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# STATE LEGISLATION CONCERNING THE POLYGRAPH IN JUNE 1973

by

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After many years of maligned service to the public, it is encouraging to note that the polygraph is fast becoming recognized as a valid weapon in the arsenal to combat crime. The signs that announce the improved position of the polygraph in the pecking order of equipment and techniques are the recent cases of court recognizance, increased interest and research by the scientific community and by the expanding number of state laws enacted to regulate the use of the polygraph.

The changing attitudes toward the use of the polygraph have been brought about by many influences in the recent past. The public has clamored for security from incursions upon its safety and privacy. Yet the ever increasing crime problem and the flow of federal funds has yielded few results that can be looked upon with complete satisfaction. Amidst this equivocal situation the field of polygraphy has slowly but certainly made inroads toward professionalization by reforming splinter organizations into one association, proposing standards to upgrade the membership, supporting licensing regulations and publicly refuting detractors of the polygraph technique. The American Polygraph Association has made a sincere commitment to improve the standards of the practitioners and their public service by an arduous and continuous program of review and research of the past, present and future needs of the American people.

This concerted effort has not escaped the attention of the courts, the scientific community and the public. Despite its controversial, misunderstood and widely criticized past, and without taking recriminatory actions on its own behalf, general acceptance of the polygraph technique has flourished. Contrary to its detractors' wishes, the instrument and the technique have not been summarily banished. This can be

noted in the fact that in the past seven years no prohibiting type state or federal legislation has been enacted; rather, in the same period no less than thirteen states have enacted legislation to permit and regulate polygraph examinations.

State Laws That Limit Polygraph Examinations

There are no state laws that prohibit polygraph examinations per se. Nor are there any state laws that prohibit the possession of a polygraph instrument. The state laws that exist concerning prohibitions involving the polygraph state in effect that the polygraph examination shall not be used as a prerequisite for employment or for continued employment. This means that the laws have been created to circumscribe the use of the polygraph involving personnel employment practices in the business, industrial and commercial fields. As a matter of interest, of the twelve states that have prohibitory statutes, ten statutes specifically exempt law enforcement agencies, divisions of government or personnel associated with the dispensing of drugs. It can be seen that these twelve state laws are less prohibitory than they had been generally thought to be. Although these statutes do limit somewhat the indiscriminate use of the polygraph technique, it is available for use as an investigative tool in each of those states.

Table 1 is a listing of the state laws that limit the use of the polygraph, the statute titles, the exemptions, penalties and the specific words within the statutes that perform as the limitors. It should be noted that the statutes are generally brief, and often the language is ambiguous and possibly legally ineffective. For instance, the California Act legislated in 1963 states that the employer cannot "demand or require" an applicant for employment to undergo a polygraph examination. By January 1964 the state Attorney General opined that the limitation does not prohibit the employer from requesting or permitting such tests, and it does not prohibit a person from volunteering for such a test. There is no information available to this writer concerning any court tests of the constitutionality of the state laws that pertain to commercial personnel testing, although they are obviously discriminatory in nature.

State Licensing Legislation

Since 1962 seventeen states have enacted legislation to permit and regulate polygraph examinations. Table 2

lists the salient features of each licensing statute.

Each of the statutes had some common features and each also had unique characteristics. Commonly shared were the following: Licensing authority, fees, complaint-revocation-appeals channels and innuance of a license certificate were prescribed. License applicants were unanimously required to be citizens of the U.S.A., be free from court convictions, and except for North and South Carolina, have paid for the examination or application fee prior to the issue of a license. The remainder of the prerequisites were not in common agreement.

Not all the statutes required every polygraph examiner in the state to be licensed. Six of the seventeen states exempt law enforcement officials from the licensing requirement. Two states waive the fee for the license for the law enforcement examiners and two states specifically require that local government examiners have licenses, but do not mention state or federal government agents.

The minimum age for licenses is eighteen years in three states, twenty-one in twelve states, and twenty-five in two states.

Personal references are required in one state. In six states the applicants must show evidence of honorable service if they had been in the military. Nine states require fingerprints and six request photographs. Five statutes cite that a background investigation will be conducted, and one statute indicates that background investigations will be conducted as necessary.

All of the statutes except one describe the polygraph instruments to be used as devices with a minimum of two recording elements, to include the pneumograph and the cardiosphygmograph. Additional recording elements would be acceptable.

Educational requirements, surety bonds and penalties for violations of the statutes were variously prescribed as listed in Table 2.

## Conclusions

Although the polygraph related statutes enacted by seventeen states are not very standardized, they represent

an interest in the continuance and regulation of a much needed public service. The twelve statutes that limit the use of the polygraph are basically discriminatory and deprive the citizens of those twelve states a modern and increasingly accepted tool and technique. The few states that have not yet faced the dilemma concerning licensing of polygraph examiners should seek counsel from the schools of thought expressed by the anti- and pro-polygraph factions. Investigation of both philosophies would undoubtedly result in the knowledge that the polygraph technique is in a recrudescent and viable state, ever-ready to take up the challenges of the future in our democratic society. The solid trend toward state licensing statutes reflects a confidence in the public service available from the professional polygraph examiner.

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[Editor's Note:

This is the first of a series of articles in this journal concerning the legislation that affects the use of the polygraph throughout the country. This first article contains quick reference charts that can be used to ascertain the specific elements that are contained in the various state laws.

In every such undertaking there is the hazard that amendments or other changes have been made to state statutes, and that such changes have remained obscure due to limited publicity. Inaccuracies and omissions that might be found in these articles should be brought to the attention of the author so that the correct information can be properly published for the APA membership.

Articles relative to polygraph related laws or ordinances enacted by governments of the county, township or city level are also being planned. The author would appreciate the receipt of copies of such legislation or help from journal readers in identifying those jurisdictions with such laws.]

TABLE 1

STATUTES LIMITING POLYGRAPH USE; PENALTIES; AND EXEMPTIONS

| e, ute and : | No employer may "_____" any prospective employee or employee to take a polygraph examination. | Penalty: | Exempted: |
|---|---|---|---|
| ka 3, Art. 3 | request or suggest | fine of $1000 and/or 1 year jail | policemen or prospective policemen |
| fornia 3, Art. 3 | demand or require | none stated | any federal or st government or sub division thereof |
| ecticut Act 488 1966 | request or require | none stated | state or local police department |
| ware , Title 19 | require, request or suggest | fine of $500 and/or 90 days jail | law enforcement agencies |
| i 78 | require | fine of $1000 and/or 1 year jail | law enforcement agencies |
| and 24, par. 95 | demand or require | misdemeanor; fine not to exceed $100 | federal, state or subdivision of government |
| chusetts 97 amended 1963 | subject or cause | none stated | law enforcement agencies |
| ersey 14, Sect. 1 | influence, request or require | "is a disorderly person." | none stated |
| n 49 | require | maximum $500 fine and/or 1 year in jail | none stated |
| ylvania 782, Sect. , 1969 | require | fine of $500 and/or 1 year jail | public law enforc ment agents; drug dispensers |
| Island ssem. Jan.1964 | subjects or causes | $200 fine | law enforcement agencies |
| ngton 49.44.120 | requires | gross misdemeanor | law enforcement; drug disp |

TABLE 2

STATE POLYGRAPH LICENSE PREREQUISITES

NOTE: A vacant space indicates no specific mention of this item in the state statute.

| | Alabama | Arkansas | Florida | Georgia | Illinois | Kentucky | Michigan | Mississippi | Nevada | New Mexico | North Carolina | North Dakota | Oklahoma | South Carolina | Texas | Utah | Virginia | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Examiner License | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | |
| Renewal Period in Years | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Examiner Application Fee $ | 60 | 60 | 25 | 50 | 50 | 20 | 100 | 50 | 25 | 100 | | 25 | 60 | | 60 | | | |
| Annual Fee $ | 30 | 25 | 50 | 25 | 25 | 15 | 50 | 25 | 75 | 50 | 200 | 10 | 25 | 50 | 25 | 25 | 25 | |
| Internship License | X | X | X | X | X | X | X | X | | | X | | X | X | X | X | | |
| Internship Period in Months | 6 | 12 | 12 | 6 | 12 | 18 | 6 | 12 | | | | | 12 | 12 | 12 | 12 | | |
| Internship Fee $ | 30 | 30 | 50 | 25 | 10 | | 25 | 30 | | | | | 30 | 25 | 30 | 10 | | |
| Surety Bond Minimum (in thousands) | 5 | 1 | 5 | | | | | 5 | 2 | | 5 | | | 5 | 5 | | | |
| Background Investigation | | | X | | | X | | | X | | X | | | | X | as nec. | | |
| Persons Excluded From License | c | b | b | b | | c | $c^1$ | | b | | b | b | | $c^1$ | | | | |

Symbols: X - Cited in the statutes
a - Fees are for two years
b - Municipal, County, State & Federal law enforcement agents excluded from licensing requirements
c - License required, but fees are waived for official police authorities
$c^1$ - License required by private & local governmental examiners; federal agents not specifically mentioned
d - Fine from $20 to $500

| | Alabama | Arkansas | Florida | Georgia | Illinois | Kentucky | Michigan | Mississippi | Nevada | New Mexico | North Carolina | North Dakota | Oklahoma | South Carolina | Texas | Utah | Virginia | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Revocation Authority | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | |
| Appeals Channels States | X | X | X | X | X | X | X | X | X | | X | X | X | X | X | X | X | |
| License to be Displayed | X | X | X | X | X | X | | X | X | | X | X | X | X | X | X | X | |
| License Violation Penalty (maximum) | h | h | g | f | e | d | f | h | f | f | f | e | h | h | h | f | i | |
| Grandfather Clause | X | X | X | X | X | X | X | X | X | | | | X | X | X | X | X | |
| Instrument Prescribed | X | X | X | X | X | X | X | X | | X | X | X | X | X | X | X | X | |
| State Examination | X | X | | X | X | | X | X | | X | u | | m or n | X | | | | |
| State Examination Fee (in dollars) | 30 | 20 | | | | | 50 | | j | | | | 20 | | | | | |
| Non-Resident License Required | X | X | X | X | X | X | X | X | X | | X | X | X | X | X | X | X | |
| Reciprocal Agreements | X | X | X | X | X | | X | | | | | X | X | X | | X | | |

f - Misdemeanor penalty
g - Fine from $100. to $1.000.and/or 1 year jail
h - Fine from $100. to $1.000.and/or 6 months jail
i - Fine from $100. to $500. and/or 12 months jail
j - Application fee covers cost of examination
k - High School graduate
l - Baccalaureate degree
m - Baccalaureate degree waivable with 5 years investigative experience
n - Only 6 months internship required
o - Two years internship or experience
p - Either graduate from polygraph school and have 6 months internship, or have 12 mos. internship without school

TABLE 2 (continued)

| | Alabama | Arkansas | Florida | Georgia | Illinois | Kentucky | Michigan | Mississippi | Nevada | New Mexico | North Carolina | North Dakota | Oklahoma | South Carolina | Texas | Utah | Virginia | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Age | 25 | 21 | 21 | 21 | 21 | 18 | 18 | 21 | 21 | 25 | 18 | 21 | 21 | 21 | 21 | 21 | 21 | |
| Citizenship | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | |
| Character Statement | X | X | X | X | X | X | | X | X | X | X | X | X | X | X | X | | |
| References | | | | | | | | | X | | | | | | | | | |
| Conviction Free | X | X | X | X | X | X | Y | X | X | X | X | X | X | X | X | X | X | |
| Honorable Discharge (military) | | | X | | X | X | | | | | | X | | | | X | X | |
| Fingerprints | | | X | X | | X | X | X | X | | X | | | | | X | X | |
| Photograph | | | X | X | | | | X | X | | X | | | | | X | | |
| Formal Education | m | m | m | m | l | | m | m | | k | k | | n or m | m | m | l or v | k | |
| Polygraph School Required | p | s | X | X | n | X o | | p | q | | p | r | m or X | p | p t | w | X | |

q - Two years experience
r - Specialized training as approved by Attorney General
s - Polygraph school waivable by 5 years investigative experience
t - Only state that cited specifically acceptable schools
u - Upon discretion of Director, State Bureau of Investigations
v - High school graduate and 4 years of investigative experience
w - One year internship and 250 exams
Y - Within 5 years

# ANALYSIS OF POLYGRAPHIC DATA

## PART 2

by

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ABSTRACT

In Part 1 laboratory operators rated the significance of the physiological reactions to each of the critical questions used in the test. The process was essentially subjective since only a visual comparison of the tracings was required. There were no measurements made of the responses.

In Part 2 Dr. Kubis examines the problem of objective measurement of physiological responses to determine if operators are more accurate than decisions arrived at by purely objective measurements. Results suggest that computerization of analysis may be feasible. (N.A.)

## Accuracy of Measured and Rated Physiological Response Systems Used in Lie Detection Work

The decisions made by forensic polygraph examiners are basically subjective in character. Undoubtedly they are based on careful study of the polygraph charts but usually there are no measurements, no statistical analyses, and no specific objective criteria against which the measurements are compared.

In the previous section, laboratory operators rated the "significance" of the physiological reactions to each of the criticalquestions used in the test. This was done independently for each index: respiratory, plethysmographic, and psychogalvanic. When this analysis was completed, the operator was instructed to give his overall decision as to the guilt, conplicity, or innocence of the individual whose records he had just rated. Despite this attempt to provide a firm basis for his final decision, the process was essentially subjective since only a visual comparison of the tracings was required. There were no measurements made of the physiological responses.

If computer techniques were to be utilized, the visual evaluation would have to be superseded by objective measurement. The measurements would have to be based on those aspects of the visual record which provide the operator with the subjective criteria he uses in arriving at his judgment. Once such measurements were made, they could be used with complete objectivity to determine the guilt, complicity, or innocence of the individual tested. The accuracy thus attained could be compared with that achieved by the lie detector operators evaluating the same records. If the accuracy of the objective measurements were comparable to that of the lie detector operators, computerization would be feasible. With the physiological signals converted to digital form, the examination of a suspect could be facilitated by "immediate" feedback from the computer indicating the minute-to-minute (or the cumulative) status of the suspect's total physiological reactivity.

## Statement of Problem

Since polygraph records were available from the previous study (Kubis 1962), these could be subjected to measurement. The first problem was to determine the most feasible and reliable characteristics of the physiological reactions. Once these were measured and combined into a diagnostic form which would provide a decision as to the guilt, complicity, or innocence of a suspect, the final and basic question could be answered: Will objective measurements provide the same degree of decision accuracy as lie detector operators?

If the decisions of operators were found to be more accurate than those derived from purely objective measurement, more work would have to be done either on objectifying the subjective criteria or on discovering other measureable physiological characteristics that would increase the accuracy of the objective decisions.

