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INTRODUCTION

There is a belief on the part of some examiners that all countermeasures are readily detected. There is some literature which contends that physical countermeasures are easily recognized. Work by Abrams (1977), Jayne (1981), Magiera (1975), Reid and Iubau (1977) and Sparagowski and Ritter (1977) indicate ready recognition of countermeasures.

This, in my opinion, is a misconception and is probably perpetuated among some examiners (especially those with limited experience) by the fact that many examinees who do attempt physical countermeasures have little or no knowledge of the factors involved. Crude countermeasures are readily identified, but one cannot confine expectations of countermeasures use to be limited to such simple areas as gross hyperventilation, obvious movement or muscular contraction, etc. In addition, some basic polygraph courses treat countermeasures in an incomplete and/or inadequate fashion. My own research, and that of others, suggests that countermeasures may not be readily detected and we cannot realistically expect countermeasures to be limited to simplistic, naive attempts by uninformed subjects.

Examiners should not become complacent by holding to the idea that all countermeasures will be readily distinguishable. They should,

instead, recognize that it may be difficult to identify countermeasures use and become skilled in the detection and neutralization of such measures on the part of their subjects.

Numerous countermeasures may be employed in an attempt to defeat the examiner. These range from obvious, easily detected, gross physical movements to mental efforts; from drug ingestion to self inflicted pain. They can also include completely illogical beliefs, lacking any scientific basis whatsoever, but which may be effective simply because the examinee <u>believes</u> it will work. Countermeasures can also include means to defeat the examiner by physical aids such as placing foreign substances on the hands. Psychological ploys on the part of the examinee can also be considered to be a countermeasure.

Numerous as they are, countermeasures can be categorized into four major types: (1) Mental, (2) Mentally or Physically Induced, (3) Pharmacological and, (4) Assorted.

Regardless of the type of countermeasure to be employed the objective is the same i.e., to suppress physiologic response at the relevant questions or enhance responses in the comparative areas of control or irrelevant questions, or both. Enhancing response at guilt complex or symptomatic questions would be of limited benefit to the examinee due to the underlying theory concerning evaluation of these areas, and their interrelationship with other question areas. It is

possible, of course, that the examinee lacking any knowledge of evaluative techniques might attempt to do so. Conversely, an examinee knowledgeable of the polygraph technique might attempt to enhance response factors at the guilt complex question to compel an inconclusive opinion; however, for the most part, countermeasures are most likely to be encountered in the other question areas. Since it is much easier to enhance physiologic activity than to suppress it, the countermeasures which are employed to enhance activity are more likely to succeed than other forms of countermeasures.

MENTAL COUNTERMEASURES

There are several commonplace applications to be considered in this general category. Specifically, dissociation, rationalization, erotic or exciting imagery, hypnosis, and biofeedback.

DISSOCIATION

Dissociation is, in my opinion, the least effective mental countermeasure. This mental effort is applied in an attempt to eliminate, insofar as possible, any physiologic response to relevant questions by concentrating intensely on some irrelevant matter. Questions are answered by simple rote without conscious recognition of question content. There are obvious flaws in thinking this countermeasure can be more than marginally effective. First, it can be effective only when the questions can be answered by rote, without recognition of the question content. It could therefore be effective only where all the answers are the same such as "no" during peak of tension testing, or if the examinee could somehow memorize the order of the question sequence and concentrate on the sequence of yes and no answers.

Simple, basic pre-test and in-test procedures can assure that question recognition must be present to insure appropriate answers, and when this is done application of this countermeasure is rendered ineffective.

Conceivably, dissociation could be marginally effective in peak of tension testing if this was the only polygraph test structure involved in the examination. It would be a most unusual and unprofessional situation if only a peak of tension test was administered by the examiner. Peak of tension testing is secondary to having conducted at least one other series. Even if dissociation was effective in significantly reducing response, it would simply be considered an unrevealing peak of tension series. Even so, the examiner obviously wants to eliminate any possibility of a countermeasure being effective. This can be done quite easily through proper question formulation and observation of professional pre-test and in-test procedures.

COUNTER-COUNTERMEASURES - DISSOCIATION

Any effective use of dissociation as a countermeasure depends upon the ability of the examinee to answer questions by rote, trying to make the mind as blank as possible. This minimizes reactivity by allowing the examinee to ignore question content. While considered marginally effective to begin with, neutralizing this countermeasure is not difficult. It is necessary only to insure that the examinee cannot answer automatically and, further, that there is an intellectual awareness of the question on the part of the examinee.

Even on peak of tension sequences, it is simple enough to make the examinee intellectually aware of the question content. For example, it is easy to have the examinee repeat a key word from the question along with the "no" answer.

When using a control question technique, it is doubtful that dissociation would be effective, even without any introduction of counter-countermeasures; however, several counter-countermeasures are available, depending on the testing technique being used. A mixed sequence chart is standard in some test constructions and this will, in and of itself, avoid rote answers. If using a technique which does not allow for a mixed sequence, the control questions can be interchanged in the sequences and this will serve the same purpose. In most techniques, irrelevant question insertion is fairly standard. The random insertion of an irrelevant question, whether or not it is necessary from the standpoint of prolonged response or mechanics, is recommended. In addition, use of irrelevant questions which require both "yes" and "no" answers is recommended. If using the relevant-irrelevant technique, it is especially important that the examiner use some irrelevants which require a "yes" answer and others that require a "no" answer, and that mixed sequences be used.

On all examinations, the examiner should tell the examinee during pre-test interview that questions may not be in the same order each time they are asked. This should be done regardless of whether the examiner plans a mixed sequence.

If the above precautions are routinely observed, the examiner will have effectively neutralized this countermeasure and detection need not be of great concern. If one is not inclined to routinely neutralize this countermeasure and insists on attempting to detect it rather than prevent it, there are some indicators for which the examiner should be alert. Watch for the examinee who:

a. Seems detached from surroundings during testing.

b. Exhibits an unusually long latent duration of response or consistently answers too quickly.

c. Answers all questions in a subdued voice and in exactly the same tone.

RATIONALIZATION

Rationalization can pose some difficulty to the examiner if the examinee has truly rationalized the issue at hand. This is generally not an effort to apply a countermeasure in the accepted sense. The rationalization will have taken place as a defense mechanism before becoming an issue in the polygraph examination. Rationalization attempted for the sole purpose of defeating the polygraph examination

can be thought of as a game of wits with the examiner. It is not possible for the examinee to win this game during the emotional intensity of the field examination.

The real problem in rationalization occurs when the examinee has been able to convince himself that he has actually not committed the act defined by the wording of the question(s). As a simplified example, consider the question posed to a company employee, "Did you steal any of that missing money?" If the examinee perceived that he was justly owed the money in back salary, he might rationalize that his actions were not theft but merely taking what rightfully belonged to him. He might answer "no" and believe his answer. His rationalization for believing this to be a truthful answer is the thought process that "I didn't steal it - I was just getting what they owed me due to underpayment of salary." True rationalization in this vein is certainly not commonplace, but it can happen and when it does it can be effective. If the examinee believes himself to be innocent of theft, this is not a countermeasure in the sense of a deliberate attempt to deceive the examiner.

