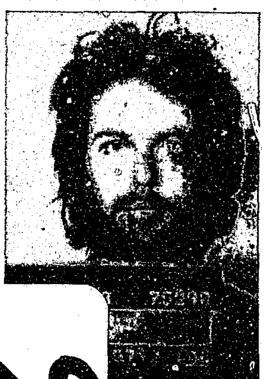

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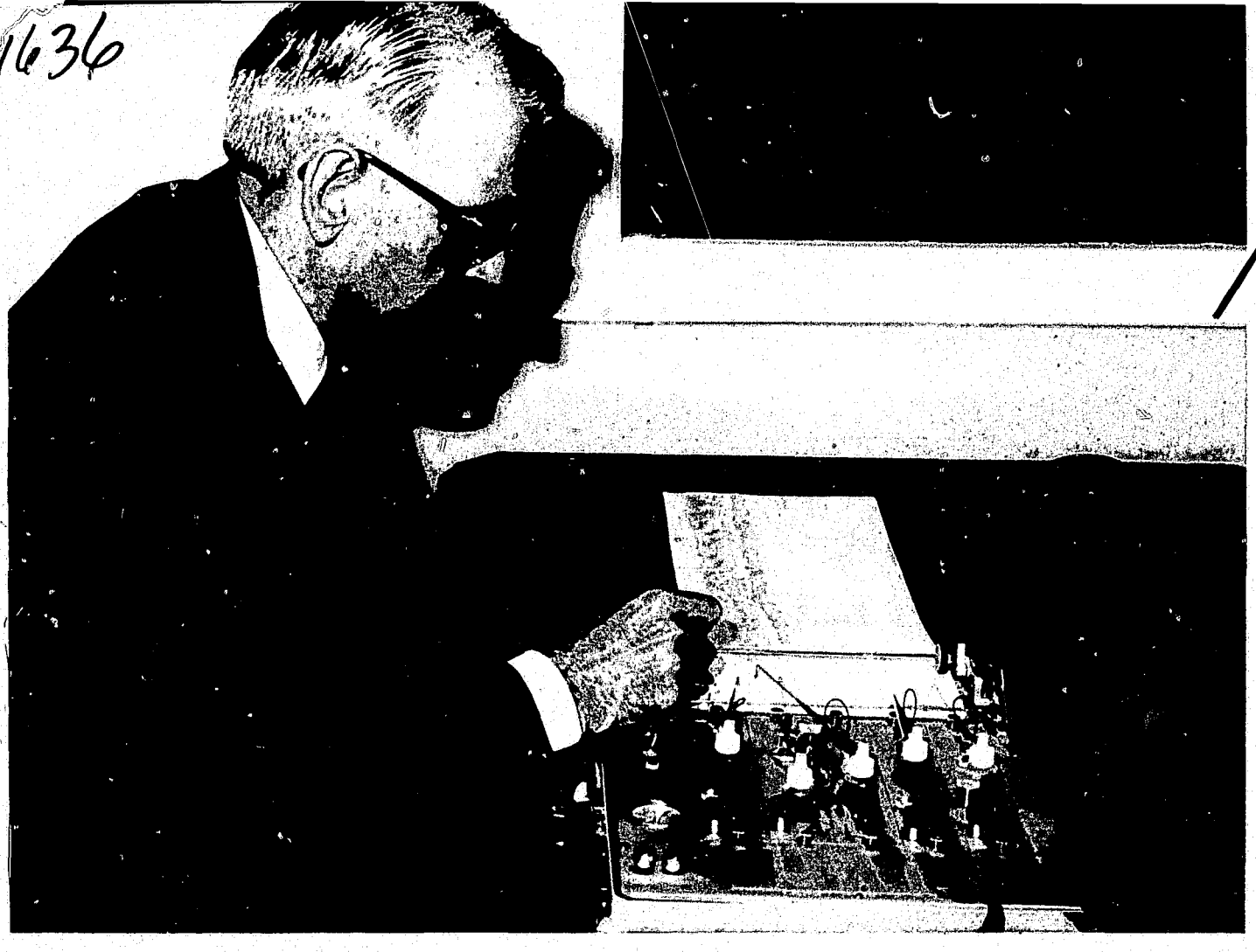


During the past couple of decades, the solution of crime through science has become more and more necessary. The reason is threefold. The criminal has become more sophisticated, the courts have made some decisions that certainly are not favorable to law enforcement, and modern research has resulted in greater technology.