## Procedure

There were three phases to the procedure: the characteristics to be measured had to be selected; a sample of records had to be obtained; the method of evaluating the accuracy of the objective (measurement) and subjective (lie detector operator ratings) methods had to be determined.

## Measured Characteristics

The three physiological reactions--psychogalvanic,

plethysmographic, and respiratory--differ greatly in form and complexity. The description of the characteristics selected for study is presented in separate sections for each reaction. A detailed analysis of the measurement procedure is included in the Appendix.

Psychogalvanic Reaction. Two measurements were used to serve as indices for the psychogalvanic reactions. These were the height of the response and its "width." The height of the deflection is a function of the conductance. "Width" measures recovery time. Since it was not always possible during the testing period to have the psychogalvanic deflection return to its base line, recovery time was measured at that point of the curve where the return sweep of the deflection was one-half the maximum height attained. This criterion made it possible to get a measure on all the deflections used in the study.

Plethysmographic Reaction. Two of the characteristics of the plethysmographic reaction are direct analogues of the height and width mentioned above. In excitement the change in finger blood volume is indicated by a rise in the plethysmographic curve. Within a short period of time the curve returns to its base line. Consequently, amplitude or height can be measured; similarly, recovery time or width. In addition, the change in the magnitude of the pulse beat was also used. To facilitate later discussion, these three characteristics are referred to as Height, Width, and Change.

Respiratory Reaction. It was felt that the amplitude and frequency of the respiratory cycles contained all the relevant information that would reflect the emotional state of the subject under test.

The selection of these seven characteristics was based on the diagnostic significance they were considered to possess. In particular, the height of either the psychogalvanic or plethysmographic reactions has always been considered a good indicator of the "disturbed" or emotional state of the individual at that point. Both are used by polygraph examiners as presumed indices of disturbance (or lying, if properly interpreted). Similarly a diminution of respiratory amplitude at a critical question has often been used as an index of lying. Other characteristics of the physiological reactions were not selected for analysis because

they failed to meet the criteria of measurability and diagnostic significance for detecting deception.

Change in responsivity is the critical index for Joseph (1957). The most obvious measure of change is a comparison of the reaction at a critical point with the reactions before and after it. Such was the procedure used. As an example, the Height of the psychogalvanic reaction to a critical question was divided by the sum of the Heights to the non-critical questions before and after it. (Averaging the Heights of the two noncritical questions would have introduced a constant factor of 0.5, common to all measurements and therefore an unnecessary operation.)

All measurements were done by two statistical clerks who did not know the nature or purpose of the experiment. There was a preliminary training period to assess the adequacy of the measurement instructions and to develop consistency and reliability in the measurement procedure.

## The Sample of Records

The measurement of the seven characteristics was very time-consuming. Consequently, only a limited sample was selected to serve as a pilot indicator of the diagnostic promise inherent in the objective measurements. The records used for the objective analysis were chosen from the second half of the Simulated Theft Experiment (Kubis, 1962). They comprised 11 complete experimental groups of three persons. Each such group contained a Thief, a Lookout, and an Innocent Suspect. All of these groups (totalling 33 persons) had been examined by one lie detector operator thus insuring relative uniformity of questioning and machine operation. These records had been analyzed and rated by three persons: the examiner and two raters.

## Accuracy Evaluation

Lie Detector Ratings. The physiological reactions to each critical question (i.e., a question relating directly to the Simulated Theft) were rated on a scale of 0-3 to indicate the degree of disturbance the question aroused. The critical response (reaction to the critical question) was compared with its predecessor and with its successor. Depending on the comparative magnitude of the disturbance aroused by the question, the critical response was given one

of the following numerical ratings:

3 - very significant
2 - significant
1 - doubtfully significant
0 - nonsignificant

This scale was used and described in the Simulated Theft Experiment (Kubis, 1962). These ratings were combined into three discriminant scores: the Thief-Innocent (T-I), the Thief-Lookout (T-L), and the Lookout-Innocent (L-I). These scores were to determine the relative accuracy of the three types of discriminations possible within a group of three persons one being a Thief, one a Lookout, and one an Innocent Suspect. Thus, for example, the T-I score was constructed so as to distinguish the Thief from the Innocent Suspect. With three physiological reactions, there were three T-I scores, one for each of the indices: the respiratory, the plethysmographic, and the psychogalvanic. In the earlier research (Kubis 1962) it was found that the most accurate discriminator was the psychogalvanic response. The least accurate was the respiratory response.

The natural question that arises is, Would a combination of the three physiological indices increase accuracy? The simplest type of combination, the sum of the three physiological discriminants, proved no more accurate than the single psychogalvanic discriminant. However, the use of linear discriminant function analysis provided a set of weights (or multipliers) for the physiological discriminants that maximized the efficiency of classification. This linear function proved to be the most accurate discriminant.

For any required discrimination, as, for example, the classification of an individual as a Thief or as an Innocent Suspect (T-I), there were five sets of discriminant scores: one for each of the physiological responses, one for the sum of the three physiological discriminants, and finally the maximizing linear discriminant function. This was the case also for the T-L and for the L-I scores.

Decisions Based on Measurements. Although the same three discriminations (T-I, T-L, and L-I) must be made whether the physiological curves are rated or measured, there are a number of differences that must be mentioned. In the one case the physiological tracings are evaluated and rated by eye; in the other, the same tracings are measured on a scale.

In the subjective evaluation, the total physiological pattern (ex. respiration) accompanying a question is compared with the total physiological patters (ex., respiration) accompanying the surrounding questions. In the objective procedure only two facets of the particular curve (ex., amplitude and frequency of respiration) are singled out for measurement. Although it appears that there is potentially more information in the subjective evaluation, it must be admitted that the measured information is more reliable. Finally, the multiple measurements made on each physiological response make possible many different linear combinations of measurements. Specifical there are 12 different (3x2x2) linear discriminant scores that have exactly one measurement from each physiological reaction. Further, theoretically there is no inherent restriction on the number of variables to combine. There may be a few as two or as many as seven. In the present case the emphasis has been on linear combinations utilizing one measurement from each of the physiological reactions. Some additional linear discriminants were computed and these will be indicated in the treatment of results.

Accuracy scores, for both the rated and measured condition will be expressed in terms of percent correct discriminations. The discriminations will be Thief vs. Innocent (T-I), Thief vs. Lookout (T-L), and Lookout vs. Innocent (L-I). In this way, it will be possible to evaluate the relative accuracies of the three types of decisions that are inherent in the identification of three members of a group one of whom is a Thief, one a Lookout, and one an Innocent Suspect.

## Results

The basic variables under study were the three physiological reactions to "critical" questions used in the Simulated Theft Experiment. The reactions to these questions were evaluated in two ways: by direct physical measurement of the tracings with respect to such characteristics as Height, Width, Change, and by a visual examination of the same tracings by trained lie detector operators who rated the significance of the reactions on a scale of 0-3. Objective measurement analysis yielded at least two indices for each physiological reaction, e.g., Height and Width for the psychogalvanic response, Frequency and Amplitude for respiration, and Height, Width, and Change for the plethysmographic tracing. The visual analysis by lie detector operators produced one overall rating for each of the physiological response systems.

Since the measurements and the ratings were obtained from the same set of 33 polygraph charts, a direct comparison of the accuracy of the two methods (measurement vs. rating) was possible. Accuracy was expressed in terms of percent: the percent of correct discriminations between pairs of subjects one of whom was a Thief, the other an Innocent Suspect (the T-I discrimination); the percent of correct discriminations between Thief and Lookout (the T-L discrimination); and the percent of correct discriminations between Lookout and Innocent Suspect (the L-I discrimination).

In the sections that follow, the initial comparisons between the measured and rated data will focus on the accuracy of the single physiological indices. The subsequent comparisons between the measurement and rating procedures will involve the accuracy scores attained by combining indices.

## Single Physiological Indices

The first comparison between the two methods of scoring, objective measurement and visual rating, involves the accuracy attained by using single indices. Table 8 presents the accuracy scores of the measurements and ratings for each of the physiological reactions. Each measured percentage is based on 11 paired discriminations. In other words, the 91 percent accuracy attained by using measured Height of the psychogalvanic response to make the T-I discriminations indicates that in 10 of 11 comparisons the psychogalvanic index was larger for the Thief than for the Innocent Suspect. The accuracy of visual ratings for the same 11 Thief-Innocent pairs is expressed as 91 percent and indicates that in 30 of 33 comparisons of Thief-Innocent pairs the psychogalvanic rating was greater for the Thief than for the Innocent Suspect. There were 33 comparisons in the rating because three lie detector operators rated the polygraph charts of the 11 Thief-Innocent pairs. For all visual ratings, then, the percentages are based on the evaluations of three raters.

TABLE 8

ACCURACY SCORES FOR SINGLE PHYSIOLOGICAL INDICES OBTAINED BY MEASUREMENT AND BY RATINGS

| Measured and Rated Indices | Discrimination T-I | T-L | L-I | General Average |
|---|---|---|---|---|
| PSYCHOGALVANIC | | | | |
| Measured | | | | |
| Height | 91 | 91 | 100 | 94 |
| Width | 82 | 91 | 82 | 85 |
| Visual Rating | 91 | 90 | 82 | 88 |
| PLETHYSMOGRAPHIC | | | | |
| Measured | | | | |
| Height | 64 | 55 | 82 | 67 |
| Width | 55 | 55 | 82 | 64 |
| Change | 82 | 73 | 64 | 73 |
| Visual Rating | 82 | 77 | 73 | 77 |
| RESPIRATORY | | | | |
| Measured | | | | |
| Frequency | 64 | 45 | 45 | 52 |
| Amplitude | 55 | 55 | 64 | 58 |
| Visual Rating | 71 | 41 | 71 | 61 |

The overall picture indicates that greatest accuracy is attained for the psychogalvanic response, whether it be for the measured data or for the rated data. Least accurate are the respiratory indices, measured or rated. Approximately midway lie the accuracy scores for the plethysmographic response.

The main purpose of measuring the physiological reactions was to determine how accurate discriminations could be when certain selected aspects of the total reaction pattern were used as diagnostic indices. Such accuracy was to be compared

with the accuracy of ratings of lie detector operators who evaluated the total reaction on the basis of a visual examination of the curves. Thus, as regards the Thief-Innocent discrimination the measured Height of the psychogalvanic response proved to be as accurate (91%) as the ratings of the lie detector operators who studied the total psychogalvanic pattern in arriving at their rating of the same response. Measured Width (82%), however, did not prove to be as accurate as the Visual Rating (91%). It is likely that the lie detector operators are more influenced in their ratings by the height of the psychogalvanic response rather than be its width (recovery time). "Insofar as the psychogalvanic response is concerned, when all three types of discrimination are averaged, the measured height yields the greatest accuracy (94%)". Visual ratings (88%) are slightly more accurate on the average than measured Width (85%). The important fact that emerges from this analysis is that measured Height alone is at least as accurate as the Visual Rating, despite the greater amount of information potentially available in the visual evaluation of the total physiological pattern.

A study of plethysmographic accuracy reveals that the average of Visual Ratings (77%) is slightly higher than the average of Change in pulse beat (73%). Height (67%) and Width (64%) of plethysmographic response, are, in turn, slightly less accurate then Change. The pertinent observation is that only one measured aspect of the plethysmographic pattern (Change) is almost as accurate as the Visual Rating which is based on the total plethysmographic reaction.

A similar result is to be noted for the respiratory response system which attained the lowest degree of discriminatory accuracy. Measured Amplitude had an average accuracy of 58%, a value just slightly lower than the 61 percent for Visual Rating.

In summary, there is at least one measured characteristic in each of the physiological response systems that attains an accuracy score very close to that achieved by the visual ratings of lie detector operators. It is thus within the realm of practicality to replace such subjective ratings by objective measurement without sacrificing overall accuracy. Further, since the terminal decisions of lie detector operators are not significantly more accurate than the optimal weighting system assigned to their ratings of individual physiological reactions, it is theoretically conceivable that

the objectively measured responses -- ultimately done under computer control -- can be optimally weighted by a computer into an objective decision reflecting the guilt or innocence of a subject.

Combination of scores

It was noted above that the measurement procedures yielded two scores for the psychogalvanic response, three for the plethysmographic response, and two for the respiratory response. There were, then, twelve possible ways of obtaining a combined score by always selecting one score from each of the three physiological response systems. As an example, psychogalvanic Height, plethysmographic Change, and respiratory Amplitude could be used to determine the degree of accuracy such a combination would have in discriminating between a Thief and an Innocent Suspect (T-I), between a Thief and a Lookout (T-L), and between a Lookout and an Innocent Suspect (L-I). Two ways were used to combine such scores; simple summing of the individual scores or weighting each score by means of a linear discriminant function. These two will be called Summed Score and Discriminant Score. The linear discriminant procedure was used and described in the Simulated Theft Experiment (Kubis, 1962).

There was only one rating for each of the physiological indices. It was based, as mentioned earlier, on an overall evaluation of the total pattern involved in each physiological response. With only one rating available for each physiological response, only one combination of all three was possible The two methods of weighting such a combination were the same as indicated above: Summed Score and Discriminant Score. In this case it was the ratings that were summed or weighted by a linear discriminant function.

It would serve no eful purpose to catalogue all 24 measurement scores (12 Summed, 12 Discriminant), each a combination of the three physiological parameters. The accuracies with which these combined scores were able to make the T-I, T-L, and L-I discriminations have been averaged and the results presented together with the two combined Visual Rating scores (one Summed and one Discriminant) in Table 9. The overall results are fairly clear. The scores obtained by measurement, when combined so as to include one representative from each of the physiological reactions, yield accuracy scores that are slightly better on the average than the

combined visual ratings obtained from the lie detector operators. Thus, when simply summed, the measurement scores attain an average accuracy of 87 percent, two units higher than the corresponding summed ratings (85%). The discriminant weighted scores (91%, 89%) are slightly and uniformly better in accuracy than the summed scores for both the measurements (87%) and ratings (85%). The superiority of the averaged measurement socres is due in large part to the differential accuracy noted for the Lookout-Innocent discrimination in which the Visual Rating accuracy happened to be relatively poor.