COUNTER-COUNTERMEASURES - RATIONALIZATION

Rationalization, to be effective, requires the examinee to convince himself that the relevant questions do not apply to him or do not correctly describe his action or intent. This is effectively neutra-

lized through routine semantic considerations during pre-test interview and careful question formulation. A good guideline is to adhere to one of the most basic tenets of question formulation. Of each relevant question formulated, ask "could the examinee have committed the offense but still answer the relevant question(s) truthfully?" Furthermore, when formulating questions, anticipate possible rationalizations and word the question accordingly. Have the examinee explain to you exactly his understanding of the question(s). Have him express in his own words what he thinks the question includes and what it means. Reword the question if necessary after listening to his explanation.

Detection of true rationalization is difficult, if not impossible (you will quickly spot the individual who is playing word games with you). Pre-test your questions with care - leave no doubt in the examinee's mind about the intent of the question, regardless of the specific words used in question formulation.

HYPNOSIS

Hypnosis will most likely take the form of posthypnotically suggested amnesia with regard to the specific incident or a given period of time. In either event, it will probably be apparent during a well conducted pre-test interview that something is amiss due to the examinee's reactions during conversation. However, beyond that reasonable assumption, there is evidence to suggest that the procedure

would be ineffective anyway. W. E. Cumley (1959) reported a study in which two individuals committed mock crimes and were then subjected to hypnotically suggested amnesia for all events in a seven day period. The pair was then examined by polygraph and their involvement in the mock crime was detected, as well as the objects which were taken. This study concludes that posthypnotic amnesia was not an effective countermeasure. Studies by Germann (1961), Tocchio (1963), and Weinstein, Abrams and Gibbons (1970) also suggest that posthypnotic amnesia is not an effective countermeasure, although it may increase inconclusive rates.

Posthypnotic manipulation of arousal levels is a possibility. Consider a substantive examination in which time/location bars will be used in the control areas. Assuming the individual is familiar with the polygraph technique, posthypnotic arousal at key words likely to be in the control areas is a possibility.

Overall, there is no substantial indication that hypnosis is an effective countermeasure. Further research is certainly needed in this area. All the above studies have weaknesses and Tocchio's study, especially, is badly flawed in that it involved only one subject, no control group, and substandard quality tracing characteristics.

COUNTER-COUNTERMEASURES - HYPNOSIS

As indicated above, hypnosis will most often take the form of post-hypnotically suggested amnesia; however, the possibility of hypnotic manipulation of arousal levels or emotions is also possible.

There are several indicators for use in identifying an examinee who may have been hypnotized. Probably the most useful is that, very simply, the examinee looks hypnotized. Barland suggests that there is a tendency to stare fixedly; a lethargic appearance; a demeanor which suggests the examinee is absorbed in something else; and, a relaxed state accompanied by slow respiration. Additionally, there will probably be a delay in answering questions and the examinee may speak in a soft tone of voice. A sound pre-test should indicate to the examiner that the examinee is not "normal".

If the examiner is convinced that this countermeasure is likely, the following remedies are suggested:

a. Bring the examinee's appearance to his attention - tell him he doesn't look normal. This should be done without an accusatory approach. Advise him that his demeanor might have an adverse affect on the examination.

b. Have the examinee take a break and walk around in an effort to make him more alert.

c. Have the examinee repeat key words during the testing sequences to insure that he is intellectually aware of the question content, especially if using a peak of tension or R and I technique.

BIOFEEDBACK

Biofeedback is not considered a viable countermeasure. It has heretofore not been considered a significant threat. GSR control was generally thought to be difficult at best and extensive training would have to accompany its use. Control of arousal levels in the cardiovascular system is commonplace; however, to be effective against the control question technique it would have to be employed selectively at fifteen to twenty second intervals. That is, it would require a suppression of arousal levels at relevant questions and normal response levels at the control questions. This is simply not feasible, at least to my knowledge, considering the present state of biofeedback control measures.

Biofeedback could, of course, have an effect on peak of tension and relevant-irrelevant question techniques by lowering general responsivity levels, but it is not logical to assume it would be effective against the control question technique.

There is some recent inconclusive evidence to suggest that general lowering of GSR levels by biofeedback is possible. If true, this could

add to the threat against peak of tension testing and relevant-irrelevant testing but it would not affect the control question technique due to the short time periods required for selective control of the arousal levels.

The greatest danger from biofeedback would seem to be the possibility of accomplishing generally subdued physiological activity and then inducing response at the control area.

Most biofeedback research has been limited and offers mixed results. Additional research is certainly indicated in this area.

EROTIC OR EXCITING IMAGERY

Erotic or exciting imagery is the last to be mentioned but, in my opinion, poses the most significant threat to the examiner as a mental countermeasure. It can produce significant response, particularly in the GSR component and may well be effective if employed only at control questions. It will often result in an abnormal GSR tracing if employed throughout the question sequence, rather than at selected questions.

I first encountered erotic imagery during the conduct of an operational examination in an overseas area in about 1965. During that particular examination, an abnormal GSR tracing was observed along with a

somewhat disorganized response pattern indicating a lack of psychological set in any particular area. Due to the unusual nature of the GSR and the general tenor of the charts, interrogation was undertaken and the examinee admitted he was attempting to defeat the test. He indicated that he was employing erotic imagery throughout the question sequences in an attempt to defeat the examiner. See Illustration Number 1 for an example of the effect of continuous erotic imagery on the GSR tracing.

With today's greater public awareness of the control question technique, it is considered unlikely that one would encounter exciting imagery used as a countermeasure throughout the question sequence. It is much more probable that such imagery would be employed only at selected questions, with the goal being to enhance response factors at that point. This use of imagery would be considerably more difficult to detect. In my field study, erotic or exciting imagery was employed and substantial response can be generated. For examples of response generated by erotic/exciting imagery see Illustration Numbers 2, 3, 4, 5, and 6.

COUNTER-COUNTERMEASURES - EROTIC OR EXCITING IMAGERY

This countermeasure, obviously, is undetectable through observation of the examinee since it is purely mental. The examiner must depend on chart artifacts or general counter-countermeasures techniques to be discussed later.

The examiner enjoys the advantage in this situation in that it is difficult to employ exciting imagery consistently throughout an extended testing phase. The examinee's repertoire of exciting thoughts may be quickly exhausted and emotional impact will be likely to diminish upon repeated recall by the examinee. In some cases, though, this can be an effective countermeasure and the examiner should be concerned with both detection and neutralization.

If the examinee uses this countermeasure throughout the question sequence the examiner should see a continuing change of basal resistance in the GSR, a "jittery" GSR tracing i.e., continual small fluctuations (see again, Illustration Number 1), and a good possibility exists of inappropriate answers by the examinee due to concentration on imagery. Again, it is more likely to be encountered only at the point of control questions. If used selectively (only at controls) the examinee may feel it necessary to start the imagery before the question and you will sometimes see unusual preliminary GSR activity. (See Illustration Number 5).

