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IN DEFENSE OF
THE RELEVANT-IRRELEVANT POLYGRAPH TEST

By

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In polygraph work, as in every other practical application of behavioral science, there are strong disagreements among devotees of various theories and techniques. In addition, examiners tend to be faddists, espousing or discarding one technique in favor of another which happens to be newer or more popular at the moment. In the article which follows I plan to reexamine some of the fundamental theses of practical psychology and physiology as they apply to polygraph testing. I further intend to suggest that thoughtful consideration be granted to a return to fundamentals in the design and construction of polygraph examinations.

Semantic Barriers

One problem which besets the polygraph field arises from semantic barriers between individual examiners and between various schools of polygraph thought. Modesty, self-effacement, and diminutive egos are not exactly characteristic of polygraph examiners as a group. We tend to name various phenomena after ourselves or after the leader of our school of polygraph. The

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result is as might be expected; we use different terms to describe the same phenomena. Even worse, we use the same terms to describe different phenomena. Worst of all, we keep in discovering the wheel over and over again through our failure to realize that the promising technique we have discovered has been known for years under some non-descriptive title.

I would submit that these problems are not unique to the polygraph field, but are quite typical of behavioral science. If for no other reason, scientists in behavioral fields should be happy to admit that we belong among their ranks. For example, the field of psychology is in far worse shape than the polygraph field. Educational psychologists, clinical psychologists, social psychologists, industrial psychologists, and a host of other specialists in this fractionated field are all dealing with human behavior but in differing abstruse and esoteric terminology. In many cases, they will not even speak to each other, much less admit that any wisdom is exhibited by members of differing disciplines. Perhaps psychologists can afford such academic rigidity--it is my strong gut feeling that the polygraph field cannot afford this. We are not so well liked or so universally accepted that we can afford anything which would make us appear ridiculous.

Laboratory Research

This leads me into a discussion of one of my pet irritations --the way in which scholarly research is frequently conducted where the polygraph is concerned. The research paradigm is almost always a simulated crime, which occasionally is sophisticated enough to include a person with guilty knowledge, in addition to the innocent man and the criminal. Probably three out of five tests in the field are screening tests (including periodics), but I have never seen a research paradigm of a screening situation. Almost never do the university researchers use trained examiners to administer and interpret charts; that is usually delegated to some earnest and incompetent Ph.D. candidate. Interestingly enough, they almost never permit the examiner to interrogate, since the student being used as the examinee might confess and spoil all of the elaborate mathematical analysis of the results. In addition, the student population which volunteers for such experiments is hardly typical

of the population at large. When you summarize the whole business, it is no wonder that the results of the researchers seldom equal the results in the field. If I allowed my examinations to be designed by men with little or no experience with the polygraph, administered by men with no experience in polygraph testing or chart analysis, and barred the use of interrogation on actual and tentative specific reactions, I doubt if I would be in business very long. Yet, the exquisitely analyzed results of such a laboratory program, covering less than 50 subjects (they are expensive) are frequently extrapolated to being indicative of the population at large and the validity and reliability of the polygraph in particular.

Terminology

In order to eliminate a serious problem as far as this paper is concerned, I need to define the terms I will be using. In the 1950's the members of the American Academy of Polygraph Examiners (AAPE) undertook without success to develop a glossary of polygraph terminology. The American Polygraph Association, under the prodding of Milton Berman, who was Chairman of the Committee on Standards and Ethics, undertook the same task, equally without achieving a consensus. Changing or establishing a vocabulary is a thankless job at best. Look how long we have been trying to outlaw "lie detector" and "lie box" from polygraph terminology. (I also admit looking with disapproval on such neologisms as "polygraphist" and "polygram.") At any rate, the terms used in this paper should be defined, especially where they might differ in any way from commonly accepted definitions.

Polygraph Examination: The complete procedures involving the instrumental detection of deception. Includes pretest interview, question review, two or more polygraph charts as required, and interrogation as required.

Polygraph: Instrument which makes a permanent recording on a movable chart of three or more physiological indices to the detection of deception. At a minimum, records the pneumograph, galvanograph, and cardiosphygmograph patterns.

Relevant Question: A polygraph question which relates directly to the reason why the polygraph examination is being administered.

Also known as a "pertinent" question or a "hot" question.

Irrelevant Question: A polygraph question, of supposedly neutral impact, which does not relate to the matter under inquiry. Frequently called "norm" questions or "neutral" questions.

Control Question: A question, unrelated to the matter under inquiry, but of known or supposed emotional impact, which is asked for the deliberate purpose of creating a physiological response on the polygraph chart.

Polygraph Chart: One continuous sequence of physiological patterns recorded during a polygraph examination. A minimum of two charts is required during any examination.

Relevant-Irrelevant Test: A polygraph examination which consists of a variable series of relevant questions, interspersed with irrelevant questions and one or more control questions.

The last definition above can create problems. In a sense, it is a definition of each of the polygraph techniques in current use, since each in the last analysis, involves differentiating among the physiological responses or lack of responses to various types of questions during a polygraph examination. In this context every polygraph examination is of necessity a relevant-irrelevant test, and for this reason no current technique is truly incompatible with any other. The primary differences, which I will examine in greater detail later, lie in the absence of any fixed question sequence and in differing control procedures.

Weir's Laws

I believe one thing needs to be said at this point, and it is really a paraphrase of a sermon I have been preaching for many years. I even called them Weir's laws in a talk before the APA a few years ago, in a gentle effort to poke fun at guys who named things after themselves. The laws, though, were deadly serious:

Weir's Law #1: Any polygraph technique will work where the relevant questions pose a threat to the well-being of the guilty subject.

Weir's Law #2: One polygraph system which works is not necessarily better than another system which works.

Weir's Law #3: No polygraph system is infallible.

I expect to establish Law #1 during the discussion which follows. Laws #2 and #3 would, I hope, be conceded by thoughtful men in the polygraph field.

Let us talk for a few moments of the physiology and psychology of polygraph testing. In polygraph basic training all of us learned more about the physiology of the respiratory and cardiovascular systems than we ever found useful. Our instructors also talked at length about the GSR, but I ended up with the feeling that nobody knew for sure exactly why a GSR response took place. In any event, though, we each arrived at some understanding of what was happening and why as the pens traced their excursions across the polygraph charts. After a few years' experience we could each estimate with confidence the degree to which a question did or did not worry the examinee as he answered it. At the risk of boring you with elementary data, let us examine again what is going on as reactions occur and dissipate during polygraph testing. It might not hurt for us to pay renewed attention to what is not necessarily going on.

Man is an animal, a living thing, and like all living things he has built in a set of reflexes or instincts which promote the preservation of the species. These are not necessarily under his voluntary control, since the preservation of the species has to overrule the will or desire of any individual in the genus. Thus, it is neither necessary nor desirable that self-preservation be a matter of conscious thought; this might take too long. Lastly, all of the potential of the individual must be energized, so that a maximum effort might be exerted by the threatened individual. In prehistoric times man was faced daily with a "kill or be killed; eat or be eaten" situation. The decision to run like hell or fight like hell required instant analysis and permitted no errors. The polygraph works because the system is still incorporated in the physiology of homo sapiens.

Consider further. To galvanize the body to meet extreme emergencies, the muscular systems must be energized for maximum output. In addition, any body activity which does not contribute

to this end is reduced or halted. Thus, the respiratory system sets about increasing the oxygenation of the blood, and pulse and blood pressure increase to carry food and oxygen to the cells, while removing waste products at an increased rate. Body temperature rises a trifle through increased metabolism, and the GSR asserts control over sweat glands. Unessential functions like digestion and salivation come to an abrupt halt.

The polygraph instrument is a device which records certain of these changes which happen to be convenient to get at--and which do not require the services of a doctor and a nurse in the interrogation room. Without going into a disquisition on the anatomy of the central nervous system, it is enough to say that the phenomena recorded by the polygraph are not under the control of the individual. It fires as a reflex action, and the various physiological changes occur at the same instant. Although there have been some studies aimed at establishing whether a person can assume complete voluntary control over autonomic reactions, thereby negating polygraph testing, nothing definitive has been published. Certainly the experiments thus far with drugs, hypnosis, and conditioning do nothing to counteract the literally hundreds of thousands of cases in the field, where the polygraph worked perfectly, despite, and perhaps because of, the fervent desire of the examinee to prevent this.

It seems to me in retrospect that it is not a bad idea to review the physiological basis of lie detection from time to time. We all knew at one time that the sympathetic branch of the autonomic nervous system had to be stimulated for a reaction to be created. We all spoke of the flight or fight syndrome, and we all realized that the essential well-being of the subject had to be threatened to be sure that a reaction would take place. I have a feeling that many of us are paying only lip service to these precepts today. We speak of a "lie reaction" and the Army (as well as others) uses NDI--"No Deception Indicated" as a standard conclusion. I have even heard experienced examiners get mousetrapped into a discussion as to whether there is some mysterious difference between the reactions created by lies and those from strong emotions, such as fear or anger. All I know is that I know of no way to make this distinction, merely from the chart patterns. The examination has to be structured in such a way as to eliminate fear or anger as a material factor by making them apply equally to all questions.

Protect the Innocent

In another sense, we may be giving in to the demands of the market place. At one time we were "lie detector" examiners, and we sold "lie detection" as our stock in trade. As accurate as this might have been, the almost universal dislike which we inspired from massive segments of American society impelled us (perhaps very late) to try to improve our public image. We now realize, somewhat belatedly, that our greatest contribution to society is in the protection of the innocent and in the removal of suspicion from the guys who really didn't do it. If in the process we identify and secure a confession from the guy who did do it, this is all to the good.

It's pretty ironic, when you stop to think about it; if the do-gooders, the bleeding hearts, and the civil libertarians have their way, there will be no practical way for an innocent man to clear himself of suspicion in an unsolved crime. Despite their pious claims to the contrary, it appears to me that these pressure groups are far more interested in protecting the supposed rights of the guilty than the actual rights of the innocent. They seem to postulate that there is a right way and a wrong way to interrogate criminals, the rule of thumb being that any effective system is automatically wrong. They attempt to elevate the "right" of privacy to a constitutional right (it doesn't appear in my copy of the Constitution), and they see no reason why a person who elects a life of crime should not enjoy absolute privacy to continue his career unmolested. They see no reason why the country, its businesses, and its citizens should be allowed to protect themselves against internal and external predators.

In every society with which I am acquainted there are police, lawyers, and judges to apprehend and punish malefactors. Almost invariably there are suspects where crimes are concerned, and a considerable effort is exerted to discover, "Did he do it?" This was at one time known as "the question" and in less enlightened times putting a man to the question involved the use of devices which killed or maimed innocent and guilty alike. Even in comparatively modern times third degree brutality was not at all unusual. (My Constitution does prohibit duress in the Fifth Amendment.) With the polygraph we at last have an instrument and a technique which meet all reasonable rules regarding duress and self-incrimination--and they don't want it to be used.

False Positives

One other pet peeve, and I can return to the purpose of this paper. The psychologists seem to be inordinately concerned with "false positives" (we said he was lying and he wasn't) and "false negatives" (he lied to us and beat the test). In sworn testimony in the Zeiger Case, Dr. Martin Orne, an eminent psychophysiologist who has done a great deal of research on the polygraph, testified that the field accuracy of the polygraph was certainly in the 80% to 85% range. In other published research psychologists warn of the existence of false positives and false negatives and recommend caution in the use of the polygraph because of the errors created by these straw men which they set up in the first place. They should be required to prove that both exist in the field situation and that they occur in such numbers as to present a problem. I have never seen an authenticated case of a "false positive" presented yet. I am not at all concerned with "false negatives"; these merely mean that the examiner bent over backwards where the charts were not truly definitive. This is where our known misses occur.

In a recent article in Polygraph, Dr. Orne set up a new bete noir, the pretest interview. He then agreed with himself without furnishing proof that the polygraph examination could be affected materially by the degree of expertise or lack of it displayed by the examiner during the pretest interview. What nobody will seem to concede is that the decision in a polygraph examination results from an objective analysis of the polygraph charts, quite frequently accompanied by a confession. Any factor which invalidated testing would result in unreadable charts. As a corollary, if the charts are readable none of the myriad of physiological and psychological factors concerned, which so alarm our scientific brethren, invalidated testing.

This leads inevitably to anomalies such as the conclusion by the Moss subcommittee in 1964 that the polygraph was not suitable for use on federal employees--except in serious national security matters. This is tantamount to saying, "It doesn't work, so I will use it only in the most important cases." It was Congressman Moss, also, who remarked that he would not take a polygraph test unless his doctor, his lawyer, and his psychiatrist were present. Interestingly enough, none of the

above professions has ever established its basic validity and reliability, but I would suspect that all would fall far below the polygraph in any objective comparison, particularly where accurate diagnostic procedures are concerned.

It is a matter of some interest that the prestigious Society for Psychophysiological Research (SPR) has undertaken a project this year to take a look at the polygraph field to decide whether the SPR should go on record as opposing legal admissibility of polygraph evidence (and by implication the use of the polygraph). The APA will provide technical support to the SPR study, but I believe these gentlemen--all eminent scientists-- have been overtaken by the times. The polygraph and its obvious accuracy have been so accepted nationally and internationally by its customers that the tide cannot be stemmed by a command from the SPR to halt. The same thing may also be true of legislative efforts to ban the polygraph--you simply cannot legislate out of existence an idea whose time has come. On the other hand, I would not like to see my declining years spent in a bootleg operation, so I think we had better defend ourselves as vigorously as we can.

This digression has extended longer and farther than I contemplated, and it is time to get back to an examination of relevant-irrelevant testing. I was discussing the "lie" conclusions which appear so often in polygraph reports and in polygraph discussions among examiners. In essence, I am concerned about any conclusion or any report which is vulnerable to hostile criticism. It is my thesis that when we use such terms as "deceptive," "withholding information," and other equivalents of "lying," we are very vulnerable to this criticism. Let me elaborate.

Wording the Conclusion

Several years ago, around the time of the Moss Subcommittee Hearings, an industrial psychologist (Ph.D., of course) was in the supervisory chain above my polygraph operation. His essential argument was as follows: all polygraph operations are under attack and will remain under attack for the foreseeable future. It therefore behooves you to not say anything as a matter of record which cannot flatly be proven in the face of hostile cross examination. You may say that your chart analysis

revealed that specific physiological reactions occurred to question so-and-so, if this was clearly the case. Other examiners, including those chosen by the opposition, and even laymen, can see that this is the case. It is all right for you to say that the charts could not be analyzed, since this can also be determined to be correct by an independent chart analysis. You may not say that the Subject lied to you or withheld information from you, since these are subjective judgments, based on more than the reactions on the charts.

As you might imagine, there was a long and violent argument over this decision--which I lost. In retrospect, I'm glad I did. When I report that "Specific Physiological Reactions were observed to question so-and-so," as a conclusion, my clients are aware that something continued to be wrong in the area of that question, despite my best efforts to resolve the matter. On the contrary, when I report that "no specific physiological reactions were observed," my clients know I'm not guaranteeing absolute truth--merely asserting that the Subject was not apparently worried as he answered the questions. I can hear all of my friends in the commercial field complaining now--"My clients would never accept such conclusion." I'm inclined to disagree. After all, my client may be tougher to get along with than yours--and the stakes sometimes tend to be a little higher.

Perhaps our conclusions might be a combination of fact and opinion, with each clearly labelled. We might have such a thing then as, "The chart analysis revealed that specific physiological reactions occurred to questions concerning having been involved in the theft of the missing funds. It is the opinion of the examiner that these reactions were caused by efforts on the part of the subject to (withhold information) (attempt deception) in this area." Testifying on such a conclusion in a later trial, the chart analysis could be independently verified. The examiner could explain the careful structuring of the examination, the question repetition, the overall verification and feedback procedures which led to his opinion that the reactions were caused by deception. It is an idea which deserves further exploration. In any event, as more and more examiners begin to testify in court and in formal hearings, many of the things we do may have to be restructured

with a view toward defending them in later adversary proceedings.

Much of what I have to say in the sections which follow will be familiar to even inexperienced examiners. Much of it is incorporated in every technique with which I am familiar, and little of the material was originated by me. It would be impossible to give credit; who can remember which guy came up with a fresh and sparkling concept in a shop-talk session in somebody's hotel room? I can say, however, that none of this constitutes laboratory theories which have never been put to the test of practical application. In addition, the practical application does not consist of 26 cases extrapolated mathematically to represent all mankind. The experience represented by the multi-examiner organization to which I belong is in the multiple thousands of cases.

Plan of Presentation. I shall use captions in the remainder of this paper to permit ease of reading, or skipping, as may be the case. I do not plan to cover the materials exhaustively, since it would require a rather lengthy book to do justice to the subject matter fully. For the purposes of this paper I assume that the reader is a practicing polygraph examiner who has only limited experience with relevant-irrelevant technique. He may even have been told that the technique is back in the middle ages of polygraph technique and has no modern use, except for some dubious application to screening tests. At most polygraph schools with which I am acquainted the control question technique originated by John Reid (or one of its many modifications under other names) is taught as the technique to be used in all examinations except those where the sheer number of areas at issue makes its use impractical. I am fiercely determined to comply with Weir's Law #2 and not justify R/I testing by downgrading other techniques. In some areas, comparisons may become inevitable.

Modern R/I Testing Not Taught. It is quite probable that the techniques I shall describe have all been used from time to time by every examiner who was expert enough to adapt his technique to the exigencies of the testing situation. Yet, they are not taught, to my knowledge by any current school. The Keeler School does emphasize R/I testing, and the Army School at Fort Gordon contains an instructional sequence on R/I testing.

I recall that several years ago one of the instructors from Fort Gordon spent some time with us in preparation of R/I instruction as an advanced course. I served recently as a guest lecturer at Gordon and was disappointed to find that the course of study in use bore little resemblance to field R/I polygraph operations as I knew them. Conversations with some of the instructors indicates that their philosophy is still that R/I testing is an advanced technique for the more experienced examiner, and they still teach Backster's Zone Comparison as the bread-and-butter technique to be used in almost all of their specific examinations. This technique, particularly using the note packs, does lend itself beautifully to instruction; it is very comfortable for both the instructor and the student. I am not at all sure that this comfort is most apt to produce an examiner who has such a thorough depth of understanding of what he is doing that he can think his way through any testing situation.

The Examiner as a Problem-Solver. In a very real sense, each examiner daily faces complex problems where a wrong answer can do irreparable harm to the examinee, to the examiner, and to the polygraph profession. I recall a discussion with a company manager who justified a high salary for a personnel counselor on the grounds that he dealt with the public on a one-to-one basis in areas where poor judgment or a serious mistake on the part of the counselor would do irreparable harm to the company. We are also familiar with the very accurate statement that police officers daily make decisions in regard to arrests, and particularly the use of deadly force, which will later become the subject of lengthy deliberations by lawyers and judges. Yet the police officer frequently has only a split second to make such a decision. The examiner has something of the same situation. He must make a decision; he must make the right decision; he must make the decision promptly. We must arm him with all the techniques--including flexibility of approach--to make the decision accurate.

Employee Screening as a Polygraph Examination. I have been deeply disturbed through the years over what I view as an increasing tendency on the part of our field to denigrate employee screening. I get a sort of impression that many examiners do this as a service to their clients but without any

great faith in the accuracy of the process. Screening tests are scheduled at the rate of six or eight per day, and there may even be a tacit understanding that the examiner will not interrogate and will recommend rejection on all problem cases. Some reputable examiners have even stated that they do not view employee screening tests as being true polygraph examinations. If they are not actually administering a polygraph examination as previously defined, that statement may be all too true. But they should be ashamed to masquerade as polygraph examiners if they do not administer a complete examination to the limits of their ability, in each case they process.

Employee Screening as a Multiple-Area Examination. It would be exceedingly rare for an employer to be interested in only one facet of the character and experience of a prospective employee. We find that the employer is legitimately interested in the complete background of his applicant. Despite the wrath of civil libertarians over intrusions into the privacy of applicants, it is quite germane for an employer to make the following inquiries: "Does he have the experience and training which my job requires? Is he reasonably honest, trustworthy, and reliable? Will his hiring present me with personnel problems which completely outweigh the value of his services to me?" I believe the answers to these questions are legitimate areas of interest, and it will obviously take a multiple-question test, as well as a painstaking pretest interview, to design a polygraph examination, which will have validity as an examination and which will satisfy the requirements of the employer.

Question Scope Limitations. The competent and ethical examiner has to exert a great deal of control over questions used during applicant screening examinations. Obviously if the subject matter of the question is none of the employer's business, the question should not be used. This is particularly true in sex areas. Employers--and alas a few examiners--are sometimes entirely too nosy about the sexual proclivities of an applicant when his sexual orientation has utterly no bearing on his potential effectiveness as an employee. This area should not be touched unless, perhaps, the susceptibility of the employee to blackmail is clearly a material consideration. Perhaps a negative and defensive attitude would be best for the

examiner in the matter of examination scope. If a question could not be clearly justified before a licensing board, a grievance committee, or a hostile Congressional committee, the question should not be used.

Question Number Limitations. How many questions (relevant) can be administered during any one polygraph examination? This is a troublesome question, and one for which no definitive answer exists. I recall being involved in an examination several years ago where I was directed to examine thirty areas at issue by a person whose authority exceeded his understanding of polygraph techniques. I had to run a couple of charts before I exploded and told him that I wasn't about to tell him how to run his area of expertise, but he had better stay out of mine, if he expected to place any reliance upon my results. Following this discussion, which was much more acrimonious than set forth here, he was ready to be reasonable about limiting the examination to the five or six issues which were truly essential to reach a decision. It is not unusual in security screening situations to be able to cover and successfully resolve fifteen question areas. I also suspect that this requires examiners who have somewhat exceptional training and experience. I believe, however, that up to ten question areas can probably be verified in an R/I examination by an examiner who is comfortable with R/I testing.

Question Formulation: Dichotomy. It really should not have to be repeated that each question must face the examinee with a clear cut decision between yes and no; it must present a sharp dichotomy with no gray areas in between. Each question must present to the subject what Backster has called, "distinctness of issue." Go back for a moment, if you will, to the polygraph question as a threat to the well-being of the examinee. If the question is vague, ambiguous, or unclear, the deficiencies of the question may represent the threat to the examinee, rather than the answer to the question. Aside from the obvious chances for error in such a situation, the least that could happen would be an undesirably high level of nervous tension. Even if the examiner has had to make some concessions to the market place in his question formulation, he must remove any vagueness or ambiguities during the pretest question review. Each question absolutely must present the examinee with this decision, "I understand that question completely, and I am absolutely sure

I never did that." Or it might be, "I know what that question is covering, and I'm guilty as hell. If this machine works, and I get caught, it's gonna be terrible." Of such questions are good polygraph examinations made.

Question Formulation: Length. I fear we sometimes pay only lip service to the principle that questions should be as succinct as possible. With limitations on question numbers comes the temptation to hang more and more things on each question. We end up with the temptation to introduce each question with the phrases, "Have you ever, did you almost, or would you have, if you'd had half a chance . . .?" Seriously, all of us have observed that the subject will frequently react simultaneously with perception. The physiological chances take place as soon as the subject has heard enough of the question to believe he knows which question it will be. We have all observed what appear to be apprehensive or anticipatory reactions on long or complex questions. To me it is important that the examination be designed to eliminate misleading reactions caused by apprehension over how a question is going to end. Each question should be terse and very much to the point.

Question Formulation: Vocabulary. It should go without saying that each polygraph question must be understood by the subject for the test to have high validity. Many examiners pay only lip service to this principle. We ask the subject if he understood all the questions and accept his nod as being truthful. Did we expect him to admit to being stupid by failing to understand a question which we obviously assumed to be self-explanatory? Maybe we deferred to the client's vocabulary in wording the questions originally, but we'd better translate into the examinee's vocabulary if we want the test to have high validity. Let me interject a word of caution here, though. Don't oversimplify the questions to the point where you arouse antagonism on the part of the subject by implying that he is stupid. Misunderstanding by the subject equates to fear during the test, and antagonism by the subject equates to anger during the test. Need I go back to basic training in regard to the effect of strong emotions on polygraph charts?

Question Formulation: Lesser Included Topics. Any sort of screening examination poses serious problems to the examiner

in regard to the scope of each question. This matter was touched upon earlier, but let us examine it in more detail now. A screen which is intended to filter out predatory animals can obviously have bigger holes in it than one which is intended to stop mosquitos. R/I questions which are broad in scope can obviously cover a broad area, identifying only very major problems. Similarly we can concentrate on a very narrow area by asking several questions, each very narrow in scope, all zeroing in on a central topic of concern. In R/I testing we can easily enjoy the best of both worlds by making each broad question cover several lesser included questions. Note, however, that the technique will not work well unless both the primary question and the sub-question are discussed in detail during the pretest question review. Essentially we are sensitizing the subject to questions which will be asked, as well as to several which may not be asked. I say, may not be asked, because the examiner may use any or all of the sub-questions, both for variety and in an effort to pinpoint the source of any sensitivity to the primary question.

Sample Spiel: Less Included Questions. "Now, Mr. Smith, this (show it) is the application form you submitted to my company. At the end you signed an oath that it was complete and correct, and I know you're aware of the serious penalties for a false oath. (Always the threat) One of the questions on the test you're about to take will be concerned with the application form. I will ask you on the test, 'To the best of your knowledge is your application form complete and correct?' I'm talking about this form right here, including the corrections we made today as I went over it with you. Now, please notice that I'm only saying, to the best of your knowledge! It doesn't mean our investigators won't find some very minor honest mistakes like a date or an address when you were little. But we shouldn't find anything seriously wrong with it. (Again the threat) Actually, when I ask that question about your application form, I'm really asking a lot of other questions at the same time. For instance, I'm asking you, 'Is there any information on the form which you know to be false?' Or maybe the other way around, 'Did you leave off any information which you know should be included?' I'm also covering things which just couldn't be accidental. These would be the sort of things that a person just wouldn't forget. Things like, 'Did you actually graduate from college? Have you ever been fired from a job?

