured when in fact, only an anxiety has been relieved and the ailment still is present.

Tax Evasion

The government is itself a frequent victim of white-collar crime in which it is cheated by tax evaders. Tax evasion is a chicane practiced by all

segments of society, but the greatest temptations occur in the white-collar sector. The most dangerous form of tax evasion is that resulting from the artful juggling of loopholes and exemptions—avoidance. Hermann Mannheim indicated, "The really dangerous tax offender does not evade; he avoids" (23). While a great deal of talent and imagination is directed to exploiting every tactic and device to avoid the tax burden, it is an equally intriguing and challenging problem in criminalistics to expose this facet of white-collar crime utilizing physical evidence.

Many people make sizable tax deductions by charitable donations in large sums more as an outlet for tax evasion rather than philanthropic reasons. This has been recently related to the boom in the purchase of extravagant paintings and objets d'art, which are then over-evaluated by "fee-happy" art appraisers. These are then donated to a local art gallery and written off as a tax deduction. This has lead to the spawning practice of conniving art authentication. As a result, the Internal Revenue Service maintains a staff of forensic chemists to investigate these appraisals by examining the physical objects. Since the latter may be authentic and valuable certain non-destructive techniques of analysis are employed. Such a technique was adapted from one developed by the Brookhaven National Laboratories in 1962 utilizing X-ray fluorescence (24). Atoms in the mineral pigments are temporarily excited by bombardment with a fine needle beam of electrons (electron beam microprobe) or with neutrons and their fluorescent pattern sequentially photographed on X-ray film. The fluorescent patterns of mineral pigments of a painting are characteristic of their elemental composition. By comparison with bonafide paintings of the same artist the authenticity of the questioned painting may be established.

Art forgery, per se, whether committed for fraudulent sale and subsequent tax evasion, is also white-collar crime. X-ray shadowgraphs were used to expose the spurious Van Gogh works marketed by Otto Walker because Van Gogh's highly individual art proved remarkably susceptible to this type of examination. In the noted trial of Van Meegeren for the Vermeer art forgeries, testimony was produced that the X-rays revealed images beneath a new coating of paint. Van Meegeren had apparently purchased old and relatively worthless paintings, carefully painted them over with a Vermeer imitation, and induced a craquelue assisted by numerous aged cracks from the old painting to produce a 17th century effect.

In a similar manner, ancient Roman Arezzo pottery was shown to be a forgery. Scientists at the Brookhaven National Laboratory examining Mediterranean relics for archeologists detected that the pottery differed in chemical composition from genuine Arezzo (25).

Another form of tax evasion is the avoidance of payment of tariff duties on imported articles. As related to objets d'art, the U.S. Customs Service Agency uncovered a forgery for a museum curator. Since by law, only imported articles of artistic antiquity produced before 1830 are exempt from duty, the Agency chemists were interested in the verification of the age of an antique tapestry imported from Europe. Although the curator vouched for its antiquity, analysis revealed that the tapestry's threads were stained with coal tar dyes, and the latter were not in use before 1857. As a result the museum was saved from the embarrassment of exhibiting a forged antiquity.

Similarly, criminalistics has served to detect improper classification of imports by shippers, who attempt to pay a lower rate of duty than that imposed by the Tariff Acts. Precise quantitative and qualitative methods of analysis of the contents of imports and some regulated exports have thwarted deliberate tax evasion and removed subjectivity from unintentional and often erroneous appraisals of customs duties. For example, X-ray instrumentation analysis was employed in establishing that material declared as "ordinary zirconium oxide" was in fact stabilized pure zirconium oxide, dutiable at 15% value. This type of examination has been extended to the determination of calcium fluoride in fluorspar, silica in glass sand, the composition of ferro-alloys, and in the identification of teflon (26).

A more significant role of criminalistics in the U.S. Customs Service Agency is not so much tax evasion but protection of the stability of the domestic economic market from foreign competition. Where a product is imported in such a manner as to avoid tariff duties because of its different physical form is an aspect of white-collar crime analogous to black market operations. By way of illustration, a product imported under the trade name of "Lioxin" in the 1960's was shown to be an impure form of vanillin which could be economically purified to conform to vanillin of the U.S.

Pharmacopeia. Since the price of "Lioxin" was so low as to upset the domestic vanillin trade it was subjected to a tariff duty based on the retail value of the domestic vanillin product.