Law enforcement has made many advances during the past 30 years. Previously, a criminal investigator depended more on his skills as an interrogator and on informers than on technical procedures. Aids to investigation such as the polygraph and crime laboratories were not used with the frequency they are today. Previously, a new investigator would normally be assigned to work with an experienced agent. The experienced agent generally would ask the new detective if he could interrogate. Naturally the new investigator would answer "Yes," meaning he knew how to ask questions. That was not what the old investigator meant. He wanted to know if the new investigator could illicit confessions from a criminal who had committed a crime and if he could interview hostile and friendly witnesses to obtain truthful statements. During a homicide investigation, one investigator would start talking to the witnesses and taking statements while his partner would speak with a number of different persons on the phone. A few hours later the investigator would receive a telephone call and say to his partner, "Come on, let's go pick up the murderer." They would drive to a location, make an apprehension, and take a confession on the way back to the station. That was their case.

The author, Mr. Brisentine, reads the results of a polygraph test conducted at USACIDC's Crime Records Center.

Cases are still solved in the manner described, but not with the frequency that was accomplished years ago. For now informers are hard to find that provide information because they believe it is "good" to help law enforcement and suspects have learned to say "I want to see a lawyer before I tell you anything." Therefore, if we do not depend on science to assist law enforcement, we are not going to solve our cases with the frequency necessary to have a progressive law enforcement agency. Today, most of our identification of criminals in serious crime is accomplished by scientific means.

Regardless of how able an investigator is as an interrogator, he

State Of The Art Of Polygraph Examinations

by Robert A. Brisentine Jr.

will often have to resort to using polygraph examinations.

For the individual who enjoys interrogation, polygraph examiner is a most enjoyable field of work and the polygraph is one of the most valuable aids in the conduct of criminal investigations.

Today, some law enforcement agencies are using the polygraph in 15 to 20 percent of their criminal investigations, while 33 years ago, there was no polygraph training school that taught the procedure.

How is the polygraph helpful? It assists law enforcement by eliminating innocent suspects, thus it enables the investigator to divert attention toward other suspects.

The polygraph is used in those investigations in which physical evidence is such that the incident may or may not be a crime, such as in suicide cases that appear to be homicide or vice versa and in fraud cases.

It is also used in those cases in which numerous persons possessed the opportunity to commit the crime and it could have been committed by one or more persons. These would be crimes like homicide, burglary, and larceny.

In addition, it is most valuable in those crimes in which there are no eye witnesses. That is, crimes against property, such as burglary and larceny.

Last, many individuals are using the polygraph to swiftly prove their innocence.

Let's go back through history and briefly trace man's efforts to detect deception.

From the days of Christ, man has attempted to fetter out lies through use of the ordeal. This technique was not based on any peculiar insight into the psychological processes underlying the awareness of guilt, but rather it came from superstitions and religious beliefs. Religion and superstition retained such a hold on the senses of the peoples that frequently, when charged with an offense, they asked for the ordeal to prove their innocence. They implicitly believed in its power.

For example, the ancient hill tribes of India used the "hot iron ordeal." An accused man was required to prove his innocence by having a red hot iron applied to his tongue nine times. If at any time the iron burned his tongue, the man was adjudged "guilty."

The Chinese required a suspect to retain a handful of rice in his mouth for a given time. He was then told to spit it out. If the rice was found to be dry, the man was executed.

The two ordeals just described were, no doubt, based on superstition. Modern observation teaches us that in both instances the dryness of the mouth was caused by fear. There is no doubt, however, that many innocent people were put to death as the result of these ordeals.