Does any police department have your name in any of its records? (Not, do you have a police record?) Have you ever been treated for a mental illness? Did you ever steal from an employer?' Now, each of these questions was covered on your application form and you answered 'no' to them. You understand now, don't you, that when I ask you on the test, 'To the best of your knowledge, is your application form complete and correct?' I am also asking you each of these other questions at the same time? After all, the form couldn't be correct if any of these other things were wrong. In fact, you may find from time to time during the test, I may ask some of these other questions just for a little variety and to make sure you're listening to me carefully as I ask the questions."

The examiner will note that we accomplished several things during this spiel, which has been considerably shortened over the dialogue which would actually take place during the testing situation. This, or something similar to this, must be done for each of the relevant questions to be asked. The scope of each question must be carefully delineated, even if the examiner does not contemplate asking lesser included questions. It is good technique to require the subject to explain several of the questions in his own words, enough so you are sure he comprehends them. If we have been successful, we have sensitized the subject to seven specific question areas by asking one general question. We have also introduced him to the concept that variant wording for the questions will be used routinely during the test. (We do not want him to react, merely because a question has been paraphrased.) We threatened him both with perjury and with discoveries by our investigators to make sure the test questions would represent a threat to him.

Question Formulation: Exclusion Questions. It is not at all uncommon during the pretest question review or following a test for the subject to make admissions, particularly partial ones which he feels will not be disqualifying. At the risk of sounding cynical, it is rather rare for these admissions to be complete. Spoon feeding, and throwing the examiner a "fish" are all too common, and the examiner must be facile in devising exclusion questions to verify the subject's admissions. The phrase must go in front of the question; otherwise the subject may begin to react to the question before he hears the qualifying phrase. The following list, by no means complete, will give an

idea of exclusion questions:

Other than what we have discussed, have you . . .
Except as you have mentioned, have you . . .
Are you withholding information from me about . . .
Have you told me the full truth about . . .
Have you told me the true reason for your concern about . . .
Are you still trying to hide anything about . . .
In your adult life, have you . . .
During the last five years have you . . .
Is there anything we have not discussed concerning . . .
Do you believe you could be blackmailed about . . .
Is there anything else I should know about . . .
Have you revealed the full extent of your participation in . . .

The spiel should give a sample of a few of these questions and should point out carefully (and sorrowfully) that some people are not always completely honest in discussing incidents in their lives. That you're sure your employer is willing to give him every consideration despite the matters you discussed, but you know the employer would never be able to forgive his not being honest with you. (The threat) That further, if he has been able to discuss such sensitive matters with you, you couldn't blame the employer for feeling that anything he couldn't discuss must truly be terrible. (The second threat, intended to keep the pump primed.) If he has been honest with you, these (exclusion) questions provide him with an opportunity to prove this and there will be no reaction. Of course, if it should be that he is still not being completely honest with himself (never you, always himself) he won't feel that sense of quiet relief we all feel when being completely honest with ourselves. And this difference in the way we truly feel on the inside was just what the instrument was built to record.

Question Numbering: General. Most people who were trained at Keeler's used "26" for the first relevant question. There's nothing abstruse in this; there were 10 norm questions and 15 controls before they got around to numbering the first pertinent question. I had a session several years ago before a Congressional Committee, and these gentlemen viewed with deep suspicion the fact that the test which had aroused their ire began with Question 26. Try as I might, I don't believe I ever succeeded

in convincing them that I was not concealing 25 improper questions from them. Other schools of polygraph thought begin with question 1 and number relevants, irrelevants and controls in sequential order. This can create difficulty, when others are examining charts. In recent years we have devised a system where the question notation clearly reveals the type of question being used. This permits great flexibility on the part of the examiner in devising and applying questions to meet each testing situation, but in no way interferes with the ability of his supervisor to review his charts and findings.

Question Numbering: Irrelevant Questions. In our system each irrelevant question is identified with a small letter. Typical examples might be as follows:

a. Is your first name _____?
b. Is your middle name _____?
d. Were you born in the month of February?
g. Do you live in the city of Boston?
h. Etc.

Each examiner works from the same list of irrelevant (or Norm) questions. He is at perfect liberty to devise others or to combine them, like the first and last name. He must identify each on the chart by a small letter and must write out on his question sheet any non-standard norms which he used.

Question Formulation: Irrelevant Questions. This is perhaps as good a place as any to emphasize an important aspect of norm questions, insofar as our R/I technique is concerned. The subject should not be aware that the Norms are throwaways. In our chart analysis we plan to compare the irrelevants to the relevants to determine the subject's reaction pattern. The only way this process would have high validity would be if the subject were led to believe that the norm questions were of equal importance (though the examiner would really think it would be unlikely for the subject to be lying to the norms.) For this reason, we have never used what I call "self-evident" norms. "Do you smoke?" When the subject is smoking; "Are you now in the city of St. Louis?" You mean, this creep doesn't even know what city I'm in? There is no way that these questions can represent a potential threat to the subject. They are games, and neither he nor the examiner gives a damn how

they come out. We prefer a spiel which points out that the norm questions are actually important--after all the examiner has no way of knowing if the subject is using his true identity, address, etc. By doing this you have established a valid basis for comparing the irrelevants with the relevants. And incidentally, when we get reactions to what we had intended to be norm questions, we interrogate. An irrelevant question to which a specific reaction has taken place is no longer irrelevant. In one such case several years ago we found that an applicant was using a completely false identity in an effort to hide from her estranged husband. In our business, instead of, "When in doubt, punt!", it becomes, "When in doubt, interrogate." One possible exception to this might be made in a test of a woman who has reached a certain maturity and shows some reaction to the year of her birth, as listed on the application form. Here the examiner might let her off the hook by implying that the employer is far more concerned about the fact that she is a U.S. citizen by birth than in her actual birth date. And let the matter drop there rather than force her to admit she's 39 and holding.

Question Numbering: Relevant Questions. In our system relevant questions are numbered in sequence, beginning with Arabic 1. As I mentioned earlier it is important to begin the question numbers with 1 in order to avoid suspicion of having concealed questions in the event of a review of the test by outside authorities. In the event that other standard tests are used, with preprinted question sheets, other numbering systems might be used, such as beginning with Arabic 50, although this can cause misunderstanding. In any event, only Arabic numbers are used for relevant questions.

Question Numbering: Exclusion Questions. Questions which modify a relevant question are given the Arabic number of the basic question followed by capital letters indicating the nature of the modification. Suppose, for example, that Question 1 is "have you been involved in any way with illegal drugs or narcotics?" Then question 1 FX (full extent) would be, "Have you told me the full extent of your involvement in illegal drugs or narcotics?" Question 1 TR (true reason) becomes, "Have you told me the true reason you are disturbed about the question on illegal drugs and narcotics?" Similar abbreviations

will suggest themselves for other exclusion questions. If the examiner find it necessary to use some nonstandard variation of a relevant question, he would number it 1A and list the question on his question sheet. If it becomes necessary to ask a completely different question, this would be given the next Arabic number in the sequence and would be added to the question sheet.

Question Numbering: Breakdown Questions. Our system makes a great deal of use of breakdowns of the primary questions as a means of isolating the source of a reaction or of narrowing down the area where interrogation will have to be conducted. You may know the concept as "roving" or "searching" or "Type B" peaks. We have already prepared the subject for their use during the discussion of lesser included questions during the question review. A series of these subquestions might be substituted for a primary question to which the subject is indicating sensitivity. Under these circumstances they would be numbered 1A, 1B, 1C, etc. They would have to be listed on the examiner's question sheet. A more formal type of peak might be administered by the examiner when the subject refused to make any admissions or denies the sensitivity to the primary question. Here the examiner will devise an appropriate breakdown and discuss it with the subject in advance. We prefer for each item to be aseparate short question, rather than a single word. We feel that the classic one-word peaks might not represent as much of a threat as the denial of a direct question. For example, a standard peak on Question 1 might be "In connection with the question on illegal drugs or narcotics does anything disturb you about the following things:

1A. Marijuana?
1B. Hashish?
1C. Heroin?
1D. Cocaine?
1E. LSD?

Our system would make each item a separate question:

1A. Have you ever used marijuana?
1B. Have you ever used hashish?
1C. Have you ever used heroin?

1D. Have you ever used cocaine?
1E. Have you ever used LSD?

Of course, the examiner will list these peaks on his question sheet, but giving them the Arabic number of the basic question aids in the chart analysis.

Test Procedures: Breakdowns. Although I plan to speak at length about our general test procedures, this is a good point to discuss breakdowns. We go over the breakdown questions with the subject just before the test. We may explain to him that he will not be worried about any of these questions if he is not bothered about the primary questions. It will also let us know if he is troubled about anything which would also be important to us. These questions give us double verification that he is being truthful with himself in regard to the primary question. We tell him that we may ask the questions more than once but that this is only to be very sure of the test results. On the actual test we ask the questions once in the order in which we discussed them. We then say, "I'm going to go through those questions once more in the same order--to be sure of what I'm getting." (Chart marking: "Again") This applies some fairly rugged stimulation to the guilty subject, while hopefully not unduly disturbing the innocent. It also gives the advantage of question position for the benefits of peak of tension testing. At the close of the second sequence the examiner says, "Now I'll go through those once more, but I'll mix them up this time." We seldom isolate such peaks into a chart by themselves. We prefer to go into a peak such as I have described and then return to the regular question sequences. This tends to make the peak seem a normal part of the test of the subject, and he is unable to claim that the examiner made something special of the breakdown. Parenthetically, it may be noted that breakdowns in R/I testing seldom provide the dramatic reaction patterns we expected from basic training. In the first place, the guilty subject is frequently involved in more than one element of the breakdown. He will frequently exhibit a high response level throughout the breakdown. He may also be involved in matters within the scope of the primary question but not detailed in the breakdown.

Usefulness of Breakdowns. These tests are extremely helpful

as aids to interrogation, since they can be used effectively to destroy the subject's defenses. The fact that he reacts to the breakdown items is proof that it is not just the wording of the primary question which is causing the difficulty. When he reacts strongly to the examiner's instruction during the chart that the items will be repeated to be sure of what is happening, this is typical of the man who is trying to hide something--not from the examiner, but from himself. And so on. The examiner should not be misled by multiple reactions during these breakdowns. The chances are far better than even that the subject is worried about each of them. It is also possible to provide breakdowns within breakdowns, and in our earlier example regarding drugs the subject might be asked if he had used hash, bought it, sold it, given it away, been present when it was used, etc. Again, we are in the process of destroying the subject's defenses. We may (and should) have told him during the pretest interview that chart analysis is complex, and we are not always able to glance at a chart and know the outcome of the test. (Of course, after we have subjected it to detailed analysis in the laboratory . . .) Sometimes, though, a reaction is so strong, when the person is deeply disturbed about his answer, that he can feel the reaction happen, and the examiner can see it on the chart. Our demeanor during the administration of the breakdown and discussing it with the subject between charts is intended to convey clearly that his reactions are in the obvious category.

Question Numbering: Overall Truth Questions. Our technique uses one or more overall truth questions, generally at the end of each chart, prior to any controls. (See T2 reaction in fig. 1) There are only three logical questions of this type which are in common use by us, as follows:

T1. Did you answer all those questions truthfully?

T2. Did you answer any of those questions falsely?

T3. Have you deliberately withheld information pertinent to this examination?

Note that T1 does not ask, did you answer all my questions, and

T3 covers only matters pertinent to the examination. This can be important because the subject can otherwise react from minor evasiveness during the pretest interview about matters not actually covered by the test questions. It is quite important that these overall truth questions also be discussed during the question review. We find it helpful to point out that the man who is being truthful will welcome these questions, but the dishonest man will have to lie twice if he is troubled about any of the matters on the test. Some persons will exhibit quite a relief pattern on the overall truth questions, since they expect them to be at the end of the test chart. When I suspect that a subject may be reacting to the position of the question rather than its subject matter, I may begin chart 3 or 4 with an overall truth question, as follows: TITBK. "Have you answered the test questions today truthfully, to the best of your knowledge?"

Usefulness of Overall Truth Questions. These question are quite helpful in destroying the subject's defenses and in facilitating interrogation. If the subject reacts to one or more pertinent questions as well as to overall truth, the examiner can be that much more certain of his chart analysis. In the cases of reactions to relevant questions without a corresponding reaction to overall truth, go on and interrogate anyway. T1, 2, and 3 are actually pretty general and may not have the impact of the more specific relevant questions. It is also common that the person may react to overall truth but show no reaction to the relevant questions. You may conduct generalized interrogation along the lines of, "You seem to be worried about something that is perhaps not covered directly by the test." It really makes more sense to forget about it. Presumably the reaction to overall truth and to the controls shows that he reacts normally on the polygraph. He therefore would have reacted to any of the relevant questions which disturbed him. In the absence of such reactions, the test is clean, as far as the purposes of the client are concerned. The examiner should also note that T2 may be considered to be accusatory by many people, and he can expect heightened sensitivity to it. It is also helpful sometimes to place a relevant question which appears to trouble the subject just in front of T2 and T3. They will frequently reinforce each other and aid in the interrogation of the subject.

Question Spacing: Evenness. It is critically important that questions be spaced precisely evenly during the test. No extra space should be allowed between norms or pertinent questions. Even if a person is reacting vigorously to one of the relevant questions, the reaction should be killed, if necessary by asking a series of irrelevant questions. I emphasize this because it becomes an integral part of the controlled testing situation, the structure which makes the charts meaningful. Even if the examiner is fighting a balky pen, he should be asking a series of perfectly spaced norms, while directing nonverbal profanity at the pen. This is strictly defensive, this spacing edict. Both to the subject and to outside critics who may review the chart in court testimony, we can thus demonstrate that no artifact in connection with question spacing could have contributed to any reactions on the charts.

Question Intervals: Time. I prefer ten-second question intervals as a minimum and fifteen-second question intervals as a maximum. This is not at all in accordance with most instruction, and I suppose I should be appropriately penitent. I am far more troubled by charts I have seen displayed at various seminars with question intervals, even when they are regularly spaced, of 30 seconds or more. Very often there will be no immediate reaction to the question, but the subject will respond fifteen seconds after the question is asked. We can be sure of only one thing under such circumstances; it was most probably not the examiner's question which created the reaction. In general, it can be accepted as a truism that the subject will begin to react within two to three seconds of the perception of the stimulus. Remember, we are triggering the autonomic nervous system, which was designed to act rapidly to save the organism. Even for sluggish mentalities, considering that the questions have been discussed in advance, that reaction is going to start within a matter of a second or so, or it is not going to happen.

Consider also, how long should we let the reaction go on? If we let it run for thirty seconds or so (and I have seen this) how do we know the subject is still capable of reacting to the other relevant questions which will be following? If we let the reaction go to the point of extinction, how long must we

allow for recovery time? In our technique, we remove the triggering stimulus by asking one or more non-disturbing irrelevants. This also permits us to get some utilization out of our GSR. Since we cannot afford to wait while a free galvo meanders all over the chart, we put it on self-centering, secure in the knowledge that all the data we need is mainly in the initial slope of the GSR curve. The self-centering mode frequently gives us additional data, since strong responses can overload the self-centering circuit and give us a "saddle" at the top of the reaction or a recovery below the center line at the end of it. (See C16 in fig. 2) Similarly, adequate data for the identification of reactions in either pneumograph or cardiosphygmograph patterns should be apparent to a competent chart analyst within ten seconds of the stimulus. This invites the obvious remark--if a man is not a competent chart analyst, what is he doing giving polygraph tests? I guess the entire question of time intervals boils down to this: questions should be spaced widely apart enough to identify reactions, but not so widely that physiological fatigue, apprehension over the next question, or apprehension over what's going on while the examiner waits so long, introduce error into the process. There are no really firm answers in this area.

Control Procedures: General Discussion. Our control procedures are not at all in consonance with those of most of the rest of the field. We do not use the "known lie" or any of the variations of this control procedure which are in fairly universal use elsewhere. The reason why is very simple. I do not have complete confidence in the known lie controls and am not comfortable using them. It is rather like the time when I finished Ordnance Corps O.C.S. during World War II. We had to get drivers' licenses for all the army vehicles from medium tanks to motorcycles. I completed the motorcycle driving test all right, but I never developed confidence that I was in control of those wild vehicles. I've never been on one since.

Known lie controls obviously work very well for the majority of the examiners in the field; our procedures work very well for us. I do not claim that ours are necessarily better--but I disagree with those who say that ours are necessarily worse. The procedures and the purposes differ so widely that perhaps we shouldn't both call them "controls." If this discussion alerts

other examiners to the fact that alternative procedures exist and that they have validity, this section will have some value. It is really not a question of better or worse, nor of my proselyting other examiners to switch to my procedures. Again, from a strictly defensive position, the standard control question techniques present certain vulnerability to hostile criticism which I would rather avoid.

Consider for example, the title "known lie." This is a contradiction in terms to me. The procedure requires me to devise a question around a topic of similar but lesser significance to which the subject is almost certainly lying. But when we return to our basics, I cannot harp too much on the fact that it is not the lying, it is the fear of unpleasant consequences, the threat to well-being, which creates the reaction. As a kid I remember lying to my mother without turning a hair. At the worst, Mom just gave you a slap across the chops--and half the time she missed. But my Dad, that was another matter. The adrenaline really flowed whenever I lied to Dad. He used a strap on your bare behind--and he never missed. Thus the absence of a reaction to a control--or to another question, for that matter--does not mean the subject didn't lie. It merely means he wasn't threatened.

Some standard techniques also require me to compare the reaction to the control question to the reaction to the "hot" question and to reach certain conclusions, depending upon which is the stronger. This troubles me even more than the earlier presumption that the control reaction is created by lying. The procedure postulates many things about the psychology and the ethical standards of the subject which the examiner could not possibly know. The temptation becomes overwhelming to substitute the standards of the examiner for the unknown standards of the subject, and to proceed on that basis. The fact that I would consider grand larceny more serious than shoplifting does not necessarily mean that the subject views them in the same light. To a hit man for the syndicate, murder might be all in the day's work, and nowhere near so reprehensible as juvenile thefts from his mother's purse. Thus, I cannot ascribe completely to a technique which reaches conclusions based upon the presumed seriousness of the subject matter of the questions.

I will agree heartily that, all other things being equal, (they seldom are) the more intense the reaction, the greater was the threat perceived by the subject. This does not necessarily mean, the bigger the reaction the bigger the lie. Cleve Backster speaks of the psychological set of the subject in this regard. I would only add, that it cannot be the presumed psychological set. I would not agree, for example, that I could ignore a relatively mild reaction to a hot question in the face of a more intense reaction to a control. Granted, the subject though one was more important than the other, but I wouldn't rest easy as an examiner until I found out through interrogation why that "minor" reaction occurred to the hot question.

One other problem in R/I testing is that you are frequently covering multiple topics or multiple aspects of one topic in the case of specific tests where R/I techniques are used. You may encounter an entire hierarchy of reactions, ranging from miniscule to violent, during the test. When you compare the control reaction to these, it might exceed some and be exceeded by others. The conclusion is obvious: he was truthful about those which were exceeded by the control, and he was wrong about those which were stronger than the control. All of which works out fine, except when all the questions centered around the same topic, and the subject had to be wrong on all of them or none of them. Such a pattern is not really unusual in R/I testing, and the logical conclusion is merely that the subject perceived some as being more threatening than others. It is up to the examiner's skill as an interrogator to find out why.

R/I Technique: Controls. Polygraph examiners are a peculiar breed. When the subject is panic stricken and showing excessive general nervous tension (GNT) we are unhappy. When he is not reacting to anything, we are equally unhappy and begin applying stimulation techniques to make sure he doesn't become a nonreactor. Controls in our technique are a part of the chart validation process, but they have little if anything to contribute toward the detection of deception. They are used for one purpose, and one purpose only: to determine at the moment of stimulation that the subject was "alive" as far as the polygraph instrument was concerned, that he was physiologically capable of reacting. Negatively it establishes that he was not fatigued, under the influence of depressant drugs, or

in a nonreactive yoga state. (Or that if he had tried any of these, they weren't working to the point of invalidating testing.)

There are several differences between this technique and standard practice. The first, and most obvious, is that we do not use controls as long as the subject is already reacting to any of the questions. Why try to find out if he can react, when he is already hitting all the stops on the pens? We do not use controls, then, until there is no indication on the charts of any specific reactions which require resolution. For this reason, our major controls come most frequently at the end of testing. They tell us this: at the end of the test, when the subject was exhibiting no specific physiological reactions to any of the pertinent questions, he was still perfectly capable of reacting if any of the pertinent questions represented or continued to represent a threat to him.

Having mentioned "major" controls above, I must perforce talk of "minor" controls. These are merely mild stimulation applied, often in the middle of a nice clean chart, to be sure the subject is still awake and alive as far as the polygraph is concerned. Something which creates mild surprise, like a deliberate error in one of the irrelevant questions, is often used for this purpose. Thus he is asked, "Were you born in 1928?" instead of 1938, the correct date. Often the only response is a mild GSR reaction, after which the examiner says, "Oh, I beg your pardon. Were you born in 1938?" If successful, he has managed to secure the desired minor control without destroying the subject's trust, which he has so carefully built up during the pretest interview. (See figure 1)

One problem, where our control technique is concerned, is that the control must have some element of surprise to work properly. This gets me into a rather sensitive area. I have one friend, a highly respected examiner, who taught and says for publication that it is somehow very wrong to ever use a surprise question on a test. His reasoning behind this conclusion has never been very clear to me. My own philosophy is more pragmatic: "If it is not unethical, and it works, why fight the problem?" One simple answer to the problem is this. <u>Under no circumstances will I tolerate a control question which is or even implies that it is concerned with any sexual matter</u>. This also includes such phrases as, "I am now going to ask you

an embarrassing personal question," (EPQ) or the equivalent. This may be effective, but it is deplorably unethical. Such questions are totally unnecessary, and they create lasting enemies for the polygraph profession, even though the examiner may never actually ask any embarrassing questions.

We have already prepared the way for our controls during the question review by saying that we will ask other questions which have not been covered with the subject. Of course, this was in the context of norm questions. We also have told the subject that we will ask his permission if for any reason it is necessary to broaden the scope of the examination. Our control questions are not especially known lies, although they may partake of some of the aspects of known lies. They are merely intended to stir up some kind of emotional reaction--any kind of emotional reaction. Shame, fear, embarrassment, annoyance, worry, anxiety, all of them work equally well. Remember, we are only trying to establish that a stimulus applied to the subject's autonomic nervous system will create an artifact on the chart. (See fig. 2)

The control question must face the subject with a predicament which he cannot solve without further guidance from the examiner--and the examiner is not disposed to be helpful. For example, my examiners introduce themselves at the beginning of the interview and never mention their names again. We get a control from this very easily. The examiner uses an introductory statement, something like, "Mr. Jones, I need to ask one additional question, which will verify that you have been concentrating on the test. Mr. Jones, do you remember my last name?" In most cases, Jones has not the slightest idea what the examiner's last name is, and is embarrassed about it, because he knows the examiner introduced himself. The examiner may simply ask a question without defining his terms in such a way as to permit the subject to be sure of his answer. It might be, "Mr. Jones, at any time during the last six months, can you recall having told a deliberate lie?" Jones is up the proverbial creek. Does the examiner mean only an important lie? A little white lie? He cannot ask for clarification because he has been told to say only yes, no, or to remain silent while the instrument is in operation. Or the examiner may say, "Mr. Jones, in your entire life, have you ever been drunk?" Does

the examiner mean high or out like a light? Notice that each of the controls must present some element of threat, something which might be important to the employer. A man who is inattentive, a lush, a liar--perhaps these might be disqualifying.

It is not too difficult to devise effective controls, but the examiner must exert extreme precautions to make sure that they are both ethical and appropriate to the circumstances of the examination. For example, a control question should never be about a topic which is pertinent to the employer's interests. It should never be about a topic where the examiner should conduct interrogation. Thus, "Have you ever stolen anything in your entire life?" is an excellent control question, but not for a bank employee. Here the examiner needs to find out what he stole when he reacts to the question. In general a control question should not give offense, and it should be about matters which are not important to the employer (though the subject might not know this.) It should be devised around something where all of us, if we were going to be truly honest, would have to say yes. But we don't want to say yes, because we don't know what the reaction of the employer would be. In our shop, we maintain a list of approved control questions. The examiner must choose from this list, although he is permitted to adapt them to the particular person being tested. Thus an army officer might be asked, "Despite the officer's code of honor, did you ever lie to a superior officer?" Or a teenager might be asked, "During the last six months, did you tell your mother a deliberate lie?"

The final, and perhaps most crucial, element in our control technique is that <u>we explain what was going on after the chart is completed</u>. We assure the subject that the question was asked only to make sure he reacted in normal limits, and the question and his answer had absolutely no bearing on the test. Otherwise you may have him writing to his congressman that he was turned down for employment because he misused his sick leave at his prior job. I have never had any resentment expressed about a control, once the subject knew why it was asked, that it was unimportant to the employer, and that it helped to validate his test. Sometimes the subject will wish to explain what he was thinking about during the control. The examiner will make brownie points for himself and the profession by refusing to listen.

Question Repetition: General. Perhaps the heart of our R/I technique is involved with the repetition of questions. We are all aware that random thoughts, especially if they are of an emotional nature, can create misleading reactions on the polygraph charts. Statistically speaking, if the outside thoughts are truly random, they should occur at random intervals. If the examiner has skipped around from question to question, interspersed the relevant questions with irrelevant questions, and asked each question four or more times during the course of three polygraph charts, he has increased his statistical probability almost to the point of certainty where reactions are consistent.