An effective counter-countermeasure can be changing of question techniques. While I personally prefer a control question technique, the change to a relevant-irrelevant technique when the examiner strongly suspects the examinee is using this countermeasure can be an effective remedy. The continued use of this countermeasure during the conduct of a relevant-irrelevant question technique would result in unusually significant responses to the irrelevant questions. This observation would tend to substantiate the use of this particular countermeasure if the examinee continued its use. Changing techniques will also, of course, provide a clearer interpretive base if the examinee ceased use of imagery when the technique was changed.

PHARMACOLOGICAL COUNTERMEASURES

Pharmacological countermeasures are the subject of much speculation and, indeed, might be effective when used in a peak of tension or relevant-irrelevant technique. This is especially true of some of the tranquilizing agents such as meprobamate and propranolol which can be taken in sufficient doses to suppress, to one degree or another, autonomic nervous system arousal without any accompanying psychomotor deficiencies.

In my opinion, ingestion of drugs is ineffective as a countermeasure **assuming** a control question technique is used by the examiner. There is no pharmacological agent known to me which will act selectively on questions. That is, to be effective a drug would have to suppress autonomic responsivity at the relevant questions and not at the control questions or vice versa.

If sufficient amounts of a depressant are ingested to totally suppress autonomic responsivity it will be immediately apparent to the examiner that the tracings are abnormal. Stimulants, while they may be responsible for erratic tracings, would not affect a given question to the exclusion of others.

The ingestion of large dosages of either a depressant or a stimulant will be recognizable, in many cases, through observation of the physical manifestations of such ingestion during pre-test interview.

If we are dealing with ingestion of large amounts of hallucinogens the examiner should, again, become aware of the condition in the pre-test interview. Regardless, this type of drug ingestion even in moderate dosages, will result in disorganized responses and erratic tracings, and will tend to alert the examiner that the subject is not "normal."

I have had occasion to examine significant numbers of individuals taking prescribed medication in the form of stimulants or depressants and my experience has substantiated the logic that drugs cannot act selectively on the examinee's response to questions. Each type of drug will exhibit certain typical and predictable tracing characteristics. Such characteristics, however, will not cause false negatives or false positives. In addition, I have encountered many examinees under the influence of illegal drugs. Polygrams produced in such situations provide no indication that there is any significant probability of a false negative or false positive opinion. Heroin and other opiate derivatives tend to suppress autonomic responsivity, but the effect is not selective in nature. Hallucinogens cause erratic tracings but will not affect one question any more than another. The amphetamines and

other stimulants will produce distinct and identifiable physiological activity; but, again, do not afford any probability of selective response.

NOTE: I would hasten to assure the reader that no breach of ethics was committed in examining persons under the influence of illegal drugs. Most were private sector examinations where drug use is considerably more common than in DoD settings. In all cases the drug ingestion became known only after the instrumental phase of the examination had been completed and the nature of the tracings caused inquiry; after which the examinee admitted taking drugs and identified the type he had ingested.

In summary, I do not feel that pharmacological countermeasures are an effective countermeasure when employed against the control question technique and will frequently be counter-productive for the examinee by arousing the suspicions of the examiner.

One additional consideration which could prove to be a threat may be ingestion of depressants to lower response levels, combined with induced responses at control questions.

COUNTER-COUNTERMEASURES - PHARMACOLOGY

The best counter-countermeasure against pharmaceutical countermeasures is the control question technique.

Detection of this countermeasure begins in the pre-test interview. Observe the physical characteristics of the examinee. Ingestion of depressants, stimulants or hallucinogenics in substantial dosages will often manifest itself in predictable physical characteristics. OSI examiners are familiar with the physical symptoms of drug ingestion and should use this knowledge during pre-test interview.

Other precautions include taking a good medical history during the pre-test interview. Ask if the examinee is taking prescribed medications, whether any medications, etc. have been taken recently. The examinee may be surprisingly candid if asked; however, little will ever be volunteered by an examinee. This is standard procedure in OSI pre-test and should go without saying. When considered necessary, a question about drug ingestion can be included in the test sequences.

The use of pharmacological countermeasures can often be detected by examining the polygrams. Ingestion of depressants, stimulants, or hallucinogenics, if taken in significant doses, will result in predictable tracing characteristics. Do not, however, be too quick to cry "drug use" when anomalies are observed in the tracings. Remember, low normal or high normal physiological activity may be just that. Specifically the examiner should look for the following characteristics in the polygrams if drug ingestion is suspected:

a. Stimulant ingestion will usually result in faster respiration and heart rates. It will also increase the incidence of extraneous activity in all component areas but especially the GSR. Stimulant use can be expected to increase general levels of reactivity, making chart interpretation more difficult.

b. Depressant ingestion customarily results in decreased respiratory and heart rates. It will reduce incidence of extraneous activity and in this sense may actually be counterproductive to the examinee since charts will be somewhat easier to evaluate. Depressants will also tend to reduce the amplitude of GSR responses and may cause a plunging GSR tracing.

c. Use of hallucinogens will generally result in erratic response patterns and disorganized responses. Expect inappropriate answers to questions and considerable extraneous activity, especially in the GSR. Inappropriate answers and disorganized responses are probably the result of the examinee's preoccupation with his intoxicated condition.

Most drug use intended as a countermeasure will probably fall in one of the categories mentioned above; however, there are one or two other considerations. Tranquilizing agents such as meprobamate which suppress autonomic nervous system arousal without significant psychomotor change are becoming better known to the public and may be

encountered. Generally suppressed physiologic activity is one of the characteristics of these sorts of drugs. But, again, it cannot act selectively on questions.

Some examinees will take almost any miscellaneous drug, or combinations thereof. This can include over-the-counter medication, prescribed medications (maybe belonging to them, and maybe not), and illegal substances. It can also include substances not normally considered safe for human consumption. You may also encounter glue sniffing or similar activity.

Most, however, will fall into the general categories of depressants, stimulants or hallucinogenics and the examiner can guide himself accordingly.

PHYSICALLY INDUCED RESPONSES

This group of countermeasures poses a distinct threat to the examiner. Significant response can be generated and frequently is not readily detectable by the examiner. Controlled respiration, muscularly induced response and self induced pain are considered to fall into this category.

CONTROLLED RESPIRATION

Controlled respiration is often employed by deceptive examinees since this is the only area they can actually control. Attempts to defeat the examiner through controlled respiration can take numerous forms.

If one is knowledgeable of interpretive criteria, there can be an attempt to simulate changes in the pneumograph which would coincide with accepted evaluative parameters. This is considered unlikely in the average examination since it would require knowledge of chart interpretation and such respiratory manipulation is not easy - probably requiring coaching by a polygraph examiner and considerable practice. Even then, there is usually disparate pneumo response at the point of countermeasures use. For examples of disproportionate change when attempts are made to simulate response see Illustration Numbers 7, 8, 9 and 10. It should, however, not be excluded as a possibility.

Switching from thoracic to abdominal breathing or vice versa is an easy countermeasure to effect, and much more difficult to detect than attempting to manipulate the respiration to simulate a legitimate response. Chart artifacts indicating this countermeasure are seldom seen. See Illustration Number 11.