The part religious faith played in use of the ordeal is illustrated as follows. To settle differences, two individuals would be required to fight it out using various weapons. It was believed that divine aid would come to assist the just person and thereby administer impartial justice. We can all see where this ordeal would cause some trouble for a weakling.

In India, psychology was also used to detect the guilty. A donkey was placed in a dimly lit tent or room. Its tail was covered with lampblack. Suspects were instructed to pass through the enclosure and while going through they were to grasp the donkey's tail. They were also told that the donkey would bray when touched by the guilty person. Upon leaving, all persons were inspected by the judge. The person having clean hands was adjudged "guilty."

During the periods of the ordeals a number of serious attempts were made to detect deception by observing physiological changes in the human body. The first breakthrough in this area was in the late 19th century when Angelo

Mosso conducted experiments involving fear and its influence on the heart beat and respiration. He was able to conclude that fear is responsible for a number of visible and recordable changes in these body systems.

From this point on, experimentation increased and in 1921 Dr. John Larsen devised an instrument capable of continuously recording blood pressure, pulse beat, and respiration. He used this instrument to solve a larceny at the University of California. In 1926 the late Leonarde Keeler devised the polygraph as we know it today. In 1948 Keeler started training polygraph examiners in Chicago. Keeler's course was academic in nature and not a perceptor type of training. There are now about 18 schools in the United States that have formal polygraph training programs. Different schools and jurisdictions within the United States have different standards for polygraph examiners. The prerequisites for attending the Army Polygraph School are as follows:

The candidate must be a U.S. citizen, 25 years old, graduate of an accredited 4-year college, and have experience as an investigator with a law enforcement agency. The candidate must also pass a background investigation as a person of high moral character and sound emotional temperament and undergo a polygraph examination before starting the course of instruction.

The Army school is 14-weeks long and requires that each student satisfactorily learn polygraph theory, regulations, laws, legal considerations, and semantics; learn procedures to calibrate and maintain the instrument; learn at least six different testing procedures and procedures to evaluate mental and physical fitness of subjects; chart interpretation; as well as to conduct hypothetical (mock) examinations.

Following school, each intern must conduct polygraph examinations for 6 months to 1 year monitored by a certified polygraph examiner. The individual is then certified as a polygraph examiner.

Keeler and the forefathers of polygraph established that the principles of measuring changes that occur when a person is anxious will provide an indicator that the person may be attempting to deceive, but there had been no extensive validity studies of the polygraph before the congressional hearings of 1964.

In 1963, Congressman Cornelius Galligher of New Jersey introduced a bill into Congress to outlaw the use of the polygraph. Galligher probably did not realize that he was doing the polygraph community and law enforcement a favor. Although the polygraph examiner knew the procedure possessed validity, there were not sufficient studies to convince the scientific and political world that this was true. There was available data to validate tests of subjects who lied but not much data to validate a truthful subject.

So, what did the polygraph community do? They started conducting research to establish the validity of the procedure. Within 4 years studies have been completed to establish that the polygraph is reliable and valid. Galligher, in introducing his bill before Congress, caused the polygraph community to develop higher standards, new techniques, better instruments, and quality control to assure an increase in the reliability and validity of the polygraph. He also gave the polygraph examiners unity. The small polygraph associations came together as one in the form of the American Polygraph Association and polygraph procedures have become so standardized that one examiner can interpret a second examiner's charts. Galligher's bill has caused law enforcement to conduct research that has given the polygraph community security with the technique and has been a factor in preventing adversaries from "putting the polygraph examiner out of business."

The polygraph community presently accepts the concept that one examiner can interpret another examiner's charts. This was not the case before 1964, however, as most examiners were their own "God," as relates to polygraph. An examiner conducted the test, read his own charts, gave the results to the investigator, and filed the charts and documents away. The research following the congressional hearings of 1964 revealed that a polygraph examiner who is reading just charts and is not present during the polygraph tests can read the charts with greater reliability than the examiner who collected the charts. This is because the review examiner is not contaminated by the psychopath or "con" man or woman and won't unconsciously read something into the charts that is not present.