Looking at it in this sense, I suppose the entire polygraph procedure is really a statistical process. By this I mean that we work with emotions, knowing them to be illogical and difficult to control. We then structure the test in such a way that the odds will be very much in our favor that a reaction will indicate the perception of a threat by the subject. We eliminate, as far as possible, outside random influences by controlling the test environment to keep all exterior stimuli such as temperature, sound, humidity, etc., constant during the test. The pretest interview takes care of variable created by apprehension over test procedures and the questions to be asked. All this is designed to build up a heavy balance in our favor in the statistical odds during the test. A mathematical friend (I am not) once told me that, according to probability theory, when a question was repeated six times and exhibited a reaction each time, the odds for something being wrong were not 6 to 1, but 6 factorial, or 720 to 1. To which I say, "Horray!" Working with the often illogical emotions of often recalcitrant people, we can use all the odds we can get.

Question Repetition: Paraphrasing. I sometimes call our R/I procedures "incremental repetition" because we generally add or change something when we repeat the questions, especially if we observe apparent sensitivity to the question. Almost invariably we ask it in the same words the first two times. Then, without changing the meaning, we may turn it around so the subject can answer yes instead of no. For example, "Have you knowingly given any false answers on your application form?" might become, "To the best of your knowledge, is your application form correct?" We may add appropriate exclusion phrases to the question. There is always the chance that the subject may react (or claim he does) because the question seemed

to be receiving special attention from the examiner. For this reason, it is important that the procedure be applied to questions, even norms, to which there was no apparent sensitivity. This will assist in differentiating in the chart analysis what effect if any was created by the process.

Question Repetition: Position. Most examiners are aware of and take steps to negate the chance that the subject is a spot reactor, that is, he reacts according to the position of the question on the chart. Thus the first pertinent question will commonly receive extra attention and mild reaction from the subject. In repeating the questions, their position on the chart should be changed. They should also be placed next to different questions to prevent a reaction to one question from continually masking an equally important reaction to the question which followed it. Although the subject has been told that the questions will be repeated and that this is a routine procedure, he will often react a little to the first question which is repeated. For this reason we usually repeat a norm question before repeating any of the relevants.

Question Repetition: Sequencing. As an illustration, let us suppose that we are examining William Arthur Jones, and we have made norm questions a, b, and c, of his name. Assuming that these are to be interspersed among relative questions, we might get something like this:

c. Is your last name Jones?
a. Is your first name William?
b. Is your middle name Arthur?
a.c. Is your name William Jones?
a.b.c. Is your full name William Arthur Jones?
a.(RW) Are you known by the nickname Bill?
a.c. (RW) Do your friends call you Bill Jones?

And so on. The same process operates for the relevant questions. This is why it becomes very difficult to teach and to use a rigid question sequence for R/I testing. The examiner is going to ask each relevant question a minimum of four times for questions which show no reaction. Routinely he will repeat an irrelevant question somewhere around the middle of chart 1. Observing apparent sensitivity to Relevant question 3, he repeats #4 first (as a control) and then repeats #3. He may stick #3

in again at the end of the chart, just before asking T1. He will cover all the other pertinent questions at least once on the first chart, and will ask as many as possible twice within the time allocation for the chart.

Chart Length. This is another area where examiners disagree strongly, but there is actually little factual data to support various points of view. We limit our chart length to a nominal 4½ to 5 minutes. As a practical matter, this is about the time that the recorded pattern on the chart begins to disappear over the end of the desk. It is not a fixed rule. If the examiner needs to add controls to complete the test, he can do so, rather than have to run another complete chart. On the other hand, the blood pressure cuff can become uncomfortable during a chart which lasts too long. We do not have a fixed question sequence, and the questions are going to be repeated anyway. We work from the point of view that there is no reason why the test has to be any more of an ordeal than necessary. We generally apply the blood pressure cuff to the forearm, where it is more comfortable than on the upper arm but does not exhibit the loss of reaction intensity which frequently takes place at the wrist. We will usually tell the subject that he can expect some mild discomfort or tingling from the blood pressure cuff, but if it begins to be in the least painful, tell us, and we can halt the chart at that point. Often, merely putting the subject in charge will be enough to run charts of adequate length. By this I mean long enough so that a question which is giving trouble can be asked two or three times, with appropriate paraphrasing and exclusion phrases. This permits the examiner to be certain whether or not he has a problem and to plan how to attack the problem with between-chart interrogation and question emphasis on subsequent charts. A chart which is too short will not permit this. One which is too long brings in another set of unknowns, the effect of fatigue and discomfort on the chart. At the risk of sounding calloused, discomfort is not an invalidating problem. It should apply to all the questions equally; the subject's hand should not become uncomfortable only on question 6. At an extreme, of course, the subject will show pain reactions throughout the test, and the examiner will be unable to read the chart. I am much more concerned about fatigue. We expect this to be an ever-increasing factor during the test. At some unknown time it will arrive insidiously at

the point where the subject exhibited no reaction when he felt threatened, because his autonomic batteries needed recharging. We know from experience that a five-minute chart creates no serious fatigue problems, so we play it safe and chop the test off at or around that time.

Number of Charts. If fatigue, discomfort, and increasing tension operate as limiting factors governing the length of charts, they play a similar role in controlling the number of charts administered during any one examination. We set a rather arbitrary limit of five charts during any one sitting. It is highly possible that most subjects are not unduly tired by the time five charts, with intervening rest or interrogation periods of not less than five minutes, have been run. On the other hand, there is generally little to be gained by running additional charts at the same sitting. Additional charts are certainly no substitute for interrogation, if the problem is one of unexplained reactions. If the problem is one of excessive GNT, it is strongly probably that, if the subject has not calmed down by the time five charts have been run, he is not going to calm down at that session.

Determining Need for Additional Charts. Even in a specific R/I test, to cover knowledge or suspicion, actual participation, and one or more outside issues will require two charts by the time the relevant questions are mixed with norms and repeated. If at the end of the second chart, there are no apparent reactions to any of the pertinent questions, the examiner will use one or more control questions as needed. If an adequate control is obtained, the test is over. He does not go into control procedure as long as there are any apparent reactions on the chart. He must interrogate. I generally discourage (but not prohibit) my examiners from running another chart in specific reaction cases until the subject has given some admissions which might make another chart fruitful. One exception would be where the examiner plans to use breakdowns and exclusion questions as aids to breaking down the subject's defense. Another frequent occurrence is when the problem seems to be one of GNT. Here the examiner might chat for a moment or two between charts to reassure the subject and run a final chart after he apparently regained his composure. At any rate, the examiner is prepared to run a maximum of five charts. The need for additional charts is determined very simply. If there are continuing reactions

to any of the pertinent questions, the examiner is not ready for controls and closing procedures. It might be appropriate to note that we do not normally use card tests and so on as stimulation procedures. As a practical matter, chart time is precious to us, and we begrudge any time spent on other than the primary purpose of the examination. I recall a violent argument with a good friend and an expert examiner who had run three tests for various stimulation purposes--fifteen minutes of chart time gone, and he had not even asked the first relevant question. I suppose, if I have a philosophy about these procedures it would be as follows: Try to avoid stimulation procedures which smack of parlor games and might decrease the respect of the subject for the examination. Use stimulation as necessary, but do not use it in advance of demonstrated need. We find in general that a good pretest, minor controls, and major controls at the end of testing take care of most of our needs.

Feedback. Our procedures place a great deal of stress on feedback. There is an analogy with high fidelity sound which might be apropos here. I remember building an amplifier from a kit which used the feedback principle. The signal was sent around and around the circuit, each time losing distortion, until it became a pretty faithful copy of the original sound which entered the system. The same thing is true in our R/I testing. Unfortunately human beings are ornery cusses, and a man who has something important to hide will frequently tell you only a part of what is on his mind, in hopes that this will satisfy you. It is a cardinal principle with us that all admissions are fed back into the test to see if they are complete. This is why we have developed an elaborate series of exclusion questions. It is also why we do not arm the examiner with fixed procedures. He must continually hold his questions and procedures under self-analysis to adapt them to the test situation. No matter how convincing or sincere the subject may sound, the examiner must feed back his admissions into the test and must believe his charts. When the examiner finds himself excusing the reactions on the charts because of his belief in the subject--he has lost control of the interview. We have a standard interrogation procedure where the examiner looks at the charts, looks at the subject, shakes his head, and says sadly, "I'd like to believe you, Mr. Jones. You do sound sincere to me.

But how can I believe you, when you don't believe yourself? You can lie to me, and I don't know you well enough to tell. But you can't lie to yourself--and that's what I'm getting on these charts." A word of caution needs to be inserted here. It is really rare for a reaction to disappear completely after admissions. The very emphasis on the matter during interrogation will create some residual sensitivity. Certainly, however, a man who has substantially or completely relieved his anxiety about a matter will show decreased sensitivity. If it remains at the same level, and especially if it increases, the examiner should suspect he has been thrown a fish, and the subject is still holding out. There are really no hard and fast rules in this area, and it is one where experience or the ability to consult with other experts about the charts is very helpful. I suspect that partial admissions, which decrease reactions to some extent, are responsible for many of the "false negatives," which our psychologist colleagues are so fond of discussing. As in hi-fi, feedback procedures will result in an improved product, but they will not create perfection.

Question Sequence: R/I Mix. It is difficult to provide any rules in this area. If the examiner were to ask nothing but relevant questions, even though he had explained his absolute neutrality to the subject during pretest, it would be pretty difficult to keep the subject from feeling that the examiner was hammering at him. Correspondingly, if the examiner uses any fixed mixture of relevant and irrelevant questions, the subject will spot the formula and begin to tense up when a relevant question is due. Again the watchword becomes flexibility. Personally, I prefer to open the first chart with two or three irrelevant questions to permit the subject's pattern to stabilize. From there on in I will ask two or three relevant questions to each irrelevant question. In some cases where relevant questions have a naturally cumulative impact, I prefer to ask them without intervening norms. A typical example would be the "Do you suspect, do you know, did you . . . ?" sequence which plays a part in so many specifics. The devastating impact of progression of this series on the guilty subject should not be diluted. The general principle in our technique is that the subject should not know which question is coming next, a norm question or a pertinent question, and should not be able

to figure out from the question mix or the examiner's procedures which questions show reactions. You must take this ammunition away from him to destroy any alibi. One other point which gives the examiner additional flexibility is this; a pertinent question to which the subject has shown no reactions during the first three or four times it was asked has become a norm question and may be used as such.

Question Sequence: First Two Charts. In begining this section, I contemplated postulating a seven-question screening examination and setting out an optimal question sequence for chart one. Chart two would have been more difficult, since the sequence would depend to a large extent on what happened during chart one. This is probably what happened when we trained an examiner for one of the armed services one time and later found that procedure set in concrete. It is probably that good R/I tests stretch the state-of-the-art as we now understand it (I'm still learning) and rigidity will only lock in errors and imperfect procedures. While I will not give a fixed question sequence, I will point out some of the things which are desirable to accomplish during the first two charts. Each relevant question should have been asked three or four times. Exclusion techniques, paraphrasing, etc., should have been applied to at least some questions where apparent sensitivity was exhibited. The examiner should be reasonably sure, either that he has no problems, or he should have isolated and identified the problems. He should have applied one or more breakdown procedures where sensitivity was exhibited to narrow down the source of the reactions. In the main, however, the first two charts will be fairly general--completing clean cases and getting a good start on the others.

Question Procedures: Subsequent Charts. In some R/I tests the scope may be so broad that three charts will be required to obtain proper coverage for each question. If this is not the case, the third, fourth, and fifth charts will all be aimed at solving whatever problems have remained unresolved during the first two tests. It is hard to set forth firm instructions concerning these later charts because they will vary widely, depending on the nature of the problems encountered. We may expect that rather extensive interrogation will take place between chart two and three, and that further interrogation will be conducted after each subsequent chart. I tend

to discourage the examiner from conducting another chart unless something has been accomplished in the interrogation. If no admissions have been obtained or if no logical explanation has been secured for the reactions, there is little sense in running another chart. This merely represents wishful thinking on the examiner's part that the reactions will go away. Valid reactions seldom do, and the first two charts should have established that they were valid. We are always faced with the problem that we cannot afford to waste chart time. With an arbitrary five-chart limit, the examiner must make each minute count.

Special Procedures: No Questions. There are some special procedures which we have found helpful in resolving problem cases. They are not unique with us, nor original with us, but they can be very helpful. A silent chart or section of a chart can be especially effective with the subject who is claiming that the test procedures and the instrument have him worried, but he is not at all troubled by the questions. The examiner destroys this defense by telling him that this is not too unusual and that this will be verified by beginning the next chart with a two-minute section with absolutely no questions. ("This will permit recording your basic pattern and will facilitate the later chart analysis.") This is particularly effective with subjects who have been fouling up the charts with exaggerated and controlled breathing patterns. The next chart begins with the instruction, "There will be no questions for the next two minutes." After 1½ minutes (the subject can't tell, and we're saving precious chart time) the examiner says, "I am now ready to resume the regular questions." If the subject exhibits steadily increasing tension through the no-question sequence, and goes to pieces at the resumption of the regular questions, the examiner should interrogate. Under these circumstances, the subject is not worried in general--he is worried in particular.

Special Procedures: Single Topic Test. As I pointed out earlier, sex topics are quite difficult to verify with the polygraph, since they carry their own emotional load, and ethical operations require the examiner to avoid the topic like the plague, except in those cases where susceptibility to blackmail is an integral part of determining eligibility for employment. It is common in such cases for the subject to assert that it is the general topic of sex, rather than involvement

in homosexuality or perversion, which is given him difficulty. The examiner can then assure him that this is not unusual for sensitive and intelligent people (sugar-coat the hook) but that will be easily established on the next test. All the questions (no norms) will have to do with sex, and they will cover so many areas that the subject couldn't possibly have been involved in all of them. If he reacts equally to all, the examiner will know that he has been truthful about the matter. On the other hand (always the threat) if he decides to be twice as sensitive to one area as to some of the others, the examiner will regretfully have to come to the conclusion that the subject has been unwilling to be honest with himself about the matter.

Special Procedures: Conference with Superior. It is sometimes helpful for the examiner to leave the room after running a third or fourth chart to confer with a real or ficticious "senior examiner," "company expert," or "management analyst." The examiner returns with the word that during the conference it became apparent that Question so-and-so appears to be the source of at least part of the difficulty (leave an escape hatch). You don't blame the subject for making sure the technique works and the examiner is competent. After all, why should a person have to discuss something uncomplimentary about himself if the procedure doesn't work? But--now that he knows it does work, a really bright guy would make the best of the situation and be honest with himself. This is a procedure which can be overworked and should be used in moderation. For one thing, it can give the subject an opportunity to regain his composure if the "conference" takes too long. I had an examiner who used the procedure on every case, until I found that he was a tobacco fiend who used the out-of-room time to sneak a smoke during the test. We are old fashioned enough to expect the examiner to spend the same length of time in the room, the same time without smoking, the same time under strain as the subject. This is a wonderful defense against any later claims of duress on the part of the subject.

Chart Analysis. By and large, chart analysis is chart analysis, regardless of the polygraph technique in use. Most of us, I am afraid, tend to place more credence in one of the patterns than in the others. I insist that my men get good patterns in the pneumo, the GSR, and the cardio--and to study

each pattern carefully for the information it contains. At the present time, I have not yet seen definitive research on the validity of a plethysmograph or CAM pattern and would not want to call a case "wrong" solely on them. I am really not personally convinced that the field is really in need of newer and more sensitive indices than those presently in use. If the polygraph really were a lie detector, I believe I would prefer that little fibs not show up. I would prefer that only triple-distilled block busting damned lies would create quivers on the charts. Put another way, I do not believe we should be looking for trivia, and our instrumentation should not be aimed in that direction.

There are one or two special considerations in the chart analysis of R/I tests. The first of these is created by the repetition of the questions. We can and do demand that a reaction be consistent (See fig. 4). It should occur to a demonstrable degree each time a question is asked. If it is very inconsistent, it is hardly likely that it was created by a direct threat to the subject. The same thing would be true of a reaction which did not begin until the fourth time a question was asked. Even granting the possibility that something might have popped in the subject's mind which he did not recall the first three times the question was asked, it could hardly have been a very important item. The important ones came to the subject's mind during the pretest question review. The examiner might as well also become accustomed to paradoxical reactions to overall truth questions without any corresponding reactions to the pertinent questions. In some cases the subject is aware of withholding information which he believes to be important but which was not covered by the test. In others the reaction might reflect an overly conscientious person who is worried for fear he might have forgotten something related to the test questions. A third possibility is that he might have lied during the pretest interview but in an area not covered by the test questions. In any event the matter would hardly be of earth-shaking importance. I sometimes instruct the subject not to review his entire life in a flash as he answers each question, but to listen to each question and give it a sincere answer. I admit the possibility that the subject might overlook minor information regarding the question, but it would certainly not be important enough to worry either me or the client.

Interrogation. I feel rather strongly about the subject of interrogation. I believe it to be an integral part of each polygraph examination, so much so that I have serious reservations about the validity of any polygraph conclusion where interrogation and feedback were not employed to verify the source of reactions on the test. I have seen too many tests where the explanation by the subject as to the source of a reaction was so far afield that I was unable to understand how he could possibly have thought of it in response to my questions. I cannot harp too much on the fact that we are dealing with autonomic responses. Granted, the organism has to perceive a threat--but there is no necessity for the threat to be in any way logical. There has to be some reason for it, but it need have little or nothing to do with the question which I was asking at the moment. In essence, we deal with the classic cause and effect situation, except that everything is backwards. We have the effect as demonstrated in the chart patterns. The problem is, what was the cause? The only conceivable answer to me is to interrogate, discover the cause, and feed this back into the test to see if it cancels the effect. The polygraph instrument is by no means a substitute for interrogation. It does eliminate unnecessary inquiry when the charts are clean or into question areas where the subject exhibits no reaction. Even granting that the subject is being dishonest in the area where he is reacting, we need to find out whether it was truly important or was merely something important to the subject but which the client could care less about. Was the matter recent? Was it extensive in numbers of occurrences? Has it lasted over a long period of time, so we can reasonably expect it to continue? Was it a youthful indiscretion which will not be repeated, or did it occur during adult years when we would expect the subject to display better judgment? We are being unfair to both the examinee and the client if we do not interrogate to find the answers to these and similar questions. One unfortunate effect of the outcries of the bleeding hearts (none of whom was ever robbed by a dishonest employee) is that examiners tend to become defensive about interrogation. They seem to feel that if they don't get a confession from the subject, they won't incur his enmity--and they won't have the problem of what to do with the confession, once obtained. I do not pretend to have blanket answers for questions like these, but some things seem reasonable to me. If the admissions are pertinent to the client's interests, tell him, and let him figure out what to do

with the information. If the admissions have merely served to validate the test and are none of the client's business, forget them--and tell the subject this. He deserves the reassurance that matters not germane to the client's interests will not be a matter of record. It is hopeless for the examiner to expect the subject to feel friendly toward him anyway. The subject knows damned well the examiner is not his friend. It is not too much, however, for the examiner to expect the subject to respect him for being neutral and objective.

Examiner Daily Capacity. The foregoing discussion should have made it abundantly plain that R/I testing, done as we recommend, takes longer and is probably harder work than some other techniques currently in use. This naturally gives rise to the crucial question, "How many exams can a man conduct in a day?" In my youth, I was not so cowardly, but I think I'll duck that one. It is a never-ending source of wonder to me that in countless discussions through the years I have grown to believe that each examiner sees his own daily production as being a norm for the field. He sees those who run more cases as "chart-rollers" who could not possibly be doing a thorough job. Correspondingly, those who do fewer may not actually be lazy, but they are certainly not facing up to the demands of the market place. The scope of the examination and the extent and difficulty of interrogation needed obviously have a material effect on the length of time to complete a test. At the risk of offending some good friends, it is hard for me to conceive of a good R/I test being conducted in less than an hour. We also have to face the fact that a good test takes almost as much out of the examiner as the subject. An examiner who is fatigued, who is not perceptive and alert, who is unable to maintain control over the interview, is probably going to administer a poor examination. I do not believe he can conduct the eight examinations per day which are becoming fairly standard in the commercial field, but that is about as far as I would like to be nailed down.

Conclusion. I realize this paper has been rambling and discursive, but the temptation to talk to my colleagues in the polygraph field under conditions when they couldn't talk back was irresistible. Perhaps the paper should be judged by what it attempted to do. Discussions perforce had to be brief, since it would take a lengthy book to treat each topic fully. The impossibility of providing illustrative material also makes

the discussion more didactic than truly desirable. I attempted to point out the dangers inherent in overlooking the autonomic origin of reactions and in equating them automatically with deception. Paraphrasing Mark Twain, I assert that the report of the death of R/I testing or its consignment to some polygraph limbo have been greatly exaggerated. I postulate that R/I testing is wonderfully flexible and adaptible to almost any circumstance where a polygraph test might be administered. I outlined several special considerations which apply to various phases of this test. Not intended for novices, the discussion made no effort to provide a step-by-step primer for these tests. There is enough data for the experienced examiner to give the procedure a try or perhaps to apply some of the suggestions to his own operations.

I fully expect that many of my very good friends in the field disagree with me strongly, and I welcome their indignant letters telling me why. Maybe they would even write an article for Polygraph.

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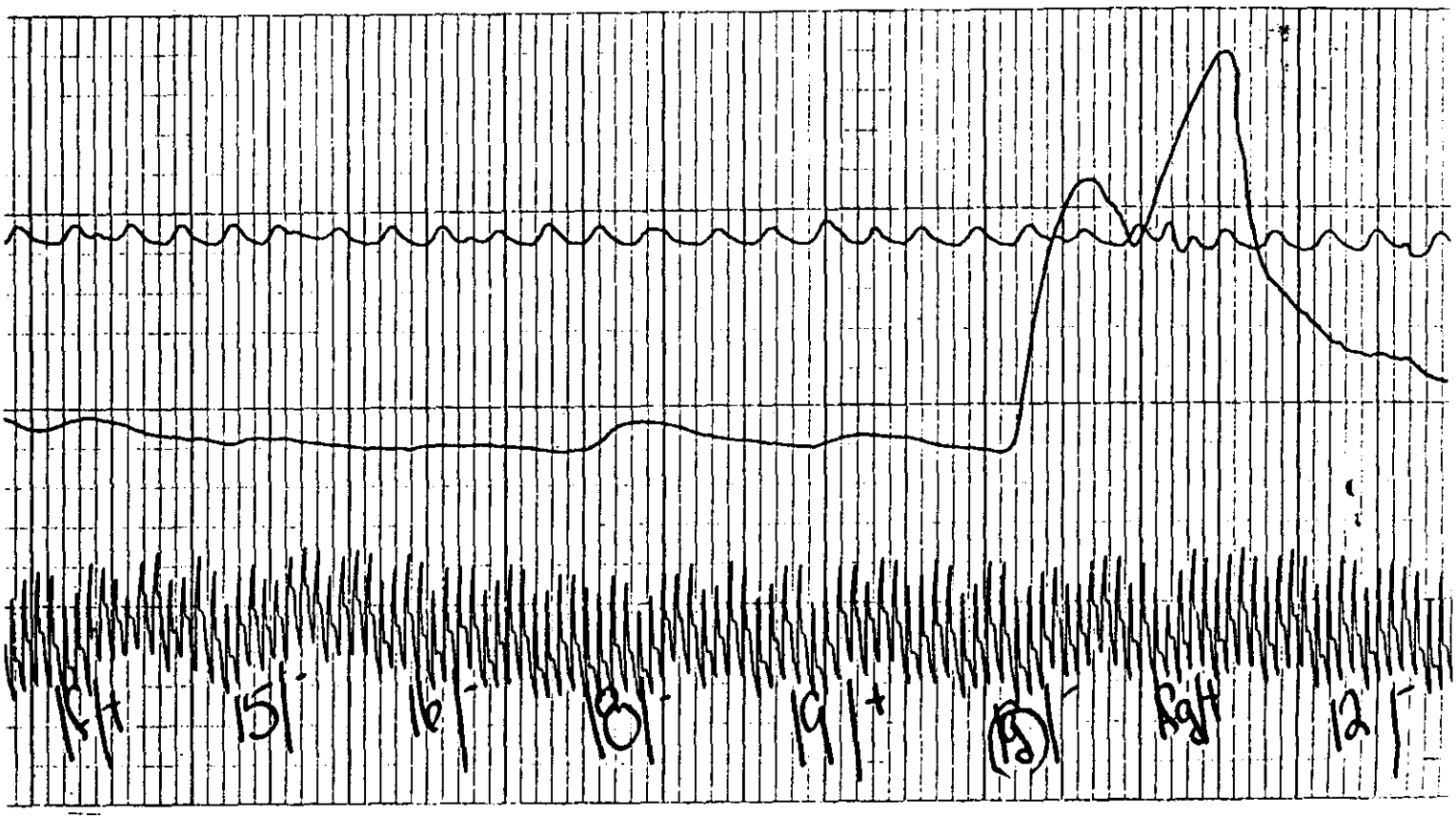

Fig. 1

Minor Control Question. A deliberate error in the year of birth introduced in question g. Note the circle around the letter to indicate it is a mild control. The subject responded no, and the examiner then asked the same norm question with the correct month and year of his birth. The month is letter f, used as a norm earlier in the chart. The galvanograph is in a self-centering mode. Light vertical lines are one second apart. The galvanograph pen is longer (to the left) by five one-second lines than the cardio and pneumo pens.