The most common occurrences involve slow, deep respiration; shallow, rapid breathing, frequent deep breaths or a combination thereof. This will frequently result in compensatory change in cardiovascular and GSR activity. The examiner should bear in mind that what is commonly called "controlled breathing" may also be encountered in the non-deceptive examinee suffering from high levels of general nervous tension.

The examiner should establish in the pre-test interview any medical problems or physical abnormalities which could influence the pneumograph tracings.

The common instances of intentional respiratory function manipulation can generally be detected by simply recording respiration without the examinee being aware of it. This technique may also be used effectively with the examinee who is not consciously employing countermeasures.

Generally, controlled respiration is not considered an effective countermeasure. It can be irritating to the examiner and a decided aggravation, but the skillful examiner, through proper procedures can detect controlled breathing and can usually neutralize it and conduct a valid examination. At worst, this countermeasure should result in an opinion of inconclusive.

COUNTER-COUNTERMEASURES - CONTROLLED RESPIRATION

Considering the range of "normal" respiration (12 to 18 cycles per minute) it may sometimes be difficult to be certain that the individual is actually practicing controlled breathing. Any rate slower than 12 cycles per minute should be looked at with considerable suspicion and is probably controlled breathing.

The examinee knowledgeable of countermeasures will realize that compensatory changes in GSR and cardiosphygmograph tracings will usually accompany slow, deep breathing and they hope to interfere with evaluation of these component areas, reduce interpretive criteria in the pneumograph tracings, and still give the appearance of trying to cooperate. The examiner should remember, though, that on occasion the non-deceptive examinee may try to calm himself through slower than normal breathing when general nervous tension levels are high, or may try to "help" the examiner by trying to "breath regularly", which may also result in slower than normal respiration.

Some examinees may simply become preoccupied with their respiration due to the presence of pneumograph chest assemblies, or any number of other reasons. The examiner should not confuse such a person with an examinee who is consciously employing countermeasures. This condition is primarily encountered when utilizing electronically enhanced cardiosphygmograph components which allow relatively low cuff pressures during operation. With low cuff pressures, the examinee may allow his attention to go to the pneumo assemblies, or respiration in general.

Detection of this countermeasure begins, as with almost all countermeasures identification, in the pre-test interview. The examiner should look at his examinee to determine his respiration rate. The examiner should then be alert for changes when the instrumental phase of the examination commences. The simplest, and probably the most effective way, is to simply compare the examinee's rate of breathing with that of the examiner. The examiner should get in rhythm with the examinee's respiratory rate and consider the difference between his and the examinee's rate.

The examiner should look for changes in the pneumograph tracings following announcement of test beginning and ending. This is certainly not the most effective detection method since examinees with any knowledge of procedure at all will (if they are consciously using countermeasures) begin respiratory control at the time they think the examiner is recording and continue until they think the recording has

ceased. Nevertheless, it is indicative with the naive examinee or the non-deceptive examinee who is trying to "help" the examiner.

A better method of detection of purposeful countermeasures application by the examinee is to record respiration when the examinee is unaware of the recording and then compare that recording with those produced when the examinee is aware of the recording process. This, of course, must be done with some subtlety. It can be accomplished at the beginning of a chart, or after a chart is torn from the instrument at the end of a question sequence. If done at the beginning of a chart, the examiner should set the instrument into operation (recording pneumograph only) and then make some plausible excuse to delay starting the question sequence such as a mechanical adjustment that is necessary. The better way, in my opinion, is to record pneumograph tracings after the question sequence. The examiner can conclude the sequence with the customary procedure for going out of operation, tear the chart from the instrument but let the pneumograph continue to record. The examinee will assume that recording has ceased since the pressure is released from the arm cuff and the chart torn from the instrument. The examinee has presumably been told in pre-test that there will be a break between charts to allow for annotating the charts, etc. The examiner can make some irrelevant comments in the form of "small talk", file maintenance, etc. to give the appearance of normal unrecorded inter-chart procedure. If the kymograph motor is so

noisy that the examinee can readily hear it, it might be necessary to make a little additional noise, i.e., rustling some chart paper or whatever to cover the noise of the kymograph motor.

The production of what I refer to as a "procedures" chart is also helpful in identifying controlled respiration. This is also useful in other areas and will be mentioned again later. I consider the procedures chart to be generally useful in conducting a good examination and suggest that it be used routinely. It must be done as the first instrumental step and, obviously, the examiner cannot back up in his test procedure to conduct it. Therefore, if not used routinely it will be of no help. The procedures chart is simply a short (one or two minutes) recording of physiological activity without any questions being asked. Again, this is the first instrumental step taken. It is explained to the examinee as a process used to adjust sensitivity levels on the instrument, check proper component placement, and insure the best quality tracings possible from the examinee. The examinee intending to practice countermeasures is uncertain as to what, if any, measures should be employed at this time and will want to look "normal". The non-deceptive examinee who later tries to help the examiner will have no reason to do so at this point since no questions are being asked. The routine non-deceptive examinee will form the impression of enhanced professionalism on the part of the examiner if

the procedure is presented correctly. The procedures chart provides useful comparisons, if needed, to polygrams produced later in the examination.

NOTE: As an aside to use in counter-countermeasures, the procedures chart is useful in other ways. It will aid the examiner in quickly going into operation on the first chart and it will have a positive psychological effect on the examinee. If sensitivity levels (on electronically enhanced instruments) and proper component placement are established to provide optimum tracing quality prior to the first polygram, considerable time is saved in going into operation. If component adjustment is required to enhance tracing quality it is accomplished without aborting the first chart or producing a mechanically inferior first chart. It also serves to avoid the unprofessional appearance of "fumbling around" when a chart has to be aborted to adjust components.

Before attempting to remedy controlled breathing the examiner must be certain that the respiration is, in fact, controlled, as pointed out above. If the examiner is convinced that controlled breathing is occurring, he must address it with the examinee. Controlled breathing, whether it be purposeful or non-purposeful; consciously intended as a countermeasure or not, will <u>not</u> improve unless the examinee is made aware that the examiner knows the respiration is controlled and intends to remedy the situation. This need not, and should not, be done in an

Another approach which can be taken is to start a chart as usual, but after the first question and before any evaluative question is asked, abort the chart. The examiner can at this point talk to the examinee and explain that the chart was aborted becuase it will not be useful in evaluation due to his abnormal breathing. If it is explained that it will be a waste of time to continue unless the examinee can assume a more natural respiration pattern, this will often solve the problem. This is particularly useful with the examinee who is not consciously employing countermeasures.

Another measure which may be helpful is to complete a chart and leave the pneumograph in the recording mode. Walk around and face the examinee and talk to him about his breathing or some other subject. Observe the pneumograph tracing and it will often assume normal characteristics as you force the examinee's attention from his breathing to your conversation. Once you see a normal pattern, you can then show it to the examinee and make the appropriate comparisons with earlier recordings. Dealing with controlled breathing when the examinee insists he is breathing normally can be difficult, but can be done. See Illustration Numbers 12, 13 and 14.

Another remedy suggested by some is to run a silent chart. I have personally found the procedures chart previously described to be more effective than a silent chart - the individual deliberately employing

controlled breathing as a countermeasure will not be likely to assume a normal respiratory pattern just because the examiner is employing a silent chart procedure.

