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DECEPTION TEST CRITERIA

How One Can Determine Truth and Falsehood From Polygraphic Records*

Paul V. Trovillo†

It is the purpose of this article to offer a set of standards for the interpretation of polygraphic (lie detection) records. Those few readers who have had considerable specific experience may find here little that is unfamiliar to them. However, those who are interested in the tactics of criminal interrogation and would like to know more about the basis of lie test interpretation, or those who are beginning a specialized study of deception and have access to a lie detector, will find here representative standards to guide them. If publication of the accompanying charts makes possible a more common understanding of lie detection test criteria and encourages the use of the tests in criminological applications, our purpose will have been served.

In the United States today about forty police departments, and several organizations operating in a consulting capacity, are employing lie detection tests. Their examiners operate the instruments, interpret the records obtained therefrom, and interrogate the persons under investigation. Successful operation of the instrument and interpretation of the records is dependent upon the examiner's possession of keen psychological insight—the examiner's understanding will have been deepened if he has had special studies in psychology, physiology, and criminological techniques—; his conscientiousness, and objectivity; the extent of his experience in the questioning of criminal suspects; and the thought he has given to the understanding of the recorded polygraphic patterns of deception. Success in the obtaining of confessions and statements from subjects, following the actual examination itself, is likewise a matter of training and experience, and demands the employment of many and various psychological techniques. In police work—instrument operation, record interpretation, and subject-interrogation, are the three fundamental duties of an examiner, and each are mutually interdependent.

The strategies of police interrogation have been treated in some detail by other writers¹ and are not essential to this article. Likewise, technical considerations of the psycho-physiological factors

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¹ Kidd, Lieutenant W. R. *Police Interrogation*. (1940).

Inbau, Fred E., *Lie Detection and Criminal Interrogation*. (1942). See especially pp. 71-133.



Figure 1

The writer and a former Laboratory employee (Miss Hilleve Lantz) demonstrating a typical test situation.

responsible for the bodily changes recorded during deception tests, are continuously under discussion in the professional journals, and do not enter into our theme. It is the recorded emotional complexes and states of mental conflict themselves, as criteria of deception, which here interest us.

The charts reproduced here are tracings made by the author from sections of polygraph records obtained from subjects examined at the Chicago Police Scientific Crime Detection Laboratory. With the exception of those described as experimental, the reactions are those of men or women whose guilt or innocence was established, after the tests, by their own or by others' confessions or by subsequent police investigation and court findings. Doubtful cases, with one exception, do not appear.

THE EXAMINATION PROCEDURES

Before considering the indices themselves, the reader may want to know the conditions under which the original records were made. Reference to the accompanying photograph (Fig. 1) will make clear the arrangement long in use at the Chicago Police Scientific Crime Detection Laboratory. The examiner is shown seated in a position enabling him to mark the moving chart whenever he asked a question of the suspected person (more precise methods of marking the time elapsing between the asking of the question and the answering of it, are not employed because of the length of the questions used

and their varying grammatical structure). The instrument employs three recording pens, each being filled with ink. The chart paper moves at a rate of speed of six inches per minute. The Sumner "pneumograph" tube encircling the chest of the subject is made of thin-wall rubber tubing and contains a supporting close-wound helical spring. The tube is closed at one end, and opens at the other end into a small rubber tube which transmits to the recording instrument all air pressure changes occurring within it caused by expansion and contraction of the chest walls. This actuates the pen which appears adjacent to the subject's arm.

The physicians' blood pressure cuff is bound around the subject's right arm and is inflated with air to a pressure midway between his systolic and diastolic pressures. As the blood in the brachial artery pulsates under this tight cuff, it displaces minute quantities of air within the cuff and thus actuates the pen shown on the left (Fig. 1). Any increase or decrease in the subject's blood pressure likewise disturbs the volume of air and is reflected in a rising or falling baseline of the recorded pulse waves. Each pulse beat is likewise recorded, facilitating analysis of pulse rate changes.

The pen shown in the intermediate position on the chart records variations in the subject's "electrodermal" reactions (electrical skin reactions). This is attached to the subject by means of electrodes in contact with the back and palm of the hand. Stimulation of the subject in either an emotional or an ideational manner, such as by questions bearing on a guilt complex, affects his glands of internal secretion, his sympathetic and parasympathetic nervous systems, the perspiratory and other skin cells and their level of resistance to the passage of the minute electrical current being passed through them. Such stimulation is reflected in fluctuations of the pen, the pen being connected to a sensitive "galvanograph" (recording microammeter). The recorded patterns are known as electrodermal reactions.

When the test is begun, the subject is instructed to sit quietly, look straight ahead, and answer only yes or no to each question asked by the examiner (further talking would so disturb the respiratory patterns recorded that interpretation would be complicated). The questions themselves are direct and unambiguous, questions relevant to the investigation being interspersed among irrelevant ones. A single test generally consists of from seven to fifteen questions spaced about twenty-five seconds apart, and the examination usually involves from one to seven of these tests. Figure 2 shows a typical record of a suspect.

The comparisons between reactions to relevant and to irrelevant questions, to which the reader's attention has just been called, form a fundamental premise in any interpretation of lie detection records; although, as will be seen, there are many corollaries and

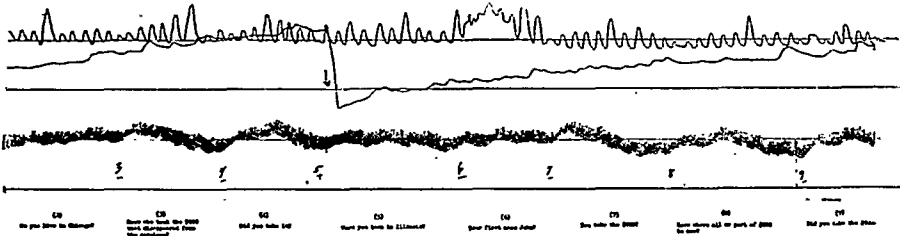


Figure 2

THE LIE DETECTION RECORD OF A SUSPECTED THIEF

This typical chart was obtained from a 23-year old messenger boy employed by a large metropolitan hotel. He was suspected of having appropriated for his own use \$900.00 entrusted to him in an envelope to deliver. After a second test, the young man was confronted with the guilty indications in his records, and he then confessed the theft.

Notice that on relevant questions (numbers 3, 4, 7, 8, 9) there is a decided and immediate increase in blood pressure (bottom line), suppression in respiration, followed by deeper "relief-breaths" (top line), and occasionally greater area or magnitude of reaction in the electrodermal responses (although not of great significance in these particular charts, see middle line). Compare these reactions with those on irrelevant questions (numbers 1, 2, 5, 6).

many complications to be observed. At this point it is necessary to observe that each case must be treated individually, that disturbances are not always found to occur on *every* relevant question asked a lying "suspect," that disturbed reactions, to be symptomatic of deception, *need not appear simultaneously* in the breathing, the blood pressure, the pulse, and the electrodermal patterns, that individuals vary greatly in responsiveness to crucial questions, that exaggerated electrodermal reactions are not as useful as the other criteria of deception, that only extensive experience will enable the examiner to differentiate between the indications of certain borderline types of recordings, and, finally, that in one out of every five cases competent examiners may be completely unable to say whether a person is innocent or guilty.

