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A Hundred Years of Polygraphy: Some Primary Changes and Related Issues



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The question at hand:

The question to be addressed is essentially: “Supposing you were a polygraph examiner in the early years of the field, what are the foremost changes you have witnessed in the last 100 years?”

Early Practitioners

I’ve been affiliated with the field of Polygraphy for quite a long time. Most of what I have learned about the early formative years in the United States came from reading the material written by some of the leading spokespersons at that

time, among them Leonarde Keeler (1930, 1933), Dr. John Larson (1932) and Dr. William M. Marston (1938). I've learned about those persons from more contemporary writings that provided useful biographical material such as what Alder (2007) and Bunn (2012) have written. (See also: Horvath, 2008.) And, I was fortunate to learn in a different way about those years from those who knew personally some of the early practitioners but who were most active in a somewhat later time period. These included Professor Fred E. Inbau, John E. Reid, Esq., Leonard Harrelson, Warren Holmes, Cleve Backster and my good friend who, fortunately is still with us, Mr. Lynn Marcy. In addition, I learned a lot from persons who were active in Polygraphy in government service, such as Norman Ansley, Ronald Decker, Raymond Weir, and Walter Atwood who is now the oldest living member and Past President of the American Polygraph Association (Starks, 2019). And, there are many others whose names would not be so well recognized but who were experts willing to share their knowledge.

I mention many of the early practitioners not because I want to recount anything they said but rather because they represent a wide range of thinking about the early years and more generally about the field of Polygraphy. If any of the names I've noted are not familiar to you, I urge you, the reader, to read what they wrote. You'll see that in spite of what advances have been made much of the early thinking is still with us and, though the field may seem to have advanced considerably, it is actually at the beginning. There is a lot that remains to be discovered. And, importantly, there is a need in the field for much more, and more honest, attention than has been apparent.

I presume that the question at issue here is directed at changes observed over time in more technical areas, such as the development and evolution of the Reid developed "comparative response question; "testing processes, known generally as testing 'techniques;' the change from analog to digital instrumentation; the use of different forms of comparison questions; the use of different manual and computer-assisted polygraph data 'scoring' methods; refinements in scoring (physiological) features and other similar topics. I'm confident that many of these will be covered by others who are addressing the same question I've been asked. And, though I'll offer an overview of some of these at a later point I'd like to address first issues that broaden the scope of the question at hand beyond narrow, technical considerations. My emphasis will be on factors that have changed Polygraphy over time—at least in my experience—some of which occurred largely beyond the control of those in the field. These, I think, tell us more about where we are—

and maybe where we're going—than most of the so-called improvements that now seem to dominate the professional literature in the field.

Polygraphy—the use of a polygraph instrument in a structured clinical process to assess credibility—was one of many developing forensic techniques. And, it was one that, in its early years, received a lot of public attention, perhaps more than most other nascent forensic procedures that were developing at that time.

Polygraphy was initially applied, as the public was told in the popular media, in efforts at “lie detection.” More important than that simple misnomer, however, was that Polygraphy was seen as a primary means of sorting those who were involved in known criminal events from those who were not, or, in different terms, sorting liars, if you will, from truth-tellers. (That's different, I think, from sorting “lies” from “truth” as the term “lie detection” would imply.)

The early application of Polygraphy being devoted to investigation of criminal events is the place I'll start. It is well known that many of the founding practitioners were well educated and had scientific and professional training in their background. For example, William Marston was a student of Hugo Munsterberg, a well-known, highly respected, academically trained psychologist, who gave considerable thought and writing time to “lie detection.” And Marston himself had academic training as both a psychologist and a medical doctor. Dr. John Larson held a doctoral degree and unlike his contemporary and well-known colleague Leonarde Keeler, sought to improve Polygraphy with greater emphasis on science-based processes. Keeler seemed to resist this idea and apparently was very idiosyncratic in his testing methods. He appeared to be highly reliant on the force of his reputation—which was of high order—and personality. Professor Fred Inbau and John Reid both held law degrees and both held strong positions in trying to ‘professionalize’ Polygraphy. They were very active in trying to eliminate or, at least, minimize what were seen in their day as abusive police practices, particularly in police interrogation.