One of the most important areas of white-collar criminality and tax evasion concerns the Alcohol and Tobacco Tax Division of the U.S. Department of Treasury. During the Prohibition Era, its major task was in tracking down illegal distilleries. Since a heavy excise tax, which produces approximately 5% of all federal revenues is imposed on alcoholic beverages, the Division's laboratory has expanded its facilities (27). It is said that enough "moonshine whiskey" is distilled domestically especially along the "moonshine belt" across the Southeastern states to reduce the collection of taxes by 35% (28). Detection of this liquor is important because when it is transported across some state lines as contraband, it is sold at less than half the price of the regular liquor because of nonpayment of the excise tax.

In a precedent-establishing case, both in law enforcement and the administration of justice, criminalists identified the source of contraband liquor leading to the conviction of several liquor dealers for tax evasion. Illicit whiskey had been seized from a low-slung rented trailer transporting 2,400 gallons of the contraband from a still in Atlanta, Georgia to a distribution point in New York City. Samples of red clay soil clinging to the bottom and tires of the truck were scraped and compared with sample soil specimens from tire tracks in the vicinity of the illicit still in Atlanta utilizing neutrol activation analysis. Trace studies of the elemental composition of the two soils' constituents established a common source of origin. This physical evidence was of substantial value in associating the contraband seized in the Brooklyn raid with the Atlanta operators and was the first instance where the results of neutron activation analysis (29) was accepted in a U.S. District Court (U.S. vs. Anderson, et al.).

Insurance Frauds

Insurance frauds constitute another portion of white-collar crimes whose detection and investigation is dependent upon the science of criminallistics. This is why some major insurance companies contract with consulting criminalists. Practically all claims for insurance coverage require proof that the insured item or person sustained injury or destruction. This means that there must be some physical verification such as the decease of a policy-holder, vandalism, a traffic accident, workman's injury, or the loss of funds (possibly through embezzlement) from a federally insured bank. The white-collar crimes considered under this category are generally of the type committed by a party against a corporation. The cause can be an unshareable problem as discussed by Cressey or some greedy purpose. The crime is enacted by a man who, for example, decides he needs a new car, and vitiates his archaic 1956 Buick, or the benefactor-son who plants a bomb aboard an airplane which his $100,000 insured mother is on. The fraud need not be limited to the feigning of the act as an accident; there is also the unscrupulous doctor and the automobile mechanic who "pads" the bill to be paid by the insurance company with superficial, exorbitant, and unnecessary expenditures.

In this category of white-collar crimes, the criminalist's function is principally to determine if the given incident was intentional or accidental from examination of the physical evidence. For example, a criminalist investigating the burglary of an insured jewelry item may find no toolmarks or tampering on the safe from which it was missing; also, the window screen may be found to be cut from the inside of the house. The conchoidal fractures of the broken glass window may indicate the breakage originated from the inside, too. Since the only occupant of the house and the only person in possession of the safe's combination is the owner, the criminalist would infer an insurance fraud in which the owner had "framed" a burglary.

The best illustrating example of criminalistics investigation of insurance frauds is the study of arson. Fires have been known to be set by respectable persons and businessmen for the purpose of defrauding the insurance company. Arson for profit is always the first motive to be considered. The heinous social injustice that is not realized is the criminal responsibility for the death of citizens and firemen trapped in rescue or suppression attempts.

An insurance agent or broker may be a firesetter using arson as a device to awaken a community into purchasing fire insurance or to collect a greater monetary commission. Secondly, a corrupt claims adjuster may collaborate with policyholders or or potential buyers to defraud the insurance company and thus create or augment the existing

white-collar crime. The period of the depression, 1930–35, was marked by the notorious era of arson torch rings and firesetting by businessmen in conspiracies with insurance agents and public claims adjusters. The infamous Brooklyn arson ring included one such broker who gained the reputation of being able to guarantee a fire with every policy he wrote. Another ring included the "brains" of an unscrupulous attorney; in his position, he was able to use all legal loopholes and means available to defy apprehension and to counsel policyholders to commit arson. One other inducement for arson is the careless writing of fire insurance policies --over insurance--when policies are issued far in excess of the value of the insured property. This may be part of the plan of the white-collar criminal insurance agent or an outcome of the highly competitive nature of the insurance business. It is interesting to note here that insurance fraud is a white-collar crime committed *against* the corporation or institution whereas before only white-collar crimes committed *by* the corporation with the consumer public as the victim had been considered.