THE RELIABILITY OF THE TESTS

Now, under these circumstances, what is the reliability of the measures employed?² No one of the scientific deception tests in use today is infallible, and at no time have they approached the "100% perfection" sometimes claimed for them by over-enthusiastic promoters. The figures presented in the table below suggest the present status of the tests.

This tabulation indicates that out of all the records indicating guilt obtained at the Laboratory, 85% can be verified as correct. The status of the persons who were reported to be innocent cannot be learned with anywhere near the same degree of accuracy—in fact,

²Trevillo, P. V., "What the Lie Detector Can't Do." J. Crim. L. and Criminol. (Pol. Sci. Sec.) 32 (1): 121-124 (1941).

CHICAGO POLICE SCIENTIFIC CRIME DETECTION LABORATORY
EXPERIENCE IN THE RELIABILITY OF LIE DETECTION TESTS

Percentage of Total Subjects Examined	Examiner's Findings Involving 1,127 Subjects Given Lie Detection Tests in the Four-Year Period 1938-1941.	Percentage of Sub-Groups
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DEFINITE REPORTS

40%	<p><i>Sub-Group I.</i> Subjects whose records indicated deception and reported as such by the examiner.</p> <p>A—Subjects showing deception—who confessed at Laboratory to the crime in question, 50%</p> <p>B—Subjects showing deception who confessed at Laboratory to additional crimes, 20%</p> <p>C—Subjects showing deception who confessed their guilt to officers after leaving Laboratory, 15%</p> <p style="padding-left: 40px;">Total showing deception and verified by confessions, 85%</p> <p>D—Those showing deception—whose status could never be verified, 14.95%</p> <p>E—Those showing deception—who were later proved truthful, .05%</p> <p style="padding-left: 40px;">Total showing deception and not verified, 15%</p> <p style="text-align: right;">Total <u>100%</u></p>	
40%	<p><i>Sub-Group II.</i> Subjects whose records indicated no deception and reported as such by the examiner.</p> <p>A—Status changed to guilty by subsequent investigation, 2%</p> <p>B—No subsequent changing of status, 98%</p> <p style="text-align: right;">Total <u>100%</u></p>	

INDEFINITE REPORTS

20%	<p><i>Sub-Group III.</i> All of those subjects whose records were inconclusive and whose status could not be determined and remained unchanged. 100%</p>	
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can rarely be known except through the confession of other persons. Court decisions, of course, cannot be accepted as unquestioned verification or disproofs of polygraph records.

With competent examiners the tests may reach a very high degree of reliability. That, however, is not sufficient justification for introducing the tests as evidence in court, *over the objection of opposing counsel*. If attorneys for the prosecution and for the defense, and their clients, sign a stipulation and agreement to take the tests, agreeing that the court may consider the indications in the tests for whatever he deems them to be worth; when considered along with all the other evidence in the case, then no harm can be done. For although the last decade has seen some technical advances in test procedure and instrumentation, the scientists in the universities, who should be most concerned with the problems of deception testing, have not yet actively interested themselves in these

matters to any appreciable degree. Until the scientific view goes deeper than the present "suspended judgment," the courts will be compelled to depend upon other evidence than the academicians have produced that deception tests are practical, and that they are worthy of general acceptance by the courts.

Although trial courts in Illinois, Ohio, Wisconsin, New York, the District of Columbia, and other states have admitted the tests in evidence, the Supreme Courts have not as yet ruled upon the question of their admissibility. And this is truly fortunate, for in recent years there has come a definite threat from quackery in several of our larger cities, a threat to the continued usefulness of procedures employed by honest examiners. The records, of course, are peculiarly susceptible to misinterpretation by charlatans who are willing to testify either for a dishonest dollar or for purposes of publicity. These methods are not as accurate as fingerprint identification and probably never will be. They do have great utility in the establishment of avenues for investigation, and it is hoped that those people who are claiming "infallibility" will not interfere with this usefulness by action leading to an adverse ruling from the appellate courts.

THE NEED FOR STANDARDIZATION

The need for criteria for interpreting recorded patterns of deceptions has long been recognized.³ Pioneers in the field have written of certain fundamental ways in which a liar may be caught,⁴ but as refinements in the methods occurred, only partial explanations were prepared to clarify interpretation for the inexperienced. The time has come when oral and casual explanations of deception criteria are insufficient to dispel the common skepticism about the significance of the examinations. Examiners themselves are becoming better informed about the patterns of deception and their limitations and are demanding standardization in chart interpretation.

The pressing need for such standardization grows daily more obvious. For some time the National Research Council has had its committee in psychology busy, at the request of the Federal Government, surveying the possibilities for the application of current lie detection techniques to war-time problems. A similar committee was established by the Council in 1917, when Doctors Troland, Burt, and Marston reported favorably on the then-available tests of blood pressure, pulse, and respiration. Since that time much has

³Lombroso, C., *L'Homme Criminel* (2nd French edition, 1895). Also accompanying Atlas. Larson, John A., *Lying and Its Detection* (1932). Gross, H., *Criminal Investigation* (1907). Marston, W. M., *The Lie Detector Test* (1938). Keeler, L., "A Method for the Detection of Deception." *Amer. J. Police Science*, 1 (1): 42 (1930). Inbau, Fred E., "Detection of Deception Technique Admitted As Evidence." *J. Crim. L. and Criminol. (Pol. Science Sec.)* 26 (2): 262-270 (1935).

⁴Trovillo, P. V., "A History of Lie Detection." *J. Crim. L. and Criminol. (Pol. Science Sec.)*, 29 (6): 848-881; and 30 (1): 104-119 (1939).

been learned by those who have been administering the tests in criminal, civil, and personnel investigations. Experts have been developed, many police departments in the United States are utilizing the results of lie-detection tests to establish clues for investigation, and more and more the examinations are being recognized as a potent means for securing the truth.

THE INDICES OF DECEPTION

Several steps have already been taken toward the unification of practices, procedures, and criteria of deception, and the present article is another effort in that direction. The graphs here shown are arranged so that they can be used for reference purposes or in a training program for examiners, and are found under two headings:

I. The Indices of Deception

II. Ambiguities in the Records

The criteria developed here are based on thousands of polygraphic records of innocent, guilty, and doubtful individuals, some of whom were suspected of having committed felonies, some of whom were employed in occupations wherein the employer and the employed all took deception tests regularly every few months by arrangement with an insurance company, and some of whom were interested witnesses or complainants. In presenting these records the writer lays no claim to great originality (indeed, the majority of these indices were observed by others years ago⁵); this, however, is an effort to discriminate between the record indications in greater degree than is sometimes done, and it may be that careful consideration of the "ambiguities" section, wherein are discussed the influences and factors which tend to confuse the examiner or to prevent conclusive record interpretations, will serve to demonstrate why lie detection is still not a *precise science*, and why specialized training is a prerequisite to successful employment of the tests.