As a result, all Federal agencies and many U.S. police departments

have quality control programs. The Army started its quality control program in 1965. Quality control of Army polygraph examinations consists of four examiners reading the charts of all examinations collected by the field examiners. In other words, the quality control consists of a blind analysis of all charts collected by Army polygraph examiners worldwide. The quality control officer does not know the determination of the field examiner at the time of the analysis.

Another aspect of quality control is that when an examiner knows that someone else will be reviewing his work, he is encouraged, even on those off days that we all have, to produce the best polygrams possible under the circumstances. When he knows that the charts will be reviewed by others, he is motivated to take a little extra time and effort to produce a product that he will be proud of. Of course, when we produce better charts, we are able to interpret polygraph with less effort.

In other words, regardless of the technique, one examiner should be able to read another examiner's charts. CID has proven the benefits of quality control, as since 1964, inconclusive polygraph examinations have been reduced from 8 percent to less than 1 percent.

The person who is skeptical about the validity of the polygraph must ask himself why a properly trained examiner will consistently provide accurate conclusions regarding the truth or deception of subjects he tests. This phenomenon is understood when we remember the physiology of the autonomic or "involuntary" nervous system.

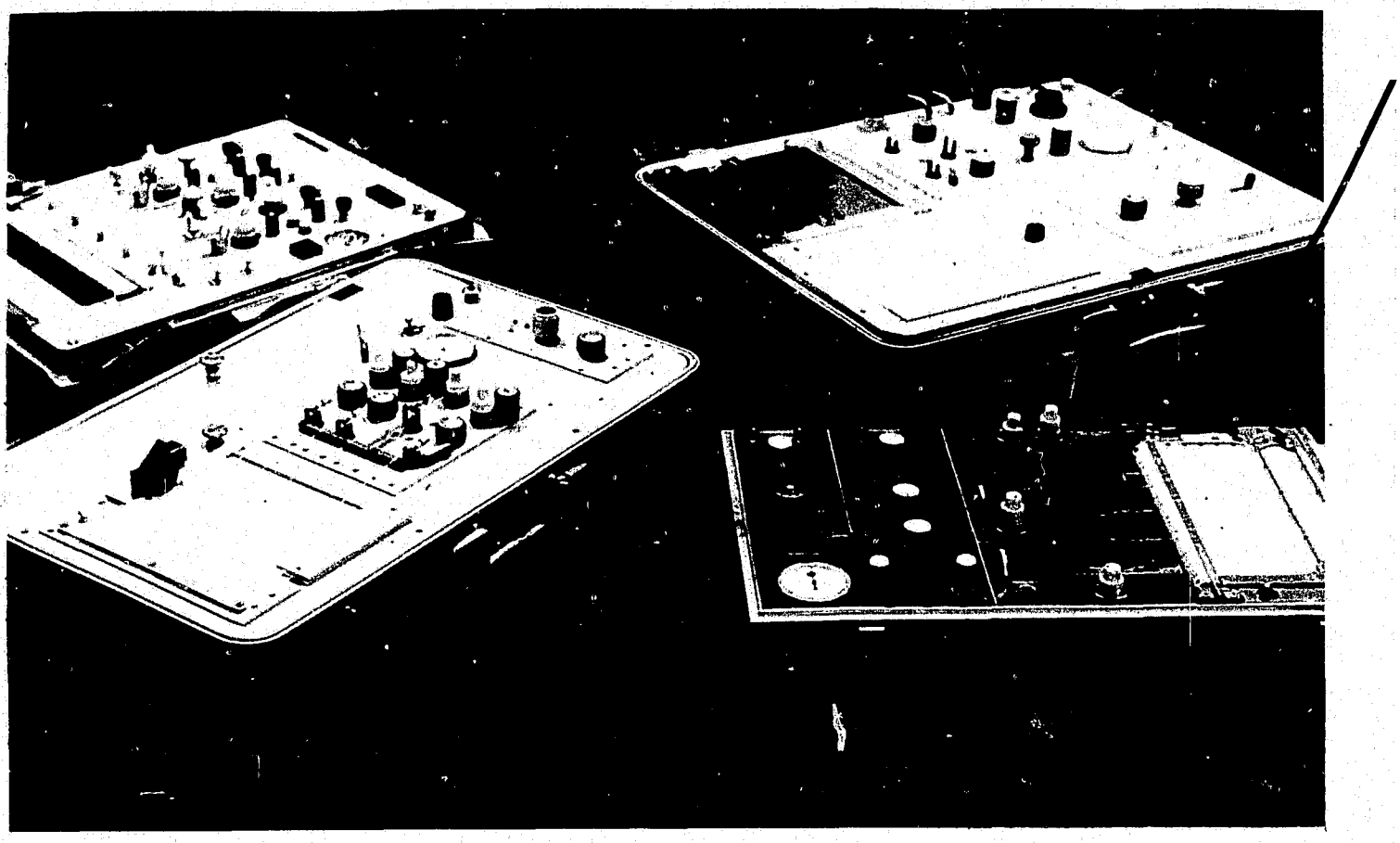
The model demonstrates that modern polygraph equipment is comfortable for the subject.