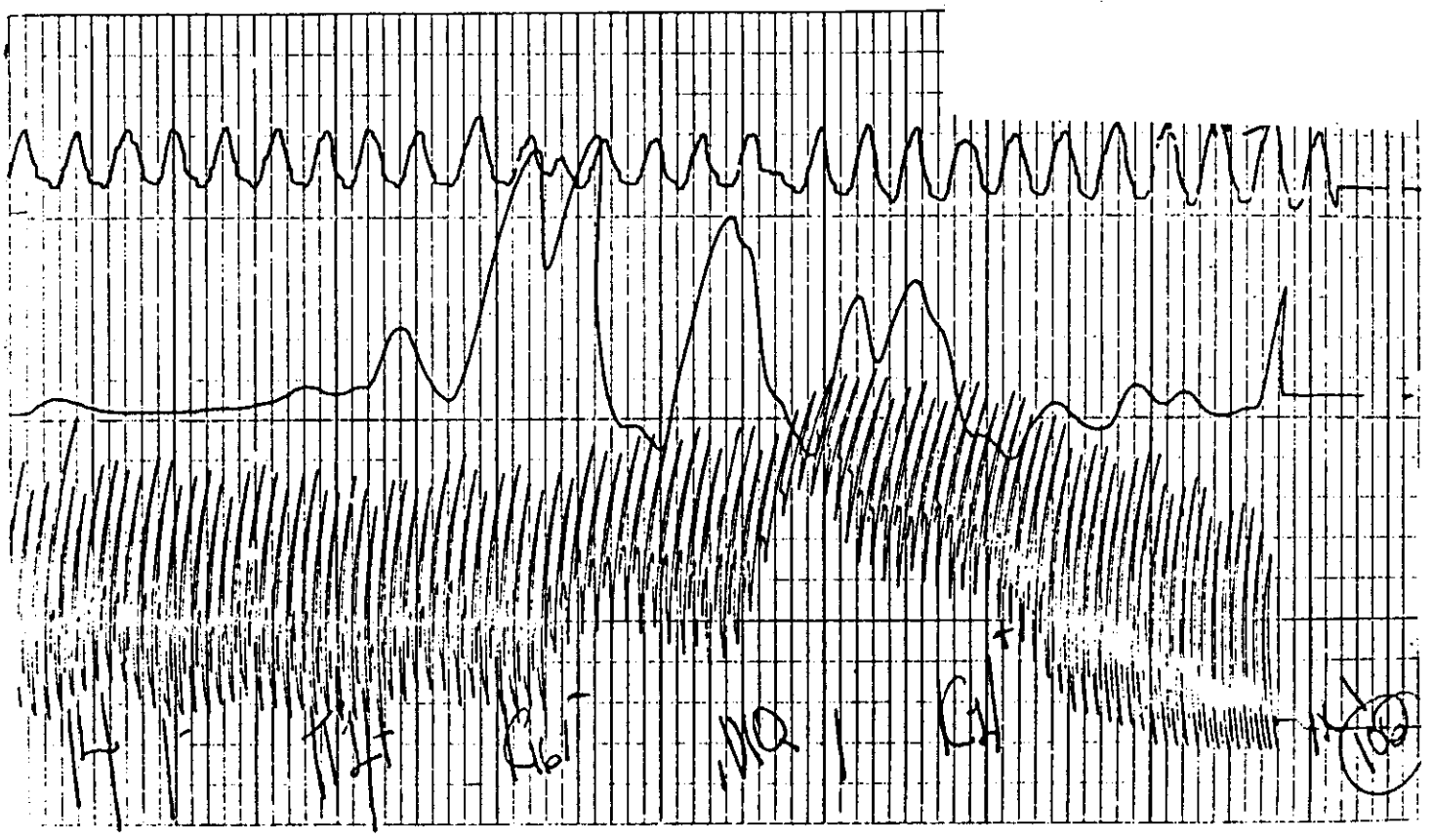

Fig. 2

Interesting Pattern. Control reaction at the end of a relevant-irrelevant screening test. Q4 and T1 are a relevant question and an over-all truth question. C16 is the introduction and part of a double stimulus control, completed with V1Q. C1 is a relief statement behind V1Q which takes the emphasis away from it. Circled number is the end pressure in mm. Hg. with the cuff at the forearm. The Stoelting galvanograph is in a self-centering mode at S2Ø.

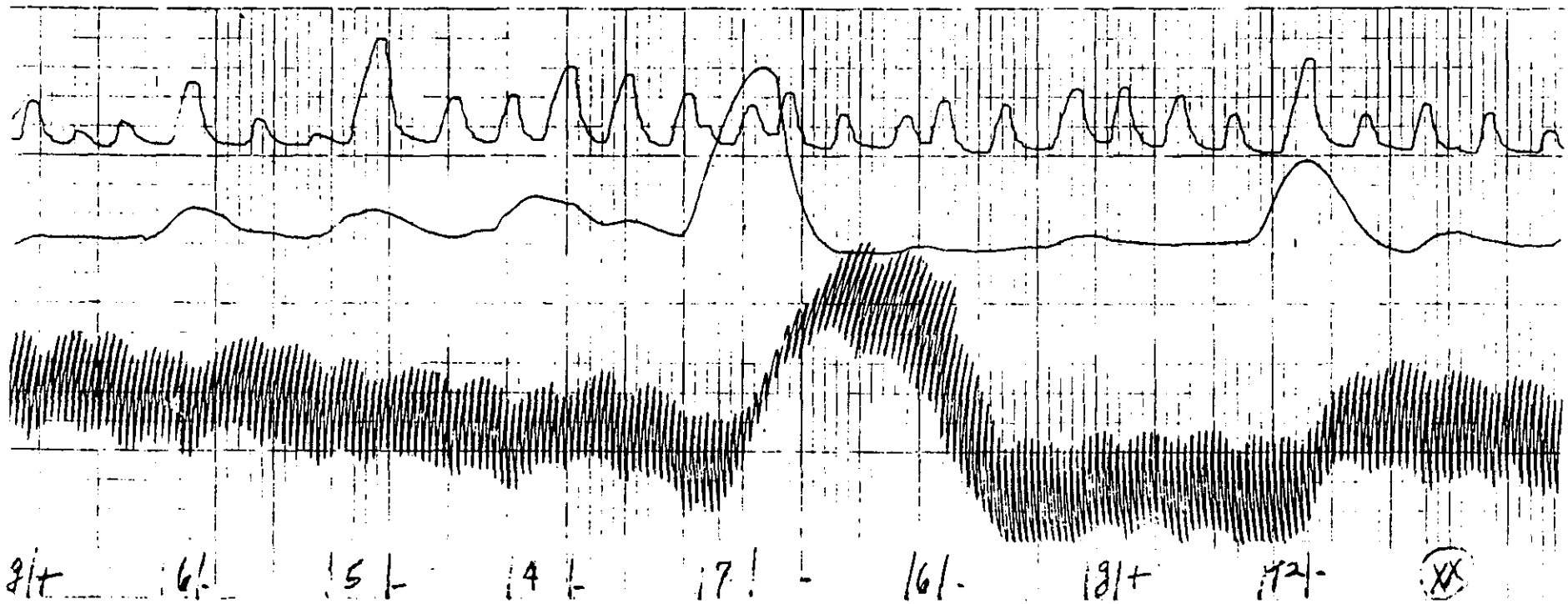

Fig. 3

Specific Reaction in the second chart of a relevant-irrelevant screening examination. The examiner used relevant Q6 as a norm to end the reaction to Q7, since the subject had not previously reacted to Q6. He followed Q6 with a norm (g., year of birth), then the overall truth question. Note that the response to the overall truth is less than to Q7, but specific. The galvanograph is in a self-centering mode, and the galvanograph pen is longer by five one-second lines (to the left) than the cardio and pneumo pens. The xx symbol is an instruction to the Subject that the test (chart) has ended. No control necessary.

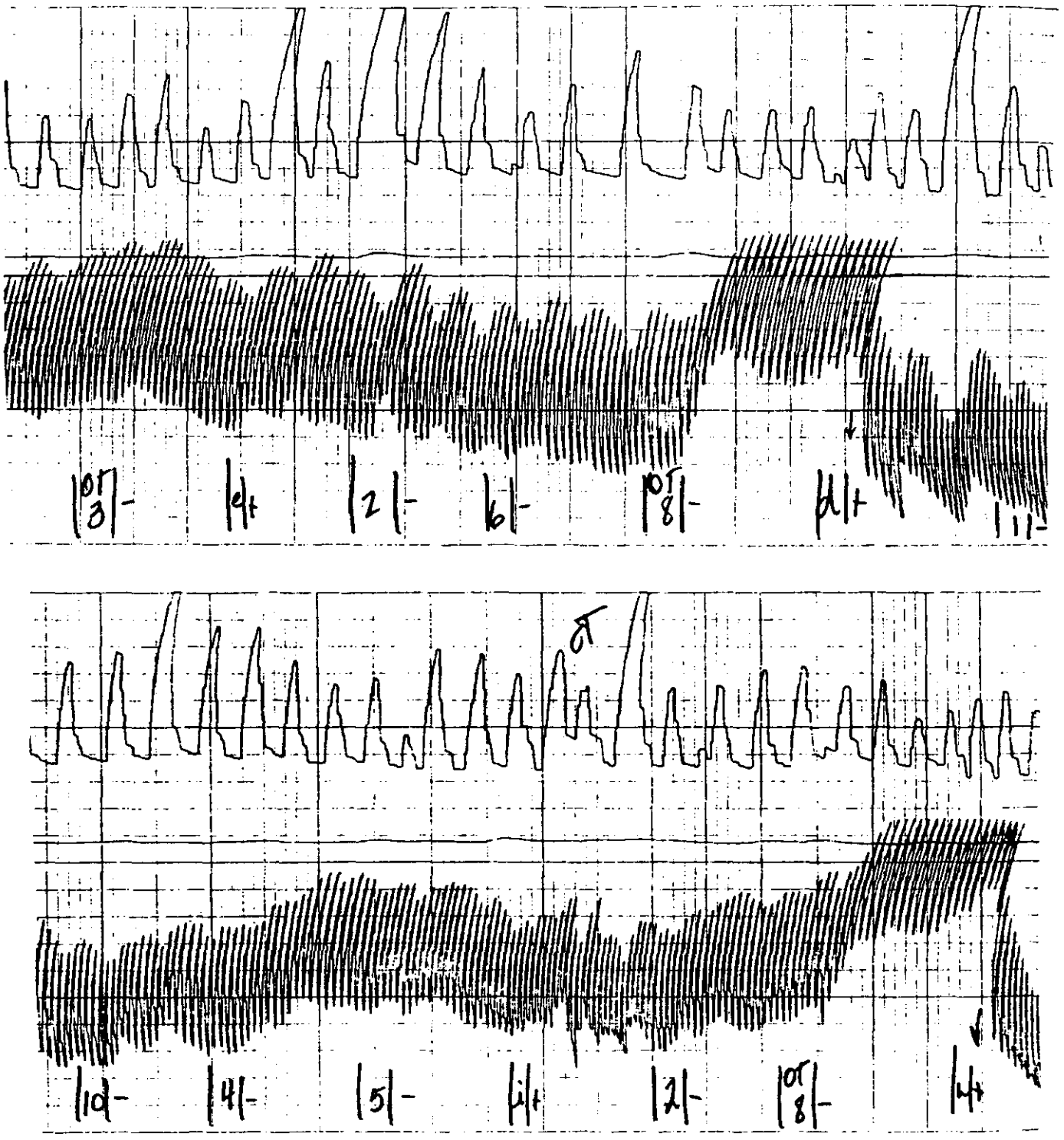

Fig. 4

Top shows a portion of the front of the third chart on a screening examination. Admissions have been made to Q3 and Q8, and both questions now have the prefix O.T. for "other than what we have discussed . . . " The lower illustrates a part of the end of the third chart, showing the consistancy of the reaction to Q8. After Q8 the cardio tracing was re-centered and a norm question introduced. CT is for a cleared throat sound.

WHAT DOES THE PHOTOPLETHYSMOGRAPH INDICATE?

By

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Plethysmography is concerned with recording the volume of a body segment. The name is derived from the Greek word meaning fullness. Therefore, it would appear that a plethysmographic recording ought to provide a single type of physiological information, namely whether there is more or less blood in the segment to which the plethysmograph has been applied. However, in a practical case, the situation is not so simple. It will be the object of this brief report to describe what the standard, commercially available photoplethysmographs record and what physiological information is contained in such recordings.

Principles of Operation of Photoelectric Plethysmographs

Basically there are two types of photoelectric plethysmographs; one type operates via light transmission, the other employs light reflection. Figure 1 illustrates both types. Usually visible light is employed for measurement. A change in the volume of blood in the transmission or reflecting path will therefore alter the amount of light presented to the photoelectric detector.

It would be simple enough to state what information is contained in the plethysmographic record if the method were applied in a straightforward manner, for movement of the baseline would indicate an increase or decrease in the volume of the region of the body to which the plethysmograph has been applied. Small pulsatile changes in volume would ride on any shift in baseline which indicates a change in blood volume below the photoplethysmograph. Such a recording system would

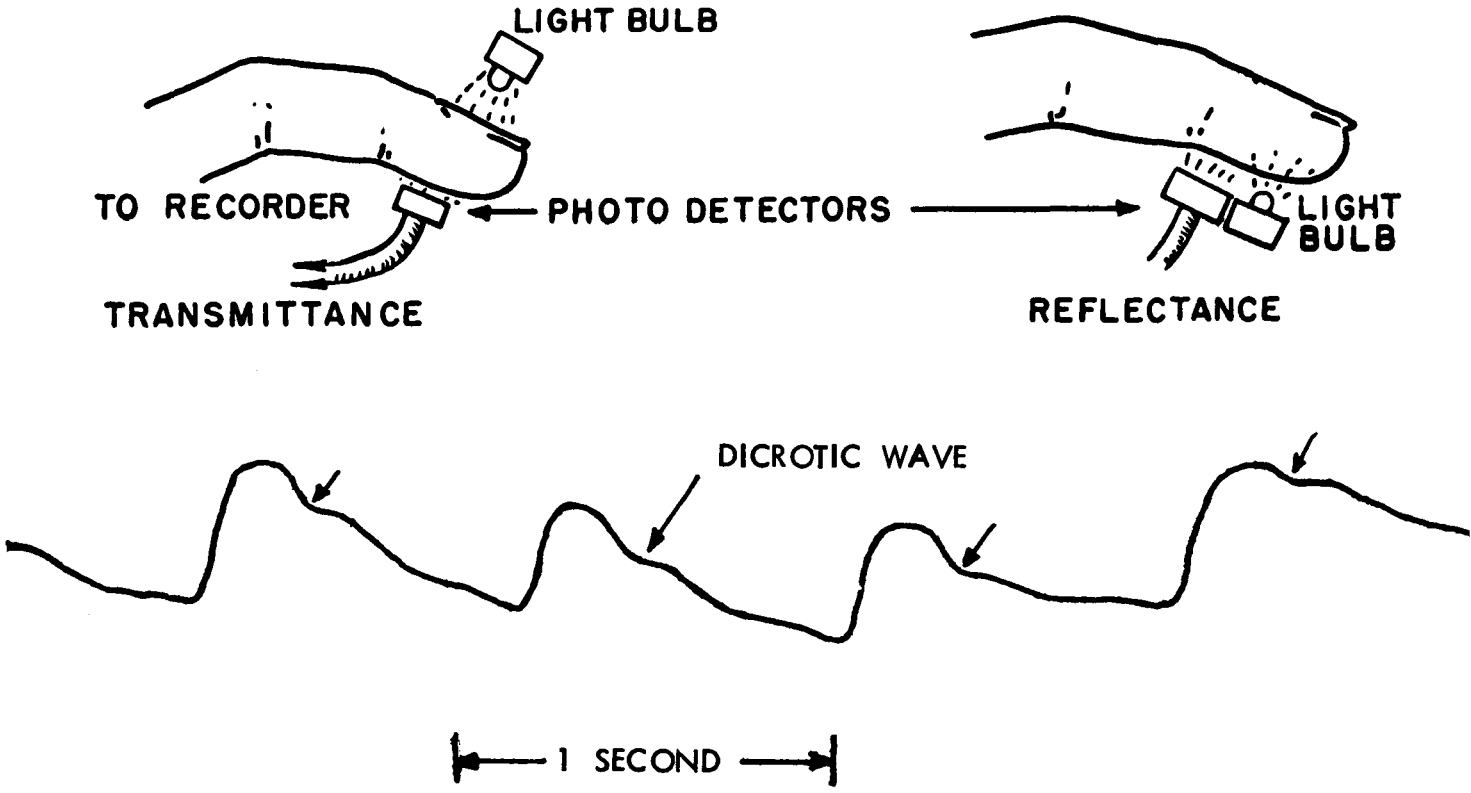

Figure 1. The two types of photoplethysmograph and a typical record. In one type the amount of transmitted light is measured and in the other, the amount of back-scattered reflected light is measured.

be designated a direct-coupled or dc system. However, with such a system, the display of the volume shifts that occur when tiny blood vessels contract or relax, result in the appearance of only very tiny pulsatile oscillations appearing on the record. Therefore, to better visualize the pulsatile volume changes the overall amplification of the recording system is increased and direct-coupled recording is not employed; instead, capacity coupled recording is used to obtain a stable baseline. Therefore, the information on true volume shifts in the body segment is lost, although moderately rapid changes are detectable but not quantifiable.

Figure 2 presents schematically the meaning of the statements made in the previous paragraph. An increase in the amount of blood in the segment is caused to occur suddenly as shown in Figure 2A. Note that the capacitively-coupled photoplethysmograph (Figure 2B) detects only the change in the volume, rather than demonstrating that a sustained increase in volume had occurred. When the volume of blood in the segment is suddenly reduced, only the change is recorded and the recording returns slowly to the original baseline as in the previous case. The time taken for the recording to fall to 37% of the peak amplitude of the change is called the time constant (T) which is made short enough to eliminate slow baseline variations which reflect true volume changes. In all commercially available models the time constant is made long enough to allow recording of the pulsatile changes in blood volume. Often, however, the time constant is too short to permit display of the slow respiratory volume changes.

It is possible to create a photoplethysmograph system which can display total volume change in a body segment. However, when this is done, it becomes extremely difficult to keep the baseline of the tracing centered on the record because slight displacement of the photoplethysmograph, and small volume changes in the underlying tissues, will produce large displacements in the baseline of the recording. In addition, the pulsatile changes in amplitude would be quite small. However, with capacitive coupling, volume shifts do not show up on the baseline and the recording appears much more stable and it is possible to increase the sensitivity to make the pulsatile changes clearly visible. If a sustained volume increase occurs with a rapid onset, the baseline

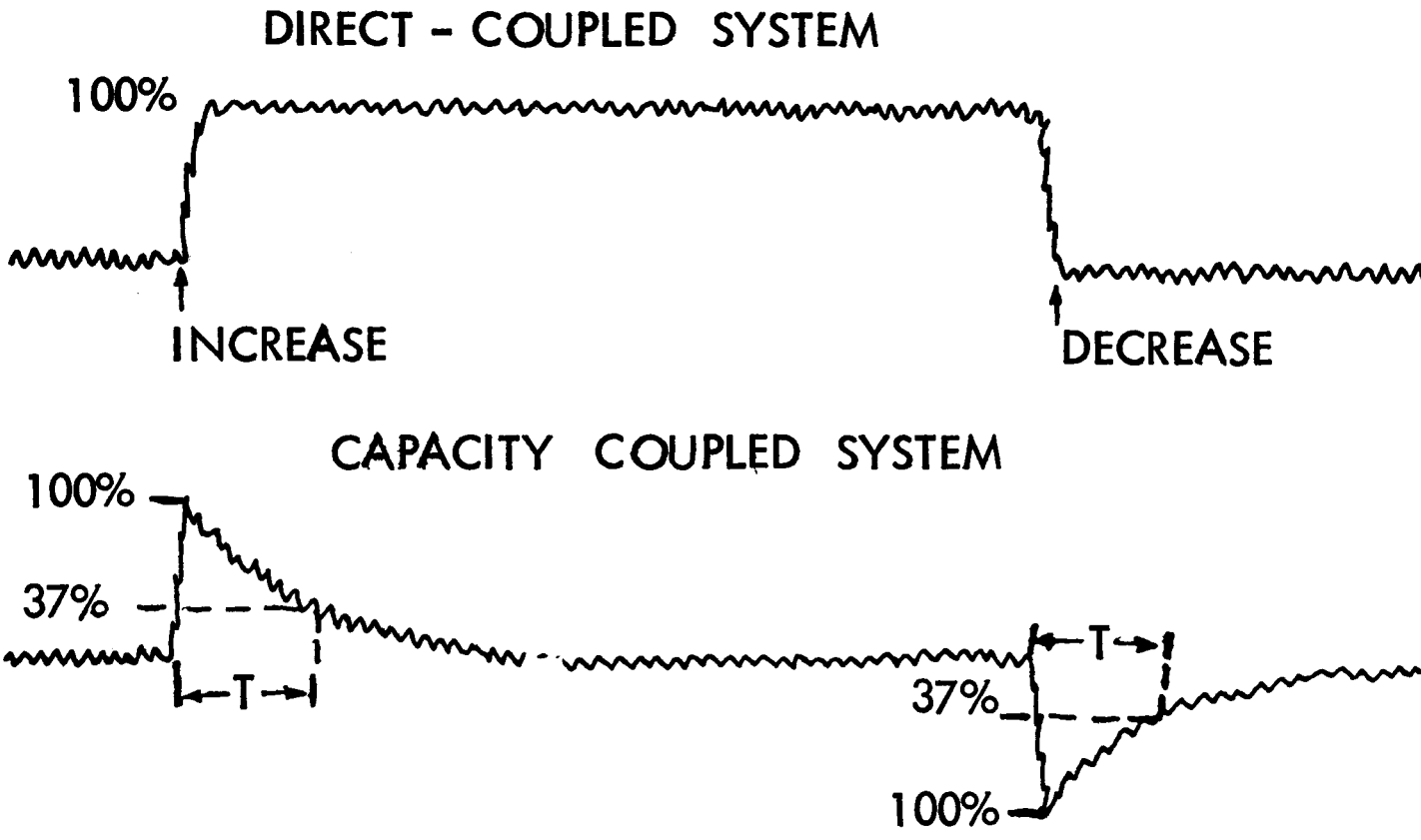

Figure 2. Schematic representation of direct-coupled (A) and capacitively-coupled photoplethysmographic systems (B). A sudden increase and latter sudden decrease in blood volumes is represented in A. With conventional capacitively-coupled photoplethysmographs, only the changes are displayed, as shown in B. The time taken for the recording to fall from 100% of the change to 37% is called the time constant (T) and is measured in seconds.

will be deflected during the change and will return to its former level, as sketched in Figure 2B, despite the fact that the body segment has a new volume. If the volume of the segment decreases quickly, there will be a transient deflection in the baseline in the opposite direction. Obviously very slow changes, and sustained changes in volume of the segment, will not be detected by capacitively-coupled plethysmographs.

The importance of an adequately long constant is demonstrated in Figure 3, which shows a typical recording made on a relaxed subject as the time constant was increased from 0.15 to 2 seconds. Note as the time constant was increased, the recorded pulsatile amplitude increased and, in addition, the respiratory induced volume changes become recordable.

Because capacitive coupling is used for convenience in recording, one might well ask if there are changes in the amplitude and contour of the photoelectric pulse which indicate that changes in blood volume of the segment have occurred. There often are, but the changes are small and difficult to recognize. Two types of change can occur; one relates to the overall amplitude, which is decreased with vasoconstriction; the other is a change in the dicrotic wave (Figure 1) which often becomes less pronounced. However, in many subjects, the dicrotic wave is not identifiable.

Despite the fact that the capacitively coupled plethysmograph only indicates transient changes in segmental volume, it does show heart rate. In addition, if the time constant of the capacitive coupling is long enough, respiratory variations can be seen varying the baseline and the amplitude of the recording as shown in Figure 3.

Physiological Responses Recordable with the Photoplethysmograph

A large number of vital body functions (blood pressure, heart rate, temperature, water balance, secretion of glands, digestion, elimination,etc.) are controlled by the autonomic nervous system, which functions virtually un-noticed. The autonomic nervous systems consists of two parts, the sympathetic and parasympathetic. Both parts participate in regulation of the functions just identified. Although the autonomic

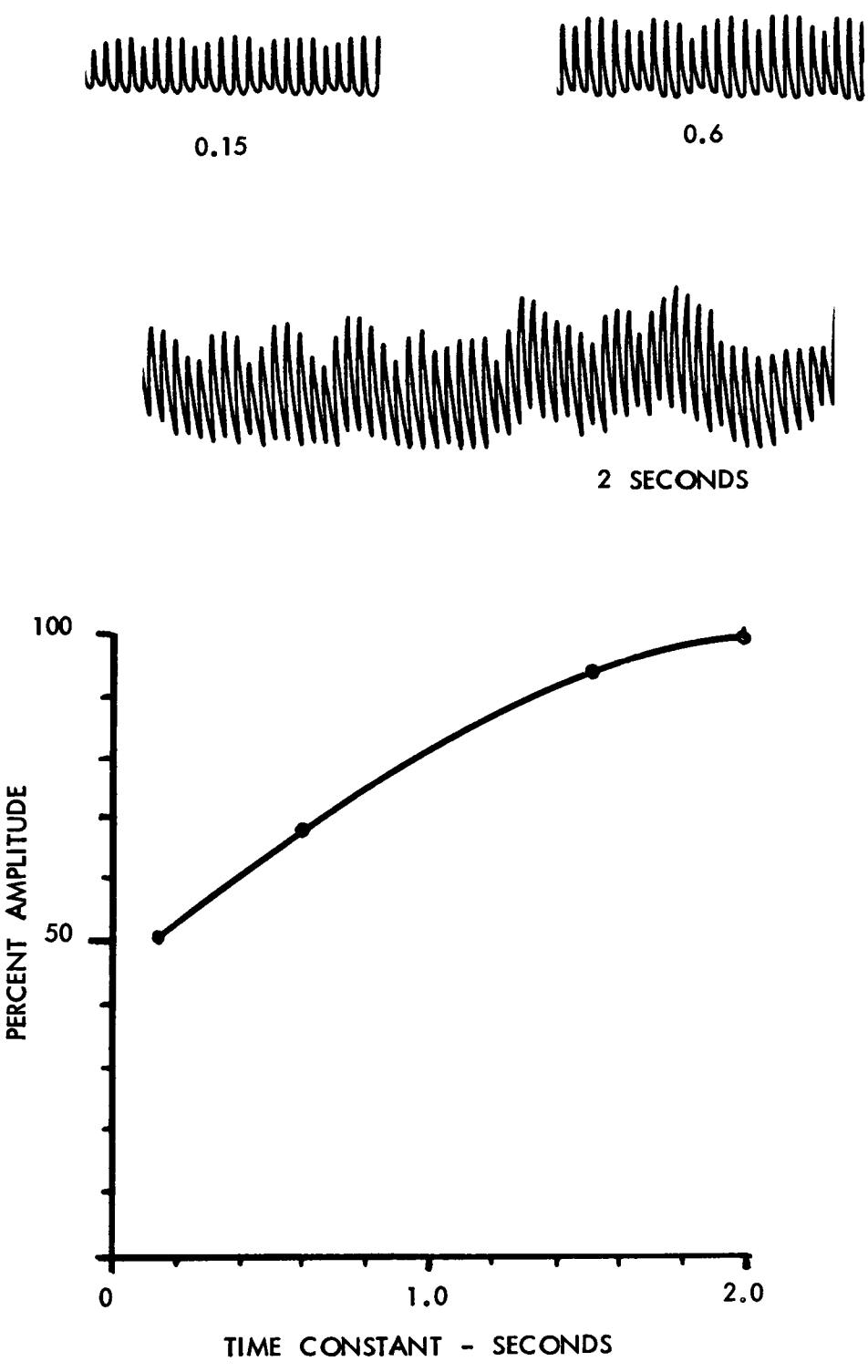

Figure 3. Changes in the photoplethysmogram produced by varying the time constant from 0.15 to 2 seconds. Note that as the time constant is increased, the pulsatile amplitude becomes larger and the slow, respiratory changes start to appear. The graph below shows that a time constant of about 2 seconds is adequate for displaying respiration and the pulse.

nervous system operates by itself, its activity is modulated by changes in the mental state of a subject. Each person has his own pattern of response to an alerting or threatening stimulus, and this mental response alters the activity of the autonomic nervous system.