I believe that the training and background of these early practitioners gave the developing field a high degree of acceptance and respect. They were all seen as being devoted to the need to investigate and resolve criminal events in support of a societal need for law enforcement. While each of them engaged in the media-driven controversial possibility of “lie detection” what they did in practice was well regarded and seen as a positive contribution of scientific advance.

Event-free Polygraphy

This, I believe, changed in time. Keeler, presumably because of his public reputation and self-promotion, initiated—along with some others—the use of “lie detector” testing of employees in private organizations as well as government agencies calling for secure environments. This testing for “loyalty, integrity, reliability, mental stability and suitability” (Alder, 2007), whether of employees in private organizations or of scientists and others involved in governmental work (Testing done for the Atomic Energy Commission in the 1940’s is an example.), represents what in my view is one of the most significant changes the field has seen in its 100 years of existence.

Keeler opened the first private practice in Polygraphy in the U.S. (Alder, 2007). Because of his reputation he was often called upon to investigate/resolve criminal events. The use of Polygraphy in these matters today is referred to as event-specific testing. However, there is another use of Polygraphy apparently initiated by—or, at the least—strongly promoted by Keeler referred to generically as event-free testing; depending on circumstances it may also be referred to as periodic testing, employment screening, routine testing, or more often just as ‘polygraph screening.’ It is critical to distinguish this use of Polygraphy from that involving known events. While both involve the use of a polygraph and both rely on analysis of physiological data to determine if an examinee is lying or telling the truth the differences between the processes are quite pronounced. While there isn’t room here to go into great detail regarding these differences let it suffice to say that when there is a known-event polygraph testing, properly carried out, has a high degree of accuracy. For example, if an examinee is asked: “Did you shoot John Doe?” in a properly constructed examination one can conclude that the outcome is likely to be correct regarding the specific issue that was covered in the questions the examinee was asked. On the other hand, in an event-free examination the examinee may be asked something like: “Did you ever use an illegal drug?” It is obvious here that a testing outcome leading to a determination that an examinee has been “untruthful” does not lead to any knowledge of what produced that result. That is why I’ve referred to this kind of result in other contexts as the “So What.” result. That is, what is important in the contexts in which such a result is gotten is not the result itself but rather what the examinee might have done, if anything, to produce it. In other words, “So what?” if there is a physiological response to a question about drug usage? Did he/she use marijuana one time or one-hundred times? Or, was it marijuana that was used or heroin? When? How

often? And so forth. In other words the value of event-free testing—at least as it is currently carried out—rests on the acquisition of information (which is often not otherwise available), not on a simple testing outcome. Keeler, of course, as well as his colleagues at the time, was highly regarded for his ability to produce information from those he tested.

From the time when Keeler was active (1930's – 1940's) until the mid-1980's the use of event-free testing became over that period the dominant testing procedure. At the same time it also became a leading source of criticism of Polygraphy, even though it was not often seen in isolation from known-event testing. The testing of applicants for employment in private business as well as in governmental agencies, and the periodic testing of employees, grew sufficiently to trouble many, particularly labor unions and 'civil rights' groups. Because they had considerable political influence they were able to raise congressional concern. Enough concern that a federal agency, the Office of Technology Assessment (OTA) was called upon by the U.S. congress to investigate research on Polygraphy. The OTA published its report in 1983 (OTA, 1983). Not surprisingly it was a very critical report, particularly regarding usage in event-free situations.

The OTA report led to a congressional effort to engage the growing field of Polygraphy. That effort, although initially focused on the use of polygraph testing within federal agencies, broadened to include usage in non-governmental, mainly commercial businesses where labor unions were most heavily focused. Congressional attention eventuated in what is now known as the Employee Polygraph Protection Act of 1998 (EPPA, 1998). This was indeed another significant development in Polygraphy. This act essentially prohibited the use of Polygraphy in all private commercial businesses though it did not affect usage in federal agencies nor in non-federal agencies with a demonstrable interest in law enforcement and certain security tasks.