There are numerous instances whereby fire has been used to dispose of unwanted property at the expense of the insurance company: a house too old to live in is burned down, scrapping of machinery, liquidation of surplus or unsaleable quantities. There is also arson committed as a white-collar crime for making profit but not at the expense of the insurance company: the chance to rid a competitive business, the opportunity to seek a rebuilding contract, display of vanity for seeking employment or promotion, a situation where salvage profits over storage, the liquidation of real estate before it can be inherited, etc. Whatever the case might be, the crucial question that the criminalist is always confronted with is is whether a fire was accidental or incendiary. There has always been a tendency to regard fire as an unfortunate accident than a possible arson. The event of a fire is usually associated with "spontaneous combustion," electrical overloads, or lightning; even a cigarette planted in a bed appears to be an innocent cause of a fire. Thus, incendiarism is the most suitable and unsuspecting means of replacing unwanted furnishings and paraphernalia or collecting high premiums or for other personal gain. Another reason for using fire as a means of committing insurance frauds is that it destroys incriminating evidence making the investigation of arson the most difficult of all crimes. The major obstacle to arson investigation is on the part of some of the detectives and criminalists spuriously assuming all evidence is consumed in a fire.

Fires have also been known to be used for covering up other white-collar crimes such as embezzlement and pilferage. Embezzlers have attempted arson to disguise incomplete and unbalanced books. In some cases, books are tented with burning newspaper stuffed into them. Experimentation with combustible materials show that books are the hardest to burn because of high inorganic salt content in high quality paper and small surface area, and thus can be recognized as physical evidence in arson. Managers, foremen, and inventory clerks are in favorable positions to conceal their pilferage by arson. By writing off the pilfered merchandise as fire loss, they are able to carry on this white-collar crime. An interesting example of such a case occurred in a southern textile mill which was destroyed by a fire of unknown origin. Although incendiarism could not be implicated, insurance agents were hesitant about honoring a claim for thousands of dollars worth of coats and suits. The owner's description of the destroyed clothing items detailed specific textures, models, and buttons and was submitted to a forensic chemist. The forensic chemist indicated that a particular type of button in the description was fireproof and arranged for tediously sifting through the ashes and debris to establish the number of coats consumed in the fire. The search for these pieces of physical evidence resulted in a finding that there were no such buttons. The arson investigation concluded in discovering that the plant's stock of clothing had been hauled off, a fire was set, and a false claim had been submitted (30).

The establishment of proof of arson in the administration of justice is very difficult indeed. Criminalistics evidence may be labelled as "insufficient" to prove guilt beyond a reasonable doubt in a criminal court since the rules of evidence are very exacting and whatever meager scientific evidence is meaningless if there is so much as one small link missing. Criminalistics, however, does not stop serving the interest of justice here but enters into the civil court. The insurance company simply refuses to honor the claim for loss from an insured person believed to be linked with a suspicious fire. In turn, the insured must commence a civil suit to recover his loss. Since only a preponderance of evidences is

required to fight a suit, the testimony of the criminalist regarding the suspicious nature of the fire and possible link of the insured may be sufficient. Where the same criminalistics evidence would hardly have been accepted in a criminal court, it still serves administration of justice in cases of civil litigation. Such an action is a deterrent to arson because it eliminates or hinders the lucrative nature of the fraud, and this is the role criminalistics play in checking as well as detecting white-collar crime.

Questioned Documents

There are numerous instances where white-collar crimes are frequently detected through the alteration, obliteration, or forgery of a binding legal document: a bookkeeper "doctors" a few numbers to embezzle some money, a counterfeiter prints up a set of credit cards, a postage franking stamp is altered, an administrator adds several heirs to a will, the date of expiration of a contract is postponed, the specifications of a building contract are are changed to substitute inferior products. In brief, the document is a written agreement made with stipulations and conditions between two or more parties and is intended to provide a permanent record where memory is untrustworthy. Despite this intention, documents are not failsafe but are fallible to dishonest manipulation. The surreptitious alteration or forgery of a document is indubitably a criminal breach of trust and an instrument of the white-collar criminal. Some criminalists have ventured into this area of examination or specialize entirely in this area. However, for the most part they are handled by specialists designated as Examiners of Questioned Documents, and they function as such even though they may be attached to forensic science or criminalistics laboratories. Consequently the role of criminalistics in this area of specialization and white-collar crime is more often supplementary and of a routine nature, such as the identification of inks and papers by chemical analysis, determining the individuality of die stamps, and the restoration of erased or tampered writings and markings on different types of surfaces. A discussion of the role of the Examiner of Questioned Documents in white-collar crimes is hence a separate and extensive area of study.