Activation of the sympathetic division of the autonomic nervous system causes dilation of the pupils, a tendency toward dryness in the mouth, an increase in heart rate and blood pressure, vasoconstriction in some vascular beds, (especially the skin), cessation of the activity of the gastrointestinal tract and the secretion of sweat. Activation of the parasympathetic division of the autonomic nervous system causes constriction of the pupils, salivation, slowing of the heart rate, increased activity of the gastrointestinal tract and evacuation of the bladder and bowel, if voluntary control does not supervene. The sympathetic nervous system tends to produce all of its effects; the parasympathetic is more discrete and capable of more variety in the type and degree of response.

It is an interesting fact that when a person is presented with an alerting or threatening stimulus, he can only conceal certain normally visible responses; autonomic nervous system responses cannot be entirely suppressed voluntarily. Thus a broad spectrum of physiological events is available to indicate the response to an alerting or stressful stimulus. It is the autonomic response, along with respiration, that polygraph examiners record during interviews.

It is now useful to relate the information provided by the photoplethysmograph to the physiological events (skin resistance, breathing, heart rate and blood pressure) recorded by polygraph examiners. In doing so, it is important to recognize that the type of response to an alerting or threatening stimulus is highly individualized, a fact that is well known to examiners. Nonetheless, it is useful to investigate the possible relation of the photoplethysmogram to the respiratory, cardiac and skin resistance channels. In practice, whether it turns out to be so, or not, the changes seen in the photoplethysmogram should be related to those in the cardiac channel. A change in heart rate will, of course, show up in the photoplethysmographic record. Whether a change in blood pressure is indicated cannot be stated with certainty. Blood pressure is increased by vasoconstriction, but blood vessels in a variety

of beds can be constricted to accomplish this response. In all probability, in some subjects, the vascular bed seen by the photoplethysmograph will constrict, and this event will be revealed by a transient movement in the baseline and a decrease in overall amplitude of the pulse height, along with a diminution in the size of the dicrotic wave, if previously present. Since a skin resistance change, like an increase in blood pressure, is produced by an increased outflow of the sympathetic nervous system, a GSR should accompany a change in the plethysmogram. If the time constant of the photoplethysmographic channel is adequately long, the vasoconstrictive event may be signalled quite well by a transient shift in the baseline. The use of an adequately long time constant will also favor reproduction of respiratory variations in blood flow. Unfortunately, no exhaustive studies have been carried out to date to identify the most appropriate time constant for the photoplethysmograph. With most of the available units, the time constant has been chosen only long enough to reproduce the pulse wave and to provide a baseline that need not be continually recentered. Such a situation may result in missing important respiratory-induced volume changes in the segment seen by the plethysmograph. What all of this means is, that although it is easy to make and use a plethysmograph, the information that it will produce depends on the type of circuit used with it and the subject's type of response. Because of ease of application and the fact that it can indicate cardiovascular events, there is need to conduct serious studies, first with direct-coupled plethysmographs to examine the true nature of the changes in segment volume encountered in polygraphic examinations, and then to discover whether the capacitively-coupled photoelectric plethysmograph can indicate them.

In the design of a photoplethysmograph, great care must be used to guarantee that the light source does not produce enough local heating and alter the degree of vasodilation or vasoconstriction that existed before the device was applied. To minimize this effect, many instruments use either a small, low wattage bulb and operate it below its rated voltage. Often a light-emitting diode (LED) is used which emits "cold" colored light in a narrow band. However, unless care is taken, the heat produced by the LED may also alter the local circulation. It is an interesting fact that a little heat produces a slight degree of vasodilation and provides a large amplitude pulsatile signal from the photoplethysmograph. Just how much heating is permissible to obtain the most useful information for polygraphic examination is not known as yet.

Despite the lack of adequate design information for photoplethysmographs to be used in polygraphic examination, it is possible to use some existing models profitably. For example, the responses to two different types of stimuli are shown in Figure 4. A reflectance type photoplethysmograph was applied to the tip of the second finger of the left hand. The overall time constant was 2 seconds. In Figure 4A, the subject was relaxing with his eyes closed and respiration can be identified as slow variations in the amplitude and baseline of the recording. The subject was instructed to inhale deeply and then exhale. Note the change in amplitude and shift in baseline of the record following the breath. Note also the increase and decrease in heart rate.

In Figure 4B, the subject was relaxed with his eyes closed, and the operator delivered an alerting stimulus by clapping his hands near the subject's ear. Note the transient decrease in amplitude and shift in the baseline of the photoplethysmographic record. On this occasion there was virtually no heart-rate change.

From the foregoing, it can be seen that one of the factors of major importance appreciated with the photoplethysmograph is the time constant used with it. An adequately long time constant is necessary to reproduce the pulse accurately and to display respiratory variations. With a time constant of 2 seconds, recordings such as those shown in Figure 4 can be obtained and investigated for their value in polygraphic examinations.

References for further reading:

Brown, C. Methods in Psychophysiology. Baltimore, Md., 1967. Williams & Wilkins Company.

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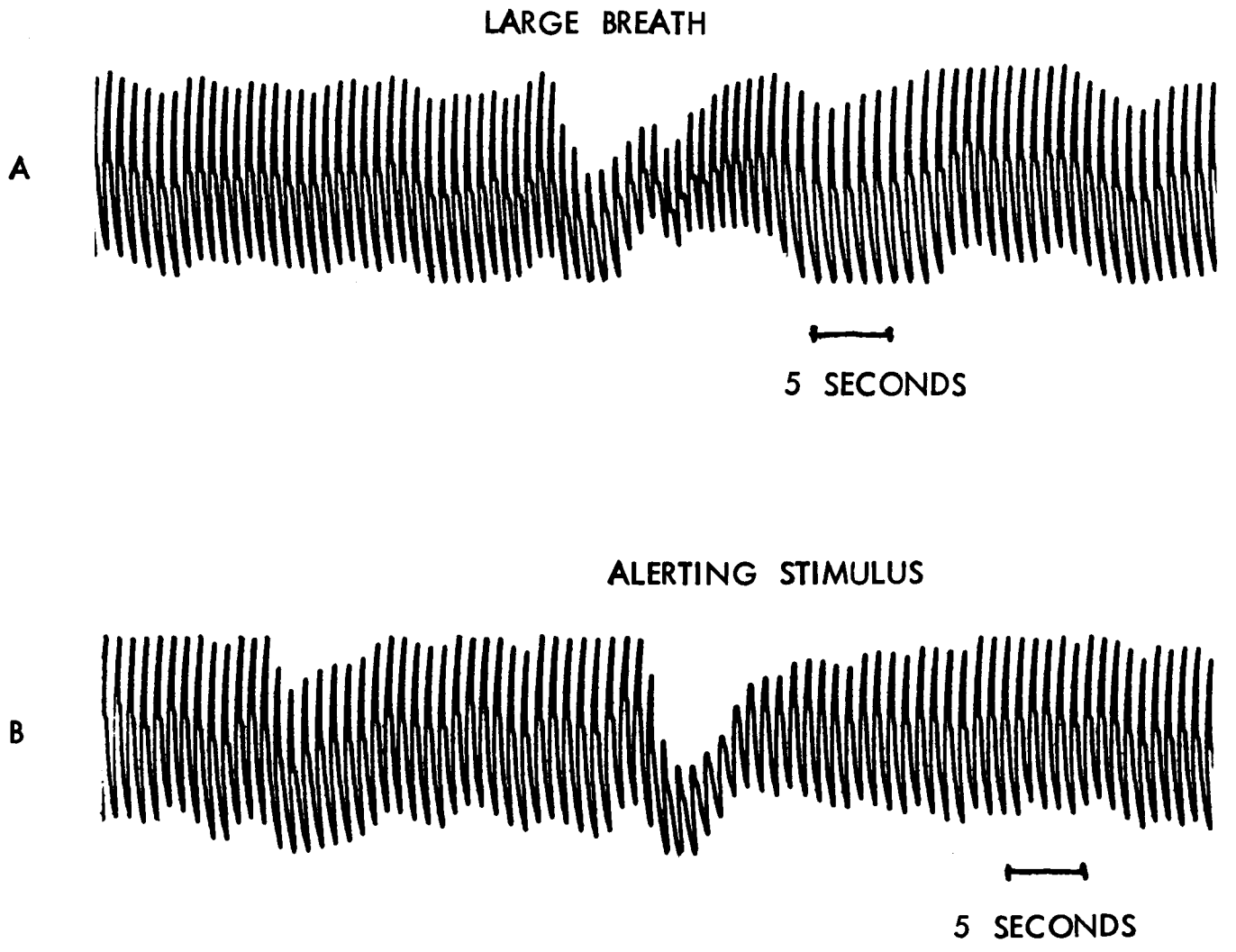

Figure 4. Photoplethysmograms recorded from a relaxed subject using a time constant of 2 seconds. In A, the subject was asked to take a deep breath; note the decrease in pulsatile amplitude, the shift in the baseline of the recording and the transient increase in heart rate. In B, the subject was presented with an alerting stimulus (a loud hand-clap); note the transient decrease in pulsatile amplitude and shift in the baseline of the recording. In this case, no change in heart rate occurred.

PostScript: The Multigraph and Emotional Stress Monitor polygraph instruments produced by Stoelting Company offer three modes of plethysmograph operation. There is a D.C. coupled mode ("manual"), an A.C. mode with a time constant of 1.5 seconds ("Auto 1") and an A.C. mode with a time constant of .5 second ("Auto 2"). (Ed.)

APPLICANT SCREENING IN THE LOS ANGELES POLICE DEPARTMENT

By

Raymond D. Inglin
Officer in Charge
Polygraph Section
Scientific Investigation Division

The Polygraph Section of the Los Angeles Police Department is responsible for the specialized examination of suspects, victims of crimes, witnesses, as well as internal screening of a critical nature and examination of those who must rely on the polygraph to prove their innocence.

In addition to examinations involving criminal investigations, we examine police applicants on critical issues that the background investigators are unable to resolve. In addition, Departmental personnel are screened for sensitive positions requiring top security and sworn personnel and witnesses involved in personnel complaints are tested.

The applicant screening examination currently employed by the Los Angeles Police Department covers 15 significant areas, with some of the aspects covered in the pretest interview listed below.

Financial

a. Present indebtedness
b. Monthly obligations
c. Delinquent payments
d. Repossession or collection actions
e. Overdraft checks
f. Wages garnished

Physical Fitness

a. Infirmities or conditions not reported during the medical examination

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b. Mental or emotional problems (including manias, phobias, tendencies, attitudes, etc.) not discussed during the psychiatric evaluation
c. Past work compensation claims
d. Sick days off from work in the past three years

Work Record

a. Employers omitted on application
b. Account for open periods of unemployment
c. Termination for cause
d. Former employer's recommendations

Honesty

a. Past or present involvement in criminal activity
b. Significant juvenile thefts
c. Shoplifting
d. Thefts of cash or property from employers
e. Expense account frauds
f. Cheating on income tax
g. Fraudulent insurance claims
h. Thefts of government property in military service

Drinking Habits

a. Frequency of intoxication
b. Drink on the job
c. Drink and drive
d. Violent and/or abusive when drinking

Driving Habits

a. Accidents omitted from application
b. Accidents not reported, to include hit and run
c. Insurance claims regarding accidents
d. Moving violations in past three years

Arrest Record

a. Arrests or convictions not discussed with the investigator

b. Juvenile arrests regarding sealed records
c. Arrests in other states or jurisdictions
d. Military courts-martial
e. Involvement in investigations and other police contacts

Narcotics and Dangerous Drugs

a. Generic or slang name of all drugs experienced
b. Time frame of usage (earliest to most recent date)
c. Number of occasions each drug
d. Methods of abuse (smoking, ingestion, injection or sniffing)
e. Description of effect (Hallucinogenic, euphoric, "high," etc.)
f. Current possession of any illegal drugs
g. Quantities and number of times purchased
h. Selling illicit drugs to others
i. Attitude toward legalization of marijuana
j. Occasions present when others smoking marijuana
k. Stated intentions regarding enforcement of drug laws, including marijuana, after becoming a police officer

Gambling Habits

a. Extent of gambling involvement (type, frequency, stakes, losses, etc.)
b. Past or present indebtedness due gambling losses
c. Participation in illicit forms of gambling
d. Connections with bookies and other gambling professionals, legal or illegal

Homosexual Activity

a. Overt experiences with persons of same sex
b. Nature of acts (oral, anal, fondling, etc.)
c. Passive, active or mutual reciprocation
d. Sexual arousal and gratification
e. Number of occasions and time frame
f. Adult sexual behavior and tendencies

Marital History

a. Present marital status, children, domicile, etc.
b. Prior marriages, divorces, separations, etc.
c. Alimony and child support obligations
d. Intentions regarding marriage if single

Military Record

a. Branch, dates, type of discharge, rank and duties
b. Overseas tours
c. Courts-martial and other disciplinary actions
d. Serious thefts or violations of military orders while assigned

Friends and Associates

a. Neighbors and relatives
b. Criminal records or involved criminal activity
c. Using narcotics and/or dangerous drugs
d. Homosexuals
e. Militants or dissidents

Moral Character

a. Self definition and evaluation
b. Immoral sexual conduct
c. Participation in sex orgies, communal living, etc.
d. Adulterous activity
e. Patronizing prostitutes
f. Indecent exposure
g. Child molestation
h. Latent tendencies

Loyalty to the United States

a. Subversive activities or affiliations
b. Militant or dissident activities
c. Organizational memberships not listed in application
d. Juvenile gangs
e. Possession of illegal weapons
f. Involvement in riots or acts of violence

g. Sentiments and beliefs regarding governmental control of society, etc.

Examination Results January 1, 1972 - December 31, 1973

In the two-year period from January 1, 1972, through December 31, 1973, the Los Angeles Police Department Polygraph Section examined a total of 962 examinees, including 933 police applicants and 29 applicants for positions with the Los Angeles Fire Department. At present, it is the policy of the Personnel Department of the City of Los Angeles to allow specific examinations on applicants only when adverse information is developed in their background. There were 8,600 (8,235 - police; 365 - fire) prospective applicants considered for employment during this period and only 962 or 11.19% were examined on the polygraph. This small percentage of the total number of police applicants considered for employment reflects the restrictive use of the polygraph allowed by the Personnel Department of the City of Los Angeles. This policy is in contrast to many police departments in the nation where all prospective police applicants are examined.

The results of the 962 examinations were as follows:

	Police Department		Fire Department		Total	
Truthful	223	23.9 %	4	13.79%	227	23.60%
Deceptive	704	75.46%	24	82.76%	728	75.68%
Interrupted	5	0.53%	1	3.45%	6	0.62%
Inconclusive	1	0.11%	0	0.00%	1	0.10%
Total	933	100.00%	29	100.00%	962	100.00%

Truthful Applicants

The "truthful" opinion indicates that the examinee had not lied to his investigating officer or otherwise withheld significant information in the listed areas of concern.

Deceptive Applicants

The "deceptive" classification reflects that what the subject told his investigator prior to the examination was not true

or only partly true. Examinations in which significant admissions are made during the pretest interview are statistically recorded as "deceptive" even when subsequent polygrams indicate that the applicant is "now truthful."

Interrupted Examinations

The "interrupted" category covers tests not completed due to interjected priority criminal cases, subject's refusal to continue, sickness, medical problems, time restrictions and other such disrupting factors.

Inconclusive Results

A completed examination in which the examiner was unable to render a positive opinion in analyzing his test charts would, of course, be considered "inconclusive." The zero inconclusive rate of the 18-month period is attributed to the higher levels of intelligence and physical condition encountered with applicant subjects. In contrast, the "inconclusive" percentile for criminal cases over the same period was 0.39%.

APPLICANT ADMISSIONS

Applicant admissions made during a polygraph examination were not statistically recorded as confessions, regardless of the seriousness or nature of the admissions. The Los Angeles Police Department does not deem such a classification to be appropriate in "screening" type examinations. Of the 728 Police and Fire Department applicants diagnosed as "deceptive," 586 voluntarily disclosed adverse information not previously known to their investigating officer. This does not mean that all admissions were of sufficient magnitude to disqualify the individual; however, "admissions" were not credited for petty indiscretions or trivial revelations and particularly when they pertained to preadult conduct. The results of the 728 examinations were as follows:

	Police Department		Fire Department		Total	
Diagnosed Deceptive	704		24		728	
Admissions	562	79.83%	21	87.50%	583	80.08%
No Admissions	142	20.17%	3	12.50%	145	19.92%

ADMISSION AREAS

These adverse disclosures have been divided into three categories toward analyzing the value of polygraph in furthering personnel investigations as follows:

Same Issue

Of the 583 total applicant admissions, 361 (61.92%) revealed additional derogatory information in the same areas which were the basis for initiating the examination. For example, the applicant told his investigator that his experience with illegal drugs was limited to two occasions at age 17 and 18 when he smoked marijuana. During the polygraph examination, he expands on his drug experience admitting the use of LSD, "Bennies" and "Reds" on numerous occasions; besides smoking marijuana an estimated total of 300 times up to the current month.

New Areas

One hundred twenty-three (21.10%) made significant admissions in one or more areas other than the original issue. For instance, the applicant told his investigator that he had smoked marijuana only five times in his life and reiterated the same account to the examiner. But while having previously denied ever stealing as an adult, he disclosed numerous thefts of property and money from various employers, and recurring participation in homosexual acts.

Same and New Areas

In both the original area of concern and in new issues, 158 (27.10%) made adverse disclosures. As a case in point, the examinee had told his investigator about his juvenile arrest record in California. During the

examination, he revealed several arrests and one conviction in another state under an alias. He further described a serious physical impairment which had escaped attention during his medical examination, as well as, involvement as a passenger in an unsolved hit and run fatality.

REACTIONS - NO ADMISSIONS

One hundred forty-two (24.36%) of the deceptive subjects did not confirm the chart analysis by rendering admissions to the examiner. However, in numerous instances not statistically recorded, the indicated areas of deception were supported by subsequent investigative developments or later disclosures to the investigating officer.

EXAMPLES OF ADMISSIONS FROM APPLICANTS

Financial Background

Disclosed $1,200 additional indebtedness to six creditors not previously reported and currently delinquent to six creditors. A $142 debt was in the hands of a collection agency. A major oil company was trying to collect $5,977 for claims against a station he previously operated. Recurring payments due on existing debts exceeded his salary as a police officer with a neighboring city.

Revealed additional creditors with total indebtedness of $4,616 currently delinquent $432 in payments.

Physical Fitness

Disclosed that his nose was broken six or seven times, his left foot was crushed in 1971 and he suffers from a pinched nerve in his neck. He has had two operations to a finger on his right hand and bone was removed from his hip to repair the finger (still cannot bend joint). Also, wind causes congestion of his nose and eyes. This applicant had been physically passed but was medically disqualified on a second physical examination.

Honesty

Admitted three fraudulent insurance claims. Disclosed

seven additional past employers. Stole an estimated total of $340 in cash from five places of employment and $289 in electronic equipment from three other employers.

Admitted defrauding an estimated $3,000 from a major oil company during the period he operated one of their stations. Also, admitted purchasing car parts and accessories he knew had been stolen.

Disclosed that while working as a Los Angeles Police Department Student Worker assigned to the Supply Division, he stole numerous pieces of property. He also released confidential police information to unauthorized persons.

Admitted stealing the transmission out of a Volkswagen van in 1972.

Disclosed that while employed as a truck driver in 1971-72, he stole merchandise in case lots; including liquor, record albums, soap, gum, etc. Also, stole three new tires valued at $150 from a car dealer and stole an estimated $100 in cash from gas stations where previously employed.

Admitted that since age 18, he had stolen about $700 in property and $75 cash from employers. Further, that while selling Christmas trees for the YMCA since age seven, he had given away an estimated $100 worth of trees each year.

Drinking, Driving and Gambling

Admitted frequently driving while intoxicated though never caught. The most recent instance was 12 days prior to the examination when he "blacked out" while driving on the freeway with his car sideswiping the road dividing barrier.

Criminal Activity

Applicant requested immunity and confidential treatment concerning a prior fraud and arson case in which investigation had strongly indicated that this individual had

set fire to a business building which resulted in a $20,000 insurance settlement. The request for immunity was refused and the applicant was disqualified.

Applicant admitted that he had fled the Philippines in June of 1971 with charges of Robbery and Resisting Arrest pending against him. Said he was shot twice by police during his apprehension.

Applicant disclosed extensive criminal activity with a juvenile gang in New York City including burglaries, muggings, stealing cars and auto parts, etc. Further recalled carrying an illegal gun into a gang fight in which one youth was seriously or fatally injured.

Drugs

Admitted use of LSD five to ten times, marijuana 70-75 times and other dangerous drugs 11 times.

Admitted use of cocaine with last experience three days prior to the examination. Also, use of opium, mescaline, benzedrine, barbiturates and marijuana. Disclosed that he has been selling marijuana from plants grown in the background and that he then had a cannabis plant cultivated to three-four feet in height.

Admitted marijuana use on estimated 220 occasions up to recent weeks. Also had used LSD, peyote, amphetamines, and "angel dust" (PCP).

Admitted smoking marijuana 120 times up to June, 1973.

Allowed marijuana use on 70 occasions up to June, 1973.

Disclosed use of marijuana 50 times up to September, 1972.

Admitted experience with marijuana 30 times up to April, 1973.

Allowed use of marijuana an estimated 100 occasions, including recent experience.

Admitted smoking marijuana on about 25 occasions up to few weeks prior to examination.

Allowed that marijuana experience totalled about 60 times and purchase of marijuana in $10 bags on numerous occasions.

Admitted experience with LSD, mescaline, "Reds," "Whites," and marijuana, including illicit drug use during the ten month period he had been a police cadet with the Los Angeles Police Department. Also, disclosed shoplifting activity while a cadet.

Admitted that he smuggled marijuana purchased in Mexico into the United States on numerous occasions.

Revealed marijuana experience totalling about 80 occasions, though none since December, 1971, when he decided to enter the police field.

Admitted smoking marijuana on about 40 occasions over the past seven months with most recent use during the week before the examination.

Disclosed use of marijuana about 40 times up to a recent period.

During June, 1973, an applicant for police admitted to his investigator just prior to submitting to a polygraph examination that he had used the following: marijuana more than 1,000 times; LSD more than 50 times; opium more than 20 times; THC more than 50 times; cocaine more than 30 times; and six serious thefts.

Sexual Conduct and Morality

Disclosed participation in six adult homosexual acts of oral copulation with most recent occurring three weeks before the examination.

Admitted that as a juvenile, he had fondled and orally copulated with girls of four to six years of age on

numerous occasions. As an adult, he often has fantasies of sexual experience with little girls and becomes sexually aroused when his own daughter sits on his lap.

Admitted participation in numerous acts of mutual masturbation, oral copulation and anal sodomy with other males from juvenile into adult years.

Disclosed that as a juvenile, he exposed his penis to random females in public with sexual motivation until he was caught and subjected to psychiatric therapy. Applicant was later reexamined by the medical authorities and disqualified, for "latent exhibitionist tendencies."

Loyalty

Disclosed close personal affiliation with noted members of subversive and dissident organizations and expressed sympathy with Marxist philosophies.

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THE POLYGRAPH AND THE INNOCENT

By

James A. Lucas

Since the beginning of polygraphy, examiners have experienced a degree of self-satisfaction upon the completion of a successful interview in which a suspect is found innocent. Those cases which seem to be foremost in the minds of polygraph examiners include ones in which the accused declares his innocence and it is substantiated through the use of the polygraph. In many cases, if it were not for the use of the polygraph, innocent persons accused of crimes would today be unjustly incarcerated. Many examiners have revealed that the expression on the face of the subject who has been falsely accused and then his innocence proven with the aid of the polygraph, is one which cannot be described in words. To assist other examiners who must write or speak about the use of the polygraph as a means of exculpation, I have collected for this article some examples of various types of cases. Examiners are welcome to cite these cases in articles, interviews and speeches.