TABLE 9

PERCENT ACCURACY OF THE COMBINED MEASUREMENT SCORES AND THE COMBINED VISUAL RATINGS FOR THE THREE TYPES OF DISCRIMINATION

| DISCRIMINATION | VISUAL RATINGS | | MEASUREMENT SCORES | |
|---|---|---|---|---|
| | Summed | Discriminant | Summed | Discriminant |
| THIEF-INNOCENT | 91 | 94 | 90 | 83 |
| THIEF-LOOKOUT | 88 | 94 | 82 | 92 |
| LOOKOUT-INNOCENT | 76 | 79 | 89 | 97 |
| General Average | 85 | 89 | 87 | 91 |

This analysis is intended to be suggestive rather than exhaustive. The percentages are based on only 11 paired comparisons within each of the three types of discrimination. Despite this limitation, the results are encouraging from at least two points of view. In the first place objective measurement yields results that can be used to discriminate among Thief, Lookout, and Innocent Suspect with at least the accuracy obtained from ratings of lie detector operators. The accuracy percents for the various discriminations range from 82 to 97 for the combined measurements. It is apparent that the measurements are tapping real physiological differences in the responses of the various groups who had different roles to play in the Simulated Theft Experiment.

It may also prove instructive to combine the several measurements within each physiological response to discover how accuracy is affected by including more than one measurement aspect in the discrimination task. With this objective

the two scores for the psychogalvanic response, Height and Width, were combined by simple summing and by weighting the two scores with a linear discriminant function. This was also done for the three scores (Height, Width, and Change) obtained from the plethysmographic response and for the two scores (Amplitude and Frequency) from the respiratory reaction. The accuracy in discrimination (T-I, T-L, L-I) for each physiological combination is presented in Table 10. A comparison of these results with those of Table 8 does not reveal any consistent increase in accuracy of the combined scores over that found for the single scores. Thus, one would do as well with PGR Height alone as with a combination of Height and Width. For the plethysmograph, however, the discriminant scores in the T-I and the T-L discriminations would do better than either of the three single scores. But this is not true for the L-I discrimination. As for respiration, only in the T-I discrimination is there any appreciable increase in accuracy for the combined scores. The absence of appreciable increases in accuracy for the combinations is due in part to the relatively high degree of correlation between the indices within the physiological response systems.

TABLE 10

PERCENT ACCURACY FOR THE COMBINATIONS OF SCORES WITHIN EACH PHYSIOLOGICAL RESPONSE SYSTEM FOR THE THREE KINDS OF DISCRIMINATION

| COMBINATION | THIEF-INNOCENT | | THIEF-LOOKOUT | | LOOKOUT-INNOCENT | |
|---|---|---|---|---|---|---|
| | Summed | Discriminant | Summed | Discriminant | Summed | Discriminant |
| PGR (Height, Width) | 91 | 82 | 100 | 91 | 91 | 82 |
| PLETHYSMOGRAPH (Height, Width, &Change) | 73 | 100 | 64 | 91 | 91 | 73 |
| RESPIRATION (Frequency | 55 | 73 | 55 | 55 | 55 | 45 |
| | 73 | 85 | 73 | 79 | 79 | 67 |

## Conclusions

1. Measured characteristics of physiological responses can attain an average accuracy equivalent to that achieved by visual ratings obtained from lie detector operators. In other words, there is at least one aspect of a physiological response, e.g., height of PGR tracing, that can be used to discriminate between a Thief and an Innocent Suspect with the same degree of accuracy as that achieved by ratings of lie detector operators who examine the total psychogalvanic response pattern in arriving at their evaluations. This is generally true of the plethysmographic and respiratory responses as well.

2. The combinations of the measured indices within each physiological response system, e.g., intensity (Height) and recovery time (Width) of the psychogalvanic tracing, do not yield appreciable and consistent increases in accuracy over those attained by the single indices.

3. The combinations of the measured indices, one from each of the three physiological response systems, yield an average

accuracy of discrimination at least as large as that attained by the corresponding combination of rated physiological reactions.

Although these results must be evaluated against the background of limited sample size, it is encouraging to note that the ratings of lie detector operators are not more diagnostic than the objective measurements that are most likely possible with the aid of a computer. More work needs to be done on the nature and frequency of "serious" errors (e.g., calling an Innocent Suspect a Thief) in the objective measurement system.

## REFERENCES


Joseph, C. N. Analysis of compensatory responses and irregularities in polygraph chart interpretation. In V. A. Leonard (Ed.) Academy Lectures on Lie Detection. Vol. I. Springfield, Ill.: Thomas, 1957, Pp. 93-99.

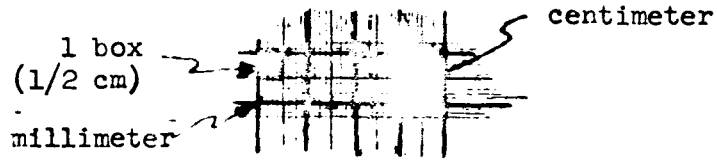
Kubis, J. F. Studies in lie detection: Computer feasibility considerations, U. S. Air Force, RADC-TR 62-205, 1962.

## APPENDIX

## DIRECTIONS FOR OBJECTIVE MEASUREMENT OF RESPONSES

### GENERAL INSTRUCTIONS FOR OBJECTIVE MEASUREMENT OF RESPONSES

1) Use the glass grid provided to make all measurements which cannot be made directly from the lines marked on the record paper. This grid is ruled in millimeters, half-centimeters, and centimeters, as shown in the diagram. The half-centimeter square will hereafter be referred to as a "box."



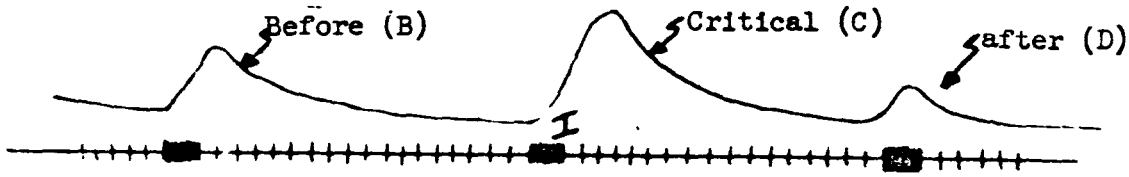

2) Each question is identified by a solid block on the bottom line of the record, as shown. The responses, starting immediately above these blocks are the ones to be measured.

A response to a question is considered valid, even if the response slightly precedes the solid block on the record. If, however, the response occurs a full box (1/2 cm.) or more before the block, measure the next response.

Count this as the response

In this case, count the second rise as the response.

3) Measure only the response marked by the Roman numeral (critical question), and the response immediately before and after this question. Record the values in the appropriate columns marked on the data sheets, either column B (before critical), column C (critical), or column D (after critical).




4) Make all measurements to the nearest 1/2 millimeter.

5) Be sure to note the order of questions on the record sheets: some are ordered I, II, III; other III, II, I; other II, I, III; etc., and record in the appropriate place on the data sheet.



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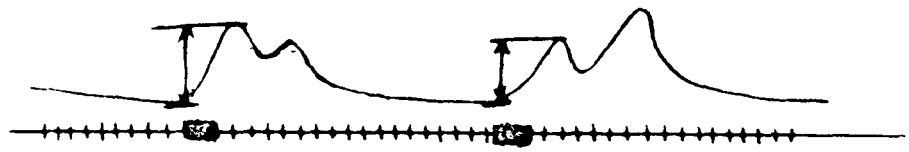
SPECIFIC INSTRUCTIONS: CRITERIA FOR MEASUREMENT

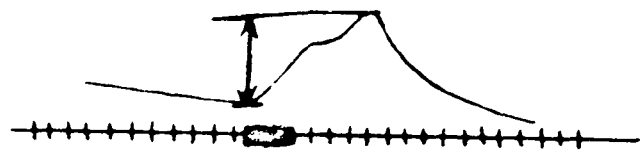
PGR Height

Measure from beginning of rise to top of initial rise.

When there is a double response, measure only the first one, even if the second one is higher.

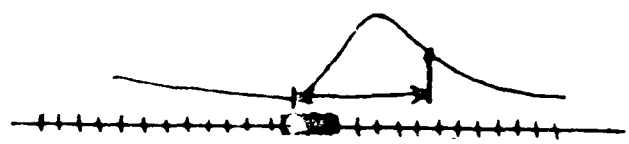


If the first bulge does not show definite signs of moving down, include the second one in the measurement.

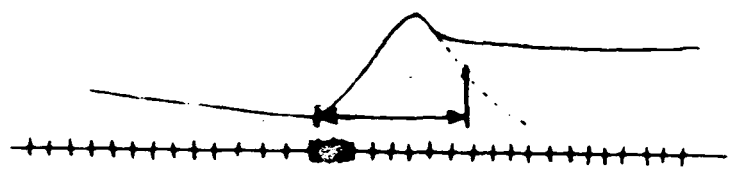


PGR Width

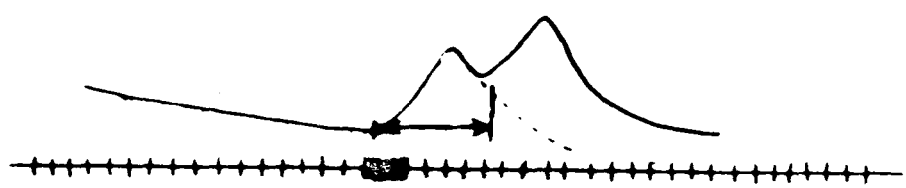
Measure the horizontal distance from the beginning of the rise to the point where the curve has fallen one half the height of the rise.



When the curve does not fall to the half-way point, extrapolate it and measure as described above.

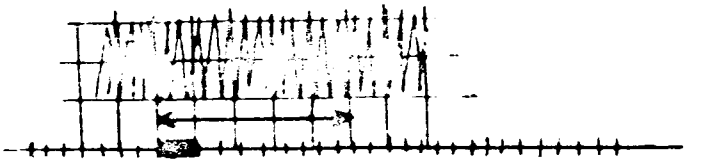


When there is a double response, extrapolate the first (if necessary), and measure it as above.



Plethysmograph Frequency

Count the number of spikes per 5 boxes (25mm.). Always count at the bottom of the spikes as shown in the example. In this example, there are 14 spikes in the 5 boxes.

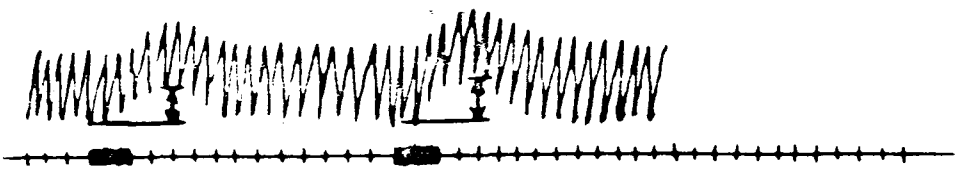


Be sure to include as many spikes as possible after the question, by placing, the first box exactly on the point of the first spike, as shown in the example above, otherwise you may miss a spike or two in your count.

If the next question occurs before 5 boxes have elapsed, use as many boxes as possible in your measurement, but keep the number of boxes used, constant for each B-C-D triad.

Plethysmograph Height Of Rise

Measure the height of the rise from the two beginning points (prior to the rise) to the two shallow points of the rise. If the level of the two points does not coincide, estimate their mean and measure this distance.

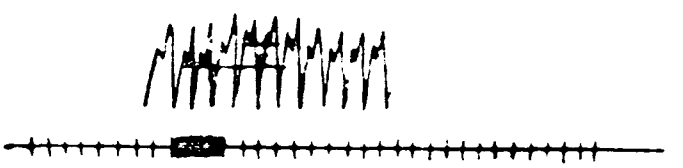


In the case of a double rise, measure only the first one. Unless the rise shows definite signs of dropping, consider it as a single rise, i.e., a single spike below the others may not be a real drop, so disregard it.

This is a double rise

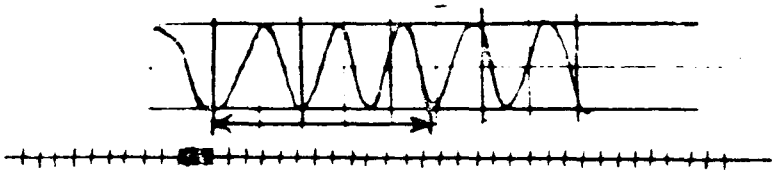
This is not a double rise

If no rise is evident, check for a notch in the middle of the spike and measure the rise in these notches, if any.



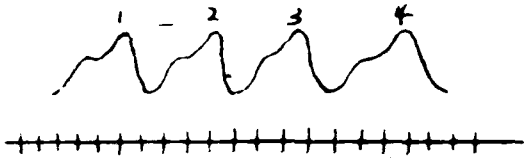
## Respiration Frequency

Count the number of millimeters on the grid within three cycles. If the limits of any one question in a triad include only two (or less) cycles, then count the number of millimeters for that number of cycles, but keep it constant for all three questions in each triad. Never use parts of cycles.

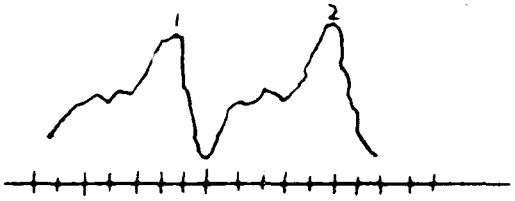


There are 24 millimeters in this example

Count only clear, evident cycles



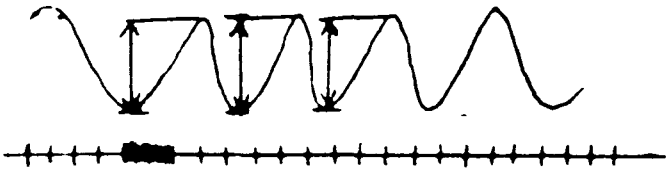

This example has four cycles




This one has only two

## Respiration Amplitude

Add the heights of all three cycles in each question of a triad. If there are less than three cycles before the next response, use as many as possible but keep the number of cycles used constant for each triad.

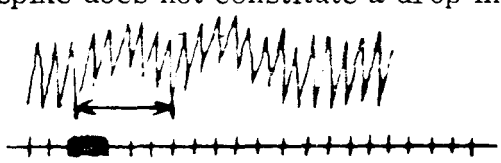


Measure the left side of the cycle in all cases.

Plethysmograph Width Of Rise

Measure the horizontal distance from the beginning of the response to the end of the response. To avoid chance results, always make sure there are at least two low points at both the beginning and end of the rise.

In case of a double response measure only the first one. Remember, a single spike does not constitute a drop in the curve.

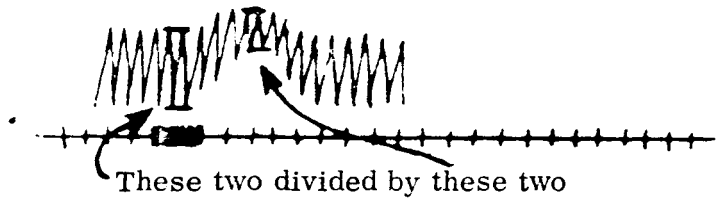


This is a double response

This is not a double response

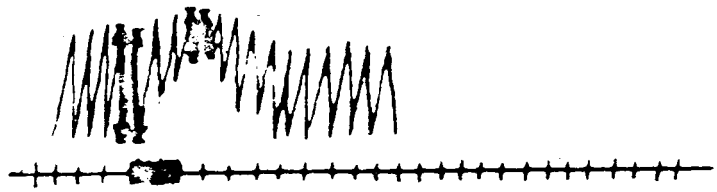
Plethysmograph Change In Pattern

Divide the length of the first two responses by the length of the two shortest successive responses for each question in the triad. That is, measure the height of the spikes; add the heights of the first two and divide by the sum of the heights of the shortest two.