While some controlled breathing i.e., slow, deep respiration, frequently distorts cardiosphygmograph and GSR tracings, it often does not. If remedial action does not eliminate the abnormal respiration and there are no substantial compensatory changes in the other tracings, the examiner still may be able to form an opinion by eliminating the pneumograph tracings for evaluation purposes and interpreting GSR, cardiosphygmograph and CAM tracings. Obviously, it is more desirable to eliminate the controlled respiration.

In addition to the procedures chart mentioned earlier, another possible comparative factor can be found in the stimulation test. This is not as effective as the procedures chart when dealing with the individual who is consciously employing controlled breathing as a countermeasure because they will use this measure consistently throughout any recording procedures with the probable exception of the procedures chart. It can be useful, though, in some instances. I suggest that the stimulation test be conducted before the first question sequence is undertaken, rather than as a second chart, as suggested by some. Tracings in the stimulation chart <u>may</u> be indicative of later attempts at distortion and provide comparisons.

MUSCULARLY INDUCED RESPONSE

Almost any muscle group in the body can be contracted to produce tracing changes which resemble legitimate response factor(s). Obviously, to be effective the person intending to employ the countermeasure must use it selectively. He must induce a physiologically significant response at the appropriate question. The goal would be to generate a response at the control questions greater than, or at least equal to, the magnitude of the response to the relevant questions. Furthermore, it must be done in such a way as to escape detection by the examiner.

Normal movements are readily identified by observation of the tracings since they usually result in characteristic distortion. Furtive muscular contraction may not be so easily recognized since they are intended to be subtle and are concealed by the examinee. Examples of obvious movement or clumsy attempts at countermeasures are seen in Illustrations 24, 25, 26 and 27.

The effectiveness of muscularly induced response is dependent on (1) subtlety of application, (2) adeptness of the individual employing the countermeasure and, (3) the examinee's knowledge of polygraph procedure. Muscle contractions which are irregular or clumsy in their attempt can be readily detected by the examiner. To be successful demands that the examinee must be able to produce sufficient muscular

contraction to induce changes in the tracings, yet not be observable to the examiner. This requires that both the physical demeanor and cooperation of the examinee be above suspicion and that the polygrams do not indicate any "abnormal" tracings or any artifacts characteristic of movement. The examinee's knowledge of polygraph procedure will affect the appropriateness of the physiological responses. Muscular contractions must be produced to be timed with the answering of the specific questions and the examinee must be aware of the method in which questions are constructed and polygrams are evaluated.

If skillfully applied, many surreptitious movements do not cause discernable artifacts in the tracings and appear to be legitimate responses. Detection of such movements may be difficult when dealing with the sophisticated examinee. The more commonly encountered effective, but difficult to detect muscular activities are:

a. Pressing the toe(s) against the floor.

b. Scrunching the toes.

c. Pressing the thighs against the chair seat.

d. Crossing the eyes.

e. Pressing the tongue against the roof of the mouth.

f. Clenching the teeth, and

g. Constricting the anal sphincter.

Other activity may include slowly contracting and relaxing the arm to which the cuff is applied and the Valsalva maneuver.

COUNTER-COUNTERMEASURES - MUSCULARLY INDUCED RESPONSE

Flexing the upper arm and the Valsalva maneuver are considered separately since they are more likely to produce observable artifacts in the tracings. Arm flexing (to be effective) requires constant muscle tension since inducing movement from the relaxed state almost always produces a less than smooth action. Constant muscular tension may well reflect itself in trembling or abrupt base line changes when tension can no longer be maintained, especially near the end of a chart. If the examiner is concerned that this countermeasure may be in use, he can negate manipulation by physically relaxing the examinee's arm through lifting it, extending it straight out, and then setting it back on the chair arm at the beginning of each chart. The examiner should be alert, though, for exertion of tension subsequent to this procedure. This procedure is customarily done after all components are in operation except for the cardiosphygmograph and is done after inflation of the arm cuff. The Valsalva maneuver produces such distinct tracing characteristics that it is not considered subtle enough to escape detection by any competent examiner.

Detection and neutralization of the other physical countermeasures mentioned above may not be so simple. Identification and neutralization of these countermeasures depend to some degree upon the resources available to the examiner. Detection of the surreptitious movements

earlier described is a blending of active observation of the examinee, use of specialized equipment and identification of artifacts in the tracings.

The use of an examinee chair equipped with pneumatic sensors will usually indicate movement of the torso, legs, toes and anal sphincter. This piece of equipment has, in recent years, not been offered by any major manufacturer. Within the last few months a movement sensor is being offered by Lafayette, although I have not been able to evaluate how good the equipment is at this time. The equipment being marketed by Lafayette does not consist of pneumatic sensors, so I am uncertain as to the sensitivity and usefulness of the equipment.

The examiner must maintain a close observation of the examinee. He cannot allow chart markings and mechanics to become of all consuming interest. The examiner should mark all observed movements even if no apparent artifacts occur in the tracings. The examiner should remember that not all physical countermeasures will be effective in creating the same response with every examinee. Likewise, the same movement with the same examinee will exhibit different degrees of effectiveness over a period of time. While there is the physical effect involved in the employment of movement as a countermeasure, there is also a psychological aspect of this, or any countermeasure. The fear of being detected in the use of countermeasures will often enhance the response factors

involved. Marking observed movements may allow the examiner to determine patterns which, of themselves, may be indicative of the use of countermeasures.

The examiner can use a qualified observer to assist in the observation for movement on the part of the examinee. Video tape recording equipment is an excellent aid, and its use is strongly recommended. Not only does it make available an instant recording which the examiner can make use of if suspicious of countermeasures, but when played in the fast search mode, even the slightest movements become readily apparent; however, even video may not be effective when looking for eye crossing.

Some activity is more readily detected than others. For example, pressing the tongue against the roof of the mouth and clenching the teeth produce only small indicators of movement. However, generally, if the activity is sufficient to produce a response it must be done to such a degree that the movement is discernible. Pressing the tongue against the roof of the mouth will result in a slight but detectable contraction of the muscles under the lower jaw at the neck juncture. Clenching the teeth causes muscle contraction of the jaw muscles below and to the front of the ear. Neither of these measures is particularly effective in producing significant tracing changes. See Illustration Number 15 for an example of the tongue being pressed against the roof of the mouth.

Pressing the toe(s) against the floor is not readily seen nor is scrunching the toes. Toe pressing is relatively simple to counteract. A reclining chair may be used to lift the feet from the floor. The easiest method, available to all examiners, is to simply have the examinee extend his legs straight out and cross them at the ankles. (This may not be so good for small statured examinees when their feet barely reach the floor anyway. In these cases, use the same procedure but give them something to put their feet on). Toe scrunching is much more difficult to observe and if done carefully, may not be observable. See Illustration Numbers 16, 17 and 18. For examples of toe pressing see Illustration Numbers 19 and 20.

Crossing of the eyes is a very difficult area to deal with. It can produce significant response factor and yet is not possibly visible to the examiner, nor does it produce any visible muscular contraction. Use of an observer or video equipment will often surface this countermeasure. For examples of response factors produced by eye crossing see Illustration Numbers 21, 22 and 23.