Defendant Cleared of Murder Charge*

A second-degree murder charge was dismissed in Seattle, Washington on June 20, 1973, following a polygraph examination by the Seattle Police Department. Henry Hamilton, 47, was charged with murder in the April 10th shooting of Charles E. Georgia, 53, at the Star Tavern.

Superior Court Judge David W. Soukup signed an order submitted by Phillip Y. Killien, Senior Deputy Prosecutor, stating that justice does not warrant prosecution. Killien said that Hamilton's lawyer, Roder Johnson, provided statements from three witnesses who previously had not given statements, indicating that Hamilton shot in self-defense.

Henry Hamilton agreed to a polygraph test. The court was advised that, in the opinion of the police department's examiner, Hamilton was being truthful when he stated that the victim had approached him with a gun, that he believed

*Seattle Times, 21 June 1973.

he was going to be shot at the time he fired, and he had not asked any witness to falsely testify on his behalf.

Murder Suspect Set Free Following Polygraph Test

On August 5, 1973, a female reported to the police that she had been severely beaten by her husband. She was taken to a hospital and admitted because of bruises on her body. While in the emergency room, she gave officers only a brief statement implicating her husband, then passed into a coma. The police arrested her husband for "Felony Wife Beating," and booked him in jail. After ten days in custody, he posted bail and was released. On August 15, 1973, the wife died, having never regained consciousness. An autopsy revealed cause of death to be acute bronchopneumonia, bilateral, due to massive subdural hemmorrage (i.e., a large blood clot on the brain). The hospital notified the Police Department, who in turn notified the District Attorney's Office. A warrant was issued for the defendant's arrest on a charge of murder.

The defendant was again arrested on August 24, 1973 and placed in jail without bail. At the arraignment, the County Public Defender was assigned to defend him. Approximately five weeks later, shortly before the preliminary hearing, he was interviewed by an Investigator from the Public Defenders Office who had conducted an investigation. He informed the defense attorney assigned to the case that he believed the defendant's statements that he had not beaten his wife nor in fact had he struck her in any manner or caused any of the injuries that she claimed.

Mr. Frederick C. Martin of Los Angeles, California, an experienced polygraph examiner, was requested to administer a polygraph test, by the Public Defender, to ascertain if the husband was responsible in any way for any of his wife's injuries. Investigation had revealed that the woman had been a heavy drinker with a history of personal injuries from falling while in an intoxicated state. When drunk, she became aggressive, attacking not only her husband but others as well. The polygraph results were not stipulated to, nor did the defense want one of the District Attorney's polygraph examiners to do the examination.

The polygraph examination conducted on September 27, 1973, revealed that the defendant had not struck his wife, nor did

he cause her any injury. A case conference was held September 28, 1973, with the District Attorney, Public Defender, and the examiner, at which time examination results were presented.

The defendant was ordered into court on September 28, 1973, at which time all charges were dismissed in the interests of justice. Unfortunately, by the date of dismissal the defendant had spent six weeks in jail, though in fact, no crime had been committed.

First Degree Murder Charged Reduced to Manslaughter*

Using the polygraph to support a story of accidental shooting, the District Attorney's office in Mobile, Alabama, recommended that Leopold T. Johnson, charged with first-degree murder, be given a six-months' suspended sentence for manslaughter. Johnson was accused of killing Dorothy Trotter in April of 1973. Judge Robert E. Hodnette, Jr. accepted a plea to second degree manslaughter (accidental but negligent homicide) on the ascertion of the State that a two-hour polygraph examination by Mobile police examiner Sam Pennington, indicated Johnson's gun had discharged accidentally, killing Miss Trotter.

It was one of the first cases in Mobile, Alabama, in which polygraph results were used to verify the facts in a case. Assistant District Attorney, Willis Holloway, was convinced that Johnson was telling the truth when the gun he was handling accidentally discharged. For this reason the District Attorney agreed to the reduced charge of manslaughter.

Polygraph Test Wins Unconditional Parole**

Eddie Hargrove, Who was sentenced to a life term in prison after being convicted in Jenkins County Superior court, Georgia, in May 1959, as a "human torch" murderer' received an unconditional parole on June 1, 1960.

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* Mobile Register, Mobile, Alabama, 1 November 1973.

**Case presented by B. G. Ragsdale, Georgia Bureau of Identification, Atlanta, Georgia at the 9th Annual Meeting of The American Academy of Polygraph Examiners, Chicago, Illinois, August 1972.

The machinery for his freedom was set into motion after a series of belated polygraph tests indicated he had been convicted on the strength of purjured testimony. Judge J. L. Renfroe, Superior Court, Jenkins County, Georgia, ordered the case to be reopened because of conflicting testimony during Hargrove's trial.

A summary of the pertinent facts revealed that the daughter of the deceased testified in substance that in the early morning of 21 February 1959, at her father's residence, she saw Eddie Hargrove pour kerosene on her father from a lamp which was sitting near a wood-burning heater. She then saw an associate, Nelson Sapp, ignite her father with a piece of burning wood from the heater.

Both Hargrove and Sapp alleged throughout that the deceased accidentally poured kerosene on his clothing while attempting to light a cigarette from the lamp, enveloping him in flames. The deceased then ran from the house and neighbors testified that Hargrove and Sapp overtook him and attempted to extinguish the flames.

The daughter of the deceased did not mention the possible foul play by Hargrove and Sapp until approximately six hours after the incident, although she had ample opportunity to tell numerous people, including the police chief, at an earlier time. She alleged that Hargrove became incensed when her father accidentally spilled hot coffee on him.

Because of the conflicting testimony, polygraph examinations were administered at the State Crime Laboratory, Atlanta, Georgia, to Hargrove, Sapp, and the daughter of the deceased. The test results indicated that Hargrove and Sapp were being truthful in their testimony, and that the daughter of the deceased was not telling the truth.

At the trial of Sapp, the jury was instructed that they could consider the results, the examiner's opinion, along with other evidence in the case and afford it whatever weight and effect they thought it reasonably deserved. The court also instructed the jury that they should not accept the test results or the examiner's opinions as conclusive on the issue before them. Polygraph examiner, B. G. Ragsdale, Georgia Bureau of Identification, Atlanta, Georgia, testified

as an expert witness at the trial. The polygraph examiner provided the jury with opinions on each of the three polygraph tests. The jury acquitted Sapp of igniting the deceased and after further legal action, the defense attorney initiated a motion for the unconditional parole of Hargrove. One of Hargrove's final statements was "I am thankful there is such a thing as a lie detector."

Two Cases Conducted by C. B. Wilkinson, Akron, Ohio

An individual in Akron, Ohio, had been fired from his job as a driver for a local beer distributor. There was strong substantial evidence of theft against him. The subject insisted on being administered a polygraph test and the results of that test indicated that he was not guilty of stealing the merchandise missing from his truck. He provided the names of two employees whom he suspected, and they were administered polygraph tests. As a result, the suspects were subsequently charged, convicted, and made reimbursement to the company.

A student at Akron University, Akron, Ohio, was accused of raping one of the University cheerleaders. The subject denied using force, claiming that the girl had been willing to submit to the act and, in fact, had even supplied the blanket. The subject requested a polygraph examination and was found to be truthful. The cheerleader was also administered a polygraph test and she then admitted she had been untruthful in her accusation.

Polygraph Settles a Law Suit*

In the case of Jacob Walther, Plaintiff, vs. Helen Connell, Defendant, Civil Court, City of New York; Judge Issoff admitted the results of the polygraph test in evidence. The Plaintiff testified he loaned the Defendant $1,010 and that the Defendant had repaid only $100, leaving a balance of $910. The Defendant denied ever borrowing money from the plaintiff. One of the parties was committing perjury. Both the Defendant and Plaintiff consented to polygraph tests. The polygraph tests identified the Defendant being untruthful and judgment was granted to the Plaintiff.

*Law Reports, State of New York, 21 February 1973, No. 891.

In this particular case, the Court was faced with the problem of determining which party was telling the truth and which party was committing perjury. Perjury consists of willingfully, morally, absolutely and falsely swearing in a matter material to the issue or point of question, in a judicial proceeding, by a person to whom a lawful oath or affirmation is administered by the court.

This court had the benefit of polygraph tests given by a noted expert, and it presented an ideal situation for the use of such tests. When testimony before the court is diametrically opposed, and there is no doubt that one of the parties is being untruthful, the polygraph provides a service to the court that cannot otherwise be satisfied.

In this case the court ordered both parties to submit to polygraph tests. They were examined separately at the Lie Detector Laboratories, Inc. by Dr. Thomas J. McShane, who found that the plaintiff had given the sum of money in question to the defendant.

Polygraph Clears Policeman*

Polygraph test results, used for the first time in Detroit Police trial board proceedings, have cleared a sergeant of misconduct charges.

Three superior officers had convicted Sgt. Thomas McManus, who had been on the force 17 years, of falsifying the log sheet on which he recorded his on-duty activities. The trial board removed his name from the promotion list and fined him five leave days.

The board reversed itself after examining the results of a polygraph test arranged by McManus' attorney.

McManus had been accused of knowingly entering the wrong times for two visits to the Anchor Bar, making it appear that he had spent less time there than he had. He was also accused originally of consorting with an accused gambler for illegal purposes. He was not found guilty on this charge.

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*From the Detroit News, February 17, 1972.

The polygraph test results indicated that McManus had entered the wrong times on his log sheet unwittingly, with no intent to deceive. They also showed that he had not consorted with the accused gambler for any illegal purpose.

The trial board gave McManus back his leave days and restored his eligibility for promotion.

The polygraph tests had been a factor in a feud between Police Commissioner John F. Nichols and Carl Parsell. Parsell, President of the Detroit Police Officers Association (DPOA), opposed Nichols because the Commissioner ruled that policemen accused of wrongdoing could be required to take the tests under certain conditions.

Ironically, the first use of the polygraph as evidence in a trial board case resulted in clearing a policeman of charges on which he had already been convicted.

Polygraph Clears Bank Employee*

In early 1972 bank officials suspected a woman employee of forging several checks. A handwriting expert identified her as the person forging the names to the checks, but she denied it. Mr. J. M. Rivers, Security Associates, Jasper, Alabama, conducted a polygraph examination of the employee. The results indicated that she was innocent, and the bank officials were so advised.

The bank was still considering prosecution, based on the handwriting testimony, when Mr. Rivers suggested examination of other possible suspects. The most likely was another woman who had recently been fired. At. Mr. Rivers' insistance the bank officials located her, and during a discussion with her she admitted forging all the checks in question. The bank is now in the process of reviewing some other cases in which they have based their actions solely on the testimony of the handwriting expert.

Polygraph Clears Suspect of Forgery**

Judge Samuel Caniglia admitted the expert testimony

*APA Newsletter, No. 6, July 1972, pg. 5.
** Omaha World Herald, Omaha, Nebraska, 6 March 1973.

submitted by Mr. Leonard Harrelson of the Keeler Polygraph Institute, Chicago, Illinois, in a court case involving a subject accused of attempting to cash a forged check. The defendant was tried on the charge. However, the jury could not reach a verdict. Prior to his trial, he successfully completed polygraph examinations but the results were excluded. The defendant's attorney made another attempt to enter the results of the polygraph examinations prior to the second trial.

At a pretrial hearing, Judge Caniglia ruled that the results of the polygraph examinations, as well as foundation testimony, would be admissible at the trial, providing the defendant agreed to submit to a polygraph test by a court-appointed examiner. Using questions to be posed with the prior approval of the court, Mr. Harrelson, Director of the Keeler Polygraph Institute, agreed to administer the examination.

In court, Mr. Harrelson testified that the defendant was unaware that the check was forged. The prosecution then moved to dismiss the case. Unfortunately, the defendant already had been incarcerated for a six-month period because he was unable to raise bail.

A Case of Innocence*

One of the first cases handled by the Northern California Polygraph Center involved a 16 year-old boy who was stopped by the California Highway Patrol while driving a car that was reported stolen. The car contained items worth over $900 which were stolen that day from a school. The youth was charged with driving a stolen auto and possession of stolen goods.

The youth maintained steadfastly that he did not steal the car, and that he had no knowledge that the goods were stolen. At his request, a polygraph examination was conducted. Results of the examination conducted by Mr. Charles Entile, indicated that the youth was telling the truth. Accordingly, the high school student who reported that his auto had been stolen was interviewed. He admitted to burglary of the school and cleared the youth who had been arrested.

*APA Newsletter, No. 10, November 1972 p. 62.

Soldier Clearing in Robbery Case*

Sgt. Gene Danish, Chief Polygraph Examiner of the San Antonio Police Department, is credited with clearing a 23 year-old Army supply sergeant who was arrested for armed robbery. A store attendant accused the soldier of the robbery. The soldier's plight began when he entered the store to buy a quart of milk. The clerk "positively" identified him as the suspect and followed him to his nearby apartment. The clerk then called the police, while fellow store employees watched the building, to be sure the soldier did not leave.

Despite pleas of innocence, the sergeant was arrested and booked. Police detectives listened to his story and asked him if he would consent to a polygraph test; and he agreed. The examination, conducted by Sgt. Danish, indicated the soldier was innocent of the robbery.

At about the same time, another store was being robbed by a man whose description was similar to that of the soldier in custody. The arrest in that case was prompt and correct, and the accused was guilty of the first robbery. The soldier was immediately released.

Polygraph Ordered After Conviction - Youth Passes But Judge Doesn't Wait**

A judge refused to delay proceedings and sentenced a teenager to 10 years in prison -- just hours before results of a polygraph test arrived at the Justice Building.

The polygraph examiner said the results indicated the teenager was telling the truth when he denied being guilty of an early September robbery of the Winn-Dixie Kwick Chek Store in Miami.

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* APA Newsletter, Number 4, April-May 1972, pg. 2.

** Miami Herald, November 21, 1971. Details confirmed by Warren D. Holmes on February 15, 1971.

Criminal Court Judge Murray Goodman ordered a polygraph test for Jerome Lee Robinson, 19, after a jury convicted him of armed robbery of a supermarket and assault with intent to commit murder in shooting the manager. Goodman later changed his mind, ordered the test cancelled and set sentencing. The judge said he had second thoughts and felt he should avoid the possibility of "usurping the jury's verdict on the basis of a lie test."

Assistant Public Defender Joel Magazine had Robinson tested by polygraph expert Warren D. Holmes despite Goodman's action. When Judge Goodman refused to delay sentencing until Monday when Holmes' report would be available, the report was rushed to the court Friday afternoon, but Goodman had already sentenced Robinson to 10 years.

The maximum sentence is life for robbery and 20 years for attempted murder. Goodman said he imposed the light sentence on the recommendation of police officers who spoke in Robinson's behalf. No one else had been charged in the robbery.

An elderly female customer, who said she saw the gunman for about three seconds, identified a photo of Robinson, who had a recent breaking and entering arrest. She also identified him in a lineup in court.

The wounded store manager, Cliff Jordan, made no identification from pictures, chose another man in the lineup, but pointed to Robinson in court as the man who shot him.

During the polygraph examination Robinson denied ever being in that particular store, Holmes said. He denied possessing a gun that day, shooting anyone, helping in, or having any knowledge of the hold up. Holmes said there were no reactions indicative of deception and that Robinson was telling the truth. Cases of this type may have a greater effect in court in the future, but this one did not have a happy ending.

Polygraph Saves Youth From False Accusations*

*APA Newsletter, Number 7, August 1972, pg. 5.

Two youths, ages 15 and 17, were arrested by the police on two different occasions. One offender was found in possession of marijuana and the other in possession of LSD. Although interrogated separately, both offenders stated that they had made their purchases from an acquaintance who was 16 years-old. The boy they named was arrested. However, he strongly denied the allegations. With agreement of the Judge of the Juvenile Court, the defense attorney, the Ocean County (New Jersey) Prosecutor, Martin B. Anton, and the Chief of the County Detectives, Calvin Woolley, a polygraph examination was conducted by County Polygraph Examiner, D. J. Presson.

Mr. Presson concluded from his examination that the defendant was in fact telling the truth when he denied the sales. The police then reinterviewed the two accusers. Both admitted that they had been untruthful about their source of drugs, and had identified the subject because he was new in their high school. They did not want to identify the actual sources of drugs because they were personal friends.

Victim in Triple Mistaken Identity Case Absolved After 15 Months*

A 19-year-old high school honor student was officially cleared of robbery as the story of his entanglement in a case of triple mistaken identity was disclosed in court.

The youth, George Morales, was arrested and charged with stealing $15 while using a razor as a weapon. He was sent to Rikers Island, and before his impoverished family could raise the $1,000 bail, he spent three days in detention and was beaten by other prisoners. He lost a term of school because he had to work to pay legal fees. Finally, through chance discovery of newspaper photographs, the suspect's remarkable resemblance to two other men came to light. Polygraph tests were administered and one of those two men confessed. Supreme Court Justice Burton B. Roberts affirmed Mr. Morale's innocence and praised the young man's faith in himself and justice.

The web of circumstance began on October 4, 1972 when a young man armed with a straight razor took a pocketbook

* New York Daily News.

from Mrs. Danzig in the stairwell of her apartment. Six days later Mrs. Danzig saw Mr. Morales as he was going to class at the Maritime Trades High School. She followed him, called the police, and he was arrested.

Mr. Morales insisted he had been home at the time of the robbery. The young man, who had no prior police record, was a straight A student. According to Mr. Goldberg (Morales' attorney) the break in the case came in November 1972 when Mr. Morales saw a newspaper article telling of the mistaken identity of Lawrence Berson. Richard Carbone, 20 year-old cab driver, was eventually found to be guilty in this case. Mr. Morales pointed out to his lawyer that the pictures in the newspapers of both Mr. Carbone and Mr. Berson had resembled him. Mr. Goldberg sought polygraph tests for both his client and Mr. Carbone, who was then serving eight concurrent 20-year prison terms.

Detective Laurendi, a polygraph expert, administered polygraph tests to the inmate and to the high school student. He said the tests indicated Mr. Morale's innocence, that "Carbone was able to tell me details of the crime that only the robber would know . . . "

Robbery Suspect Cleared*

An unemployed key-punch operator, twenty-one years of age, had gone to a Youth Community Service Center where he donated his time working with underprivileged children. He and another worker left the Center around 5:oo P.M. and walked about a mile where they were stopped by police and subsequently arrested for a strong-arm robbery allegedly occuring about 3 blocks from the scene of the arrest. A short time later, the subject in the case was positively identified as the perpetrator by a witness to the robbery.

The subject, even though the victim of the robbery couldn't identify him, was tried in the Los Angeles County Superior Court, and was found guilty of robbery in the second degree by a jury. The conviction was based solely on the visual identification of the one witness.

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*A case as conducted by W. M. Gidney, Polygraph Associates, Glendale, California

The Honorable Peter S. Smith, the presiding judge, and long-time polygraph advocate, felt that to sentence the defendant to prison for an indeterminate sentence of from one year to life on such evidence could be a gross miscarriage of justice. He, therefore, handed down a decision that a new trial would be granted if the defendant would voluntarily submit to a polygraph examination on the issue of the robbery. The defendant readily agreed.

A court order was issued by Judge Smith directing W. M. Gidney to examine the defendant on the polygraph. At the conclusion of the test, it was the opinion of the examiner that the subject was telling the truth in that he had no personal knowledge of the robbery, and that he was in no way involved in the crime.

Judge Smith, after being advised of the results and conclusions of the test, granted a motion of a new trial for the defendant. When he appeared the Judge dismissed the case, setting the defendant free.

Defendants Cleared in Theft Case*

In February 1972, Michael Chadwell and Robert Voils were arrested and charged with removing a brief case and suit from an automobile. Both defendants denied the charge and upon agreement of both defense and prosecuting attorneys, as well as the presiding judge, they were administered polygraph tests by Mr. Gillingham for the purpose of ascertaining information regarding the theft.

Both defendants claimed that they had, on the day of the theft, visited a bar in order to purchase some beer. Upon leaving the bar they had difficulty with their automobile and one of the defendants remained to attempt to fix the auto and the other went to purchase some sandwiches at a nearby restaurant. The complaintant came out of a bar and accused one defendant, who was working on the car, of stealing the briefcase and suit from his nearby automobile.

Both defendants denied being involved in the theft and the polygraph examinations which were administered substantiated their statements.

*From the files of Mr. C. E. Gillingham, Gillingham Polygraph Service, Louisville, Kentucky.

The Honorable Judge George H. Kunzman, Third Division, Jefferson County Circuit Court, released the defendants subsequent to their polygraph examinations.

Fort Worth To Offer Polygraph Tests*

Deputy Police Chief, W. T. McWhorter, Fort Worth Police Department, Fort Worth, Texas, said that polygraph tests will now be offered to all criminal suspects. The new policy was announced in light of recent incidents in which charges against three men were dismissed. One of the suspects was arrested for armed robbery, another for murder, and the third for burglary. The suspect charged with burglary was cleared after spending six months in jail prior to winning a dismissal of the charge. The dismissal was obtained after he successfully passed a polygraph test.

The murder suspect won his freedom subsequent to a polygraph test. The burglary suspect was released when it was determined he was in prison at the time of the robbery with which he was charged.

The Chief of Police, Cato Hightower, disturbed because the incidents "hurt law enforcement" stated that "we are going to offer everyone suspected of a crime a polygraph test even though it is not admissible in court. If there is a conflict between witnesses and the results of the polygraph test, we will have a consultation with someone, maybe with the witness, the defendant and then someone from the District Attorney's office and show them what the problem is." Hightower reported that such unfortunate incidents result from the shortages of personnel in which the detectives are given additional cases to investigate each day when the previous cases are not completed.

Polygraph Clears Other Innocent Men**

In a central Texas town some years ago a middle-aged grocery store owner stood behind the counter on a dark Sunday night and watched a man buy a pack of cigarettes and then pull a gun and shoot him.

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*Evening Star Telegram, Fort Worth, Texas, Written by Bob Bain.

**Fort Worth Star Telegram, 3 November 1966, by Robert Pirtle.

Police thought the motive was robbery, but the bandit had apparently become frightened, because the money remained in the cash drawer. The wounded store owner told the County Sheriff the name of the gunman and within hours the suspect had been arrested. The police performed a paraffin test in search of powder burns. The test showed there were traces of nitrate on the hands of the defendant.

Dee Wheeler, then employed by the Texas Department of Public Safety, was called upon to examine the accused man with the aid of the polygraph Wheeler concluded that the man was innocent. The Police Department was concerned about the results of the paraffin test and Wheeler replied the suspect reported he had been fertilizing the yard prior to the arrest and possibly his hands contained nitrate from the fertilizer.

Subsequently two more suspects were placed in custody. One was a roving evangelist who had completed a sermon early on the night of the shooting and quickly left town. The second man was a drifter who the police arrested on an anonymous tip, and he was identified as "Big Apple."

Wheeler first examined the roving evangelist and determined he did not shoot the store owner; however, he had knowledge of who was involved in the crime. Later the evangelist confessed that as he walked near the store he observed a big fellow running toward him waving a gun. The individual reported that he had just killed a man and would shoot him (the evangelist) if he told of seeing him. The evangelist identified the person as "Big Apple." Wheeler then administered a polygraph examination to "Big Apple" and the suspect led police to the place where he had hidden the pistol.*

It was later determined that the store owner was in a state of shock as a result of the shooting, and, therefore, his identification was false. His identification could have sent the wrong man to prison had it not been for the results of the polygraph.

In another case on the south side of Fort Worth, the

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*Fort Worth Star Telegram.

two managers of a small grocery store became grateful believers in the polygraph. From all indications one of the men had burglarized the store of $500. Both began accusing each other because the safe had been opened during the night and the money removed. The windows and doors were found to be locked and the two men were the only individuals with keys. The polygraph cleared both men, and the police were baffled.

Approximately six months after the burglary, a 16 year-old youth confessed, hoping to clear his record before he became an adult. He reported to police he had been employed at the store and had learned the safe combination. On the afternoon of the robbery he slipped a paper in the window to keep it from locking. He climbed in through the window at night, opened the safe and took the money, closing the window behind him.

A False Confession Detected

In another Texas case, Dee Wheeler recalls the day when a teenager female suspect was brought to his office for polygraph testing. She had already confessed to forging 36 checks, and was being tested in an attempt to determine if she had been involved in other specific forgeries. As a result of the polygraph test, Wheeler found that the suspect had not forged the checks to which she had confessed. She explained that her father was a strict disciplinarian and said she wanted to strike back at his authority, and in confessing to the crimes she felt she would punish him. At a later date, the perpetrator of the forgeries was apprehended.

CHANGES AT THE ARMY POLYGRAPH SCHOOL

By

Bobby J. Daily

The Army's polygraph school is officially known as the Polygraph Committee, Investigation Group, Department of Investigation, Security and Corrections, United States Army Military Police School, and is located at Fort Gordon, near Augusta, Georgia. This school is sometimes referred to as the Federal Polygraph School due to the fact that it trains polygraph examiners for many agencies other than the Army. Examiners for all branches of the military service, most of the federal investigative agencies, some municipal law enforcement agencies, and certain foreign governments are trained at this school.

There have been numerous personnel and some curriculum changes at the school recently and this article will bring you up to date on what and who is new here. The 14 week course consists of 506 hours of academic subjects and 54 hours of non-academic subjects. The academic phase is outlined as follows:

Polygraph Theory and Administration	13 hours
Polygraph Maintenance Management	19 hours
Polygraph Examination Procedures	84 hours
Evaluation of Mental and Physical Fitness of Examinees	34 hours
Comprehensive Practical Exercises	331 hours
Examinations (Performance Tests)	25 hours

The success of this polygraph school is greatly enhanced by many factors. One is the low instructor-student ratio, which is at least one instructor per two students. This permits extensive individualized instruction, monitoring and counselling. Improper procedures or tendencies can be corrected before they become habits. The student gets immediate attention to his problems and questions, as well as much needed praise and reassurance for his successes. As we know, prompt feedback is important in learning situations, and polygraph students are no exception. With our low-instructor-student ratio, we are able to provide almost instant feedback to all students.