These two divided by these two

In making the measurements of height, measure the height of the right side of the spike.



# PROSECUTION AND THE POLYGRAPH

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## Introduction

In recent years, the use of the polygraph has been of increasing interest to those involved with law enforcement and the criminal justice system. I welcome the opportunity at this time to review some of the past legal developments regarding the use of the polygraph as well as to discuss some of its current uses.

Although this article is not meant to be exhaustive on the subject, there are four areas on which I will touch: (1) what is the law on polygraphs and the admissibility of examination results as opinion evidence; (2) the opinions of expert polygraph operators are, in appropriate cases, being given considerable weight in day to day decisions, a prosecutor must make on whether or not to file charges on a given case; (3) even with existing case law limitations the opinion testimony of polygraph experts can be of a quality that should make it available to the trier of fact in determining guilt or innocence; (4) finally, in certain narrow and specific instances, the polygraph is a very useful tool for any internal investigations that might occur concerning the conduct and performance of public officials and employees with regard to their guardianship of the public trust.

## State of the Law

Even a cursory search through the law library makes it clear that the polygraph has not yet won widespread judicial approval. Yet those who would categorically oppose the use of the polygraph or admissibility of polygraph results will find it increasingly difficult to legitimately maintain such a stance in light of more recent developments. More work needs to be done with regard to a better understanding of the exact relationship between certain physiological reactions such as pulse rate, blood pressure, muscle tension, respiration rate, and galvanic skin response, to the telling of a truth or a falsehood. The empherical data is, however, convincing with respect to the opinions of qualified experts when there is the opportunity for verification or corroboratio



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such as in a confession case. A key here is "qualified" expert. We are quite fortunate to have some of the top polygraph people in the country in the King County area of Washington. National standards would be helpful in speeding the acceptance of the use of polygraph evidence, but until such time, the courts should be able to proceed on a case by case basis with regard to the qualifications of a given examiner, in much the same manner as would be necessary in laying the foundation for any expert opinion testimony. At this time, polygraph technique has developed to the stage where competent examiners should be allowed to testify in courts of law as experts, with the evidence to be treated as opinion evidence just as, for example, handwriting analysis is.

Frye v. United States, 293 F. 1013 (D.C. Cir. 1923) set forth the reasons upon which current arguments against the use of the polygraph are still based. In Frye, a murder case, the defense offered the testimony of an expert witness concerning the results of a "systolic blood pressure deception test." The trial court denied the admissibility of this evidence holding:

> We think the systolic blood pressure deception test has not yet gained such standing and scientific recognition among physiological and psychological authorities as would justify the courts in admitting expert testimony deduced from the discovery, development, and experiments thus far made.

Id. at 1014.

One might note that the polygraph was in its infancy in 1923. In Frye, only one physiological measurement was taken. Today at least four are included. Furthermore, as with so many scientific tests and theories in other areas, the development of polygraph testing during the last ten years has shown enormous gains and advances. As an aside, another person confessed to the murder for which Frye was convicted.

A major breakthrough in the use of the polygraph as evidence came in the early 1960's with such cases as State v. Valdez, 91 Ariz. 274, 371 P.2d 894 (1962). Valdez and similar cases opened the way for the use of polygraph evidence to corroborate other evidence in the case, upon

stipulation by both sides. The court said:

> With improvement in and standardization of instrumentation, technique and examiner qualifications the margin of proven error [5 per cent or less] is certain to shrink. 'Modern court procedure must embrace recognized modern conditions of mechanics, psychology, sociology, medicine, or other sciences, philosophy, and history. The failure to do so will only serve to question the ability of courts to efficiently administer justice.' Chappell, J., concurring in Boeche v. State, 151 Neb. 368, 383, 37 N.W.2d 593, 596, 600 (1949). Although much remains to be done to perfect the lie-detector as a means of determining credibility we think it has been developed to a state in which its results are probative enough to warrant admissibility upon stipulation. Cf., People v. Zavaleta, 182 Cal. App. 2d 422, 6 Cal. Rptr. 166, 171 (1960).

Id. at 900.

The Valdez standard was adopted by the Washington Court of Appeals in State v. Ross, 7 Wn. App. 62 (June 1972).

More recent decisions indicate that polygraph evidence is approaching full status as opinion testimony. The key decision here is United States v. Ridling, 350 F. Supp. 90 (Oct. 1972), a former dean of Wayne State University's Law School. In Ridling, the defendant proposed to offer the testimony of polygraph experts. Judge Joiner held such testimony was fully admissible as opinion testimony provided that the defendant would agree to submit to a further test by a court appointed expert chosen from a group of three independent experts, and provided further that the expert found the subject fit for testing and was in fact able to reach an opinion as to the truthfulness of the subject's responses. In reaching this decision, Judge Joiner heard evidence from persons considered experts in the use of the polygraph on the following:

1. The basic theory of the polygraph.

2. The reliance on the polygraph by government agencies.

3. The reliance on the polygraph by private industry.

4. The comparative reliability of the polygraph and other scientific evidence, such as fingerprint and ballistic evidence.

5. The opinion of the experts as to whether polygraph evidence would be a valuable aid in connection with the determination of the issues such as the one facing the Court in this case [perjury] and in the administration of justice.

Id. at 92.

In coming to its determination, the court made the following observations:

> Although these opinions [cases cited against the use of the polygraph evidence] are entitled to great weight in considering the matter at this time, they are not persuasive insofar as they are predicated on the unreliability of the polygraph. This is a question to be determined in each case, United States v. Wainscright, 413 F.2d 296 (10th Cir. 1969). Techniques improve. The evidence in this case indicates that the techniques of the examination and the machines used are constantly improving and have improved markedly in the past ten years.

Id. at 94.

The court further noted that the opinion testimony of the expert was admissible as any other opinion testimony, with its weight to be determined by the trier of fact.

Finally, the court noted that:

> The use of the Court appointed expert, whether or not he agrees with the expert

> tendered by the defendant, is a practical solution to the problem presented by the fact that only minimal standards exist for polygraph experts. It will in most cases permit the jury to hear the evidence.

Id. at 97.

Before Filing the Polygraph Role

The polygraph should and does have a very important use as an investigatory aid in addition to any use it might have as evidence in a trial. There are occasions when the polygraph plays a very useful role in our office in the pre-charging phase. It is the responsibility of the prosecutor and his staff to carefully scrutinize all cases presented by the various police agencies for filing. The prefiling examination of cases is a vital step in weeding out any possible "bad" charges. There are occasions where deputies will carry on investigations in addition to those performed by the police agencies, including personal interviews with key witnesses. The areas where this procedure must of necessity arise are the so-called "one-on-one" situations, where the alleged victim is the only witness to the crime, with no other witnesses or evidence to corroborate that testimony. One such obvious area includes morals cases. The victim may then be asked to submit to a polygraph examination. Should the victim be a suitable subject for testing, and pass the test given by a reputable examiner, this substantially reduces any possibility that a person will be wrongfully charged.

After Filing - Stipulation Cases

After charges are filed against a person, the use of the polygraph also plays a role in our office policy. In certain types of cases, stipulated polygraphs are offered to defendants. The use of stipulations is in keeping with the current state of the law in Washington under the Ross decision. With respect to the present office policy, the stipulation, which must be agreed to by the defendant, his counsel, and our office, indicates that the defendant will take a polygraph examination from a given examiner agreed upon by both parties, that if the examiner determines that the person is a fit subject for testing and if in the examiner's opinion the test results are conclusive as to either truth or deception with respect to questions asked, then the results will be admissible as evidence

in a court of law.

It is further stipulated that if the subject is not fit for testing, or if the results are inconclusive, then the taking of the test will not be mentioned by either party.

This type of stipulation takes into account a number of factors. First it recognizes that in some cases the person may not be suitable for testing where, for example, the person is ill, too young, or suffering from the effects of drug addiction. Second, there is recognition of the fact that some test results may be inconclusive as to truth or deception.

Moreover, by stipulating that the results will be admissible as evidence rather than stipulating that the results will be dispositive of the case, there is tacit recognition of the fact that the polygraph is not relied upon as a sole determiner of guilt or innocence. It does represent opinion evidence which may be very helpful to the trier of the fact. Such testing is, as with all evidence, subject to impeachment through cross-examination or contradiction.

Our office does not stipulate that a finding of truthfulness would automatically mean a dismissal of the case as this would rule out the possibility that additional independent evidence being discovered in the case. There have been situations where additional evidence has shown that a person's involvement in a given crime was different than originally thought at the time the polygraph test was given. The wrong questions may have been asked in the first examination, and additional polygraph tests have then been given with questions reflecting the new information.

Similarly, we are not in a position to demand that a test result indicating deception will require a plea of guilty. To do so might well be to deprive a person of his constitutional right to trial. In reality, the stipulated polygraph usually results in a reaffirmation of the other evidence supporting the charges, and a plea of guilty often results. The polygraph should not be used to decide the ultimate issue of guilt or innocence but should be considered like any other opinion evidence offered by an expert.

As a practical matter, should a defendant take and pass a stipulated polygraph, the state would usually not proceed with the prosecution. This of course assumes that further investigation uncovers no new evidence to support the proposition that the test was not properly given or the correct questions were not asked.

One recent case shows how a possible miscarriage of justice was averted through the use of the polygraph. There was direct eyewitness and physical evidence to indicate that the defendant participated in an armed robbery. The proffered defense was that of duress. Although this was a case involving direct, and not circumstantial evidence, the evidence was not inconsistent with the defendant's theory. Experience suggested that without any polygraph evidence, the defendant stood a strong chance of being convicted. Nevertheless, a stipulated polygraph was arranged and the defendant passed the test. After reexamining the evidence, and making further investigations, the decision was made to dismiss the charges.

Internal Investigations

In addition to its use in determining the filing or possible disposition of cases, the polygraph has an additional important function in connection with internal investigations. Such investigations might be appropriate in any area of public and governmental service. Recently, the focus has been in the area of police department internal investigations.

Legally, the Washington courts have addressed remarks to the issue of the use of the polygraph in internal investigations. In Seattle Police Officer's Guild v. The City of Seattle, 80 Wn.2d 307, 474 P.2d 485 (1972), our Supreme Court held that:

> A police officer may be required to submit to a polygraph test under the penalty of dismissal for refusal, when the authorities investigating serious and notorious allegations of police misconduct or corruption conclude, in the exercise of prudent judgment, that it is reasonably necessary to use the device as an investigatory tool to test the dependability of prior answers of suspected officers to questions specifically, narrowly, and directly related to the performance of their official duties.

Inherent in such a holding is judicial approval of the substantial reliability of the polygraph when expertly used. As this article is written there are debates in progress within the Washington Legislature and the Seattle City and King County Councils. Police unions are urging these legislature bodies to statutorily prohibit the effective use of the polygraph in internal investigations. It is my opinion that to say the law as set forth in the Seattle Police Officers' Guild case makes police officers second class citizens is a specious argument. All public employees with law enforcement responsibility, (including prosecutors) should be held to the highest standard in carrying out their public trust. To deprive chiefs of police and sheriffs of this infrequently used but vital tool, in the fact of their advice as to its importance, would be a serious legislative mistake.

Summary

It is clear from the cases and from the legislature debates that the polygraph remains controversial. It is not infallible and certainly must be used with expertise and in the context of other available evidence. But it remains useful in all phases of the law enforcement process, and it is clear that the courts recognize this and have given their approval to the polygraph and admissibility of polygraph evidence under proper circumstances.

# NEW JERSEY SUPREME COURT COMMITTEE ON CRIMINAL PROCEDURE IN POLYGRAPH TESTS - A REVIEW

by

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The purpose of the Criminal Procedure Committee was to provide a review of judicial and scientific authorities on polygraph testing and to render an opinion on the admissibility of expert testimony concerning the results of polygraphic examination.

The following is a summary of this report and its basic tenets. For the full report see 96N. J.L.J. Index Page 525, dated May 10, 1973.

The Committee initially looked at the judicial authority that has developed concerning the admissibility of the results of a polygraph test. The leading decision being Frye v. United States, 293 Fed. 1013 (D.C. Cir. 1923), which established two basic criteria which the courts since 1923 have steadfastly held to in determining admissibility of polygraph testimony: (1) does the present technique possess a reasonable measure of precision in its indications and (2) is it ready for acceptance in the field of science to which it belongs or by the group of specialists within the field? Using these criteria the courts have established a general rule of inadmissibility of the results of a deception test.

Concerning comments at trial regarding the refusal or willingness of a defendant to take a polygraph examination, these have generally been considered improper as either lacking probative force, violating constitutional privilege, or inviting prejudice. In many of these instances, however, the appellate courts do not consider this reversible error, but rather harmless or cured error. State v. Kolander, 236 Minn. 209, 52 N.W. 2d 458 (1952).

Exception to This Rule

(1) "Clear case of waiver." The Alaska court has held

that where there was a reference made to the test by a State witness, and there was no objection during the trial to this, then the person has waived his right to claim the admission of the comment was error on appeal. Rank v. State, 373 p.2d 734 (Alaska 1962).

As far as admissibility of statements or references to the fact that a polygraph examination was administered, generally such references are inadmissible. Once again such statements are at times considered harmless error. Johnson v. State, 166 So. 2d 798 (Fla. App. 1964); Smith v. State, 402 S.W. 2d 412 (Ark. 1966). Also when there is no objection to the statement that a test has been administered, then there is no error. People v. McLaughlin, 3 Mich. App. 391, 142 N.W. 2d 484 (1966).

Two exceptions to the General Rule of Inadmissibility: (1) Waiver - In Pulakis v. State, 476, P.2d 474 (Alaska 1970), the court held that it did not find the polygraph so unreliable as to constitute plain error if the results were admitted, and that failure to object by defense counsel to its admission constituted "a clear, intelligent waiver of any privilege to exclude this evidence."

(2) Stipulation - State v. Valdez 91 Ariz. 274, 371 P.2d 894 (1962), is the leading decision in this area and it held that the results of a polygraph examination may be admitted upon certain conditions, i.e., a stipulation, proper qualification of the examiner and conditions of the test, extensive cross-examination, and a limiting instruction to the jury concerning the weight to be given to the testimony. Florida and Washington agree with Arizona. State v. Brown 177 So. 2d 532 (Fla. 1965), Florida Bar v. Rayman, 238 So. 2d 594 (1970). State v. Ross, 11 Cr. L. Rptr. 233, (Wash. Ct. App. 1972).