Thigh pressing usually results in discernable chart artifacts assuming the examinee is in the proper position, i.e., both feet flat on the floor.

Once detected or suspected by the examiner, the only remedy for these types of countermeasures is confrontation of the examinee. The

examiner will obviously have mentioned the undesirability of movement during the pre-test instructions and this should be reiterated. Tell the examinee to sit still and make no movements.

There may be occasions when physical abnormalities or disease cause trembling, shaking, or uncontrollable movements. This can generally be coped with through measures used in dealing with handicapped examinees and are not, obviously, countermeasures and will not be addressed here.

SELF INDUCED PAIN

Self induced pain can be an effective countermeasure and is relatively easy for the examinee to apply. It is difficult to detect if done subtly and with some degree of sophistication. It can range from tongue biting to having a sharp object in the mouth to press against to concealing the proverbial tack in the shoe.

COUNTER-COUNTERMEASURES - SELF INDUCED PAIN

As with muscularly induced response, careful scrutiny of the examinee is essential and will often serve to detect self induced pain measures since at least some minimal movement is necessary. Tongue biting is sometimes discernible through jaw movement. The examinee may attempt to overcome this by placing the tongue between his teeth at the beginning of the chart and keeping it there throughout the question

sequence, eliminating the need to move the jaws. The examiner can usually detect this by the lack of lip and jaw movement at the point of the answer and a somewhat different tonal and diction quality than that displayed by the examinee at other times. For examples of response generated by tongue biting, see Illustration Number 28, 29 and 30. Not all measures involving self induced pain are completely effective. See Illustration Numbers 31 and 32.

ASSORTED COUNTERMEASURES

This final cluster of countermeasures is a conglomerate of activity that does not fit into any of the preceding categories.

Chemical countermeasures intended to interfere with accurate recording can be included here. For example, spraying anti-perspirant on the fingers or applying clear nail polish or transparent glue to the fingers in hopes of diminishing or eliminating the recording of GSR changes.

Other countermeasures defy any logic and are attempted by the examinee simply because someone told him they would work. Never underestimate the power of suggestion. No matter how ridiculous a countermeasure may seem, it has some chance of success if the examinee believes in it. Karl Klump tells of the examinee who put soap under his arms. Reid and Inbau mention the examinee who tried to hide a bullet under the arm cuff.

There are other accounts of examinees visiting voodoo doctors to acquire a spell before the examination. There is the story of the individual who wrapped his torso in tinfoil. Both of these reportedly resulted in inconclusive results, but were successfully reexamined when the cause was discovered by the examiner.

In my own experience I have encountered examinees who have abstained from sexual activity in belief that it would allow them to defeat the test. Other examinees have worn asafetida bags or carried lucky charms or religious symbols specially purchased for the occasion. One consumed copious amounts of garlic just before the examination; painfully obvious during the examination, but without any effect upon the outcome. Another examinee was convinced that he had caused the malfunctioning of the instrument through psychokinesis, but I discounted this theory.

Bear in mind that all of these activities have a common denominator - a superstitious, simplistic belief by the examinee that the ritual he practices will allow him to escape detection of deception. Lacking any scientific basis whatever, if attempted by an examinee who <u>believes</u> it will work, it may.

Another countermeasure is to simply wear the examiner down. This is most likely to occur in extended testing such as screening tests or very complex cases requiring multiple series. For example, after a deceptive series the examinee makes minor, incomplete admissions which necessitate further testing. This results in polygrams which are judged deceptive, but again the examinee makes minor admissions (sometimes after lengthy discussion) which are incomplete and require further testing. This cycle is repeated and with each deceptive series the examinee makes further admissions which require further testing.

This circular activity begins to tire the examiner and he must at some point make a decision to terminate testing. While it is unlikely that the examiner would conclude that the examinee was truthful, he may conclude out of frustration and lack of desire to continue the cycle that the examination is inconclusive. In this sense the examinee has employed a successful countermeasure.

Adrenal exhaustion has sometimes been touted as an effective countermeasure. Some underground newspapers have advocated such measures as running around the block before a polygraph examination (DeGrak, 1970). The idea was to bring about adrenal exhaustion; however, I do not consider adrenal exhaustion an effective countermeasure. Any normal pre-test interview will consume enough time to offset the effect of any physical activity prior to the examinee's arrival at the examination location. Response factors are assumed to result from the sympathetic nervous system directly activating the effectors involved and production of adrenalin is not a vital factor.

Reid and Inbau observed deceptive responses, during an experimental situation, in two examinees who had been subjected to a bilateral adrenalectomy. Additionally, Harvey (1971) indicates that for GSR activity the mediating chemical is not epinephrine or norepinephrene, but acetylcholine. A study by Sternback (1966) arrived at the same conclusion as Harvey.

Finally, simple fatigue can operate as a countermeasure since there is diminished response capability in the exhausted individual. This is not to be related to the theory of adrenal exhaustion. This refers to the individual who through lack of sleep or other activity is simply overly tired and lacks the physical capacity to respond "normally". In the extreme, this can be characterized by the subject falling asleep during the interview or chart production. This factor may or may not be a conscious attempt at employing countermeasures - it may well be only a coincidental condition. It does not seem reasonable to assume that it will result in false negatives or false positives as long as a control question technique is used.

COUNTER-COUNTERMEASURES - ASSORTED COUNTERMEASURES

Application of chemicals or other foreign substances to the fingers in the hope that they will provide an invisible barrier between the finger electrodes and the skin surface are not generally effective. Any substance which would completely isolate electrical contact would be observable or could be felt on the fingers. Less visible chemicals such as antiperspirants are only marginally effective, even if undetected and no steps are taken to neutralize the effect. Such chemicals may reduce the mean size of GSR response which could conceivably increase false negative errors if using a relevant-irrelevant technique or peak of tension sequences standing alone. This countermeasure would offer little benefit to the examinee attempting

deception against the control question technique since no selective activity against particular questions can occur. These applications can be defeated through routine procedures.

The examiner should have the examinee wash his hands with soap and warm water. I suggest this be done routinely as part of every pre-test interview. As a standard procedure, I take a short break between final question review and commencing the instrumental phase of the examination. The examinee is directed to the appropriate facility and instructed to wash his hands with soap and warm water. While an effective step in neutralizing chemical countermeasures, it serves several other purposes as well, and will generally result in an improved GSR tracing and serve to enhance the overall quality of the examination.

Another counter-countermeasure in this area is to simply look at the examinee's fingers and feel the surfaces when applying the electrodes. If the examiner feels foreign substances on the fingers, the examinee has provided a message about his veracity.

Some further indicators of chemical countermeasures may surface during the instrumental phase of the examination. Unusually high basal resistance levels or generally diminished GSR activity may be indicative. (Remember, though, that this condition can occur naturally in some examinees and is not a positive indicator of checmical counter-

measures. The examiner can attempt to remedy this situation by use of customarily accepted methods of enhancing GSR tracings such as applying electrode jelly or selecting a different application site for the electrodes.