In Section I, The Indices of Deception, each graph has been selected from the Laboratory files to illustrate a specific criterion of deception.⁶ The graphs here shown are reproductions of tracings

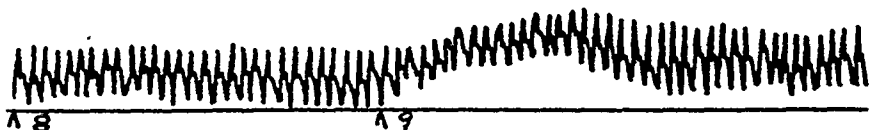
⁵The works of Leonarde Keeler, Dr. John Larson, Dr. W. M. Marston, Fred E. Inbau, and many research workers in the fields of physiology, psychology, and criminology should be consulted.

⁶The recordings discussed here were made by a polygraph in use several years at the Chicago Police Scientific Crime Detection Laboratory and used in the Laboratory when it was affiliated with Northwestern University. It is one of the early instruments devised by Leonarde Keeler, and employs metal tambours, pen and ink recording, and mechanical amplification of pneumatic changes occurring in the blood-pressure cuff and the pneumograph tube. Electrodermal changes occurring in the tissues separating electrodes affixed to the back and palm of one hand actuate a recording microammeter which makes an inked record on a moving paper chart. These blood-pressure, pulse, and respiration graphs are fair approximations to the recordings obtainable from any Keeler polygraph, new or old, as well as from the Berkeley Psychograph, or other ink-recording polygraphs. The electrodermal recordings are made by a separate instrument, a recording psychogalvanometer developed by Charles Wilson, Director of the Chicago Police Scientific Crime Detection Laboratory.

from the original records, the tracing being done to make the recordings stand out from the background more sharply than they did on the original charts. As is here shown, there is not a single criterion of deception, but many; graph number one, as an example, illustrates a common form of blood pressure rise, number two illustrates a blood pressure rise complicated by cyclical alteration of pressure, and number three illustrates a rise and rapid decline in blood pressure, accompanied by obliteration of pulse amplitude at the point of deception, etc. In this fashion the reader can follow along as the criteria are shown for blood pressure and pulse tracings, then respiratory reactions, and lastly, the electrodermal reactions.⁷

I. INDICES OF DECEPTION

A. Blood Pressure-Pulse Records, Showing Criteria of Deception.



1. COMMON FORM OF BLOOD PRESSURE RISE.

Subject A. B., colored, confessed murderer. Case P-562, Test No. 3.

Question 8. Do you deal in laundry? Ans.—Yes (Truth).

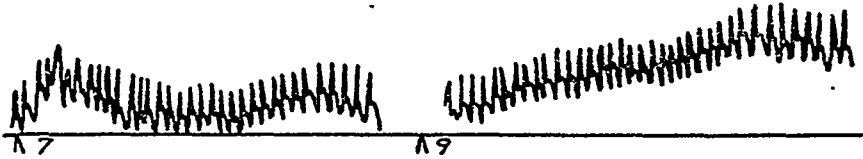
Question 9. Was your wife dead before you left the house at about 9:30 P.M.?
Ans.—No (Lie).

⁷Whenever "blood-pressure" change is referred to, it is commonly understood that this means blood-pressure and/or blood-volume change. The graphs merely reveal the result, and certainly do not discriminate between such influences as pressure changes in the ventricle or auricle of the heart, the elasticity of the veins or arteries, CO₂ tension in the vasomotor centre, nervous control of the veins, etc.

Respiratory changes referred to are those effects known simply as (1) suppression, or comparatively shallow breathing, (2) respiratory block, or inhibition, in which breathing is discontinued for several seconds—an exaggerated form of suppression, and (3) altered pattern of the breathing. The records may also reveal an apparent respiratory tremor (see Ambiguities Section, respiration record number 8) occasioned by the pneumograph tube picking up especially violent heart action. Of the three criteria just mentioned, the first two seem of the greater importance and the first one especially is the reaction most commonly observed.

Regarding the nature of the influences on the electrodermal patterns reproduced here, little can be said. The research done in this field indicates a complex of factors, including alterations in skin resistance to the externally imposed electrical current, changes in amount of perspiration, capacitance effects, disturbances in the sympathetic and the parasympathetic nervous systems, glandular activities, and other bodily states. And this complex does not operate with any inner consistency, so that at times it is largely influenced by states of fear and apprehension, at times by that end product known as the level of alertness, at times by states of mental conflict and deliberate deception, at times by emotional states, and at other times by sensory impressions and shock situations. The vagaries of the electrodermal patterns make them difficult, if not impossible, to use in deception tests wherein criminal suspects are involved. Experimental tests, however, involve simpler situations and may be extremely accurate in their indications, as high as 98%.

Careful experimental work done in university laboratories indicates that the electrical concomitants of electrodermal changes are of an extremely complicated nature and are not to be explained away by a simple application of Ohm's law to a resistance network having stable known parameters.



2. BLOOD PRESSURE INCREASE ON RELEVANT QUESTION COMPLICATED BY CYCLICAL INCREASES THROUGHOUT THE GRAPH (the latter are caused by subject's great excitement and tension and are not to be confused with the specific changes at the point of deception).

Subject H. F., white, age—20, admitted incest with ten-year-old niece. Case P-544, Test No. 1.

Question 7. Have you had coffee today? Ans.—Yes (Truth).

Question 9. Have you laid on top of E.? Ans.—No (Lie).

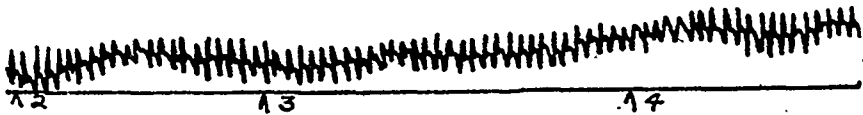


3. RAPID RISE AND DECLINE IN BLOOD PRESSURE, ACCOMPANIED BY OBLITERATION OF PULSE AMPLITUDE.

Subject A. G., white, murder accomplice. Case P-14, Test No. 1.

Question 2. Do you live in Chicago? Ans.—Yes (Truth).

Question 8. Do you know who shot that policeman? Ans.—No (Lie).



4. GRADUAL INCREASE OF BLOOD PRESSURE FOUND IN SOME SUBJECTS

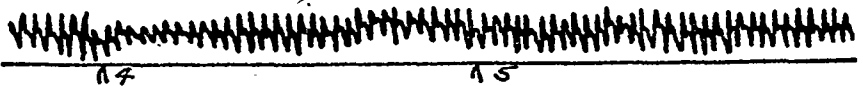
(Questions 3 and 4).

Subject R. L., white, who admitted statutory rape of his step-daughter. Case P-530, Test No. 3.

Question 2. Do you live in Chicago? Ans.—Yes (Truth).