Federal Exceptions to the General Rule

Two federal trial courts have recently admitted the entire results of a polygraph test without requiring any stipulation.

In United States v. Zeiger, 12 Cr. L. Rptr. 2135 (D.C. Cir. Nov. 9, 1972). (D.D.C. Oct. 10, 1972) Reversed without opinion 12 Cr. L. Rptr. the court held that the Frye standard of "general acceptance" meant reliability and not infallibility; that the polygraph belonged in

a specialized field of its own; and that Frye requirement of recognition among physiological and psychological authorities is too broad. The court also stressed the importance of laying a proper foundation and having a thorough cross-examination. The examiner would not be permitted to give an opinion on the issue of guilt or innocence, but only to assess the truthfulness of specific answers and to explain the basis of his opinion.

The court heard and accepted testimony on the reliability and general acceptance of the polygraph in United States v. Ridling, 12 Cr. L. Rptr. 2055 (E.D. Mich. Oct. 6, 1972).

Two significant factors on this case were: (1) it was a perjury case and the polygraph evidence went directly to the innocence or guilt of the defendant, and therefore admissible by either side. In those cases where the truthfulness of the defendant is not directly involved, then the examiner's opinion can only be used by the prosecution if the defendant takes the stand or puts his character in issue. Proposed Rules of Evidence for U. S. District Courts Rule 404, (2) Certain conditions were established to which the admissibility of the polygraph experts opinion would be subject.

a) The parties will meet and will recommend to the Court three competent polygraph examiners other than those offered by the defendant.

b) The Court will appoint one or more of the experts to conduct a polygraph examination.

c) The defendant will submit himself for such examination at an appointed time.

d) The expert appointed by the Court will conduct the examination and report the results to the Court and to the counsel for both the defendant and the government.

e) If the results show, in the opinion of the expert, either that the subject was or was not telling the truth on the issues directly involved in the case, the testimony of the defendant's experts and the Court's expert will be admitted.

f) If the tests indicate that the examiner cannot determine whether the defendant was or was not telling the truth, none of the polygraph evidence will be admitted.

New Jersey Law

Recently in State v. McDavitt 62 N.S. 36, - A 2d - (1972), Rev'g 118 N.S. Super. 77, 286 A. 2d 86 (App. Div. 1972) the New Jersey court held that polygraph evidence would be admissible when there had been a previous stipulation entered into by the parties.

General Discussion of the Polygraph

The Committee pointed out the courts' failure to approach the admissibility question dead on. Because of the principle of stare decisis (relying on precedent) the courts have grown stale in their appraisal of the polygraph and thereby preventing a thorough analysis of the strides the polygraph has taken in its development.

The Committee stressed the idea that there has to be a better understanding of the polygraph theory, equipment, operation, and technique of examination. In doing this the courts will be able to make a more extensive judicial inquiry into the polygraph.

As far as the reliability and accuracy of the polygraph the Committee cited several of the studies that have been done which support and indicate its reliability and accuracy.

These studies were then considered in light of the standard established by Frye, supra. for admissibility, that being "general acceptance" in the particular field in which it belongs. In analyzing this the Committee cited McCormick, a leading expert in evidence, as saying "general scientific acceptance is a proper condition upon the court's taking judicial notice of scientific facts, but not a criterion for the admissibility of scientific evidence." McCormick, Evidence, pp, 363-364 (1954).

It was also pointed out that in United States v. DeBetham, 348 F. Supp. 1377 (S.C. Cal. 1972), Aff'd 470 F 2d 1367 (9th Cir. 1972) the judge was in general agreement with McCormick in that the standard of admissibility should be one that weighs the probative value of the evidence against such factors as the possibility of misleading or prejudicing

the jury or taking up too much of the court's time.

Conclusions of Majority of the Committee

The majority of the Committee felt that, despite the substantial reliability of polygraph evidence, it should be excluded from use in a criminal trial because of policy reasons subject to the exceptions set forth in State v. McDavitt, supra. (stipulation).

The following is a list of the difficulties the Committee felt would arise if polygraph testing were to be admitted.

(1) Fear of jury giving conclusive weight to the polygraph testimony. Jury will consider the testimony, because it is based on mechanical results, as scientifically infallible.

(2) If admitted the jury will be expecting polygraph testing with the result being that in those instances where it is not offered by the defendant an unfavorable inference could be drawn against him.

(3) Possibility of conflicting expert testing causing confusion and consumption of time.

(4) Possibility of subjecting witnesses to polygraph exams; i.e., the defendant may demand that the complaining witness or eye-witness take an examination. This would lead to more confusion and consumption of time and could cause the jury to be less concerned with the testimony of the witness and more concerned with the polygraph testimony concerning the veracity of these witnesses.

Conclusion of a Minority of the Committee

The minority concluded that the polygraph is sufficiently reliable and substantially accepted so as to allow the entire results of a voluntary polygraph examination to be admitted as probative evidence in court per se.

In weighing the probative value of the evidence against the policy consideration of misleading or prejudicing the jury the minority stated that the courts can

provide sufficient safeguards so as to protect the policy consideration.

These safeguards mentioned:

(1) Competent, qualified examiners, formal education, polygraph training and internship, sufficient field training as an expert.

(2) Voluntariness of the examination should be determined before laying the foundation, and outside the presence of the jury. The Miranda warnings with an additional warning that the subject does not have to submit to a polygraph examination and that his failure to do so cannot be used against him will ensure this voluntariness. Stipulation should also be considered at this time.

(3) Subject to extensive cross-examination, a foundation should include: The nature and theory of the polygraph, reliability, acceptance, description of the equipment and its operation, and the conduct and circumstances of the tests.

(4) There should be proper demand and notice of the test, and the recordings of the test should be capable of diagnosis. The Court has discretion of allowing an independent examination by the opposing party or by court appointment.

(5) Jury instruction: The trial judge should instruct the jury that the test results are not conclusive; that the testing by the examiner is at best only an indication that the defendant was or was not telling the truth at the time of the examination; the examiner's testing does not tend to prove guilt, innocence, or an element of the crime charged; and that the jury is to decide the corroborative weight to be given such tests.

# THE POLYGRAPH EXAMINER AS A WITNESS IN COURT

by

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First, let me describe the organization I work for, Federal Defenders of San Diego. Federal Defenders is a private, non-profit community organization. When indigent defendants come into court charged with a Federal offense, on a showing of indigency, our office will be appointed to represent him.

We take 60 percent of all the cases in the Southern District of California, which ranges from the Nevada border to the Pacific and from Mexico to just below Los Angeles. We have one of the heaviest case loads in the United States due to the problem of entrants coming across the border, whether illegally from Mexico or to transport contraband such as aliens or narcotics. We have been in existence since 1966. We have a staff of 10 attorneys located in the United States Courthouse in San Diego. Our responsibilities are to defend those individuals who we are appointed by the court to represent.

## DeBetham Case

In the DeBetham case,[1] we were appointed to represent an individual who had crossed the border with an amount of herion located in the trunk of a car which did not belong to him. The car belonged to another man who happened to be waiting across the border as DeBetham was coming across from Mexico. Mr. DeBetham indicated to the arresting agents that he had been driving the car, but that he had no knowledge of contraband being hidden in the trunk compartment. He pointed out the whereabouts of the individual who owned the

[1] United States v. DeBetham 348 F. Supp. 1377 (S.D. Cal. 1972) District Court Opinion; 470 F. 2d 1367 (9th Cir. 1972) Appellate Court Opinion; Cert. denied ____ U.S. ____ (May 21, 1973).



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vehicle. Mr. DeBethem's story was that he had gone to Mexico with two friends; that they had become separated because he went to a cafe while the others went to a "girly" show. The people who had the car took off without him after failing in an attempt to locate him. In any case, he started hitchhiking back toward the United States from Tijuana, when he was picked up by the man who owned the car. As they approached the border and were preparing to enter the United States, the gentleman who was driving and owned the car indicated that he had to go to the bathroom. He said he would meet DeBethem at a bathroom in a restaurant on the other side of the border. My client, Mr. DeBethem, then slid over in the seat and drove. The car was searched and heroin was found. The Customs agents went and fetched him and that's how the case arose.

Both men were charged and the reason I am indicating the facts of this in some detail is that this case did not involve just one individual who had taken a polygraph test, passed it, and then had to contend with multiple witnesses on the other side. Mr. DeBethem, at trial, did take the stand and testify, as did the others who went with him that evening. They verified his story that he had not been with the co-defendant, owner of the car. The co-defendant also took the stand and said that he had been with Mr. DeBetham all day and that they had gone for the specific purpose of purchasing heroin. In sum, we had four witnesses testifying on Mr. DeBethem's side with entirely inconsistent lines of testimony from that given by the Government's four witnesses.

Polygraph Examinations

Now, Mr. DeBethem took three polygraph examinations from separate examiners. All of the examiners cleared him.

The charts of Chris Gugas were examined by experts: Mr. March, Mr. Zimmerman and Mr. Brisentine who is the head of Criminal Investigation for the United States Army, Washington, D.C. He ran a qualitative analysis of the charts and found them to be valid.

Introduced Into Court

In any case, during the midst of the trial, I rose to make an offer of proof for the introduction of the polygraph

evidence without any hope of the judge allowing the evidence in. In times past, all that happens when you try to mention polygraph evidence is a curt suggestion by the court that you sit down. In this case, Judge Thompson shocked us all by indicating that he would, indeed, hear testimony on the validity of the polygraph technique. This began a four-month experience for me in which I became educated in polygraphy.

We had four separate days of the testimony, one day each month from March to June. On each day we had a number of witnesses. There were ten witnesses in all: Mr. Chris Gugas, Mr. Lynn Marcy from Michigan and Mr. Charles Zimmerman from Boston, who runs F. Lee Bailey's cases. F. Lee Bailey also testified. Dr. David Raskin, a psychologist from the University of Utah, testified. I think if any of you are ever going to be involved in introducing the polygraph in court, for whatever reason, and you need foundation testimony, he is the man to contact. For the past two years, he's been doing nothing but validation studies of the polygraph technique at the University of Utah, using all three components on a Keeler polygraph. He has a qualified assistant by the name of Gordon Barland who was graduated from the Fort Gordon School, who runs actual field tests.

For the Government, two San Diego polygraphers testified against the introduction of polygraph evidence into court. Also testifying were an assistant U. S. Attorney and a psychophysiologist, Dr. David Hord. I might add that the psychophysiologist had never done any studies with the polygraph in terms of determining human deception. He was a typical anti-polygraph witness, stating that there are too many behavioral anomalies in the human personality for any polygrapher to be able to determine whether the response he sees on the chart is deception or whether it derives from fear, love or whatever. This is the typical argument you're going to face if you take the stand.

I would estimate that within the next year or two, a brave judge is going to announce that polygraph evidence is, on a discretionary basis, admissible on a showing of its validity. I think we showed its validity in the DeBethem case and Judge Thompson wrote a very favorable opinion. However, he indicated that the Appellate Tribunal, that is the Ninth Circuit, had already ruled on this subject against admissibility. Therefore, in his 27-page opinion, 26 pages

supported the polygraph and indicated that it is a reliable technique for determining deception. On the last page, he indicated that he would like to admit it; however, two Ninth Circuit decisions seemed to preclude admissibility [U.S. v. Sadrzadeh, 440 F. 2d 389 (9th Cir. 1971); U.S. v. Salazar-Gasta, 447 F. 2d 468 (9th Cir. 1971); Frye case 293 F 1013 (1923)]. The key case that most court decisions rely on is the Frye case, which is a 1923 decision from the District of Columbia. The citation for that is 293 F. 1013. The Frye case said that polygraph evidence, at least in 1923, was not shown to be generally accepted in the scientific community as a valid means of determining human deception. Judge Thompson found in his decision that the test in 1972 had been met; so that it should no longer be a stumbling block for the Ninth Circuit.

Other Federal Cases

F. Lee Bailey, at the same time I had this case going, had one going in Washington, D.C., and the results of that case supported admission of polygraph results. See U.S. v. Zeiger, Crim. No. 1831-70 (D.C. 10-10-72). The court wrote an excellent opinion citing the DeBethem case. Unfortunately, the court of appeals reversed it without an opinion on November 6, 1972.

In Michigan, another federal judge ruled polygraph evidence admissible in U.S. v. Ridling, Crim. No. 46732 (E.D. Mich. 10-6-72) as did a California court judge in People v. Cutter, -- Cal. Rptr. -- No. A176,965 (Judge Miller, 11-6-72).

Examiner Credentials and Foundation Testimony

The court in DeBethem adopted the suggestion by Reid and Inbau that the following requirements should be made of an examiner: (1) that he possess a college degree; (2) that he have received at least six months of intensive training under an experienced, competent examiner or examiners with a sufficient volume of case work to afford frequent supervised testing. I don't think that means six months of actual schooling; it means some sort of supervision over a period of time after you have completed your school. Judge Thompson also indicated that the witness should have at least five year's experience as a specialist in the field of polygraph examination. Finally, the examiner's testimony must be

based upon the polygraph records that he ran and which he must produce in court and make available for cross-examination.

There are two ways of establishing your expertise in a court of law. You can (1) have the opposition stipulate to your expertise. We did this with one witness in the DeBethem case, Mr. Brisentine, who is the head of the Criminal Investigation Division of the United States Army. His department does a qualitative analysis of every polygraph chart run in the Army within 72 hours of every examination. We got the Government, which was the United States Attorney in this case, to stipulate in the following manner: "Mr. Brisentine has acquired more direct experience in the analysis and quality control of polygraph examinations conducted in connection with a criminal investigation than any other expert on polygraph examinations in the United States." That was a pretty powerful stipulation. If you can get away with it, do it. You might just type up a resume indicating your expertise. If the opposition will agree to stipulate to it, you've made some gain because you're not subject to cross-examination on your expertise. Half the ball game is won. If there is no stipulation, of course, there will be a question and answer dialogue between the attorney and yourself establishing where you went to polygraph school and undergraduate school, how much experience you've had, and other questions which would satisfy the four criteria which I indicated previously. Those criteria aren't necessarily absolutes. Courts could differ from what Judge Thompson recommended. The important point to remember is that when you take the stand, your life's work in polygraphy is going to be open to review. Be prepared for it.

In the DeBethem case, Mr. Gugas, our first witness, demonstrated how the polygraph works. Mr. Gugas ran an actual demonstration with a subject picked from the audience. I think that is very dangerous, and it may not even be recommended, because if it goes wrong in court, it is a disaster. The reason it is dangerous is that in picking a subject from the audience, as we did, and you have no idea of his background. He could be a psycopath for all you know. Many of the court watchers are.