When the examiner suspects the use of countermeasures by the examinee, the electrodes can simply be attached to the tops of the fingers instead of the customary bottom surfaces. Most unsophisticated examinees who attempt chemical countermeasures will have the knowledge that the finger electrodes are customarily applied to the bottom surfaces and will make no attempt to shield the upper surfaces. Generally speaking, if the pre-test procedures set out above are followed, this countermeasure will be routinely neutralized.

Superstitious beliefs are generally not effective countermeasures but they resemble the "tail of the magical ass" in that if the user sincerely believes that they work, they might. Such situations are not all that common and the result, in my experience, is invariably inconclusive results at worst rather than false negative errors.

Many such countermeasures can be detected by interview when inconclusive results are encountered. But, as with so many other countermeasures, detection begins in the pre-test interview. The examiner should talk to the examinee and, more importantly, <u>listen</u> to what he has to say. The examiner should ask him what he has heard about the

polygraph, and what he has heard that a person could do to "beat the test". A great deal of useful information surfaces if we will only ask, but the examinee seldom will volunteer such information.

Wearing the examiner down can be an effective countermeasure, but only with the examiner's permission. The examiner who tires of the circular activity involving incomplete admissions, further testing with deceptive results, more incomplete admissions followed by more testing, and so on shares the blame for the situation. The examiner should recognize this countermeasure and thus be alerted when he is being "lead" by the examinee. The examiner should make it clear by his actions that he will not give in to this activity. The examiner should refrain from appearing annoyed or frustrated. More importantly, the examiner should employ questioning techniques which discourage this countermeasure. Basically, the counter-countermeasure is simply persistence.

Fatigue can act as a countermeasure in that it may diminish responsivity. Its effectiveness will be limited to inconclusive results at best, if employed against the control question technique. It is conceivable that it could result in a false negative error if employed against the relevant-irrelevant technique. This is often simply a coincidental condition in the examinee who has not been advised that a well rested condition is necessary to the examination, or chose to ignore the advice if received. Taking a good history of the examinee's recent amount of rest will surface the condition when dealing with the veridical examinee.

ESTABLISHING A BASE FOR COUNTER-COUNTERMEASURES

In any attempt to neutralize countermeasures there can be no singular procedure which will operate as a panacea. Numerous countermeasures are available to the knowledgeable examinee, and the examiner must employ an array of procedures to effectively discourage the use of countermeasures or identify and neutralize them if in use. Consideration must be given to all phases of the examining procedure. Counter-countermeasures techniques are most effective when employed throughout the polygraph examination from pre-test to post-test. The examiner should not rely on a single check such as question formulation, test construction, observation of the examinee or close scrutiny of the polygrams.

While each countermeasure presents a different problem and requires a different counter-countermeasure, there are some techniques which can be effective against countermeasures in general, and aid in identifying their use.

GENERAL COUNTER-COUNTERMEASURES

IDENTIFYING INDUCED RESPONSES

The induced response can be effected without noticeable distortion factors, but this is not to say that we are at the mercy of the

examinee, skilled or unskilled, who may attempt countermeasures. There are tentative indicators of countermeasures use. All of the following may be indicative of use of induced responses. However, they should not be considered definitive since the same activity can result from normal psychological set; inattention, confusion, a low level of intelligence on the part of the examinee; or high levels of general nervous tension in the apprehensive individual who is not attempting countermeasures. These indicators should be used judiciously.

Chart Artifacts. In looking at charts where countermeasures are suspected, the following is indicative, but not definite since some or all of the same indicators may be present in examinations where no countermeasures are in use. If multiple indicators are consistent throughout the charts, view them with some suspicion.

a. Early pneumo change just before countermeasures use. For examples, see Illustrations 6, 22, 23 and 30. But see Illustration 34 where no countermeasures are in use.

b. Unusually active GSR at the beginning of the chart, but settling as test sequence begins.

c. Serrated GSR tracing is indicative of pressure on the finger electrodes, assuming the electrodes are not applied too tightly, picking up the pulse in the fingers.

d. Pneumo manipulation usually results in disproportionate response at point of countermeasure. For example, see Illustration Numbers 7, 8, 9 and 10.

e. Sphincter contraction, toe pressing and toe scrunching often result in delayed cardio response. For examples, see Illustration Numbers 16, 17, 18 and 33. There may also be early cardio response, but GSR and pneumo are usually timely.

f. Early GSR activity especially when erotic/exciting imagery is in use. See Illustration Number 5. But see also Illustration 4 where there is no GSR build up.

Inappropriate Answers. One may expect to encounter inappropriate answers to some questions, most likely irrelevant questions. This can occur due to the examinee's concentration being directed to inducing response and waiting for the particular question(s) at which countermeasures will be attempted. This was observed twice during the field study I conducted.

Delayed Response. There can be delayed responses to questions. The individual must recognize the question and then induce response, and this consumes somewhat more time than the normal reaction. This indicator will be somewhat dependent on the intelligence of the examinee and how quick witted he is. In some cases delayed response is a normal factor, but in such situations the delayed response is apparent at all questions and is consistent throughout the question sequences. It is felt that delayed response will occur only at control questions in those cases where countermeasures are being practiced.

Anticipatory Responses and Peaks. Anticipatory responses may be encountered as the individual prepares himself to induce a response, or there may be a peak to questions for which he is waiting i.e., questions at which he intends to employ countermeasures. Again, care must be used in this area since peaks or anticipatory responses obviously may result from normal psychological set. Normal peaks will point to one area of psychological set; whereas, in the individual employing induced responses the peaks will be inconsistent and involve more than one question.

General Nervous Tension. A signal that the examinee may be using countermeasures is a high level of general nervous tension. High levels of GNT may also be encountered in the overly apprehensive examinee who is not intending countermeasures use so, again, this signal must be intrepreted with some caution.

Cluster of Activity. The above tentative indicators should be considered as a cluster of activity. Any one of them can be indicative, but it is not ususual to see one or more of these factors during a routine examination. When one observes a combination of these factors in an examinee, then they become pertinent in regards to the possible use of countermeasures. While some care should be used in evaluating these indicators, they can be revealing.

NOTE: Do not attempt to evaluate other component areas as comparative factors if countermeasures are suspected in one component area. That is, if countermeasures are suspected of being used in the cardiosphygmograph do not look for a lack of activity in GSR or pneumograph components. The GSR and pneumograph are very active even if the induced resonse is applied to another component area, probably due to the psychological effect of employing countermeasures.

There are frequently significant pneumograph changes at the point of countermeasures application when the induced response being used involves another component area. This, in my opinion, is caused by both the switch of attention when the examinee begins application of the countermeasure and the psychological impact of employing countermeasures. It is not consciously induced by the examinee and appears to be a normal response factor. During the field study, in the twenty series in which countermeasures were practiced in components other than the pneumograph, significant changes in the pneumograph tracing occurred at all points of induced response in nineteen series. Further, GSR is almost invariably active even though the induced response has nothing to do with GSR (such as pressing on the finger electrodes, etc).