Question 3. Did you ever have sexual intercourse with M. B., your step-daughter? Ans.—No (Lie).

Question 4. M. B. says you had sexual intercourse with her several times in 1938. Is that true? Ans.—No (Lie).



5. CONSTRICTION OF PULSE AMPLITUDE AND GRADUAL RISE IN BLOOD PRESSURE

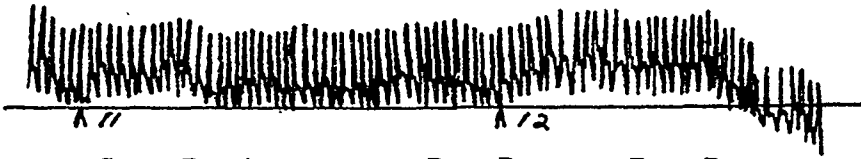
(Question 4).

Such a minor deviation may be significant when compared with the reactions to irrelevant questions. (See also graph No. 11 of this series.)

Subject A. B., colored, confessed murderer. Case P-562, Test No. 2.

Question 4. Did you strangle your wife to death last night? Ans.—No (Lie).

Question 5. Are you a citizen of the United States? Ans.—Yes (Truth).



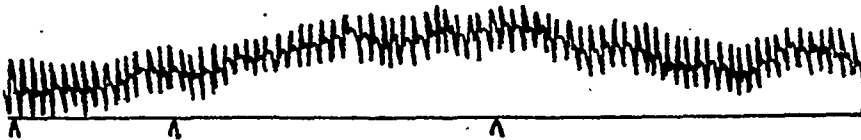
6. SLIGHT RISE ACCOMPANIED BY RAPID DECLINE IN BLOOD PRESSURE
(Question 12).

Note that Question 12 produced a larger response than Question 11, perhaps because it was more intimately linked to the actual sex offense.

Subject K. McL., white, admitted indecent liberties with P., a young girl. Case P-297, Test No. 4.

Question 11. Are you the one who jumped out of P.'s window that night?
Ans.—No (Lie).

Question 12. Are you the one who got into P.'s bed that night? Ans.—No (Lie).



7. "PEAK OF TENSION" (in Experimental Card Test.)

Subject was shown seven playing cards, asked to choose one of them, to remember the number and suit of that card, and to deny having chosen that card when asked by the examiner about the cards during the test situation. Note that maximum rise in blood pressure begins at point of deception, the second question, with decrease beginning on the following card.

Subject H. D., white, confessed robber and murderer. Case No. P-571.



8. RAPID CHANGES IN HEART RHYTHM (decrease, increase, and then decrease in pulse rate at point of deception).

Subject C. M., confessed rapist. Case P-548, Test No. 1.

Question 2. Were you born in Chicago? Ans.—Yes (Truth).

Question 7. Did you rape this girl, A. B.? Ans.—No (Lie).

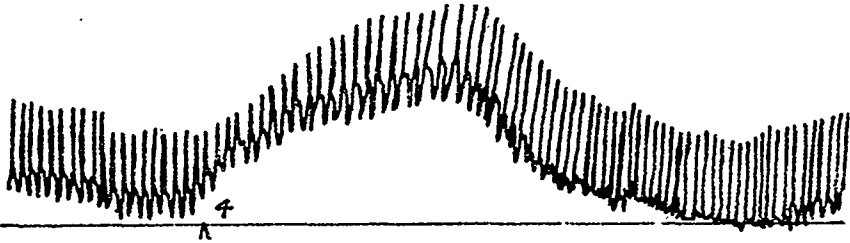


9. ANOTHER FORM OF CHANGE IN HEART RHYTHM (increase followed by decrease in pulse rate, also general pulse irregularity).

Subject H. D., white, confessed murderer and robber, Case P-571, Test No. 1.

Question 1. Is your name H.? Ans.—Yes (Truth).

Question 4. A man told the Sheriff that you tried to shoot off the lock of the deceased's shack. Is that true? Ans.—No (Lie).

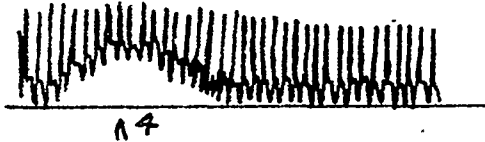


10. COMPLICATION OF DECEPTION PATTERN: Increase in Blood Pressure, Variation of Pulse Frequency, Reduction of Pulse Amplitude, and *Change in Position of Dichrotic Notch* (the notch on the downstroke of the recorded pulse wave, which is said to be caused by closure of the aortic valves and the rebound of the blood from these curtains of the heart).

Subject E. D., colored, admitted burglar. Case P-493, Test No. 1.

Question 4. Did you steal the stamps officers found in your rooms?

Ans.—No (Lie).



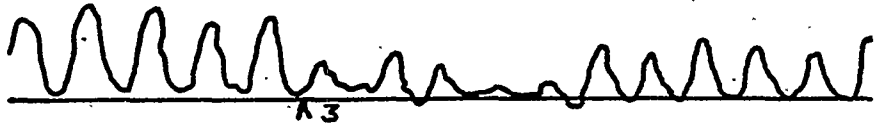
11. REDUCTION OF PULSE AMPLITUDE RESULTING FROM INCREASE IN DIASTOLIC BLOOD PRESSURE, WITH SUBSTANTIALLY NO CHANGE IN THE SYSTOLIC PRESSURE

Note that the recorded pulse wave is *shortened only at its base*, this effect being caused by increase only in the diastolic pressure. Refer back to Graph No. 5 for illustration of simultaneous increase in both systolic and diastolic pressures.

Subject E. M., colored, confessed murderer. Case P-198, Test No. 4.

Question 4. Did you kill that white fellow in the truck? Ans.—No (Lie).

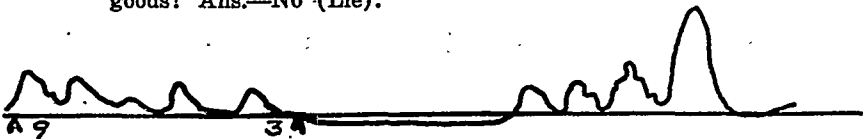
B. Respiratory Records Showing Criteria of Deception.



1. SUPPRESSION AT POINT OF DECEPTION.

Subject G. F., colored, accomplice of burglar, Case P-23, Test No. 2.

Question 3. Before B. was caught, did you know he was a robber and stole goods? Ans.—No (Lie).

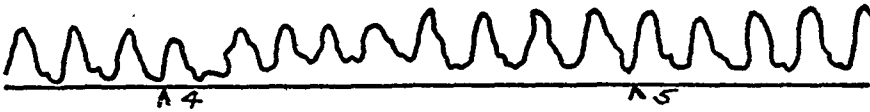


2. RESPIRATORY "BLOCK." (Note deepened respiration—the compensatory pattern—following respiratory block.)

Subject R. L., white, confessed statutory rapist, Case P-530, Test No. 2.

Question 9. Are you married? Ans.—Yes (Truth).