EPPA had a dramatic effect on the use of Polygraphy outside of the federal government. Because most of the non-federal polygraph testing was dominated by event-free testing, which was the primary source of income for polygraph examiners outside of the government, many of them were forced to close their businesses. Those that were able to sustain themselves did so by focusing their efforts on testing (mainly screening) for police agencies, carrying out known-event testing for legal purposes, often at the request of attorneys and engaging in other non-polygraph-related services.

Not surprisingly, the passage of EPPA also had an effect on membership in professional organizations representing polygraph examiners. This can be seen in the drop in the membership of the American Polygraph Association (APA) after EPPA was passed. Prior to passage of EPPA the APA had about 3,000 members; after passage membership dropped to about two-thirds of that. As I write this APA membership is about where it was prior to EPPA. What led to this renewed growth is of interest here.

A new use of Event-Free Polygraphy

After the APA experienced its drop in membership two significant events occurred, both leading to recovery of numbers of members. One of these, interestingly, was a result of growth in and application of a rather new form of event-free polygraph testing. The second, starting in the mid-1990's resulted from deliberate efforts on the part of some active examiners to encourage and promote international interest in Polygraphy. Each of these, in its own right, represented a significant change in the field.

In the first instance the use of event-free polygraph testing to monitor the behavior of sex offenders attracted many professionals who were involved in such treatment or supervision programs. Many of these saw value in relying on Polygraphy to encourage sex offenders to engage more fully and more deliberately in prescribed treatments. Others, already involved in offender-related supervision programs, such as probation agencies, were encouraged to seek out training in polygraph testing so that they could apply it directly in their work. In addition sex offender testing eventually became a primary focus of commercial polygraph examiners, both those who had been able to continue their services following the passage of EPPA and those who were new to the field.

While there are some exceptions almost all of the sex offender testing that is done is of the event-free mode. And, like other forms of such testing little is known about its use in that application. The American Polygraph Association has assumed responsibility for the regulation of its members who engage in that testing. And, there have been some research efforts to document the effectiveness of that testing mode (Grubin, 2016). Nevertheless, it has been assumed, without sound evidence, that testing of the sex-offender population can be carried out in a way similar to other event-free testing as applied in its many other applications.

My focus on event-free testing as one of the significant developments in the field is partly because it is and has been, since the early 1950's in the U.S., a widely used but obscure application. In spite of its usage—and the variety of ways it is applied—it is different enough from known-event testing that little is known about how, or how well, it works. It is so widely used because it serves a purpose not addressed by other methods in the circumstances in which it is applied. It is usually applied as one of the procedures employed to screen job applicants. However, regardless of its application, event-free polygraph testing is most useful in producing information, often unique information not otherwise available. But as a means of “lie detection” it is not likely that it permits the certainty of known-event testing. It is the information produced by event-free testing that promotes its continued use.

I have often asked those in the polygraph community as well as those who were at the levels above operational personnel “Why is it that 90% of the testing done in the government—as well as outside of it—is event-free testing but only 10% of the research and writing about polygraph testing is directed at known-event testing? Stated in a different way, we know a lot more about known-event testing than we do about event-free testing [The OTA (1983) report and the subsequent government sponsored report by the National Research Council (2003) make this point evident]. The two modes of testing are not the same and one cannot generalize from what is known in one context directly to the other. This situation, of course, persists and remains as problematic as it was when Keeler was active.