A better technique which we also used in DeBethem is to run the example before court, privately. Mr. Gugas ran me on the GSR and picked out the name of my wife. I asked him on the stand about this experiment, and he indicated how

it worked. Of course, if it fails, you need not mention it. You should explain how the GSR, pneumograph, cardio, and kymograph work. You must literally educate the court how the polygraph works. The judiciary is very ignorant of the theories and practices of polygraphy. Hopefully you have educated your attorney long before you appear in court.

The Value of the Pre-Test

The pre-test is valuable because it is the time in which you look at the subject. He's able to establish some sort of rapport with you and lessen his anxieties. You talk to him during that pre-test interview so you can tailor your relevant and control questions. You make an evaluation of his arousal level and you maximize his "psychological set" so that an innocent person is going to be responding to the control questions more than the relevant questions. The guilty person is going to be responding more to the relevant questions than the controls.

While you do this, you explain to the court what these different testing techniques are: the relevant-irrelevant, control question, peak of tension, etc. You must emphasize the value of the pre-test interview, and note that you do not just come in and test subjects cold.

If you used a relevant-irrelevant technique, assuming the other attorney has done his homework, he's going to ask you why didn't you use the control question technique. He is going to go through the control question technique and say, "Well, assuming this person is, in fact, innocent and he responds on the relevants and you're not using controls, how do you know he's innocent? You're looking at responses to relevants without controls," and then he'll put on the blackboard a simplified example of a control question technique where the man makes the same amount of response on the relevant question where the control questions show a gigantic response. Then the court is going to have some questions why you used the irrelevant-relevant technique and ask some questions as to its validity. This is something you're certainly going to have to explain to the court because it's a great simplification. In employment screening, I know that the relevant-irrelevant technique is considered preferable to the control question technique.

Another value of the pre-test is that by closely observing your subject, your plan of interrogation is ready should you detect deception. Most important, the pre-test interview enables you to evaluate your subject so that you can evaluate his physical and mental fitness because this is the big area of cross-examination, e.g., "How do you know that man wasn't on drugs? Did you have a doctor conduct an urinalysis?" In DeBethem before we ran a polygraph, we ran an urinalysis on the subject to make sure he wasn't on drugs. Of course, we know that drugs don't necessarily invalidate a polygraph; in fact, they may lessen a man's anxieties and give a better chart. However, that doesn't make sense to the court. They think if a man is on drugs, that there is no way you can examine him.

If he's mentally ill, you're going to have great problems convincing the court of your charts because as one psychiatrist said in our case, "You just can't tell about these people who are coming in and being tested unless a prior psychoanalysis was conducted." In DeBethem, a psychiatrist evaluated him as not a psychopath and not a psychopathic liar. The psychiatrist defined him as "normal," whatever that means. Nevertheless, this will impress the court on the reliability of your charts.

The next essential, when you take the stand, is to talk about the question technique and the charts. Of course, you're not going to be coming in if you see that your charts are in some way defective because you will be crucified if any component is defective. The reports which you wrote before coming to court, if erroneous in any way, will also produce a speedy crucifiction. If the person is accused of commiting a crime, as in DeBethem, and you are wrong in a few facts when you write about your pre-test interview, it will open a wide area for harmful cross-examination. If your subject lied to you and you took that lie as the truth in setting the background and in giving the examination, you're going to get hit with it on cross-examination, plus any other errors that might be in that report.

Prior to giving the examination, you must discuss the case with the attorney, read the police reports, and transcripts, so that you know completely the facts in the case before you put the man on the instrument.

I would suggest to you now that you run every test as if John E. Reid was sitting in the room at your elbow

because those charts and your interpretations have to be accurate. They have to be readable and you're going to have to be able to content with other polygraphers to whom the opposition may have given your charts. If they come up with a different conclusion, there is going to be a battle of experts in the court and the probative value of your testimony is going to be greatly decreased.

You should emphasize that charts can be accurately read by other examiners "blind." There are a number of tests from laboratory studies that have proven this and it enhances the scientific quality of your testimony if you can say that, "I can hand my charts to any competent examiner and he should be able to come up with the same result that I have."

In DeBethem, we had Mr. Bristentine run a qualitative analysis of the charts and he came up with a finding of their validity. He has a mathematical analysis technique in which he analyzes the charts that come into his office. He did that on the stand in our case and it was quite impressive.

Scientific Validation Studies

As to showing the scientific validity of polygraph tests and the ability of other examiners to examine your charts and come up with the proper conclusion, you may want to cite the following article. It's found at 62 Journal of Criminal Law, Criminology, and Police Science, No. 2, page 276 to 281. It was written by Frank S. Horvath and John E. Reid[1] in 1971. They had great success with competent examiners blind-reading charts that were previously validated. When you are on the stand, you're going to be faced with cross-examination with an attorney stating, "Well, isn't it possible that this could happen?" For instance, in blind-reading the charts, an attorney may say, "Is it possible that the person who examined this chart and validated it made the same mistakes you did?" It's going to be quite impressive for you to come back with a journal citation. Incidentally, for an article to be accepted in a scientific journal, it has to pass a certain muster of the

[1]"The Reliability of Polygraph Examiner Diagnosis of Truth and Deception."

editorial board. The research was conducted under rigorous scientific conditions to insure accuracy. When you come back with journal citations to refute the point the cross-examiner is trying to raise, it impresses the trial court.

Two of the polygraphers who testified against the admissibility in our case took the stand and said that they were not aware of any on-going scientific research on the validation of polygraphy. Well, the next witness was our psychophisiologist from Utah who had a list of 84 scientific validations studies done by scientists in the laboratory. This made the two polygraphers seem illiterate. I might add that there are a number of major studies going on in the world on the validation of the polygraph. In Israel, the major man is a fellow by the name of Sol Kugelmass. In the United States, the team of Gustafson and Orne is conducting studies. Immamura in Japan and a number of others are also doing research in the field. Also, in the United States, Raskin and his associate, Gordon Barland, of the Department of Psychology at the University of Utah, are doing validation studies. The reason courts have not accepted polygraph evidence is that they have not heard psychiatrists and physiologists testifying that "Theoretically, the polygraph is valid and these studies prove it." What we have had in the past is a number of competent polygraphers come in and state, "I've run 5,000 of these exams. I've probably made four mistakes, so I have a validation co-efficient of approximately 99 percent." That's very impressive, but there's really no way to validate such field examinations in a scientific manner. In the laboratory, they are now beginning to see that the polygraph does, indeed, have a high validation co-efficient and is a reliable indicator of deception.

Demeanor of the witness is important. You have got to look, act, and always be professional when you are on the stand. You must answer straghtforwardly and honestly. If the cross-examiner asks you a question which brings up a weakness either in your charts, your examination, or the theory of polygraphy, you have got to come forward and state it straightforwardly.

I'll give you an example. In DeBethem, one examiner took the stand who would never answer my questions. I might add that after each witness testified in DeBethem,

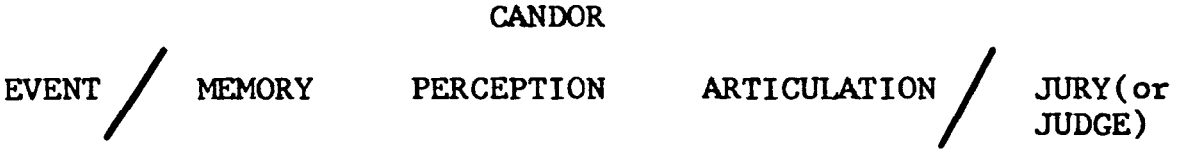
the court spent about ten minutes asking questions of its own. This witness was one of the only ones that was not asked any questions by the court, which sheds some light on what the court thought of the witness.

## Preparation Vital

Proper preparation prevents poor performance. The preparation is, of course, your own work, your report, your chart, the way you have conducted the test, but especially how you prepare your attorney. Your attorney, in all likelihood, knows absolutely nothing about the polygraph; yet, he will be there facing polygraph examiners, psychiatrists, psychologists and physiologists who may debunk the polygraph. He has to be prepared. He has to be familiar with the periodical literature to be able to easily tell how and why a polygraph examination functions as it does. There are a number of studies he can use as ammunition to attack the opposition, whether they be polygraphers or scientists. It's not that difficult for him to prepare.

## Trial By Polygraph - A Fear

A major fear of the courts is that if we admit polygraph examinations over objection of one party, we will have trial by machine rather than trial by jury. That is not at all what a polygraph is going to be doing once it is admitted into a court of law. This simplified example, I think, makes that quite clear. Let us assume that there is an event. I mark that as an "E". It could be a theft from a store, the incident involved in a paternity suit, or a crime.




Now at the other end of the spectrum, we have Jury. That is when the case is submitted to the judge or to the jury. In between, we have the testimony of the witnesses. A witness who takes the stand will be testifying from his memory, his perception of what happened, and his ability to articulate his perception based on his memory. Overriding all of these is his candor.

The polygraph does not involve the witness's ability to remember what happened. Polygraph evidence has nothing to do with the witness's perception of the incident, e.g., how many feet away he was standing from the corner when Joe Blow smashed into "X" at the intersection. That is the witness's ability to perceive the incident and how he remembers it will depend on how much time has elapsed. His ability to articulate is merely his ability to state what happened. The polygraph evidence has nothing to do with any of these, all of which are subject to cross-examination by counsel for the weighing of the jury or the judge. The only thing the polygraph evidence is relevant to is the witness's candor. Does he believe in what he says? Cross-examination of these three: memory, perception and articulation will always exist.

Assume a person actually believes an incident happened, and he passes the polygraph examination. The evidence is admitted into court. The attorney is able to cross-examine on these three matters, and, of course, on the way that the polygraph examination was conducted. If he can show the judge or jury that this person passed the polygraph because he actually believes what happened, but he had no reliable ability to remember or he had no reliable ability to perceive what happened then the test is not worth much.

## Trial and Perjury

Polygraph examinations are going to be able to prevent what is an on-going process in the administration of justice today, and that is trial by perjury. As an example, the DeBethem case involved eight witnesses. Four of them, got up and said this happened. Four others testified thereafter that the opposite happened. Thus, four people came into that court and perjured themselves. The witness oath has not been able to convince people that they should tell the truth when they take the stand. The major role that the polygraph is going to have in the courts is to be able to prevent this on-going process of trial by perjury. We are all involved in the pursuit of truth; and ostensibly the courts are as well. If the polygraph examinations were right in the DeBethem case, and I am confident they were, a major perversion of justice was effected because Mr. DeBethem was convicted of the crime of smuggling heroin.

## Polygraph Theory

The next major area where you will be confronted on

cross-examination is with the theory of the polygraph. You may be asked, "Well, how does the polygraph work?" and you will reply something like, "Well, when a person is deceptive he evidences measurable physiological responses through the GSR, pneumograph, and cardio." Then he may come up with a few journals which say that psychiatrists indicate that this is a bunch of baloney. You should retort with journal citations of other psychiatrists who say, "Oh, no, it's not. It's quite accurate." If I had to tally up the list of psychiatrists for and against, the pro-polygraph psychiatrists and psychologists who have studied the instrument far outweigh the detractors. The majority of studies that have been done validate the polygraph. Those who are debunking, for the most part, are those psychiatrists who have never studied the polygraph and never done any laboratory experiments. By and large they are the people who sit back in the armchairs and pontificate about theory and say, "Well, no, gentlemen, we cannot evaluate a person's responses because there are so many behavioral anomalies in the human personality that we cannot say with any degree of precision that a person's response was due to deception." You are going to have to be able to come up with studies to counter the cross-examiner who will be debunking the theory of polygraph.

Consider an article done by Orne and Thackray in Volume 4 of Psychophysiology, page 329 which indicated that in the opinion of the experimenters, the cardio was useless in determining deception. This article also indicates that the theory of polygraphy has validity. Such an article may be cited to you, "Are you familiar with this article, sir, where a scientist found that the cardio is a bunch of nonsense and that you can't make any conclusions based on cardio responses? Are you familiar with that?" You should be able to say, "Well, I'm familiar with that study, but I'm also familiar with the study done by the same Dr. Orne and his associate, Dr. Gustafson, at 2 Psychophysiology 10 through 13, where he supports the use of the cardio. There is an even better study that says the cardio is valid. It is in volume 59 Journal of Criminal Law, Criminology and Police Science, 632-635, done by Israeli scientists under Dr. Sol Kugelmass. They tested GSR without a cardio and GSR with the cardio and they found, as most laboratory experimenters do, that the GSR is highly reliable in determining deception. The major contention of the scientists working in the laboratories with college students is that the other

two components are said not to have the same degree of reliability. In this case, the Israeli scientists discovered that GSR was indeed valid and that GSR with the cuff was valid. The cardio unit alone was found a valid indicator of deception. This is a very important study.

If you must explain the reason why there is a difference between the laboratory and the field experimenters, I think that journal writers would say that the reason that the GSR is more accurate in the lab is because GSR is so sensitive to stress that it overreacts in the field situation. The college students who come in a lab test situation where they are asked a number of questions about the card they selected in an attempt to deceive the examiner aren't under a great deal of stress; therefore, the GSR is at a low level allowing one to read it with some degree of precision. In the field, the pneumograph and the cardio respond to the greater stress better and examiners find it easier to read charts on these two components.

However, the GSR, according to the lab experimenters, is so sensitive that when you get into a field situation where a person is charged with a crime, the GSR just goes out of control because of the stress. That seems to be the consensus of the people in the laboratories as to why the GSR has not been useful in the field. You are going to be faced with that. You are going to get on the stand and on cross-examination, the opposition attorney is going to say, "Well, I read in John Reid's book, Truth and Deception, in 1966, that he considers the cardio unit and pneumograph to be fine indicators of deception, but then I look at his chapter on GSR and it's only one page long. He said it's worthless and that you can't discern deception through the GSR. How do you explain that?" Give him an explanation. I might say that the lab people, the scientists in the laboratory, say GSR is the finest indicator of deception there is, so counter with the journal citations.