Question 3. Did you ever have sexual intercourse with M. B., your step-daughter? Ans.—No (Lie).

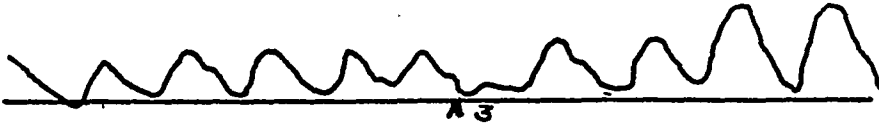


3. RISE IN BASE LINE OF RECORDED RESPIRATION (a form of suppression).

Subject G. F., colored, accomplice of burglar. Case P-23, Test No. 2.

Question 4. At the time you sold the stolen goods, did you know they were stolen? Ans.—No (Lie).

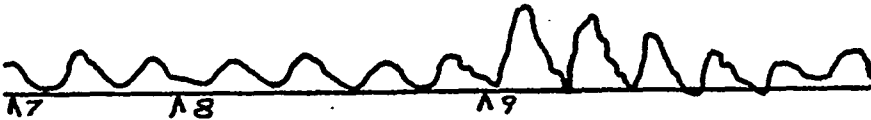
Question 5. Were you born in Illinois? Ans.—Yes (Truth).



4. RESPIRATORY SUPPRESSION PRECEDING DECEPTION STIMULUS, FOLLOWED BY DEEPER RESPIRATION AT POINT OF DECEPTION. (Compare height of the curves before and after question 3.)

Subject H. D., confessed murderer and robber. Case P-571, Test No. 1.

Question 3. Do you know who shot and killed that old hermit near the town of P in the year 1935? Ans.—No (Lie).



5. REGULARITY OF RESPIRATION UP TO AND THROUGH THE DECEPTION STIMULUS, FOLLOWED BY IRREGULAR RESPIRATION. (A form of suppression resulting from this particular arrangement of the questions.)

Subject H., colored, who had falsely alleged being raped and robbed.

Question 7. Is A. telling the truth when he says that he paid you for all but one act of sexual intercourse with you? Ans.—No (Lie).

Question 8. Did A. ever pay you \$5.00 to have sexual intercourse with you? Ans.—No (Lie).

Question 9. Are you over 21 years of age? Ans.—Yes (Truth).

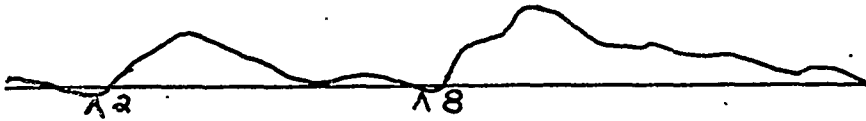


6. RESPIRATORY IRREGULARITIES UP TO POINT OF DECEPTION, FOLLOWED BY REGULAR RESPIRATION.

Subject H. B., white, confessed bank robber. Case P-375, Test No. 1.

Question 5. Were you born in Illinois? Ans.—Yes (Truth).

Question 6. Were you involved in the plans for this theft? Ans.—No (Lie).

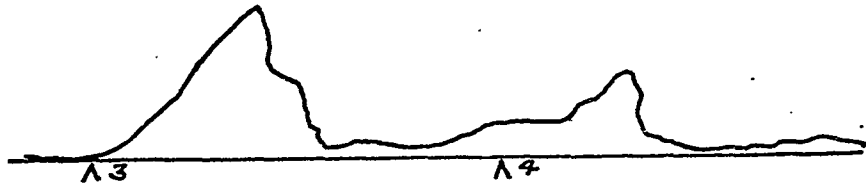
C. *Electrodermal Reactions in Deception.*

1. COMPARATIVELY LARGE AREA OF REACTION AT POINT OF DECEPTION (extension of deviation of response).

Subject K. McL., white, who admitted taking indecent liberties with a young girl, Case P-297, Test No. 2.

Question 2. Were you born in Chicago? Ans.—No. (Truth).

Question 8. Were you the one who removed P.'s underclothing that night? Ans.—No (Lie).



2. COMPARATIVELY LARGE MAGNITUDE OF REACTION AT POINT OF DECEPTION. Unidentified subject. Experimental test. Question 3—answered with a lie; Question 4—answered with the truth.

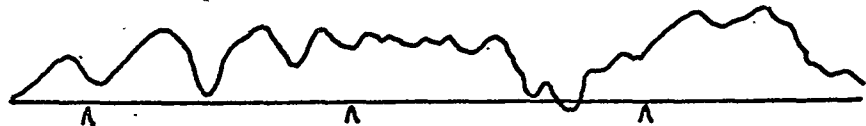


3. "PEAK OF TENSION" (AGE TEST) TEST MADE ON AN EXPERIMENTAL SUBJECT. *The last comparatively large fluctuation indicates point of deception.* (Third question asked.)

Subject was 31 years of age, and the examiner asked him, during the test, to say "No" when asked if his age was 29, 30, 31, 32, or 33. Note that when the third question was asked (Are you 31 years old?), that although the fluctuation was not larger than the preceding ones, it was followed by only minor deviations on succeeding questions.



4. "PEAK OF TENSION" TEST (CARD TEST). *The Only Large Reaction Appearing in the Series of Questions.* (Subject lied on the 2nd question).



5. PATTERN AT POINT OF DECEPTION DIFFERENT FROM PATTERN AT POINT OF TRUTHFUL ANSWERS. "Peak of Tension" Test (Card Test).

Subject chose the card here marked second in order. Note that response to the chosen card is less pronounced than responses to other cards not chosen. Incidentally, this peculiar pattern was accompanied in the records by the

largest single blood pressure increase following a series of stimuli. None of the stimuli produced a respiratory change. This type of electrodermal pattern is rather common.



6. GRADUAL RISE OF THE ELECTRODERMAL PATTERN.

This first reaction appeared (in an experimental record) at the point of the deception stimulus, and the second reaction appeared when the subject was startled by an auditory stimulus. Generally, a gradual rise of the curve is typical of deception (rather than the sharp rise which is more typical of sensory shock).

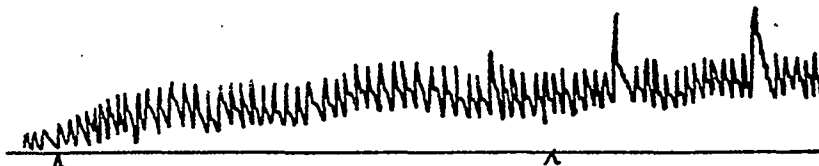
II. AMBIGUITIES IN THE RECORDS.

Any division of science employing dynamic data, as the biological sciences do, must always have an ever-narrowing hinterland of the unknown. This is the area which challenges the scientist, and which is left unexplored by the charlatan. The very fact that one can point to such an area of ambiguities, in the field of deception tests, is a healthy sign. It signifies our refusal to view the present achievements with pessimism and alarm and declares our intention to remain objective.