International Growth in Polygraphy

While for many decades following the 1950's there was an interest in Polygraphy in countries outside of the U.S. the growth was not pronounced. In the late 1980's and early 1990's there was a stronger movement in this direction. One example of this occurred in Singapore. In that country there were several polygraph examiners and one in particular who had been trained in the U.S. and who was noticeably effective and was recognized as such amongst governmental agencies. His performance and encouragement led law enforcement and intelligence agencies to seek out training for a select group of their employees. A leading U.S. examiner, Mr. Lynn Marcy, who was highly regarded and well known in the field, was chosen to do this. He, along with a support staff he assembled, brought his training program to Singapore and over a number of years built up an agency-wide polygraph testing program in

that country. The number of examiners in that country grew in a relatively short time and, reportedly, were quite successful.

In the mid-1990's after being elected to the Presidency of the APA I encouraged the APA Board to engage in activities to promote international growth in the field and in the organization. While not all members were in agreement we moved in that direction. One of the things that was done was to provide an annual luncheon for representatives from outside the U.S. during which those in attendance would meet with and hear directly from Board members. At the first of these, as I recall, there were perhaps 20 or so persons in attendance, many from Canada who, while 'international' had their own established effort in Polygraphy. Over time, however, the APA's international membership grew, as did the number who attended the APA luncheon. In fact, the luncheon was eventually discontinued, largely because the number of attendees grew too large to handle.

I mention the APA's action here because it was my belief that growth in Polygraphy outside the U.S.—generally seen as the most advanced environment—would lead to research and other positive developments in which the understanding of cultural, social, legal and political effects would become clearer and ultimately be of benefit. That has not yet occurred, at least not in a very noticeable way. But what has happened is strong and widespread growth in the use of Polygraphy outside of the U.S. And, that in turn has led to growth in APA membership. That organization has recovered its loss of members from the effect of EPPA. The total membership is now about where it was prior to EPPA, 2,700 members. This, in large part, is due to increasing numbers of international members, now almost 30% of all members. Moreover, of the current twenty-five APA accredited training "schools" that provide initial instruction in Polygraphy, 12 of them are located outside of the U.S. Of the remainder situated in the U.S. many provide regular training in other countries. Thus, it is clear that Polygraphy, with its primary home in the United States, is now truly international in scope. It remains to be seen what such a change will bring to what once was a mostly localized concern.

In addition to the actions in the APA to promote international usage, there has been in more recent years another impetus. This has been a very significant promotion of Polygraphy by U.S. government agencies. Largely because those agencies had an interest in securing relationships with allied countries efforts were made by them to implement and support the use of polygraph testing. In furtherance of this the agencies funded training programs and related activities in outside countries that had neither the funding nor sufficient self-interest in developing their own

programs. Much of this effort went forward in Mexico and other Latin-American countries and it continues today.

Because of this international growth, polygraph testing has become a common activity in many countries across the world whereas before there was little, if any, usage. Although this change has not yet led to substantive advances in many areas of importance there is now a clear potential for that to occur. For example, little is known regarding the effect of cultural differences on polygraph testing, whether of the known-event or event-free type. Advances in knowledge of such differences are much more likely because of the expansion of testing outside of North America.

The Effect of the Internet

Some have called the development of the Internet the greatest invention of all time. Even if that is a bit overstated, there is little doubt that the use of the Internet has had led to changes in Polygraphy. While for many decades a lot of information on that topic was available in training manuals, monographs and other publications these, generally, were accessible in public libraries. An interested person needed to make a special effort to access such documents. The Internet, of course, has changed that and, with respect to Polygraphy, there is now a large amount of information readily available to anyone, even information that had previously been held in a protected way. And, the one aspect of Polygraphy that dominated the concerns of the scientists who prepared the report for the National Research Council (2003), the use of countermeasures, is now a topic of in-depth discussion on a number of World-Wide-Web (WWS) sites. Moreover, this topic is often presented in such a way that anyone preparing to undergo polygraph testing can learn about what are believed to be (by those who prepare the web sites) effective ways to alter favorably the outcome of a polygraph examination. This development has influenced the practices of polygraph examiners. Whether the testing involves event-free or known-event testing the problem of countermeasures continues to warrant more and better research than what is now available. In fact, what is now available is not very helpful and quite limited in coverage.