The second factor is the availability of live "subjects" for examinations. Each student conducts a minimum of 44 live examinations before graduation. Each day during the practical exercise portion of the course, the Military Police School provides enough soldiers to permit each student to have a "subject." These soldiers, both male and female, are all volunteers for the exercise. No one is ever forced to submit to an examination, even for training purposes. At the beginning of each day, the instructor staff, utilizing the volunteer soldiers, simulate the commission of an actual crime or series of crimes. These situations are arranged so that the involvement of the "subjects" may be direct involvement, accessory to the fact, accessory after the fact, reluctant witness, or some may not have any knowledge or involvement whatsoever. The instructor staff works hard and must use much imagination in staging the "crimes" to make them as realistic as possible. Success of these efforts is repeatedly demonstrated by the high reliability of the students to correctly determine the appropriate involvement of the subjects through polygraph testing.

Another factor considered important to the success of the school might, on the surface, be considered a handicap. This is the turnover of instructor staff, with the exception of the staff chief. Instructors are volunteers from among highly qualified field examiners certified by the Army. They must have demonstrated a high degree of proficiency in the conduct of polygraph examinations, as well as qualifying as service school instructors. They bring with them from the field a wealth of experience and practical know-how which they are able to relate and demonstrate to the students. They retain their Army certification by conducting frequent polygraph examinations for nearby Army investigative units. The instructors are occasionally called upon to conduct specialized examinations throughout the world.

Military instructors must rotate back to field assignments periodically, and this is good as they can then "practice what they preached." Frequently they return to the school for a second assignment as a polygraph instructor. By this method the instructors remain current in doctrine as well as practice.

Programmed Instruction

A recent important change in instruction at the school is the incorporation of polygraph subjects in "programmed instruction." Under this system, the object is to "learn by doing." Although there is a four-week intensified academic phase which all students must satisfactorily complete, the strongest emphasis is placed on the ten-week practical phase. The student's ability to pass written examinations is minimized, whereas the real test is to determine if the student can competently conduct polygraph examinations. After all, isn't the ability to put theories into practice the best demonstration of proper understanding of those theories?

Programmed instruction provides for specific training objectives for each block of instruction. These training objectives are made up of tasks, conditions and standards. This simply means that the student, as a result of a particular block of instruction, will be able to perform certain tasks, under certain given conditions, to conform to stated standards. This criteria is determined in each instance by field requirements. Note that the objectives are for the student to "perform," not just be able to repeat it on a written examination. These training objectives are under constant review for possible revision as field requirements dictate.

Staff

Now to bring you up-to-date on the instructor staff at the school. The only current staff member mentioned in the June 1972 article by Mr. Stein is Mr. Ronald E. Decker, Chief of the Polygraph Staff.[1] Mr. Decker is a retired Army CID Agent and has 19 years polygraph experience. He has been an instructor at the Polygraph School since 1966. Upon his retirement from the Army in 1969, Mr. Decker returned to the school to fill the one civilian instructor position. However, we are talking about changes and there has even been a recent change regarding Mr. Decker. His many friends in the polygraph profession will be pleased to learn that he recently received a well-deserved

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[1]Allan E. Stein, "The Federal Polygraph School," Polygraph, volume 1, No. 2, pages 75-79.

Civil Service promotion. Mr. Decker is a certified polygraph instrument repairman. He has been guest speaker at numerous professional seminars and institutions.

The senior military instructor is CWO Albert J. Silvani, who has 23 years active military service, 19 years investigative experience, and has been a polygraph examiner since 1962. CWO Silvani holds a B.A. degree in Law Enforcement from San Jose State College. He was assigned to the polygraph school in 1973.

CWO Marshall Thomas is a veteran of 18 years military service, 14 of which have been as an investigator. He has been a polygraph examiner for five years and was assigned to the polygraph school in 1973. CWO Thomas holds a B.S. degree in Criminal Justice from the University of Nebraska at Omaha.

CWO Frederick C. Link has 16 years active military service, eight years as an investigator, six of which have been as a polygraph examiner. He was assigned to the polygraph school in 1972. CWO Link holds a B.S. degree in Law Enforcement from the University of Nebraska at Omaha.

A veteran of over 23 years active military service, CWO Bobby J. Daily has been an investigator for 21 years, eight of which have been as a polygraph examiner. CWO Daily is the newest member of the faculty, having joined in late 1973.

Warrant Officer Clark J. Tebbs has 18 years active military service, seven years as an investigator, and four years as a polygraph examiner. He was assigned to the school in 1973 and is the primary instructor for instrumentation and instrument repair. Mr. Tebbs holds a B.S. degree in Business Management from New Hampshire College of Accounting and Commerce.

Certain specialized subjects, such as physiology, psychology, and law are taught by specialists in those fields. Physiology is being taught by Dr. Henry F. Ball, presently specializing in psychiatry at Talmadge Hospital, Augusta, Georgia. Psychology is taught by Dr. Neal B. Andregg, Educational Advisor at the U.S. Army Military Police School, who holds a Doctorate in Education. Abnormal psychology is taught

by Dr. Stewart L. Wiggins, Associate Professor of Psychology at Augusta College and Associate Professor of Psychiatry and Neurology at the Medical College of Georgia. Legal subjects are taught by lawyers who are instructors on the Military Police School faculty.

Faculty members of the Polygraph School frequently make guest appearances at various seminars and polygraph training sessions, in addition to actively participating in assisting local schools in their educational programs. All instructors are particularly pleased with their affiliation with the American Polygraph Association, with every instructor being an APA member.

The basic polygraph examiner course remains essentially the same as it has been for the past several years, although refinements are made on a continuing basis. The goal never changes - to graduate the very best polygraph examiner possible. All of the staff are constantly mindful of, and dedicated to the accomplishment of that goal.

NOTE: The views of the author do not purport to reflect the position of the Department of the Army or the Department of Defense.

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L A W R E P R I N T A V A I L A B L E

Reprints of Howard S. Altarescu's article "Problems Remaining for the 'Generally Accepted' Polygraph" are available from --- BHF Printing
P. O. Box 83
Auburndale, Mass. 02166
for $1.15 each, postpaid.

This scholarly article considers many of the problems to be faced in court. It first appeared in The Boston Law Review, Volume 53, Number 2, March 1973, pp. 375-405.

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UNITED STATES PATENT OFFICE

LEONARDE KEELER, OF BERKELEY, CALIFORNIA

APPARATUS FOR RECORDING ARTERIAL BLOOD PRESSURE

Application filed July 30, 1925. Serial No. 46,986.

This invention relates to means for recording cardiac cycles and other oscillations in arterial pressure simultaneously. Sphygmographs are well known in the art. Sphygmograms, or the series of connected curves recorded by a sphygmograph, indicate cardiac cycles only, in which the up stroke is the systole curve and the down stroke the diastole curve. In addition to the pressure oscillations of the cardiac cycle, there are slower oscillations, which are more or less irregular and which may be superimposed on a considerable number of cardiac cycles. The slower oscillations in the arterial pressure may be due to various factors such as for example, respiratory movements, rhythmic variations in the activity of the vasoconstrictor center or in the cardiac activity. Heretofore, it has not been possible to record graphically a curve combining the cardiac cycle, which showed the systolic and diastolic pressures and dicrotic notch and the slower oscillations, and it is an object of this invention to provide means for accomplishing this purpose. The curves referred to will be better understood from the detailed description hereinafter in connection with the drawings in which such curves are illustrated.

My invention also has been found of great value in connection with making certain psychological tests based on arterial blood pressure variations. In such cases I have simultaneously recorded with means embodying my invention two curves taken from different parts of the body, such for example, as the two arms, two legs, one arm and one leg, etc. My invention may also record a respiration curve, which curve is recorded simultaneously with the two aforesaid curves. An apparatus of this character will be more fully described hereinafter.

It is an object of the invention to provide means whereby the sphygmogram or cardiac cycle may be recorded simultaneously with and be superimposed on the slower oscillations in the arterial pressure, whereby the characteristics of each as well as their relation to each other at any moment may be readily ascertained.

The invention possesses other advantageous features, some of which with the foregoing will be set forth at length in the following description where I shall outline in full that form of the invention which I have selected for illustration in the drawings accompanying and forming part of the present specification. In said drawings I have shown one form of device embodying my invention, but it is to be understood that I do not limit myself to such form, since the invention as set forth in the claims may be embodied in a plurality of other forms.

Referring to the drawings:

Figure 1 is a top plan view of apparatus embodying my invention.

Fig. 2 is a side elevation of the apparatus shown in Fig. 1.

Fig. 3 is an end view illustrating the mechanism of the kymograph.

Fig. 4 is an enlarged detail view illustrating the mechanism connecting a tambour unit with a stylus of the kymograph.

Fig. 5 is a cross-sectional view of a brachial cuff with the inflator and tubes shown in elevation; and

Fig. 6 illustrates an enlarged specimen of a graphic record obtained by my invention.

Apparatus embodying my invention is preferably mounted on a suitable base 1 and includes a kymograph 2, which comprises a motor 3 which drives a roller 4, having a plurality of teeth 5 on its periphery, through a suitable gear train indicated as a whole by the numeral 6. The kymograph is provided with a suitable supply roll 7, which carries smoked paper 8 or any other suitable medium for receiving records. The paper 8 is provided with holes 9 adapted to be engaged by the teeth 5 so as to draw the paper through the kymograph in a well understood manner. This apparatus is well known and does not of itself form a part of my invention as any standard type of apparatus for accomplishing the same result may be employed.

Records or graphs are traced on the paper 8 by a stylus of which three are shown, designated 9', 10 and 11, although it is to be understood that I do not limit myself to any particular number. Since each of the styli is actuated by similar mechanism embodying

Patent negatives courtesy of Charles H. Zimmerman.
Photographic prints by William J. Berndt, Jr.

my invention, a description of one will be sufficient, and will best be understood by referring to Figs. 1 and 4. The stylus 9′ is secured at right angles to a small shaft 12, (Fig. 4) preferably at a point midway between the ends thereof, and the shaft is rotatably supported by two adjustable screws 13 and 14. Preferably the ends of the shaft are provided with conical depressions to receive the ends of said screws which are suitably pointed. The screws 13 and 14 are supported on a fixed vertical member 15 by two arms 16 and 17 and the axis of shaft 12 as it appears in Figure 1 is in a plane at right angles to the plane of paper 8, which is preferably horizontal as shown. The shaft 12 is provided with a small lever 18, positioned preferably at a point midway between the ends of the shaft. The lever 18 is provided with a hole 19 to receive a hook or L-shaped member 20. A plurality of holes 19 may be provided so that the member 20 may be placed in different ones for the purpose of adjusting the amount of leverage. The member 20 is connected in a manner hereinafter described to the end of a tambour unit 21, which comprises a series of metal tambours 22, whereby vibrations or motion transmitted to the tambours 22 may be transmitted to the stylus 9′, the amplification of such motion or vibrations of course being determined by the lengths of the lever 18 and stylus 9′. The tambour unit 21 is supported at one end by an L-shaped member 23 and at its opposite end by a vertical member 24, as best shown in Fig. 2. The interiors of the tambours 22 are all in communication with each other. The tambour 22 adjacent the member 20 is closed, as indicated at 25 and the tambour 22 at the opposite end of the unit is open and connected with a pipe 26. For the purpose of maintaining the tambour unit 21 in any desired distended position, such for example as to correspond to a given pressure, adjusting means have been provided. These comprise the provision of a screw 27 which is swiveled on the end of member 20 and adapted to engage threads in the end 25 of the tambour unit 21, and a shoulder 28 (Fig. 4) bearing against the support 23. Thus when the screw 27 is rotated, the tambour unit 21 may be fixed in a given distended position with respect to the member 23. The L-shaped member is supported on a fixed vertical element 29 as shown in Fig. 2, and may extend through an opening in the member 24, not shown. The member 24 is pivotally connected to the base 1 at 30 and normally urged toward the fixed element 29 by a spring 31. The distance between the members 24 and 29 is regulated by a screw 32 in a manner readily understood. In this manner the end of the tambour unit adjacent the pipe 26 may also be held in a distended position. I preferably employ both the screws 27 and 32 for adjusting the tambour unit. The purpose of the adjustment will be better understood from the following description. In Fig. 5, an arm of a person is indicated in cross-section at 33 which is partially surrounded by a rubber bag 34 held in position by a leather cuff 35. The rubber bag is connected by means of a suitable tube 36 with a pump 37 and with the pipe 26 which communicates with the interior of the tambour unit 21. The bag 34 is inflated by means of the pump 37 to a pressure at which pulsations impart a free motion to the stylus. As the stylus would now travel through a wide arc, and be likely to jump from the paper 8, the tambour unit 21 is adjusted in the manner described to a distended position corresponding to the pressure at this time. Thereafter the travel of the stylus is limited in a manner readily understood.

By means described, I secured a graphic record of the character shown in Fig. 6. Heretofore sphygmographs have been obtained showing the cardiac cycle which was similar to the first five cycles shown in Fig. 6 designated *a* to *e* inclusive, in which the upward line *a′* to the peak indicates the systolic pressure, the downward line *a″* the diastolic pressure and *a‴* the dicrotic notch. These cycles were uniform with respect to a given line. The applicant's invention, however, produces a new and additional result. While maintaining the individual characteristics of each cardiac cycle, the same are imposed upon a wave, which may rise or fall irregularly as shown in Fig. 6. It has been found that this wave may be varied by physical, psychological or emotional changes; however, the applicant does not undertake to analyze at this time the properties of the curve obtained. The same is the subject matter of study by the medical profession, and it is now known that the curve is different from any other curve heretofore obtained.

While my invention probably has its greatest application in the field of the medical profession, for purposes of illustration I have shown the same embodied in apparatus for making certain psychological tests. This apparatus is provided with two styli, 9′ and 10, with associated mechanism similar to that above described; however, in one case the impulse transmitting means is connected with an arm and in the other case to the other arm or a leg or in each case said means are connected with a leg, whereby parallel records are obtained from different portions of the body. The stylus 11 is connected with means for recording a respiration curve. This apparatus may also comprise a clock-mechanism 38, which controls the circuit of an electromagnet 39 for indicating time intervals on the paper 8, said magnet actuating a stylus 39′. In carrying out the tests, the person under examination is subjected to questioning and his various reactions are

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indicated in the graphs recorded. In order to indicate on the record the time when certain questions are asked, a time marking device is provided which comprises an electromagnetically actuated stylus 40, which may be controlled by a push button 41. Four other push buttons, 42, 43, 44 and 45 are also shown which control signal lamps 46, 47, 48 and 49 respectively so that a signal may be flashed to a remote point to indicate what the recorded graphs show. This arrangement is provided as the person conducting the examination may be at a distance from the device and not be able to read the indications, and thus avoid any conversation which may be heard by the person under examination. The particular construction shown is designed for use by the police in making criminal investigations.

I claim:

1. Apparatus of the character specified comprising a series of metal tambours, means for transmitting pressure to the same, a pivoted member supporting one end of said series, a fixed parallel member, means normally urging said pivoted member toward said fixed member, means for adjusting the distance between said fixed and pivoted members, a screw at the opposite end of said series of tambours, means for supporting said screw carried by said fixed member, a pin swiveled to said screw and an indicating lever actuated by said pin.

2. Apparatus of the character described comprising a pivoted indicating member, a series of connected metal tambours, means for transmitting pressure to said tambours, means for holding the tambours in a distended position, and means for transmitting the movements of said tambours to said indicating member, comprising an adjustable member secured to the end tambour of said series and engaging said indicating member.

3. Apparatus of the character described comprising a pivoted indicating member, a series of connected metal tambours, means for transmitting pressure to said tambours, means for holding the tambours in a distended position, means for transmitting the movements of said tambours to said indicating member comprising an adjustable member secured to the end tambour of said series and engaging said indicating member, and means for varying the position of the series of tambours with respect to said indicating element.

4. The method of indicating the psychological and physical condition of a patient comprising simultaneously recording both the cardiac cycle and general variations in blood pressure upon a single curve.

5. In a sphygmograph having pressure transmitting means adapted to be applied to the body of a patient for transmitting variations in blood pressure and a recording device; an actuating means interposed between said first mentioned means and said recording device for actuating said recording device in response to blood pressure variations, said actuating means being so constructed and arranged that it is sensitive to fluctuations in the cardiac cycle and to fluctuations in blood pressure other than the cardiac cycle, whereby a continuous record is obtained comprising a curve of the blood pressure fluctuations having the cardiac cycle superposed thereon.

6. In a sphygmograph having pressure transmitting means adapted to be applied to the body of a patient for transmitting variations in blood pressure, and a recording device; an actuating means interposed between said first mentioned means and said recording device for actuating said recording device in response to blood pressure variations, said actuating means having freedom of movement over a range of pressure variations which includes the cardiac cyclic and arterial pressure variations, whereby a continuous record is obtained comprising a curve of the blood pressure fluctuations having the cardiac cycle superposed thereon.

7. In a sphygmograph having pressure transmitting means adapted to be applied to the body of a patient for transmitting variations in blood pressure, and a recording device; an actuating means interposed between said first mentioned means and said recording device for actuating said recording device in response to blood pressure variations, said actuating means having freedom of movement over a range of pressure variations which includes the cardiac cyclic and arterial pressure variations, and being substantially equally sensitive over said range, whereby a continuous record is obtained comprising a curve of the blood pressure fluctuations having the cardiac cycle superposed thereon.

8. In a sphygmograph having pressure transmitting means adapted to be applied to the body of the patient for transmitting variations in blood pressure, and a recording device; an actuating means interposed between said first mentioned means and said recording device for actuating said recording device in response to blood pressure variations, said actuating means comprising a series of metal tambours so constructed and arranged that the recording device is responsive to cardiac cyclic fluctuations and arterial pressure variations, whereby a continuous record is obtained comprising a curve of the arterial pressure having a cardiac cycle superposed thereon.

In testimony whereof, I have hereunto set my hand.

LEONARDE KEELER.

Filed July 30, 1925 3 Sheets-Sheet 1

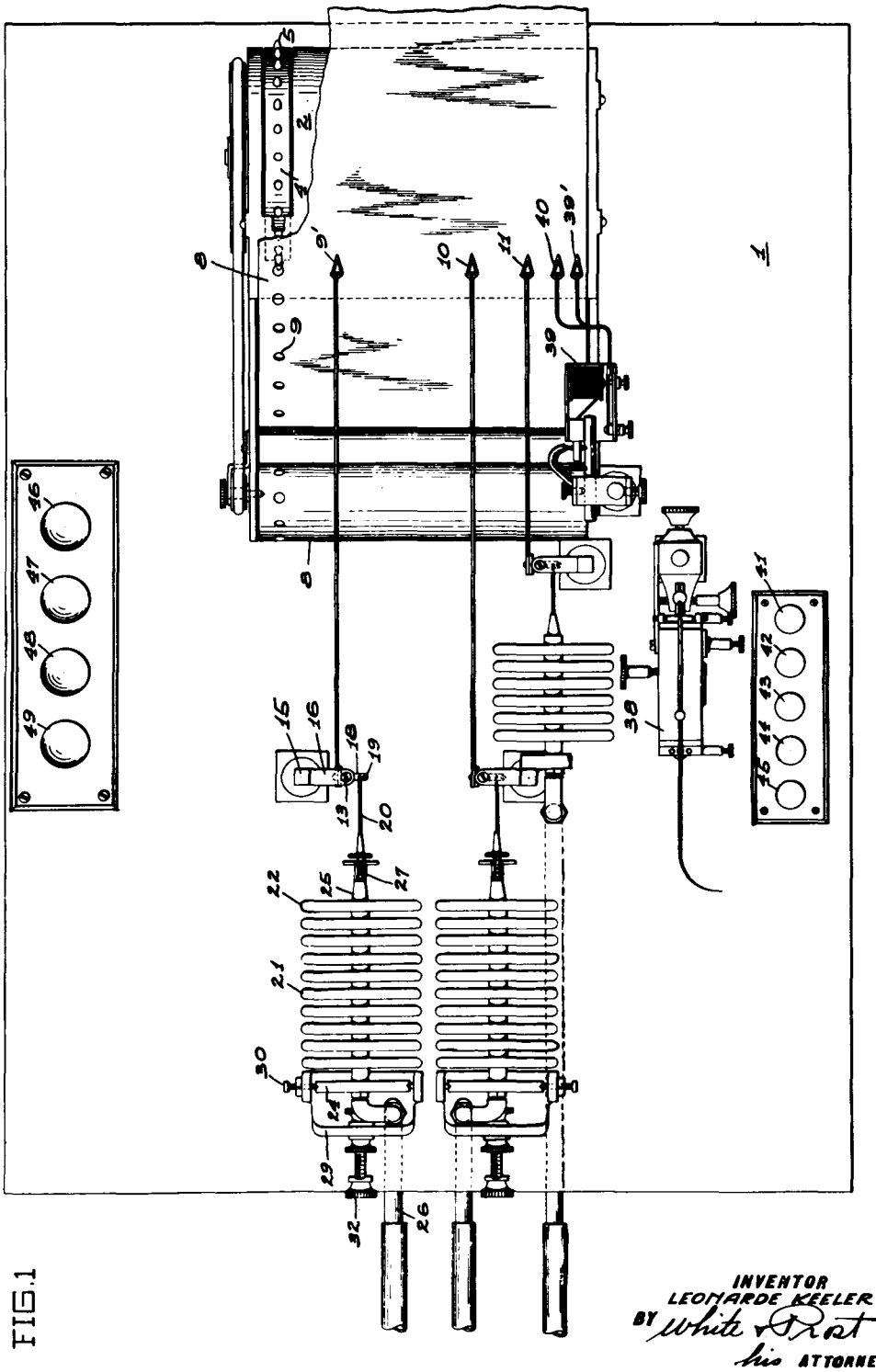

FIG. 1

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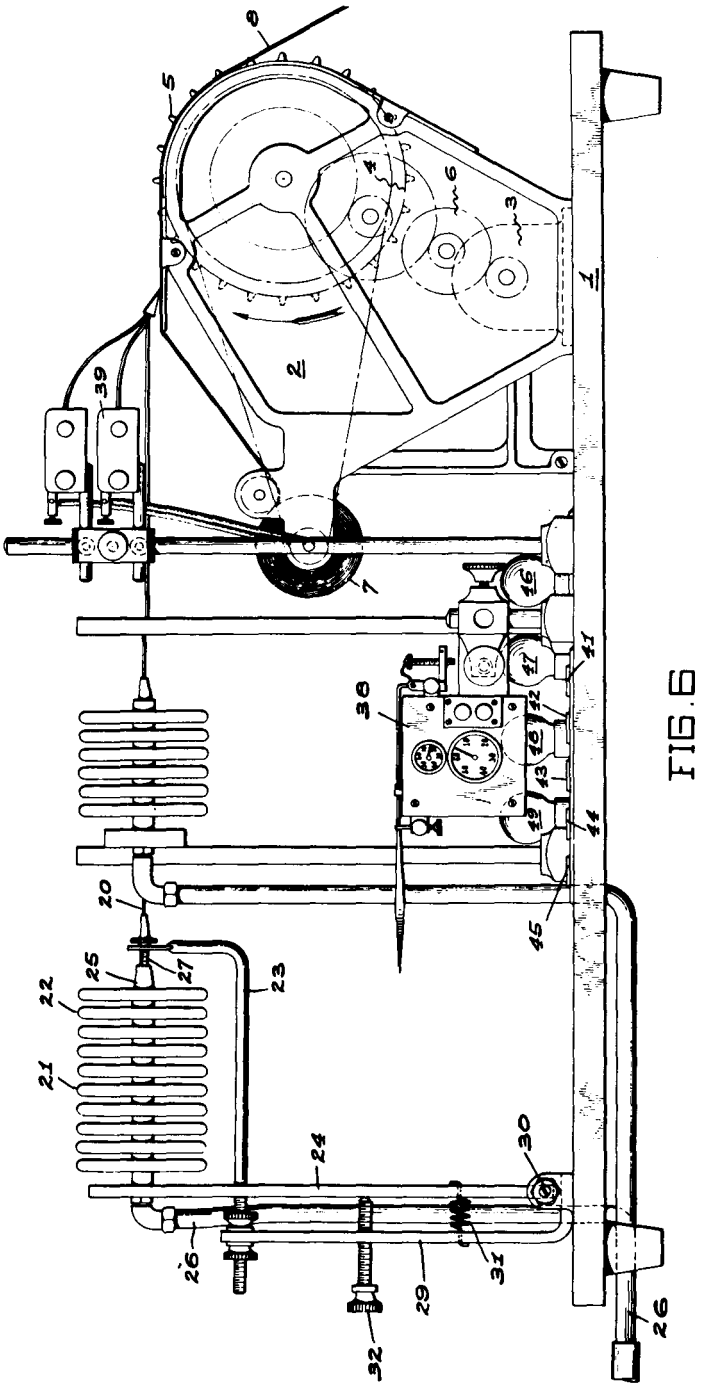