The present section, here labeled "Ambiguities in the Records," seems necessary in order to indicate the frontiers about which we now lack definitive information, and to warn the reader that generally accepted criteria and explanations must be employed with reservation and with due cognizance of the complexity of bodily responses. It is not the individual response which is ambiguous, but rather our interpretation of its relation to the whole pattern of responses.

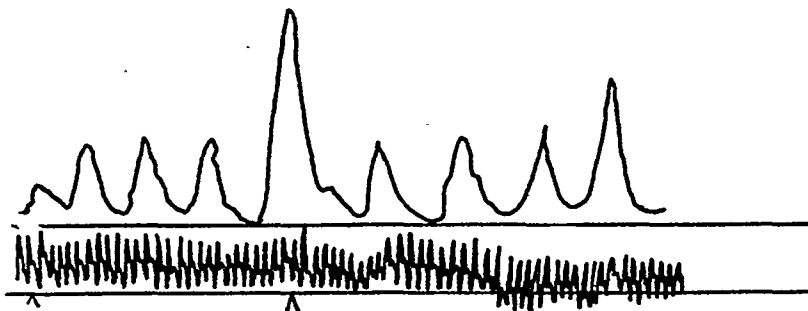
In the following pages are presented a series of representative reaction-patterns which are identified as being in this area of ambiguities. These will inevitably occur in the records of many suspected persons, but they can be properly evaluated if the reader is prepared to recognize the peculiar form bodily responses may assume. The novice may be unduly apprehensive, and to him it may only be suggested that experience in reading the records of deception will ripen his understanding. The experienced examiner will readily recognize these atypical reaction-patterns.

Experts in this field of detecting deception will, we hope, appreciate our candor in bringing this ambiguous area out into the open, where scientists from inter-related fields can objectively appraise the data.

A. *Ambiguous Blood Pressure-Pulse Records.*

1. EFFECTS OF MOVEMENTS OF THE BODY UPON THE RECORDS OF BLOOD PRESSURE AND PULSE.

Exaggerated height and serrated edges of pulse wave at several points in the record mark the places where movements of the arm occurred. Unidentified subject.



2. EFFECTS ON RECORDED BLOOD PRESSURE OF SUBJECT TAKING UNUSUALLY DEEP BREATH AT POINT OF DECEPTION. (The top line is the respiration pattern.)

The first question was answered truthfully and the second question was answered deceptively (as indicated by a subsequent confession). *Other portions of the record, contrary to this section, contained indices of blood pressure increases at points of deception, while here the normal increase is counteracted by a deep sigh (perhaps deliberately done to gain relief).* Unusually deep breaths may, nevertheless, on occasion tend to increase the blood pressure changes rather than to decrease them. Much of the effect depends upon the attitude and attention of the subject. Unidentified white subject. (Note pulse irregularity.)



3. EFFECTS OF GENERAL EXCITEMENT AS REVEALED IN THE RECORDS OF AN INNOCENT PERSON; CYCLICAL BLOOD PRESSURE CHANGES.

Subject proved innocent by confession of another. Note that approximately equivalent blood pressure increases occurred on both relevant and irrelevant questions, indicating *general excitement*.

Subject H. H., white, suspected of embezzlement, Case No. P-490, Test No. 4. Question 10. Was your mother's typewriter used in addressing this envelope?

Ans.—No. (Truth).

Question 11. Are you married? Ans.—Yes. (Truth).



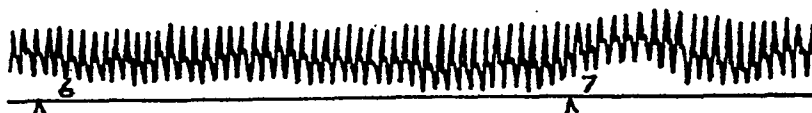
4. INCREASE IN BLOOD PRESSURE IN A PROVED INNOCENT PERSON, THE INCREASE BEING DUE POSSIBLY TO AN ASSOCIATED IDEA OR THE CONCEALING OF KNOWLEDGE RELATED TO THE QUESTION AT ISSUE.

Subject N. B., colored murder suspect, Case P-198, Test No. 1. Subject was suspected of killing a white man, but denied killing him and denied knowledge of who was guilty; several days following the test and the confession made by the guilty person, he admitted to officers that he had been concealing knowledge of who had killed the man in question. Note the extent of the rise when subject was asked if he killed the man, and the increase in blood pressure even when asked irrelevant questions. These exaggerated reactions diminished in magnitude as the tests proceeded (a clue to innocence). Although this is a rare type of case, it serves to illustrate the fallibility of lie detection criteria.

Question 4. Did you kill that white man? Ans.—No. (Truth).

Question 5. Have you had coffee today? Ans.—Yes. (Truth).

Question 6. Are you married? Ans.—No. (Truth).



5. ABSENCE OF BLOOD PRESSURE OR PULSE CHANGES DURING LYING.

Subject knew who killed the deceased and was himself involved in the attempted robbery of this person, although he was not the one who had killed him; he confessed complicity in the crime sometime after leaving the lie detection laboratory. Observe the minor blood pressure increase on Question 7 (truthful answer). Subject G. E., white. Case P-556, Test No. 1.

Question 6. Were you in a store in April when a man was shot? Ans.—No (Lie).

Question 7. Did you shoot a man in a store on Leavitt Street? Ans.—No (Truth).

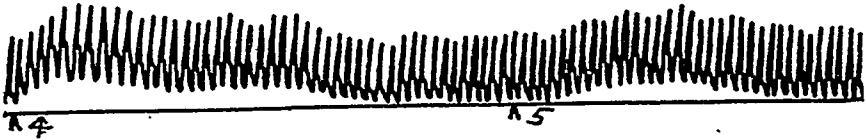


6. INCONSISTENCY OF REACTIONS ON QUESTIONS INVOLVING GUILT. (Note that Question 3, which was the first relevant question asked of this subject, was a general question, but produced greater reaction than Question 11, which was more specific.)

Subject N. B., colored, innocent of murder, but concealing guilty knowledge as to the identity of the murderer. Case P-198, Test No. 1.

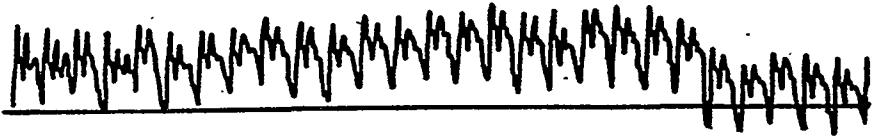
Question 3. Do you know who killed that white man in the truck? Ans.—No. (Lie).

Question 11. Over a month ago there by the picket line, did you see someone else shoot a white fellow? Ans.—No (Lie).



7. CHANGE IN PULSE RATE FOUND AMONG SOME INNOCENT SUBJECTS AT RELEVANT QUESTIONS; PATTERN OF STARTLE. (Note relatively slow pulse on Question 4, and the increase in rate when the examiner began to ask Question 5. Observe that there is a slight blood pressure rise in response to both questions. Contrast these changes with those of Graphs 8 and 9 in Section I-A).