One of the more popular—and most informative—sites found on the WWW went online in the year 2000. In the past two decades it is likely that every action examinees are instructed to engage in on that site in order to affect favorable polygraph testing has been regularly seen in field practices. No doubt sometimes these tactics have been successful. But, even if that is untrue there is little question that practices

in Polygraphy have changed. Easy access to information, reliable or not, and whether or not dealing with the effect of countermeasures, has necessitated, among other things, revised testing approaches and more advanced training programs. Changes in the field are continuing perhaps at a faster pace and in ways not anticipated prior to the advent of the Internet.

Technical Changes

The broader changes I've mentioned appear to me to have been powerful and of widespread effect. But, there are some more technical changes that have been important to Polygraphy. I'll turn to some of these, perhaps more briefly than deserved, but I wish to at least make note of them. All of these were brought about internally; that is, by practitioners.

First among these technical issues is the development by John E. Reid (1947) of what he referred to as the "comparative response question". In its early usage this question was often referred to as a 'control' question'; today, it is called simply a 'comparison' question. The use of this question, an important change, moved the field away from what was in Keeler's time the Relevant-Irrelevant Technique (RIT), highly prone to false positive errors—especially when decisions are based only on collected physiological data—to what is now, generically, the Comparison Question Technique (CQT). The RIT and the CQT are actually a family of procedures. A third family is what I refer to as the Information Recognition Technique which includes the Guilty Knowledge Test (GKT), the Concealed Information Test (CIT), and other similar procedures.

The CQT is now and has been for decades the primary mode of testing in the U.S. and in much of the rest of the world. Although the procedures within that family have been the source of controversy regarding which is the 'best,' they are fundamentally similar. There is no reliable evidence to show that they lead to significant differences in outcome.

Between the 1950's and to about 1970 there were not a lot of what I regard as significant, substantive changes. Some might indicate that changes within the CQT family were of real importance. For instance, the most well-known CQT approaches, the Arther, the Backster, the Reid and the Federal Zone Comparison Techniques all claimed certain advantages over the others. While that may be the case, most often it was the difference in format, not the "Technique," that was seen to be significant. In my view, and I believe the evidence is compelling, format differences

(Format refers to the structure and composition of the question list.) does not have any real effect on outcome differences (Horvath, 2019). (I am not aware of any honest and comprehensive assessments of “CQT Technique” differences.)

In that period there were two changes that did have significant influence. The first of these was the addition of a method for capturing movements of examinees to detect deliberate attempts to influence the polygraphic data. This was initially developed by John E. Reid (1945) and, in principle, it has been used on a regular basis by many examiners since it was introduced. It is now the case—decades after Reid first suggested it—that the use of a motion-sensing device is a standard, almost essential, addition to polygraph instrumentation.

The second important development in that time was the manual numerical scoring method advanced by Backster. This was derived from the earlier ‘check-mark scoring system’ (Horvath, 2019) and it offered several advantages. It facilitated the training of examiners; it helped to permit clearer assessments of examiners’ agreement in their analyses. Also, such scoring made Polygraphy appear to be more scientifically grounded, though the evidence to date does not show that it improved the accuracy of outcomes in comparison to the system from which it was derived. Finally, numerical scoring facilitated statistical analysis of data for research purposes. Nevertheless, numerical scoring—in its original form—is not now a preferred method, but irrespective of that, it was a noteworthy change in response to the question at hand.

Two significant events, technical in way, happened after 1970. They each had a real effect on the development of Polygraphy, particularly the CQT. The first of these was the publication by Horvath and Reid (1971) that showed, for the first time, that CQT data derived from real-life testing circumstances could be objectively blind-reviewed with a high degree of accuracy. Basically, what was done in that report has been replicated many times over the successive years. And, while these replications have revealed as yet unexplained concerns, they do support the principal point made in the Horvath and Reid study: Real-life CQT data are susceptible to a useful, accurate and informative objective review.