The autonomic nervous system is that part of the nervous system which carries unconscious and uncontrollable impulses to the cardiac muscles, glandular cells, and the smooth muscles. The heart, kidneys, sweat glands, and stomach are the parts of the body that are affected by the autonomic nervous system.

The somatic or "voluntary" nervous system carries conscious and controllable impulses to the skeletal muscles, so one can control this system on the conscious level.

The autonomic nervous system enables one to cope with stressful situations. Under conditions that are stressful from either emotional or physical reasons, the autonomic nervous system causes physiological changes to occur within the body; thus enabling the body to defend itself against the stressful situation. These changes will occur whether the individual decides to "stand and fight" or flee from the danger. This is referred to as the "fight or flee" syndrome. The changes that take place during these situations include dilation of skeletal muscle blood vessels, constriction of skin blood vessels, acceleration of the strength and rate of heart contractions, decrease secretion of saliva and gastric juices, increase blood sugar for energy, increase production of adrenalin, and stimulation of the sweat glands.

The basic polygraph instrument includes a cardiograph which records changes in blood pressure



The latest polygraph equipment used by polygraph examiners at USACIDC's Crime Records Center.

and pulse rate, a pneumograph which records changes in respiration and a GSR which records changes in the skins resistance to an electric current.

During a polygraph examination, the examiner will apply stimuli by asking questions. The subject's fight or flee reactions will occur at the question to which he will lie. I should mention that no surprise questions are asked during a polygraph examination as all questions are reviewed with the subject before the test. In the polygraph situation, the subject will focus his attention and channel his fears, anxieties, and apprehensions toward the situation or question or issue that poses the greatest immediate threat to his well being. This tuning in of the greatest threat and simultaneous dampening out of lesser threats is described or entitled "Psychological set." This concept emphasizes the need for the psychological principles involved in test construction. That is a quick summary of the psychology and physiology of the polygraph technique.

To give some idea of the accuracy of the polygraph technique, a few statistics are necessary. High validity was reported by authorities in two experiments in 1959 and 1969, in which accuracies of 89 percent and 94 percent were obtained. One authority, employing a mock crime, reported 94 percent correct judgments of the action-subjects. Most other investigations have yielded similar figures.

While the accuracy obtained in experimental situations is most impressive, it is not as high as that reported by polygraphists for real-life situations. Virtually all polygraph examiners quote validity statistics of 90 percent or higher. This is understandable, given the differences between laboratory and field research.

A number of theories exist that explain why the polygraph is effective, of which the fear-of-punishment theory is perhaps the best. It is hypothesized that the greater the consequences of being detected, the greater is the fear of detection. The increased fear in turn triggers a greater physiological change, thereby creating a greater likelihood of detection. It is, therefore, not so much the lying or guilt feelings that alter the subject's physiological responses, but rather the fear of punishment.