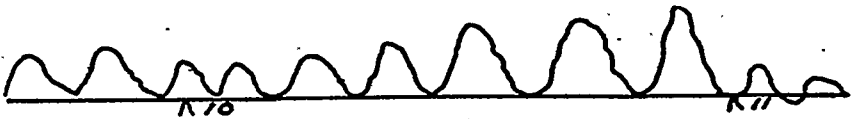
Subject R. S., white, innocent of thefts, Case P-120, Test No. 1.
 Question 4. Did you yourself steal those clothes? Ans.—No (Truth).
 Question 5. Did you ever sell any stolen clothes to this fellow, H.? Ans.—No. (Truth).



8. CARDIAC IRREGULARITY.

This specimen of blood pressure-pulse record was made before any questions were asked of the subject. The examiner made an indefinite report and called attention to the abnormality in the blood pressure record which he considered of sufficient importance to prevent a conclusive report on the subject's guilt or innocence. Subject C. C., white, suspected of arson, Case P-185.

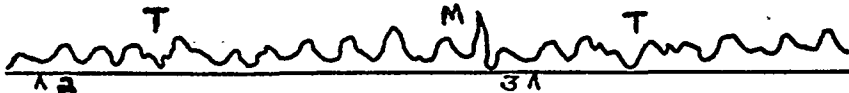
B. Ambiguous Respiratory Patterns.



1. DECEPTION-LIKE SUPPRESSION FOUND AMONG SOME OF THE INNOCENT.

Subject H. H., (innocent of embezzlement, as proved by the confession of another person) white, Case P-490, Test No. 4. Note suppression on both relevant and irrelevant questions, the real clue to the innocence of this person. Compare these reactions to the blood pressure indications of Graph 4, Section II-A.

Question 10. So far as you know, was your mother's typewriter used in addressing this envelope? Ans.—No (Truth).
 Question 11. Are you married? Ans.—Yes (Truth).



2. EFFECTS OF SUPERFLUOUS TALKING AND PHYSICAL MOVEMENT. ("T" marks the place in the record where subject engaged in unwanted talking; "M" marks the place where he moved his body, and thus altered the normal respiratory pattern.)

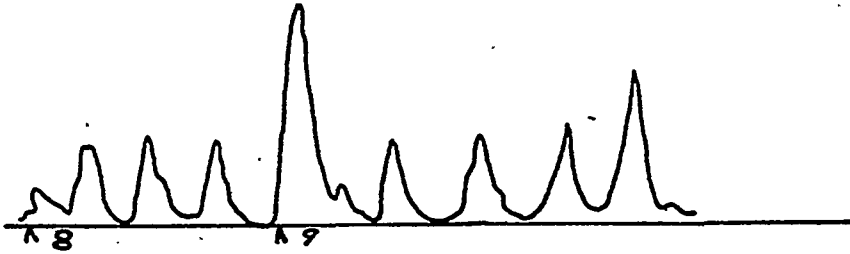
Subject H. F., white, confessed his guilt of statutory rape. Case P-544, Test No. 1.

Question 2. Have you taken indecent liberties with your little niece? Ans.—No (Lie).

Question 3. Have you had sexual intercourse with Eileen? Ans.—No (Lie).



3. ERRATIC BREATHING OF AN INNOCENT PERSON UNDER GREAT FEAR. (Note delayed suppression and changes in base line of respiratory pattern.) Unidentified subject.



4. RESPIRATORY SUPPRESSION OBLITERATED BY DEEP BREATH DELIBERATELY TAKEN BY SUBJECT AT POINT WHERE HE WAS ASKED A RELEVANT QUESTION, (Question No. 9).

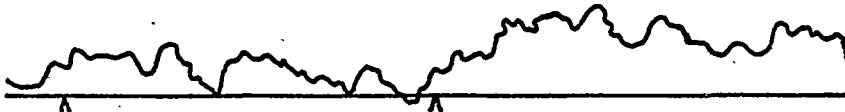
Subject M. F., white, who confessed, following the tests, that he lied to Question 9. Case P-81, Test No. 1.

Question 8. Were you born in Illinois? Ans.—Yes (Truth).

Question 9. Do you know who took the stamps from the stamp collection? Ans.—No (Lie).



5. THE NORMAL SHALLOW BREATHING WHICH IS TO BE EXPECTED FOLLOWING A DEEP INSPIRATION; THIS PATTERN IS NOT A DECEPTION RESPONSE AND HERE APPEARS IN A KNOWN INNOCENT PERSON. Note the deep sigh just preceding the first question and a similar response at the conclusion of the first question. Unidentified subject questioned regarding murder.



6. EFFECT OF SINUS CONGESTION ON THE RESPIRATORY PATTERNS.

Control (card) test given to an adult man who had a severe case of sinus congestion and was continually sniffing. Subject S. P., white, murder investigation—guilt or innocence unknown. Subject was unable to understand the English language and an interpreter had to be employed by the examiner throughout the tests. Case P-15, Test No. 1.



7. LACK OF RESPONSE IN RESPIRATORY PATTERNS OF A KNOWN GUILTY INDIVIDUAL.

Note absence of significant alteration in the breathing reactions, with the only clue to deception being the *ever so slight* rise in base line. Subject S. B., white, writer of obscene notes, proved guilty by identification of handwriting and by his subsequent confession. Case P-92, Test No. 1.

Question 4. Have you ever addressed a note to one called L? Ans.—No (Lie).



8. RESPIRATORY TREMOR FOUND ON BOTH RELEVANT AND IRRELEVANT QUESTIONS IN AN EXCITED GUILTY PERSON. (Note the absence of the common criteria of deception.)

Highly excited persons, whether innocent or guilty, occasionally reveal their excitement in this over-all type of disturbance. Although it is much more apt to be found in a guilty than in an innocent person, it should be used by the examiner only as a cue to *the presence of a state of alarm* (which condition may not be obvious when such a person is questioned without the aid of lie detection tests). Subject A. R., white, admitted accomplice in robbery. Case P-432, Test No. 4.

Question 10. Do you smoke? Ans.—Yes (Truth).

Question 11. Can you drive a car? Ans.—Yes. (Truth).

Question 6. Did you take part in planning to hold up Mr. C.? Ans.—No (Lie).

C. Ambiguous Electrodermal Reactions

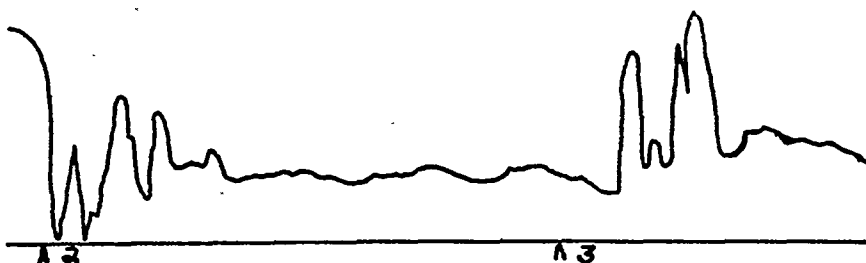


1. OVER-ACTIVITY OF THE REACTION, SEEN AMONG SOME SUBJECTS, DUE POSSIBLY TO AN EXCESSIVE TENSION OR A CHRONIC STATE OF MENTAL CONFLICT.