Conclusion

There are many other white-collar crime areas to which criminalistics has been applied. We can add others including various aspects of consumer-safety and quality-control, such as testing of hazardous gas heaters and dangerous firecrackers, also the rigging of gambling machines and other devices, the detection of fish, game, and wildlife code violations and numerous civil cases involving forensic questions of liability and malpractice. These are areas in addition to the five already discussed. Unfortunately, criminalistics cannot solve all the problems of detection and investigation of white-collar crime because of an inherent lack of physical evidence. Nevertheless, it has been demonstrated that criminalistics does play a role outside of the normal police crime laboratory in the administration of justice and law enforcement of nonconventional crime.

REFERENCES

1. Sutherland, E. H., White Collar Criminal, 5 American Sociological Review, 1–12 (Feb., 1940).
2. Cressey, B. R., The Criminal Violation of Financial Trust, 15 American Sociological Review, 738–743 (Dec., 1950).
3. Clinard, M. B., The Black Market: A Study in White Collar Crime (1952).
4. Quinney, R., The Study of White Collar Crime: Toward a Reorientation in Theory and Research, 55 Journal of Criminal Law, Criminology, & Police Science, 208–214 (June, 1964).
5. Michigan (State) Department of Health, *Seventy-Seventh Annual Report of the Commissioner of Michigan Department of Health* (Lansing, Michigan: 1949), p. 6.
6. Parker, B. P., Government Review—Science and Crime, 70 Technology Review, 10 (1968).
7. *Ibid.*
8. Neal, Harry E., The Protector (1968), p. 33.
9. *Ibid.*, p. 53.
10. Wilson, A. C., *et. al.*, Enzymatic Identification of Fish Products, 157 *Science*, 82–83, (July, 1967).
11. Food & Drug Administration, *FDA Report on Enforcement & Compliance* (Washington, D.C.: Sept., 1965).
12. Langer, G., Growing Old in America: Fraud, Quackery, Swindle the Aged and Compound Their Trouble, 140 *Science*, 470, (May, 1963).
13. Changing Times, What the Health Hucksters Are Up To, The Kipling Magazine, 221 (Sept., 1964).
14. Food & Drug Administration, *FDA Report on Enforcement and Compliance* (Washington, D.C.: May, 1965), p. 20.
15. Berkeley Daily Gazette, Vol. LXXXVI, No. 241, Oct. 10, 1963.
16. Fritch, B. E., Illusion or Deception: The Use of "Props" and "Mock-Ups" in T.V. Advertising, 72 *Yale Law Journal*, 148 (Nov., 1962).
17. 291 U.S. 67 (1934), FTC vs. Algoma Lumber Co.
18. Schlink, F. J., Your Money's Worth (1920), p. 109.
19. *Ibid.*
20. Harding, T. Swain, The Popular Practice of Fraud (1935), p. 59.

21. ALEXANDER, G. J., HONESTY AND COMPETITION (1967).
22. *Ibid.*
23. MANNHEIM, H., CRIMINAL JUSTICE AND SOCIAL RECONSTRUCTION (1967), p. 146.
24. Seaborg, Glenn T., Science & Humanities: A New Level of Symbiosis, 144 SCIENCE, 1200 (1964).
25. *Ibid.*
26. Sellers, B. and C. A. Zeigler, Applications of Radioisotope Excited X-Ray Techniques, 1 PROCEEDINGS OF THE FIRST NATIONAL SYMPOSIUM ON LAW ENFORCEMENT SCIENCE & TECHNOLOGY, 353 (1967).
27. SURFACE, WILLIAM, INSIDE INTERNAL REVENUE (1967), p. 172.
28. *Ibid.*
29. Activation Analysis in Court, 7 NUCLEAR NEWS, 31 (June, 1964).
30. BATTLE, BRENDAN P., ARSON: A HANDBOOK OF DETECTION & INVESTIGATION (1954), p. 50.