A second event of importance, interestingly at about the same time the Horvath and Reid study appeared, was a research report by Gordon Barland (Barland, 1972). In his study Barland showed for the first time that CQT testing, largely as it was being done in real-life instances, could be directly assessed in a controlled, laboratory environment. His study opened the door for additional research, much

of which has been devoted to attempts to understand better some of the factors that influence CQT outcomes. The Barland report, considered in context with the report of Horvath and Reid study revealed that CQT testing was open to useful and positive contributions from both practitioners and interested academic researchers. This, in my view, is largely what has provided the impetus for today's ongoing efforts to advance Polygraphy, again especially with respect to the CQT.

Partly because of the interest developed by the Horvath & Reid report and Barland's laboratory study the years between those studies and now have seen more research and academic attention on Polygraphy than was noted in most previous times, perhaps with the exception of the Keeler-Marston-Larson period. Much of this was directed or done by Dr. David Raskin and his erstwhile students. Although their research covered a number of topics there are two that may offer the most promising change. The first of these is the development of one of the extant versions of a "scoring" algorithm that analyses digitally collected (CQT) polygraph data. This has been shown to yield outcomes equal to what good examiners are capable of, at least in some circumstances. However, it is not certain that this algorithm or one of the others now available or under development (or any of them) will prove to be a "standard" in the field. The use of such algorithms is at the present time an unsettled issue. The APA has only recently announced the organization of a group to investigate the value of the currently available scoring algorithms (Starks, 2020).

The second development, largely a result of research by Dr. John Kircher, is the assessment of ocular changes for purposes of "lie detection." Ocular sensors are now available for integration in standard polygraph instruments, though currently they are used only by a small number of practitioners. On the other hand, as I would think all examiners know, there is at least one ocular sensor system that is currently being marketed as a standalone device, reportedly able to yield outcomes comparable to that of polygraph testing. Such devices seem to be largely in the preliminary developmental stage—the marketing and other promotional literature notwithstanding. It is not yet certain if ocular-based data will contribute in a meaningful way to standard CQT polygraph testing. Moreover, whether or not standalone devices based on pupillary data will best serve very specific purposes or will, on the other hand, actually have practical value similar to polygraph testing is now unclear.

Closing Comment*

I am grateful to Tuvya Amsel and Professor Jan Widacki for raising the question I and others have responded to. As I said earlier in this paper, we are at the beginning stages of this field and there is much to be done. I encourage all of those who find some value in what I and others have written to start doing it. Our pace, to date, has been slow and rather haphazard. More involvement in the right direction by the dedicated persons in the field will move things forward surprisingly fast.

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* The difference between event-free and known-event testing is certainly well-recognized by those who are active in Polygraphy. However, it may not be as well appreciated by those who are simply observers with a casual interest. It is useful for that reason to comment briefly on the accuracy of Polygraphy in regard to its different uses. When Reid and Inbau (1977) published their final volume on Polygraphy, they included in their forward this comment: “...the polygraph technique, properly employed, possesses a degree of accuracy commensurate with, and even superior to, most of the presently approved forms of evidence, scientific as well as nonscientific, that feature in criminal and civil trials.” (p., viii). It is clear that this comment was directed at known-event testing. And, what Reid and Inbau meant was that polygraph testing, applied and evaluated in the context of their CQ Technique, had a high accuracy. They did not mean to suggest that either their CQT or any other version would yield a similar high accuracy when applied and evaluated in a context different from their experiences, such as, for example, in controlled, laboratory environments where much of the information present in real-life is absent. I also need to mention here another important point directly related to the difference between known-event and event-free testing. It is to be noted that the 1977 volume by Reid and Inbau dealt exclusively with Polygraphy. Absent from that volume was discussion of the many aspects of proper criminal interrogation procedures that both Reid and Inbau had published on authoritatively and widely in prior years. Thus, their 1977 publication was clear indication that the authors now recognized that known-event CQT Polygraphy was a standalone practice. That is, it didn't necessitate the use of “interrogational” procedures in the context of polygraph testing in order to “know” – or determine – an examinee's truthfulness.

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