Subject B. L., white, given an experimental test to probe emotional conflicts. (Compare these reactions with the criteria illustrated in Graphs 1 and 2, Section I-C).

Question 1. Do you wish you were a success? Ans.—Yes.

Question 2. Do you think you are abnormal? Ans.—Yes.

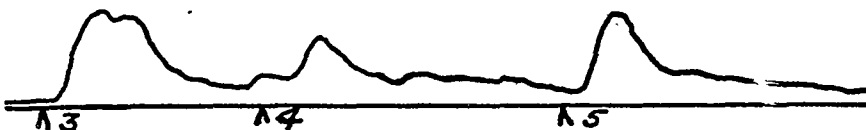


2. EFFECTS OF BODILY MOVEMENT. (Note rapidity of the electrodermal reactions on the following questions due to subject moving his hand, and compare this rapidity with the normal and gradual electrodermal reactions observed in Graph 6, Section I-C.)

Subject H. F., white, guilty of statutory rape, Case P-544, Test No. 2.

Question 2. Have you taken indecent liberties with your little niece? Ans.—No (Lie).

Question 3. Have you had sexual intercourse with E.? Ans.—No. (Lie).

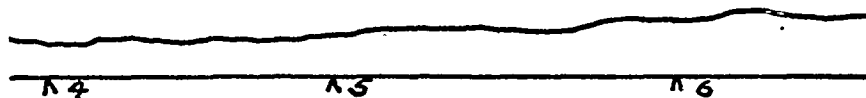


3. EXAGGERATION OF RESPONSE CAUSED BY SUBJECT TAKING A DEEP BREATH AT THE VERY MOMENT OF THE RESPONSE (Question 3).

Sometimes the taking of a deep breath heightens the electrodermal reaction and confuses interpretation, as in this card (control) test where the one lie in a series of questions was over-balanced by the comparatively larger response on another question, truthfully answered, at which point the subject breathed deeply. Subject P. H., white, guilty of theft, Case P-120, Test No. 3 (card test). Question 3. Did you choose the four of spades? Ans.—No (Truth). At this point the subject took a deep breath.

Question 4. Did you choose the two of hearts? Ans.—No (Truth).

Question 5. Did you choose the three of clubs? Ans.—No (Lie).



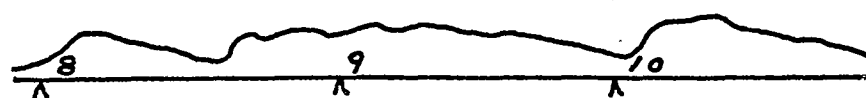
4. UNRESPONSIVENESS IN A KNOWN GUILTY SUBJECT.

Note the absence of any adequately diagnostic changes on the three reactions here traced. Subject W. B., white, guilty of arson, Case P-412, Test No. 6.

Question 4. Is it true that you said you would burn her furniture and she would then be entitled to the insurance payment? Ans.—No (Lie).

Question 5. Are you married? Ans.—No. (Truth).

Question 6. Did you burn A. B.'s furniture in March, 1937? Ans.—No (Lie).



5. REACTIONS INCONSISTENT IN THE INDICATIONS OF GUILT, IN A SUBJECT WHO SUBSEQUENTLY ADMITTED HIS GUILT.

Inconsistencies appear to be due to differences in the phraseology of the examiner's questions, to differences in the relative challenging nature of the

questions, to the normal disappearance of the reactions on successive tests—which is to be expected in many cases—and to the apparent disconnection between the emotional and the adjustive reactions of a person.

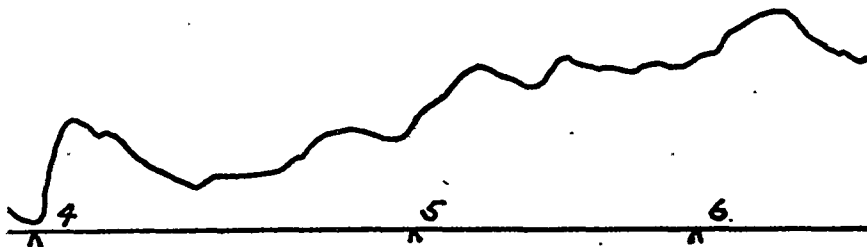
Subject T. S., white, who later admitted sexual intercourse with a fifteen-year-old girl who had become pregnant. Case P-576, Test No. 3.

Question 8. Are you a citizen of the United States? Ans.—Yes (Truth).

Question 9. Did you ever have sexual intercourse with R. J.? Ans.—No (Lie).

Question 10. Are you responsible for R. J.'s disappearance from home? Ans.—No (Lie).

(Note the absence of reaction on Question 9, the question where subject later admitted lying, and the obvious reaction on Question 10, where, by inference, he also lied.)



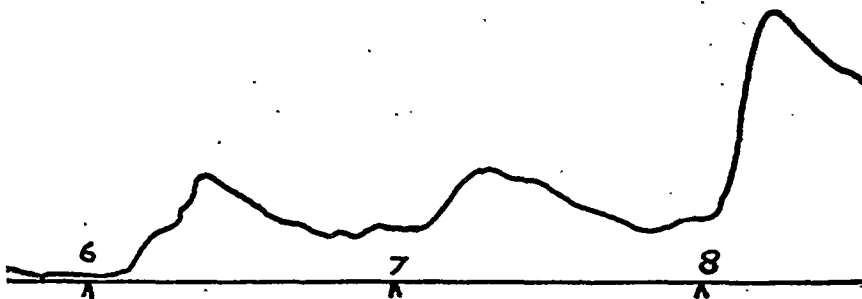
6. GUILT REACTIONS OF INNOCENT PEOPLE.

Subject N. B., colored, innocent of murder. Observe that the largest of these three reactions appeared on the question about the murder. He was later proved innocent by the confession of another man. However, he admitted that, at the time he took the lie tests, he was concealing the fact that he knew this other man had killed the deceased! Case P-198, Test No. 1.

Question 4. Did you kill that white fellow? Ans.—No (Truth).

Question 5. Have you had coffee today? Ans.—Yes (Truth).

Question 6. Are you married? Ans.—No (Truth).



7. FURTHER GUILT REACTIONS IN A KNOWN INNOCENT PERSON.

Subject N. B. (see Graph 6 above). Case P-198, Test No. 2.

Question 6. So far as you know, did E. M. shoot that white man? Ans.—No (A lie, for E. M. later confessed to shooting the man).

Question 7. So far as you know, did J. shoot that white man? Ans.—No (Truth).

Question 8. Did you yourself shoot that white man? Ans.—No (Truth).

(Note that on Question 6 the lie produced a smaller reaction than the truth on Question 8, where the subject's own security was at stake.)