FIG. 2

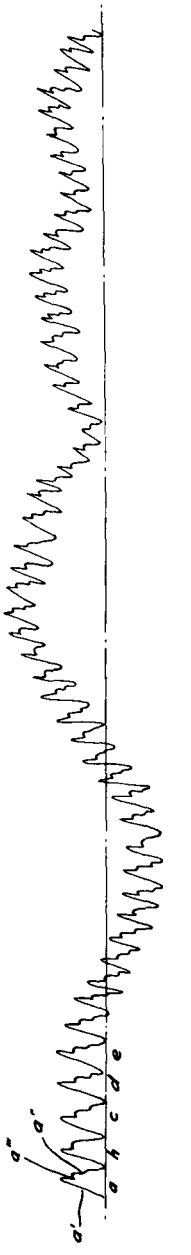

FIG. 6

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FIG.3

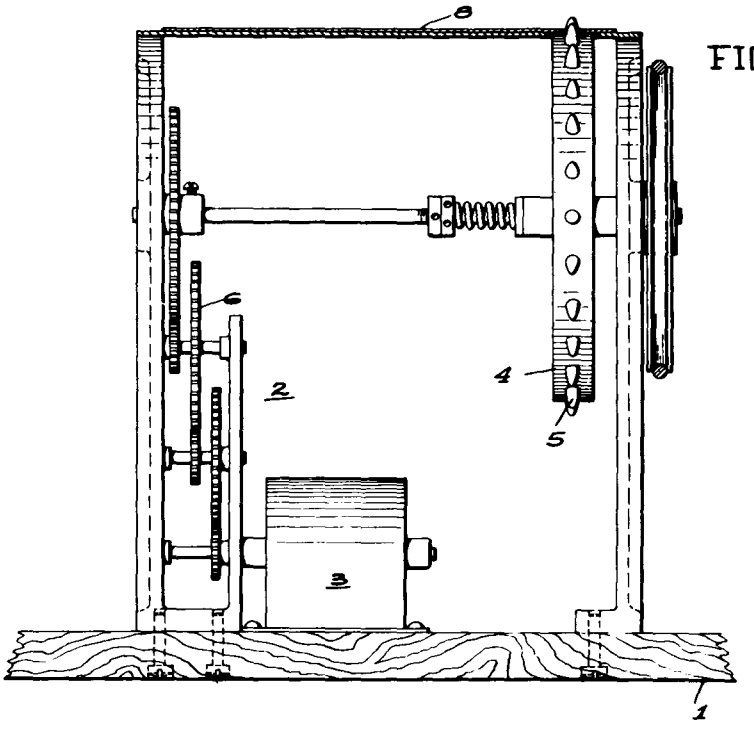

FIG.4

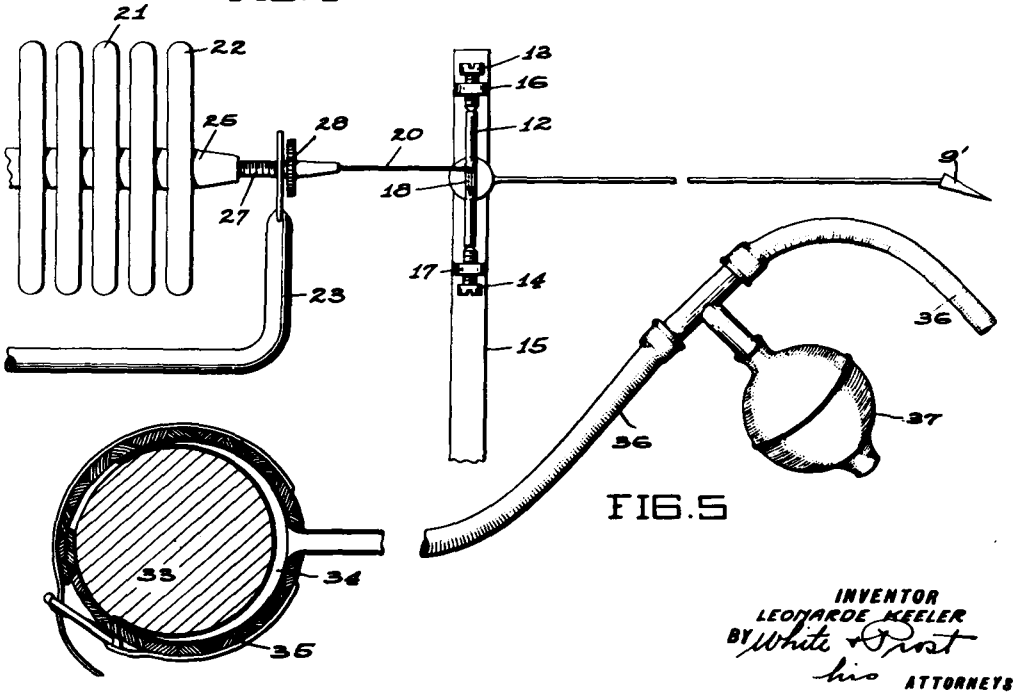

FIG.5

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REDUCING INCONCLUSIVES RESULTS BY PRE-TESTING RELEVANT QUESTIONS

By

Cleve Backster

In this paper I would like to present one effective method of reducing those self-inflicted "inconclusive" examination results. The structure and content of the backbone of any direct question test is the relevant question.

The following are ten checklist items (extracted from the Complete Relevant Question Formulation Checklist) which maybe used as a self-critique device. When items from the checklist are applied to each relevant question, many problems are prevented. These ten considerations have been selected for their universal application to direct question techniques -- regardless of the source of initial examiner training. The primary factor which has allowed our research to validate the underlying principles of several of these items relates to the "anti-climax dampening" concept.

Try applying all of the following to each relevant question you plan on using during your next polygraph examination:

IS THIS A WEAK RELEVANT QUESTION? (YES) (NO)

Does this relevant question tend to be too weak, risking lack of response to it because of "anti-climax dampening" by one or more stronger relevant questions you are using (one of several dangers when using relevant questions to probe)?

CAN SUBJECT ANSWER THIS QUESTION TRUTHFULLY -- YET BE GUILTY OF THE OFFENSE? (YES) (NO)

Is there a fair chance that Subject might be answering this question truthfully, but still be guilty of the crime or offense, thus creating unnecessary confusion (also a common danger when using relevant questions to probe)?

CAN SUBJECT HAVE DIFFICULTY ANSWERING THIS QUESTION TRUTHFULLY -- YET BE INNOCENT? (YES) (NO)

Is there a fair chance that Subject might be attempting deception in regard to this question, but is not guilty of the crime or offense, nor does he have guilty knowledge, thus creating unnecessary confusion?

IS THIS A "DOUBLE ISSUE" RELEVANT QUESTION? (YES) (NO)

Have you mistakenly included two distinctly different issues in this same relevant question, where Subject might be answering one part truthfully, but attempting deception in regard to the other part?

HAVE YOU RELIED TOO STRONGLY ON ACCURACY OF CASE INFORMATION?
(YES) (NO)

Have you over-estimated the accuracy of such items of information as (a) Time, (b) Date, (c) Location, (d) Amount, (e) Method -- in the wording of this question?

IS THIS QUESTION WORDED AT PROPER "VOCABULARY LEVELS"?
(YES) (NO)

Have you used vocabulary and terms in this question that take into consideration the "Mental Ability" and Schooling of the person you are testing?

WILL THIS QUESTION ALSO COVER THE INDIRECT PARTICIPANT IN AN OFFENSE? (YES) (NO)

Is the wording of this question inclusive enough to cover a person that did help commit the offense, but in a role he may feel is relatively minor (such as a "lookout", a "driver", etc.)?

IS THIS A "STOP BEATING YOUR WIFE" RELEVANT QUESTION?
(YES) (NO)

Is this a question where the Subject may be aroused, regardless of innocence or guilt -- with the innocent implicating himself either way he answers?

MIGHT THE COMPOSITION OF THIS QUESTION BE CONFUSING TO SUBJECT?
(YES) (NO)

Is your wording of this unnecessarily awkward or ambiguous?

IS THIS QUESTION SUFFICIENTLY DIRECT THEREBY PREVENTING AN "ANTI-CLIMAX WASHOUT"? (YES) (NO)

Are you formulating this relevant question along the sometimes indirect but logical approach of an investigator following up a lead rather than using a more direct and pointed question?

If each of your relevant questions will stand up under all ten points on this partial check list, I feel certain that you will avoid some areas that are responsible for confusing polygraph charts, causing inconclusive examination results.

Some Avoidable Errors

For amplification of some of the factors involved in cautious formulation of safe relevant questions, the following six DON'TS might be helpful:

1. DON'T select a secondary aspect for coverage by a relevant question. On many occasions the expected response to it, with a guilty suspect, will be dampened out because of a greater concern for the stronger relevant questions.

2. DON'T use more than four or five relevant questions (a maximum) during any single chart. In doing so you "dilute" the effectiveness of all of them.

3. DON'T use a "direct question" probe. This is a waste of valuable relevant questions. Use a "probing peak-of-tension"test later, if guilt is indicated and you want a breakdown on the details.

4. DON'T include more than one distinct and separate issue in the same chart. You risk an "anti-climax" dampening of the weaker issue, by the stronger one.

5. DON'T use a relevant question that has not been formulated and carefully reviewed in advance with your Subject -- and expect it to be a reliable indication of deception. There are at least four different danger areas jeopardizing

accuracy when an unreviewed relevant question is used.

6. DON'T expect "overall verification" questions, such as -- "Have you lied to any question on this test?" -- to be a reliable indication of deception in regard to the principal issue. On many occasions such questions are too weak to solicit the concern of the guilty and may cause reactions with the innocent Subject.

****

WISCONSIN ADMITS POLYGRAPH EVIDENCE

The Prosecutor's Bulletin of May 10, 1974, published by the Attorney General of the State of Wisconsin, describes the case of State v. Stanislawski as a "landmark decision" in which the Wisconsin Supreme Court reversed its 40-year-old rule and held that the results of polygraph tests are now admissible as evidence in a criminal case. The following is quoted from the Prosecutor's Bulletin:

"The Court was persuaded by evidence that polygraphs are believed by many experts to have reached the level of scientific reliability which allows the admission of expert testimony on voiceprints, electroencephalographs, police artist drawings, fingerprints, and the like. The decision reverses the rule first set out in Frye v. United States (D.C.Cir. 1923), 293 F. 1013, and adopted in Wisconsin in State v. Bohner (1933), 210 Wis. 651, 246 N.W. 314.

Adopting a set of restrictions and qualifications from the Arizona Supreme Court case State v. Valdez (1962), 91 Ariz. 274, 371 P. 2d 894, the Wisconsin Court held that henceforth "expert opinion evidence as to polygraph tests may be admitted in a criminal case subject to the following conditions."

Polygraph Tests Taken By the Defendant

Expert testimony as to such a polygraph test is admissible for two purposes:

(1) ". . . to corroborate other evidence of a defendant's participation in the crime charged," regardless of whether the defendant takes the stand to testify in his own behalf.

(2) "If he takes the stand such evidence is admissible to corroborate or impeach his own testimony."

In regard to admission of this testimony, however, a set of four conditions must be met.

"(1) That the district attorney, defendant and his counsel all sign a written stipulation providing for defendant's submission to the test and for the subsequent admission at trial of the graphs, and the examiner's opinion thereon on behalf of either defendant or the state.

"(2) That notwithstanding the stipulation the admissibility of the test results is subject to the discretion of the trial court, i.e., if the trial judge is not convinced that the examiner is qualified or that the test was conducted under proper conditions he may refuse to accept such evidence.

"(3) That if the graphs and examiner's opinion are offered in evidence the opposing party shall have the right to cross-examine the examiner respecting:

(a) the examiner's qualifications and training;

(b) the conditions under which the test was administered;

(c) the limitations of and possibilities for error in the technique of polygraphic interrogation; and

(d) at the discretion of the trial court, any other matters deemed pertinent to the inquiry.

"(4) That if such evidence is admitted the trial judge should instruct the jury that the examiner's testimony does not tend to prove or disprove any element of the crime with which a defendant is charged but at most tends only to indicate whether at the time of the examination defendant was telling the truth. Further, the jury members should be instructed that it is for them to determine what corroborative weight and effect such testimony should be given."

Polygraph Tests Taken By A Complaining Or Principal Or Other Witness

The tests and expert testimony are admissible "on the issue of credibility, for corroborative or impeachment purposes," and the same four conditions must be met.

> "We find no reason or merit for establishing one set of qualifications for admissibility of polygraph testing of a defendant, and another for admissibility of the polygraph testing of a state witness. The required four qualifications for admissibility are, in this state, to be the same for both situations."

In a later decision of the Wisconsin Supreme Court covering a similar issue, Gaddis v. State, decided April 12, 1974, the Court determined to disallow any alternative procedures to the stipulation between the parties, at least until such time as experience could be gained with the by-stipulation-only procedure. Thus, it was determined that the procedure whereby a defendant requests a polygraph examination to be conducted by the State Crime Laboratory and the trial court approves such request pursuant to sec. 165.79, Wis. Stats. could not, at present, be used as an alternative to the stipulation procedure.

It is noteworthy, as to the stipulation procedure, that a trial court judge who very recently indicated his intent to admit polygraph testimony despite the absence of the required stipulation under Stanislawski has been prohibited from doing so by our Supreme Court."

NEW MEXICO APPEALS DECISION

In State of New Mexico v. Gilbert Alderete (No. 1287, 25 Mar 74) the Court of Appeals of The State of New Mexico considered an appeal from the District Court of Bernalillo County in which the defendant was not allowed to enter polygraph results in court. In affirming the conviction, the court noted that only the results were presented, not the charts, and the polygraphist was not qualified to testify. The opinion of the court is reported here because of the comment on qualifications, and the view of the judges on admissibility.

O P I N I O N

SUTIN, Judge.

Defendant was convicted and sentenced for possession of heroin. Defendant appeals. We affirm.

A. The results of polygraph examinations were not admissible in evidence.

Defendant moved the court that the results of a polygraph (lie detector) examination be admitted in evidence. The State objected because the results were hearsay and the polygraphist was not qualified to testify as an expert.

Defendant tendered the testimony of a polygraphist and the results of his examination. The trial court denied the tender.

We agree with the State's objection that the polygraphist was not qualified to testify. The polygraphist did not produce his polygraph records in court. Only the results were presented. Neither did the testimony establish that the polygraphic test was accepted as a scientific principle in the expert's profession.

(1) Qualifications of a polygraphist

The establishment of the qualifications of a polygraphist is very burdensome. "The Polygraph Act does not apply to

research in the fields of medicine or psychology." Section 67-31A-10, N.M.S.A. 1953 (Repl. Vol. 10, pt. 1, 1973 Supp.). For qualifications of a psychologist, see "Professional Psychologist Act," Sections 67-30-1 to 67-30-17, N.M.S.A. 1953 (Repl. Vol. 10, pt. 1, 1973 Supp.).

The Polygraphy Act does not contain qualifications sufficient to meet the test under consideration. The recommended standards have been set by Reid and Inbau, Truth and Deception (1966), 235. These standards have been accepted in the courts. United States v. DeBetham, 348 F. Supp. 1377, 1386 (D.C. Calif. 1972), aff'd 470 F.2d 1367 (9th Cir. 1972), cert. denied 412 U.S. 907, _____ S.Ct. _____, 36 L.Ed.2d 972 (1973).

The trial court said:

> In the Court's opinion, a qualified examiner can be adequately identified without consuming more court time than is presently necessary to qualify any physician or psychiatrist, and an incompetent examiner can be discovered though the ordinary diligence expected of counsel in preparation for cross-examination. Definite standards of examiner qualifications have been recommended for this purpose. For example, Reid and Inbau propose that:
>
> > Before permitting the results to be admitted as evidence in any case, however, the courts should require the following: (1) That the examiner possess a college degree. (2) That he has received at least six months of internship training under an experienced, competent examiner or examiners with a sufficient volume of case work to afford frequent supervised testing in actual case situations. (3) That the witness have at least fiveyears' experience as a specialist in the field of polygraph examinations. (4) That the

> examiner's testimony be based upon polygraph records that he produces in court and which are available for cross-examination purposes.
>
> Effective cross-examinations could be based upon such standards, as well as upon the particular examiner's testing technique and reputation for competence and integrity. Nor should the importance of the last mentioned subject be underestimated in this regard, since the natural desire to protect his most essential reputation, which would be on trial in every case, would necessarily render every examiner most cautious in his diagnoses.

Psychology and physiology are important aspects in qualifying an examiner. The polygraphist did not qualify within the boundaries of the above standards. The results of the examination were not admissible in evidence.

(2) The polygraphic test is now accepted as a scientific principle. Admission is within discretion of trial court.

To date, New Mexico follows the exclusion rule. Evidence of a polygraph examination is not admissible over objection. State v. Chavez, 80 N.M. 786, 787, 461 P.2d 919 (Ct.App. 1969); 82 N.M. 238, 478 P.2d 566 (Ct.App. 1970); Chavez v. State, 456 F.2d 1072 (10th Cir. 1972); State v. Varos, 69 N.M. 19, 363 P.2d 629 (1961); State v. Trimble, 68 N.M. 406, 362 P.2d 788 (1961); Annot., 53 A.L.R.3d 1005, 1010 (1973). It may be admitted by stipulation. State v. Turner, 81 N.M. 450, 455, 468 P.2d 421 (Ct.App. 1970); State v. Turner, 81 N.M. 571, 576, 469 P.2d 571 (Ct.App. 1970).

Trimble, supra, stated, at page 407, "Presently, the question (on admission of a polygraph test) requires a negative answer." (Emphasis added). This means that courts of review must wait until polygraphy is accorded general scientific recognition by psychologists and physiologists. See State v. Lindemuth, 56 N.M. 257, 273, 274, 243 P.2d 325 (1952). "Certain

scientific principles are now used in evidence that were not formerly admissible. But such principles were not used until their validity was demonstrated and accepted. Ballistic tests are now admissible . . . ." State v. Sneed, 76 N.M. 349, 354, 414 P.2d 858 (1966). The results of blood tests are admissible. State v. Sweat, 78 N.M. 512, 514, 433 P.2d 229 (Ct.App. 1967). Tests on LSD pills are admissible. State v. Mosier, 83 N.M. 213, 216, 490 P.2d 471 (Ct.App. 1971).

We can no longer say "(t)hat polygraphic evidence is never admissible." United States v. DeBetham, 470 F.2d 1367 (9th Cir. 1972), supra; United States v. Urquidez, 356 F.Supp. 1363 (D.C. Calif. 1973). The State and the defendant can waive their rights to the exclusion of polygraphic evidence. State v. Chavez, 82 N.M. 238, supra.

We have held that it was in the discretion of the trial court to admit testimony of an experiment, although it was not scientifically accurate. State v. Rose, 79 N.M. 277, 442 P.2d 589 (1968), cert. denied 393 U.S. 1028, 89 S.Ct. 626, 21 L.Ed. 2d 571 (1968).

Scientific recognition of polygraphic tests has now arrived. A proper foundation for the testimony must first be established. The polygraphist must be qualified as an examiner. The proposed test must be accepted in his profession. The proposed test must show that it has a reasonable measure of precision in its indications. When this foundation is laid, the admission in evidence of a polygraphic test is within the discretion of the trial court. United States v. Alvarez, 472 F.2d 111, 113 (9th Cir. 1973); United States v. DeBetham, supra; United States v. Lanza, 356 F.Supp. 27, 30 (D.C. Fla. 1973); United States v. Urquidez, supra; United States v. Chastain, 435 F.2d 686, 687 (7th Cir. 1970); United States v. Wainright, 413 F.2d 796 (10th Cir. 1969), cert. denied 396 U.S. 1009, 90 S.Ct. 566, 24 L.Ed. 2d 501 (1969); Dabrowski, The Polygraph Revisited: An Argument For Admissibility, 4 Suffolk U.L. Rev. 111 (1969); Kaplan, The Lie Detector: An Analysis of Its Place in The Law of Evidence, 10 Wayne L. Rev. 381 (1964).

This rule is fair to the State and the defendant. Each should have the right to rely on the examination. If the polygraphic test is reliable as to the guilt of the accused, it is equally reliable as to the innocence of the accused. We

should no longer deny the State the right to exercise this privilege when a defendant voluntarily submits to the examination. The lie detector test must be voluntary because to compel a person to submit to testing to determine his guilt or innocence, whether willed or not, evokes the spirit and history of the Fifth Amendment. Schmerber v. California, 384 U.S. 757, 86 S.Ct. 1826, 16 L.Ed.2d 908, 916 (1966).

Affirmed.

IT IS SO ORDERED.

LEWIS SUTIN
(signed) Judge

JOE W. WOOD C.J. (Specially Concurring)

RAMON LOPEZ J. (Specially Concurring)

WOOD, Chief Judge (Specially concurring).

I agree with the result reached by Judge Sutin. I disagree with the way the result is reached.

Admissibility of polygraph test results.

The first issue is whether the results of polygraph tests are admissible. In holding that they are admissible, Judge Sutin states that the tests are now accepted as a scientific principle. This statement appears to be in answer to Frye v. United States, 54 App.D.C. 46, 293 F. 1013, 34 A.L.R. 145 (1923). Frye had held that the scientific principle of the tests was not sufficiently established in the particular field in which it belongs. The Frye holding has been viewed as preventing the admission of polygraphic test results until there was general scientific acceptance of the tests.

Another view of Frye is that polygraphic test results were inadmissible at the time Frye was decided (in 1923) because of its novelty at that time and because of the lack of acceptance at that time. On this basis, test results had little probative value. McCormick on Evidence, at 363-364 (1954). Under this view, the admissibility of test results is to be determined on

the same basis used for the admissibility of any scientific evidence. McCormick, supra, United States v. DeBetham, 348 F.Supp. 1377 (S.D.Cal. 1972), aff'd 470 F.2d 1367 (9th Cir. 1972), cert. denied 412 U.S. 907, 36 L.Ed.2d 972, 93 S.Ct. 2299 (1973). See also United States v. Wainwright, 413 F.2d 796 (10th Cir. 1969), cert. denied 396 U.S. 1009, 24 L.Ed.2d 501, 90 S.Ct. 566 (1970).

In my opinion, this second view of Frye was the view of the New Mexico Supreme Court when it followed Frye and held test results were not admissible in State v. Trimble, 68 N.M. 406, 362 P.2d 788 (1961). Accordingly, test results are admissible if it is shown that the results do have probative value.

To establish such probative value, there must be expert testimony that the test involved is an accepted one in the expert's profession and the test has a reasonable measure of precision in its indications. United States v. Wainwright, supra. There must be evidence "demonstrative of the polygraph's substantial reliability and acceptance." United States v. DeBetham, supra.

Thus, I would not base admissibility of the tests on the concept of "general scientific acceptance." Rather, in my opinion, the requirement for admissibility is evidence that the tests are reasonably reliable, reasonably precise and evidence that the tests are substantially accepted by experts whose competence includes the subject matter of the tests. The tests were properly excluded in this case because there was no such evidence.

Qualifications of the expert.

In addition to evidence concerning reliability, precision and acceptance, there must be evidence that the polygraph examiner is an expert in giving and interpreting the tests. DeBetham, supra. The second issue in this case goes to the qualifications of the examiner.

The most important factor involved in the use of any polygraph "is the ability, experience, education, and integrity of the examiner himself." Reid & Inbau, Truth and Deception, at 4 (1966). "For, it is the examiner who must screen out the

'unfit' examinee, conduct the important pre-test interview (which is essential to the proper preparation of the actual test questions), and supervise the environment of the test to eliminate possible distortive influences, as well as ask the questions and interpret the resulting polygrams." DeBetham, supra.

Judge Sutin's opinion quotes DeBetham, supra, concerning the qualifications for an examiner and holds that the examiner in this case was not qualified. Although I agree the examiner was not qualified to testify concerning test results in this case, I do so on a very limited basis. Defendant sought to introduce the examiner's conclusions from the tests but did not produce the polygraph records in court or explain why they were not produced. Thus, the basis was missing for giving a satisfactory explanation as to how the examiner arrived at his opinion. See Dahl v. Turner, 80 N.M. 564, 458 P.2d 816, 39 A.L.R.3d 207 (Ct.App. 1969). For this reason, the examiner was not qualified to testify.

I cannot join in Judge Sutin's opinion concerning the qualifications of an examiner because it utilizes (in the quotation from DeBetham, supra) standards recommended by Reid & Inbau, supra, at 257. Those recommended standards - a college degree, six months of internship training and five years experience as a specialist in the field of polygraph examinations - should not be designated as legal requirements to qualify an examiner to testify in the absence of any evidence as to the reasons for these particular standards. DeBetham, supra, points out that there is "little standardization of training among practicing polygraph examiners." The recommended standard would require a college degree. Because of the variety of subjects that may be studied in obtaining a college degree, wouldn't the subjects studied be of more importance than the degree itself? Could not experience provide the equivalent of formal study of those subjects?

I do not suggest what the minimum qualifications should be. I do oppose a statement of minimum standards prior to a showing as to the need for those standards.

I concur in the result only.

JOE W. WOOD (signed)
Chief Judge

LOPEZ, Judge (Specially Concurring)

I fully concur in the opinion of Chief Judge Wood. I wish to add that I feel that polygraph testing is potentially of great value to the judicial processes of this state. When we are presented with a proper record meeting the requirements set forth in Judge Wood's opinion, I would hold this type of evidence admissible. I encourage counsel in future cases to develop such a record.

RAMON LOPEZ (signed)
Judge

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W A N T E D

The Archives of the American Polygraph Association is now receiving material on research, law, instruments, cases, examiners' biographies, books, articles, polygraph organizations and polygraph history.

APA members are requested to submit or loan material for the development of this official archive. Anne Arundel Community College has provided a special room for the collection and will handle the filing and correspondence. If material cannot be donated, loaned material will be accepted, copied by Xerox or microfilm, and returned. An acquisition list will be published in the Journal.

Send material to: The Andrew G. Truxal Library
Anne Arundel Community College
101 College Parkway
Arnold, Maryland 21012

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Male Ss serving in the female E condition evidenced significantly higher basal conductance levels and a more rapid decrease in basal conductance levels over trials. Skin resistance response magnitude data showed a significant Experimenter Sex x trials interaction such that all Ss serving in the female E condition failed to habituate. An analysis of spontaneous SRR activity showed that Ss serving in the other-sex E conditions emitted more spontaneous responses. All Ss showed a significant decrease in spontaneous activity across trials. (Author Abstract)

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