A volunteer subject in a laboratory experiment, in contrast to a criminal suspect, has very little punishment to fear; without the drastic fear and stress, the physiological changes associated with lying are reduced, resulting in lowered accuracy levels. This has

been substantiated by Gustafson and Orne, who found that the more motivation there was to deceive, the more readily the deception was detected. Larson reported that once confession had been obtained, the physiological changes in response to critical questions were not so great as before.

Virtually all polygraph experts agree that a well-trained and experienced examiner will make correct judgments in 90 to 95 percent of those cases in which he makes a definite decision. There will always be a number of subjects regarding whom no definite conclusion can be reached, for certain medical or emotional reasons.

In studying the statistics yielded by actual polygraph examinations, the researcher is handicapped by his inability to rigidly control the investigation. Many polygraph judgments simply cannot be verified. When verification is available, however, the accuracy level is quite high. Orlansky, in reviewing the results of Government pre-employment security screening, found that correct judgments were made in 95 to 97 percent of the cases, while definite failure occurred in only 1 percent.

Studying the results obtained by two large Government agencies, which had administered more than 100,000 examinations, Chatham reported a proved margin of error of less than 1 percent (uninterpretable records did not exceed 2 percent). In 1932, Larson tested 90 college girls to determine which of them had been stealing in their dormitory. He correctly classified the 89 innocents and the one guilty girl, for a level of accuracy of 100 percent. Inbau and Reid examined 4,280 criminal suspects and obtained accurate findings in 95 percent, errors in 1 percent, and indefinite ratings in 4 percent of the cases.

In observing law enforcement agencies, Levitt indicated that correct interpretations were made in 75 to 100 percent of the instances. Wolfe, in a report prepared for the Emergency Committee on Psychology of the National Research Council, stated that 80 percent of polygraph evaluations were accurate; 3 percent in error; and 17 percent indefinite. Studying the validity of the polygraph examinations administered over 3 years at the Chicago Scientific Crime Detection Laboratory, Trovillo found errors in only 2 percent of the cases.

While there has been less investigation of the reliability of the polygraph than of its validity or accuracy, the results are nevertheless impressive. Kubis, comparing the judgments among different polygraph raters, found consistency between 72 and 87 percent. An average of 85 percent reliability among judges of polygraph records was reported by Bitterman and Marcuse.

In another study of reliability, Van Buskirk and Marcuse found 94 percent agreement on polygraph charts between two judges. Kubis obtained an average of 79 percent agreement among raters some years ago, and the same degree of reliability was reported by Barland and Raskin in a more recent investigation.

An excellent experiment carried out by Horvath and Reid, employing verified polygraph charts from actual criminal cases, demonstrated high reliability. They found inexperienced examiners were accurate in an average of 79 percent of the cases, while experienced polygraphists were successful in 91.4 percent of the forty cases studied. This degree of agreement among the examiners was obtained without benefit of observing the examinations or having any background knowledge of the subjects.

Edel and Jacoby in an Examiner Reliability Study with 10 polygraph examiners working independently on actual case material involving responses to 2,530 questions, attained a consistency (reliability) ration of 95 percent.

The most recent Reliability and Validity Study, available to the APA, is a study completed by Raskin, Barland, and Podlesky during 1976.

In this study, the scientists report an accuracy rate of 90 percent.

It is difficult to obtain meaningful statistics in real-life situations. The principal problem is getting verification of the polygraph examination administered. This can only be done when a confession is obtained. In a case where there are 10 suspects and nine of them are cleared by the polygraph and the 10th confesses, then an accuracy of 100 percent can be claimed for all 10. On the other hand, if only nine are tested and the 10th is not examined and cannot be proved guilty, then there is no way to verify the findings on the first nine. Consequently, they cannot be

"The time has come for the courts to admit polygraphs tests into evidence on behalf of a defendant in a criminal case."

included in any statistical analysis. Moreover, if the 10th man were available for testing but made no admission of guilt, then all 10 would have to be discarded for statistical purposes. In actual practice, far more innocent persons than guilty persons are tested by the polygraph examiner and in many cases the guilty person is never discovered. Thus there is no way to verify the findings of the innocent persons.