Let me give you three citations, all validation studies of the polygraph done in the laboratory. The first one is Volume 53 of the Journal of Applied Psychology, pages 399 to 403. Done in 1963 by the team of Gustafson and Orne, they came up with the following conclusion at page 401: "The fact that motivated subjects were detected far more readily supports the claims made for lie detection in actual life context where motivation would be maximum." Another

study in which the consensus was that polygraph was a valid technique in the field was done by the same team and citation is 48 Journal of Applied Psychology, 383 through 387. The tests have indicated the laboratory experiment came out with the same conclusion as above. The last citation is 59 Journal of Criminal Law, Criminology, and Police Science, pages 133 through 137. This is a study done by Dr. R. H. Blum of Stanford University, Director of Psychopharmacology. To quote from that study: "As one test of the validity of the polygraph, this study offers support to the contention that deception efforts can be detected by means of a polygraph." In this study they took a criminal type situation, 20 police informants who commonly go to the police and say such and such is selling heroin. They took 20 real life informants and the informants all gave true stories to the polygraphers in one experiment. All of those people were found to be non-deceptive and thus they were cleared. Then the informants came in with stories that were fictitious. All of those examinations revealed the informants to be deceptive. The only errors that were made -- and there were only four errors out of 106 statements -- came when the examiner tried to determine in which manner the man was being fictitious; in other words, to point to him, "Well, you're lying to me in this area, but you're telling me the truth in this area." They only made four mistakes out of 106 statements, so there was a high co-efficient of validity as well.

Counter Measures

The next area where you are going to face questioning on cross-examination is the area of counter measures. Assume that your subject was cleared on the polygraph and cleared by a psychiatrist as to his mental ability to emote on a polygraph test. On cross-examination, the attorney may start hitting you with hypothetical questions, and you must be able to come up with an answer that makes some sense and obviates the counter measure that he hypothecates.

What are counter measures? They are deliberate techniques by the subject to show you that he is innocent despite the fact that he is guilty of whatever he's charged with. The first type of counter measure, which really is not the usual type, is where a person tries to explain away a response when you show him a response. He says, "Well, let me explain that. I reacted probably because I was

thinking about it." Every time you point out, "Well, what about this?" after you've run him another time, he'll start explaining away. By the time you come to the fifth or sixth chart, he has adapted himself to the polygraph; and perhaps he can pass because he has adapted his physiological responses as a result of what the psychiatists call his "capitulation to the machine."

Another type of counter measure is used by the man who says, "I didn't do it," and you say, "Well, look at this response," and he does not try to explain it away piecemeal; he just jumps and screams, "I didn't do it. I didn't do it," and tries to convince you through the force of his personality that he is innocent. You face that all the time and it does not make any difference at all in considering your results.

However, there are more sophisticated problems in cross-examination, on counter measures such as when the person attempts to relax himself or excite himself so he can respond in a certain manner; whether he's undergone hypnosis; had an injection of chemicals prior to coming to the examination; or whether he's using physical counter measures. These are all things that the cross-examiner will ask, "Couldn't he have been doing this when you cleared him on this examination?" and unless you can say, "No, I'm quite sure that that didn't happen because I use this counter-counter measure all the time," you have trouble with the question. When the attorney hypothecates a counter measure you can say, "Well, that's impossible because we always use this counter-counter measure."

A hypothesis that underlies all counter measure cross-examination is that counter measures may be effective in one channel of a polygraph but rarely able to effect and destroy the readability of the chart in all three channels. Second, once a person employs a counter measure while you're giving the test, it's certainly an indicator of deception in that examination. Moreover, not all guilty subjects use counter measures. In fact, a five-year study done by Inbau and Reid shows that only 20 percent of those people who are guilty subjects, do employ counter measures.

A mental counter measure, where the subject is trying to either suppress a response to a relevant question or create a response to the control question, is not uncommon.

It assumes that the subject has had some education in polygraphy; he knows where to emote and where not to emote. However, it is a difficult thing to do. Some studies indicate that some of these combinations are highly effective as counter measures, and when that cross-examining attorney says, "Well, this study shows if this person employed this counter measure, he can beat you on the machine," the response has got to be, "Well, that didn't happen for such and such a reason."

The suppressive mental counter measure, where the man attempts to suppress a response to a relevant question, probably is only going to be used in a peak of tension test with any amount of success. This is called the modified Yoga technique of countering the polygraph examiner. A study by Kubis in 1962 showed that trying to suppress a reaction of your autonomic nervous system was not an effective counter measure and, in fact, he got higher results with those who tried to suppress the responses than those in a control group who just acted normally during the test. He got 80 percent successful results with people who tried to employ mental counter measures. That's something you can throw in the face of that cross-examiner when he says, "Well, couldn't this man tried to have mentally controlled his responses?"

Assume that the person counters by not listening to you. He's trying to dream of being on a desert island with that beautiful woman during the test. Of course, you would indicate on cross-examination that this man had to be responding to you for such and such a reason. Perhaps you had him responding to your key words in the peak of tension test, so he had to be thinking about the test. How do you know that he had to be thinking of your examination questions? You can do that by having him say the question again after you've said it and then respond with his answer. Dick Arthur, in 1970, claimed that when this counter-counter measure is used, the subject often makes verbal mistakes at the point of deception by failing to repeat the key words for an answer. If you employ that counter-counter measure, you've probably going to have a great deal of success with that subject.

Another mental counter measure is "rationalization." The subject convinces himself that the question does not

apply to him. For example, you ask, "Did you take that $10 from the drawer?" Now the person, in fact, did take the $10, but they were all in $1 bills and he rationalizes, "Well, I didn't take a $10 bill. I took 10 ones." He says, "No, I didn't take it." How do you counter when the attorney indicates to you, "Well, your question is defective here because couldn't the person have rationalized it away in giving his response?" The only counter-counter measure to this by the polygrapher is to avoid obvious possibilities of rationalizations. This is done by a proper pre-test and proper question formulation. In the pre-test you're reviewing the questions with a subject and you indicate to the cross-examining attorney, "Well, I went over each of those questions with the person during the pre-test, and he indicated he understood each one of them. We talked about his story, so he had to know what we were talking about because we went over each of the question during the pre-test and he indicated he understood."

The next counter measure possibly used by the subject is that of distracting imagery. "Well, Mr. Polygraph Examiner, couldn't that subject have been thinking about that woman on the desert island or other exciting imagery during your test?" Psychologists say that it's easier to generate artificial responses than to suppress genuine responses; i.e., it's easier for the subject to think about exciting images and disassociate himself from your test than to suppress his genuine responses. How do you respond to the question, "Couldn't he have been thinking of this exciting imagery rather than your questions?" Moore, in 1966, in an attempted replication of a previous study, did not find this to be an effective counter measure. Cite Moore.

There's going to be a book coming out which I think everybody should have. It's by W. Prokasy and David Raskin. They are the editors and it is entitled, Electro-Dermal Activity in Psychological Research. It will be published by the Academic Press in New York. It will have a composite of just about every study done in polygraph research.

What about polygraph test training as a counter measure? In DeBethem, the subject took three polygraph examinations. Part of the cross-examination of our experts by the U.S. Attorney, was, "Well, isn't it possible that when he took the first test that that polygraph examiner told him he passed, and, as a result of that instruction, Mr. DeBethem learned

how to pass polygraph tests?" The question then is, "Can, by practice and training, your subject have learned to pass polygraph tests, assuming he's taken more than one?" A fellow by the name of Lykken in 1960 found that when persons took more than one test, he had a 100 percent detection in the subsequent tests. That study seems to again indicate that one cannot learn how to pass polygraph tests merely by taking one or two examinations. If you're deceptive now, you're going to be deceptive 20 years from now. The scientists call it bio-feedback. If a person, through the feedback of passing one test, passes another test later because of the bio-feedback, he has learned to beat the instrument. The answer is probably not. It is hard to imagine a person, through this process of bio-feedback, learning to control his autonomic responses in all three channels. He may be able to do it in breathing, but it's rather difficult for him to control his heart rate, pulse rate and GSR.

What about hypnosis? "Wasn't this fellow under hypnosis when he came in to see you, and isn't hypnosis a rather easy means of fooling polygraph examiners? For instance, couldn't a hypnotist have taken your subject and told him that when he is under the hypnotic state he will not remember anything about the event you are going to be questioning him upon? In other words, the hypnotist is inducing an amnesiac state in the subject?" Well, that's a difficult question, and the answer seems to be that some people who have had success in getting hypnotized and being placed into amnesiac states were successful in misleading examiners; however, the studies on hypnosis indicate that the hypnotic state has not been successful in beating the polygraph. The only means by which he could possibly do it is by inducing an amnesiac state. Of course, if he comes in and he says to you he doesn't know anything about what happened, you're going to have a lot of questions. You might be able, through your pre-test interview, to figure out that something is wrong because the police reports indicate this man was on the scene. The subject's inability to remember what happened seems to be a little bit peculiar in such circumstances.

A question about physical counter measures may be: "Wasn't your subject responding (let's assume you use a control question technique) because he had a tack in his shoe. Couldn't he step on that tack every time a control question comes up and not step on it when the relevant comes up; isn't that possible?" Well, assuming you did a proper pre-test and assuming you are watching him as you are giving

the test, you would say, "Well, I always watch subjects and I would note any physical response." It's a sticky area because it's very easy to employ such tactics. There's one example I read where a person stepped on his hangnail all the time on the control questions and was able to beat the examiner. The question was, "Did you steal this document?" He answered, "No." At the controls he was stepping on that hangnail and after the exam was over the polygraph examiner cleared him, he pulled the document out of his pocket.

What about inducing pain? We've covered the thumbtack in the shoe. It will induce a response as will muscular movements, e.g., tightening of the arm, but you're able to see those movements. In many cases those responses are so great that you can tell on the charts that the response is due to muscular activity. You know that, but the judge doesn't. If you have John Reid's book of 1966, he gives examples where the subject made obvious physical movements and the cardio went way off the chart. It was obvious that he was using physical counter measures. Bring such examples to court for the judge to see.

What about adrenal exhaustion? The cross-examiner says, "Well, how do you know that this man wasn't adrenally exhausted so that he couldn't emote and respond?" The pre-test interview is your counter-counter measure. It's pretty difficult for a man to lose all his adrenaline permanently. There was one underground news article put out on how to beat the polygraph examination, which suggested that the subjects run around the block several times before they take the test. That way they would exhaust their adrenaline and they would be able to beat the polygraph test. If you employed an hour pre-test, he will rebuild his adrenaline. It probably doesn't make any difference anyway because in a study in 1966 -- I think this is in Reid and Inbau's book Truth and Deception -- they mention that the deception responses were observed in subjects who had undergone bilateral adrenalectomosis. Thus, even when you remove the adrenal process, they were still responding so that their charts could be read.

What about controlled respiration? You know the counter-counter measure to that. Just let the person breathe a few times after you have deflated the blood pressure cuff and told him, "Well, the test is over." Of course, the charts are still going and you can see him start breathing normally.

What about chemical counter measures? Your man may have been on drugs. You may want to have him tested before he takes a test. We did that in DeBethem. We had him analyzed for drugs by way of urinalysis. What about the situation when the subject defeats GSR by putting antiperspirant on his hands? It can be done. Or what if he puts clear fingernail polish on his fingertips? That should be easily observable. Chemical counter measures, anyway, are not terribly effective. Most of the people who have done the studies believe that tranquillizers, for instance, enhance the polygraph examination because they calm the subject.

Another issue which is not so much a counter measure as a principle is raised by the people in the laboratory; that is, the detection rate of subject when he's completely convinced that his lie will not be detected is going to fail greatly. For instance, watching TV one night, F. Lee Bailey was on the Cavett show talking about Clifford Irving's polygraph examination. Clifford Irving is the man who wrote the bogus biography of Howard Hughes. Mr. Irving took a polygraph examination and he indicated that the examiner came up with at worst an inconclusive result. The reason seems to be that when he entered the room he had no hopes of passing the examination. He knew it was all over. He had his confession already built in his mind for when the polygraph examiner said, "I see deception here. Why don't you give me the story?" He thought he had no chance of passing it. There seems to be an indication, according to laboratory studies, that when a person totally believes he can't possibly pass, you are not going to be able to accurately read his chart. This is something that may be posed to you in cross-examination.

I think the best response to all of these counter measures is that there's only one really effective counter measure to the polygraph examination, and that is to avoid taking the polygraph examination in the first place.

## A Respected Profession

As a final comment, you should take the witness stand as a member of a respected profession, polygraphy. Your answers should be those given by any member of the profession to similar questions. Above all, the answer must not reflect a technique of testing which only you can explain.

Standardization is the key to professionalism. If your answer to a question cannot be explained and supported by means of recognized polygraph systematology, then it is not worth much to the court or your profession. A polygrapher who contends that only he can read his own charts, and makes similar claims, will find that he and examiners of a similar ilk will keep the polygraph out of court for years to come. Polygraphy as a science can be explained in scientific terms. Kept on that level, its future in court will be assured.

# TECHNIQUES IN INTERVIEWING FOR LAW ENFORCEMENT AND CORRECTIONS PERSONNEL

by Robert J. Wicks & Ernest H. Josephs, Jr.
Springfield, Illinois: Charles C. Thomas,
139 pages; 1972.

Reviewed by Everett P. Gibbs, Extension Specialist
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This booklet, authored by Robert J. Wicks and Ernest H. Josephs, Jr., consisting of eight chapters, is bound in a plastic ring type holder, and is referred to by the authors as a programmed textbook. This is probably the first programmed text concerning interviewing to be published. It involves structured learning situations in some of the very important, but basic aspects in the initial contact and subsequent questioning techniques. In this regard the authors have brought out some very important psychological factors which all too often have been overlooked by police interviewers and interrogators. The range of subjects of interviews is broad because the authors discuss techniques for corrections personnel, as well as, for law enforcement officers.

The material in the text is offered in small numbered statements or frames which are arranged in a logical, step-by-step pattern, beginning with simple concepts and gradually progressing to more complex ones. The text is devised to teach a limited amount of information piecemeal and to allow the reader to fill in the blanks as he progresses. Each of the eight chapters is concluded with a brief review and test designed to reinforce the most salient material.

The authors begin by defining interviewing, its uses, and application in the law enforcement setting. Of particular interest and value to the reader should be the material contained in chapters two, three, four, and five, which cover the initial interview, the interview relationship, non-verbal communications, and the demonstration of interest in the interviewee, as well as, details about the factors involved in human relationships in the police or corrections settings. Investigators and polygraph examiners alike will find these chapters to be of interest.

The nature of the approach and the size of the booklet precludes the possibility of detailed treatment of the total variety of subjects encountered by the law enforcement officer, i.e., witnesses, informants, and suspects; however, the authors make no claim to differential treatment to people in each of these categories. The authors do mention that there is a differentiation between an interview of a parolee and that of a suspect. In their efforts to touch upon all types of interviewees, the approach of the text has been to cover those principles which would be common to all. Polygraph examiners could certainly use this text to benefit in their continued efforts to keep abreast of the latest professional instructions available.