The polygraph profession is aware that much of the scientific data on the instrument has been obtained from empirical observation. But this is hardly a good reason to disregard the findings. While rigidly controlled experimentation is difficult to carry out in real-life situations, there is movement in that direction. Validity and reliability studies based not in the laboratory but in the field are in progress at the present time.

Many students of the polygraph have urged that polygraph evidence be made admissible in the courts. According to Merker, "...as far back as 1952 there was general scientific recognition that the polygraph possesses efficiency and that reasonable certainty can follow from polygraph tests.... The time has come for the courts to admit polygraph tests into evidence on behalf of a defendant in a criminal case." Hardman adds: "...a high percentage of the witnesses on the stand not only lie but escape detection by the traditional methods of examination.... No reason is seen why courts generally should not bestow approval. For within (certain) limits...the possibility of error inherent in the present-day use of lie detectors seems outweighed by the opposing possibility of closing the door to truth."

Dr. Martin T. Orne commenting on the validity of polygraph data, stated "...I will certainly agree that a competent interrogator, trained in the use of the polygraph, attempting to evaluate deception with the aid of the polygraph test will be significantly more effective than without it. Further, I believe that in appropriate hands the reliability of the polygraph is far greater than what one could expect from accounts of eyewitnesses who briefly observe a stressful and arousing event. Certainly it would be more reliability than other available techniques of ascertaining truth such as psychiatric evaluations or more esoteric procedures such as the use of hypnosis or truth serum."

Mr. Howard S. Altarescu, in his article, "Problems Remaining for the 'Generally Accepted' Polygraph" addresses the present acceptability of polygraph by the courts, the difficulties through the years of admitting polygraph evidence based on the *Frye* v. *United States* decision of 1923.

Polygraph evidence has now been admitted into seven circuits of the U.S. Court, 22 State courts and in the court of the District of Columbia. Polygraph evidence is presently admissible in three circuits of the U.S. Court and in 22 State courts.

The American Polygraph Association (APA) was formed in August of 1966 by a merger of three predecessor organizations—The Academy for Scientific Interrogation, The American Academy of Polygraph Examiners, and The National Board of Polygraph Examiners. The APA came into being because of a desire of the profession to raise standards of education, training, and instrumentation, and to advance the field through licensing and regulation.

As insurance to prevent the unskilled polygraphists from entering or becoming a member of the APA, the Board of Directors of the APA changed the entrance requirements in January 1974 that requires that each individual seeking membership in the APA would pass a detailed written and oral examination administered by the membership committee. Most recently and during August 1976, the general membership of the APA increased the minimum educational and internship training requirements for all polygraph training facilities desiring accreditation with the association. This resolution increased the contact hours of course requirements, required a monitored

"Research has established that the polygraph is a valid technique when used by properly trained examiners who adhere to proper standards."

intern program, increased the qualification requirements of instructors at polygraph training facilities, and established inspections of these facilities on an annual basis by a committee of the APA.

The APA is completely in favor of State or Federal licensing and regulation of the profession. Through its own efforts and those of various State associations, the APA has supported licensing attempts in most of the 50 states. To date, licensing bills or other regulatory laws have been passed in 22 States. They are:

Alabama
Arizona
Arkansas
Florida
Georgia
Illinois
Kentucky
Massachusetts
Michigan
Mississippi
Nevada
New Mexico
North Carolina
North Dakota
Oklahoma
Oregon
South Carolina
Texas
Utah
Vermont
Virginia
Tennessee

Research has established that the polygraph is a valid technique when used by properly trained examiners who adhere to proper standards. There have been polygraph licensing laws adopted in a good portion of the states and by users in the Government, and the polygraph is admissable in court in three circuits of the U.S. Court and 22 State courts. Last, it is the best technique used by law enforcement to eliminate the innocent and identify the criminal.

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