## JUSTICE DEPARTMENT RECOMMENDS POLYGRAPH FOR POLICE INTELLIGENCE

The following is extracted from Basic Elements of Intelligence, A Manual of Theory, Structure and Procedures for Use by Law Enforcement Agencies Against Organized Crime, by E. Drexel Godfrey, Jr., Ph.D. and Don R. Harris, Ph.D. The book was published by the Technical Assistance Division, Office of Criminal Justice Assistance, Law Enforcement Assistance Administration, Department of Justice in November 1971. Police Departments may obtain a free copy by writing to LEAA.

> In those jurisdictions where it is permitted, the polygraph can be of great assistance in evaluating the integrity of a prospective staff member. By its use, the unit can make sure that the subject is not hiding some past action that might cast doubt on his capability and especially, on his honesty. It can be used to resolve doubts raised by an unsubstantiated derogatory report. In such cases, there may be no alternative but to ask the subject about the truth of the allegation. If he is attempting to conceal his past actions, he can deny he ever did such a thing. Then the interrogator (and, especially the unit commander, particularly if he is really interested in getting the subject on his staff) is in a dilemma. The use of the polygraph, operated by experienced and well-trained technicians, can help resolve this dilemma.

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The polygraph can be used at the time of the initial check and also at the time of the recheck or update. But, in either case, it should be the announced policy of the intelligence unit to require submission to this test. The prospective member of the unit must be told what to expect--whether the polygraph is used as a matter of course on all applicants both at the time of initial acceptance and at the recheck, or whether it is only used to check derogatory statements, as discussed above. The prospective staff member, by knowing in advance that he may be subjected to the polygraph need not feel personally offended when the test is given. More importantly, he probably will not apply in the first place if he has something he is attempting to conceal which he knows might keep him from being accepted as an intelligence officer.

It should be recognized, however, that, even though legally acceptable in the jurisdiction, the use of the polygraph may produce difficulties. One such difficulty could arise if it is used only by the intelligence unit. Agency personnel from other units might fear their careers would be jeopardized if by transferring to the intelligence unit they had to submit to the polygraph. The local police union or the civil service commission might consider its use by only one element of the agency as discriminatory and thus work against its being used at all. On the other hand, integrity standards for the intelligence unit should be as high as any in the agency--if not the highest. Use of the polygraph could symbolize the special personal requirements demanded of members of the unit.

# ISRAELI POLICE POLYGRAPH SCHOOL

N. Ansley

## ABSTRACT

Israeli Government school for polygraph examiners is six months, plus one year internship. The students, college graduates, learn both Reid and Backster Techniques. The school was recently accredited by APA.

The Government of Israel trains its government and police polygraph examiners in a special facility at Israeli Police Headquarters. Located at 14 Harakevet Street in Tel Aviv, the school has complete training facilities, including observation rooms, and Stoelting polygraph instruments of three and four channels.

The school limits its enrollment to six, and all students must hold an LLB or an A.B. degree in psychology or sociology. Although the school has been operating for a number of years, they now have their first female examiner in training. The students speak at least three languages, Hebrew, Arabic and English.

The school is directed by Major Eitan Gorni, an APA member, whose M.S. is from Hebrew University. A graduate of the Israeli Police Polygraph School, Major Gorni has also attended the Backster School of Lie Detection in New York City and spent several months at other polygraph schools and police facilities in the United States. Mr. A. Opatovsky, an APA member, who specializes in interrogation, has 15 years of experience and a Master's degree in Criminology. Mr. Akiva Ben-Ishai, now Director of Criminal Investigation in Israel, also teaches. He is a graduate of the University of Lausanne and the Reid polygraph course. Psychology is taught by Dr. Sol Kugelmass, the noted psychologist at Hebrew University, who has conducted research on polygraph techniques and instrumentation for the United States Air Force. His papers on the polygraph have appeared in a number of scholarly journals.

The formal training course is six months, including twenty-one weeks (850 hours) of classroom work and five

weeks of practice and observation. Students observe cases conducted at the Israeli Police Polygraph Laboratory. The curriculum includes the Reid Control Question technique and the Backster Zone of Comparison Technique. Following completion of the course, students are required to conduct a minimum of two hundred cases and an internship of one year under a Senior Polygraph Examiner before they are considered qualified to certify to the conclusion of a case or conduct examinations without supervision.

In January 1973 the school became the first foreign course accredited by the American Polygraph Association. The inspection was performed by Mr. Milton A. Berman,[1] Chairman of the APA Ethics and Standards Committee.

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ABSTRACT: AWARENESS AND ELECTRODERMAL CONDITIONING

Dawson, M. E. & Biferno, M. A. "Concurrent measurement of awareness and electrodermal classical conditioning." Paper presented at the twelfth annual meeting of the Society for Psychophysiological Research, Boston, November, 1972. To be published in J. Exp. Psych.

A discrimination classical conditioning paradigm was embedded within a masking task and presented to 56 college students. The probability that Ss would become aware of the CS-UCS relation was experimentally manipulated by means of verbal instructions. In addition, a technique was devised which permitted the measurement of awareness concurrent with the measurement of conditioning. The CS-UCS interval was divided into two subintervals: a short latency orienting response (OR) interval and a longer latency anticipatory response (AR) interval. The results revealed that GSR discrimination conditioning in the "OR" interval and "AR" interval occurred: (a) only among individual Ss who were aware, (b) only among groups of Ss for whom the probability of awareness was experimentally facilitated and (c) only at the time that awareness was expressed. These findings support the hypothesis that awareness is an important, perhaps necessary, variable in human GSR classical conditioning. [author abstract]

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"Effects of Task and Method of Stimulus Presentation on the Detection of Deception" by L. A. Gustafson and M. T. Orne. J. Appl. Psychol., 1964, 48, 383-387.

In a detection of deception experiment comparisons were made of the effects of two methods of stimulus presentation and two different S tasks. The relevant-irrelevant method of stimulus presentation proved equally effective for both tasks, but the peak of tension method was significantly less effective where the S's tasks was to deceive as to the nature of guilty information possessed (guilty information paradigm) than it was where the task was to deceive as to the possession of any information (guilty person paradigm). In general, Ss found it easier to deceive in the guilty information paradigm, where they could attempt to "appear guilty" on a noncritical item and especially when they could anticipate the order of presentation of items (peak of tension method). Author abstract.

"The Reactions of the Clothed Human Body to Variations in Atmospheric Humidity" by E. A. Winslow, L. P. Herrington, and A. P. Gagge. Am. J. Physiol. 124: 692-703, 1938.

Studies of the influence of humidity on the thermal reactions of clothed subjects disclosed that: (1) In the zone of body cooling below 25°C. (77°f.) sweat secretion and wetted area are minimal, and the relative humidity of the atmosphere has scarcely appreciable influence on physiological reactions. (2) When room temperature exceeds 25°C. (77°f.) the clothed body begins to adapt by an increase in wetted area. This increase is much sharper with high relative humidity than low humidity, and up to 32°C. (90°f.). The increase is attributed to stimulation of increasing numbers of sweat glands. The stimulation cannot be accounted for by rise in skin temperature alone, but is apparently also directly influenced by increasing internal body temperatures. (3) The upper limit of evaporation for a clothed subject at low humidity is 52°C. (126°f.). With high humidity, 70 to 80 per cent, the subject does not adjust as well, and the limit of adjustment may be below 43°C. (110°f.). (4) During the summer the mechanism of sweat secretion is in better working order, and sweat secretion is somewhat higher. (N.A.)

# REVIEW: "EMOTION AND CIRCULATION"

Altschule, M.D. Emotion and circulation. Circulation, 1951, 3, 444-454.

The article represents a brief survey of literature concerning the relationship between emotion and circulation. The purpose was to analyze available physiological studies on the subject and to relate them to clinical phenomena. The author made reference to the heart and peripheral blood vessels, excluding such topics as gastrointestinal and renal circulation.

Concerning the peripheral vascular system the author reports that cutaneous vasoconstruction in the hands and feet may occur while experiencing either pleasant or unpleasant emotions. These vasoconstrictor effects aggrevate manifestations of existing peripheral vascular diseases, e.g., arteriosclerosis. Fragmentary observations suggest that persons with unstable peripheral vascular systems develop reflexes involving this system more readily than do others. Concerning the heart, the author states that marked changes in heart rate, various arrhythmias, and various sensations about the heart are known to occur in relation to emotion. However, the mechanisms are unknown.

The author concludes that:

(1) No consistency is encountered in the occurrence or character of cardiovascular phenomena which may appear in relation to environmental factors which influence the psyche. The important significance of the environmental factor to the patient determines the occurrence and the severity of the response to it.

(2) Usually there is no indication of the mechanisms which result in the appearance of the various types of cardiovascular change.

(3) The clinical importance in knowing exactly what the physiological effects of emotion are stems from the fact that: (a) the effects may exacerbate cardiovascular diseases, (b) their manifestations may resemble those of organic diseases, and (c) their occurrence may call attention to the presence of emotional disorders not previously recognized.

## REVIEW: "CAPILLARY RESPONSE TO EMOTION"

Kramer, J., Peetz, D. J., & McCarthy, H. H. Capillary response to emotion. Psychosomatic Medicine, 1954, 16, 393-397.

Testing of capillary resistance was performed by means of a suction apparatus consisting of a vacuum reservoir, a small plastic suction cup with an inner diameter of 7 mm, and a mercury manometer with the necessary connecting tubing and stopcocks. Suction was applied by an electric suction pump. Capillary resistance readings were obtained on the abdominal skin of the laboratory animals which had first been shorn with an electric clipper. The skin then was covered with white liquid petrolatum. In human subjects the triangular area on the proximal volar aspect of the forearm was selected as standard site for measurement. White petrolatum jelly was rubbed into the skin area. The lubricant served not only to seal the skin-suction cup contact, but also to make petechiae more discernible. At least 48 hours was allowed before any skin area was employed for a subsequent reading. Suction was applied for 60 seconds and a hand lens was used, when necessary, in inspecting for petechiae. The least amount of negative pressure capable of eliciting capillary rupture and formation of petechiae was considered as the value of the capillary resistance.

Part I: The purpose of the first part of this work was to determine the immediate effect of emotional factors upon the capillary resistance. About 200 human subjects were observed, many hundreds of rats, plus several guinea pigs and dogs. All possible emotional influence other than the testing itself was carefully avoided.

Part II: Here the purpose was to study the prolonged effect of emotional factors on the capillary resistance. Nineteen albino rats were followed for a period of at least one month. Readings were made in 7 animals daily, in 12 every other day, each reading period lasting 15-20 minutes. These animals were not trained previously nor were they accustomed to handling. When tied down to the board in a deliberately rough manner, they invariably became enraged and attempted to bite anything in range. An extreme emotional state was thus created in each test period.



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Test Results

Part I: The immediate effect of emotional tension upon the capillary resistance may best be visualized by citing the entire course of readings in two typical human subjects. In the first there was no emotional effect interfering with the testing, in the second a marked emotional tension was displayed.

(A) A healthy young man showing no emotional reaction. As an average reading was expected, the manometer was first set to -25 cm Hg. The following readings were obtained, graded from "no petechiae" (-) to "marked bleeding" (+++):
25 cm ++; 20 cm +; 15 cm -; 18 cm -; 19 cm +; 18 cm -; 19 cm +. The final value of capillary resistance was 19 cm.

(B) A young girl who displayed obvious signs of nervous tension.
The course of readings was the following:
25 cm -; 30 cm -; 40 cm -; 45 cm -; 45 cm +++; 40 cm +++; 30 cm +++; 20 cm ++; 15 cm -; 17 cm +; 16 cm +; 15 cm -; 16 cm +. Final value, 16 cm.

The finding of a strongly (+++) positive capillary test, elicited by a degree of suction at or above which previous readings were negative, suggests that a hemodynamic change occurred during the test. It is obvious that at the beginning of the test on Subject B a spasm of the precapillary arterioles interfered with the reading and that later, at the very moment when the suction of 45 cm Hg was repeated, this spasm suddenly subsided. The precapillary spasm occurred in subjects (both human and animal) showing manifest symptoms of inner tension as well as those of a more placid and composed nature.

Part II: Whereas the above-described immediate effect of emotion upon the capillaries is very transient and does not really involve the capillary resistance, another type of response of longer duration has been observed, consisting of a profound change in the capillary resistance. The change begins with a rise and may be found within or after the first 24 hours following emotional stress. The degree of increase varied from 3 to 20 cm Hg. Extreme high levels (mostly 70 cm)

were maintained for 3-6 days, followed by a precipitous drop. The lowest values of 2-7 cm Hg were obtained in 1-2 days and the capillary resistance remained low for 4-25 days. The total duration of all four phases, i.e., initial rise, sudden drop, period of low capillary resistance, and restoration to normal, ranged from 10 to 30 days.

## Conclusions

A study of the effect of emotional factors upon the capillaries by means of observations on the capillary resistance revealed two types of capillary response: a short immediate reaction and a response of long duration. The first seems to be principally of nervous, the second principally of hormonal origin.

(1) The immediate reaction studied in the human and in various animals consists of a spasm of the precapillary arterioles resulting in an ischemic area at the site where the suction for testing the capillary resistance was applied. During this precapillary spasm the actual level of the capillary resistance is camouflaged and can hardly be evaluated. Recognition of this condition is essential in any study of the capillary resistance. As this phenomenon was found not only in obviously nervous vasolabile individuals but sometimes also in apparently stable ones, it is suggested that observation of the behaviour of the capillaries in the course of the capillary-resistance test may be used for detection of a latent tendency to vasospasm.

(2) Emotional stress is capable of eliciting a prolonged change in the capillary resistance of the albino rat which is in every respect similar to the change found following various types of somatic stress. Four phases may be distinguished in this capillary response: initial rise of the capillary resistance, a sudden drop, a period of abnormally low resistance, restoration to normal. The entire response has an average duration of 30 days. On the basis of previous studies of the hormonal regulation of the capillary resistance it is believed that the first phase is due to an increased pituitary-adrenocortical activity, the second and third to a refractory state of the adrenal cortex not related primarily to the pituitary. These findings may be regarded as a contribution to our knowledge of psychosomatic derailments and, specifically, to that of the emotional influence on the endocrine system.

# Plethysmography - a Bibliography

by

Norman Ansley

This bibliography was prepared to support research on the forensic application of the photoelectric plethysmograph as a polygraph channel. Unfortunately, only one article (Van Der Werken 1971) has been published on the topic. Everything else was written for some other purpose. Articles on impedance plethysmography and finger volume have been included if they helped explain a theoretical base or discussed forensic applications. (A common plethysmograph, the cardiosphygmograph, is incorporated in all forensic polygraph instruments. This unit, which employs a blood pressure cuff and high pressure system, deserves a separate bibliography.) The use of the photoelectric plethysmograph as a channel in forensic polygraph work is now several years old, and channels have been available as an extra feature in Stoelting, Keeler and Lafayette instruments. This bibliography has been prepared as an aid to those who work with these instruments.

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