SPECIFIC GENERAL COUNTER-COUNTERMEASURES

General counter-countermeasures should be employed by the examiner on every examination as a routine procedure. If the examiner routinely employs certain procedures some countermeasures will be neutralized routinely. Other procedures can aid in identifying the use of countermeasures by the examinee so that specific counter-countermeasures can be employed. Some of the procedures are simply good examination techniques which serve to enhance the general quality of the procedure as well as work as counter-countermeasures. Others are specifically oriented toward countermeasures and can be used at the examiner's discretion, depending on his estimation of the probability of encountering use of countermeasures by the examinee population with which he deals. Some of the areas have already been mentioned and are re-emphasized without much further elaboration.

PRE-TEST INTERVIEW

Probably the most obvious, but also sometimes the most neglected, procedure is to conduct a thorough pre-test interview. The examiner should get back to basics and should not short cut the procedure. He should observe the examinee. He should form an opinion as to the examinee's demeanor and behavior. Is it unusual? Does his respiration rate appear normal? Are there indicators of drug ingestion? Does the examinee's anxiety level appear to be too high or too low? What is the

medical history? Is the examinee taking prescribed medications? Is the examinee reasonably well rested? What has he heard about "how to beat the test?" The examiner should be meticulous in his review of question formulation. Questions obviously should be thoroughly reviewed and discussed with the examinee to avoid the possibility of rationalization as well as adhering to the basic rules of question formulation.

PROCEDURES CHART

It is recommended that a procedures chart be produced as discussed in earlier parts of this paper.

TAKE A SHORT BREAK

I recommend a short break between final question review and the instrumental phase of the examination. Have the examinee wash his hands in warm water with soap to, insofar as possible, neutralize the application of any chemical substances. As previously mentioned, this will also tend to enhance GSR tracing quality.

OBSERVATION

The examiner must observe the examinee closely during test sequences. An observer is recommended. A video recording is better.

AVOID SET QUESTION SEQUENCES

Pattern avoidance should be employed in the testing sequences through the use of mixed sequences. At a minimum, the examiner should switch controls on the second chart.

RANDOM INSERTION OF IRRELEVANTS

The examiner should randomly insert an occasional irrelevant question. This should be done (consistent with the demands of the particular test construction being used) whether or not it is necessary from the standpoint of prolonged response or mechanics. Irrelevants should be worded so that some require a "yes" answer and some require a "no" answer. This increases the probability of inappropriate answers by the examinee who is concentrating on employing countermeasures and eliminates rote answering.

PHRASING OF IRRELEVANT QUESTIONS

Consider phrasing some of the irrelevant questions (especially on screening or CSP examinations) so they are similar to meaningful questions in the initial wording. This will cause the user of countermeasures considerable difficulty in deciding whether it is a question at which countermeasures should be employed. It will tend to result in

countermeasures being commenced and then aborted and will often cause delayed response when induced responses are being using by the examinee.

DISGUISED CONTROL QUESTIONS

This applies to CSP testing in a stable examinee population or when the examiner is working in a setting which allows formulation of control questions which are not readily identifiable as controls.

An obvious basic premise in the application of countermeasures is that one must be able to identify control questions as control questions in order to selectively employ any attempt at induced response.

Include in the question sequence at least one control question which is not readily identifiable as a control. There are a number of these in the approved control question pool. Further, vary control questions from one examinee to the next so they do not become stereotyped and widely known among the general examinee population.

Do not make a clear distinction between the disguised control and the relevant areas - review it with the relevants. Certainly, it is customary in substantive cases to make the clear distinction; however, in CSP operations we can review at least one control (such as

security violations, or doing anything which could cause the loss of security clearance) in close proximity to the relevants or among the relevants.

Use of this procedure allows much better evaluation of true psychological set. It also generally is an accurate indicator of countermeasures use. If strong responses are apparent on obvious controls but consistently more normal or diminished responses are observed at the disguised control, countermeasures may well be in use.

PROCEDURES AND STIMULATION CHARTS

The examiner should look at the stimulation chart and the procedures chart for comparisons. Significant differences in tracing characteristics or response patterns can indicate the use of countermeasures.

USE OF A COUNTERMEASURES QUESTION

You may wish to include a countermeasures question in the question sequence. The following is provided for your information:

Questions such as "Have you done anything in an attempt to defeat this test?" or "Are you hoping I will make a mistake?"; or any other accepted countermeasures question (there are several) can be used as a

standard part of each question sequence. It can be used as the last question in the sequence since this will allow it to be used with any test construction; however, it could be moved in the mixed sequence. My experience indicates it is best used as the last question in the sequence, unless you prefer to end with an irrelevant.

There is no indication that there will be any significant response caused only by the nature of the question. I have used it in the private sector and my experience indicates there is no problem caused only by the nature of the question.

In addition, a countermeasures question in the form of "Have you done anything in an attempt to defeat this test?" was asked as part of the standard question sequence in fifty operational examinations conducted at P7S. There was little or no response to the question in most instances. It was relatively certain as determined by other means that no countermeasures were in use by the examinees. All examinees were considered non-deceptive. The countermeasures question was asked as the last question in the sequence and in the one or two examinations in which there was any substantial response, it was attributable as much to relief at being the asked the last question in the sequence as anything else. (The examinee realized it was the last question in the sequence after the first chart).

In the field study I conducted, the question "Have you done anything in an attempt to defeat this test?" was used in all series. Of the twenty-nine series, five involved no countermeasures and in one series, the examiner inadvertently omitted the pertinent question. In the five series not involving the use of countermeasures there was very little or no response to the question. In the remaining twenty-three series, significant responses were observed in two or more component areas at the countermeasures question in eleven series. In seven series, there was some response to the question. Although not substantial it would be sufficient to draw some attention to it by the examiner if seen in an operational examination.

The above would tend to indicate that one would not find substantial response only because of the nature of the question, and that response can certainly be expected if countermeasures are in use. Furthermore, it does offer the examiner the opportunity to examine responses to the question to determine if countermeasures use is likely.

In those examinations I have conducted using this type of question where countermeasures were in use, responses were the most significant on the chart.

CONCLUSION

All countermeasures can effectively reduce, or even negate, the accuracy of the polygraph technique if they are not identified and neutralized. Certainly, many countermeasures are readily recognized as such by experienced field examiners.

Only the expertise of the examiner will counteract the efficacy of countermeasures. Use of the appropriate measures to discourage the use of countermeasures by the examinee or aid in detection of countermeasures through standard examination procedure should be the beginning. The examiner's ability to detect countermeasures use and then apply the right counter-countermeasure builds on routine procedure. The two combined provide a good defense against countermeasures.

Finally, selection of test format will round out the defense against countermeasures. It cannot be suggested too strongly that the control question technique be used. It protects against incorrect opinions when some countermeasures are in use and can aid in identifying other countermeasures. The control question technique in and of itself provides protection against false negatives, especially against pharmacological countermeasures, and should certainly be the technique of choice unless there is a compelling reason to use a different technique.

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BIBLIOGRAPHY

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APPENDIX A

Field Study

LARRY V. STREEPY

This field study was intended to determine, among other things, whether or not countermeasures in the form of induced responses can be readily detected by the examiner.

The term "induced response" as I have used it in this study is defined as a group of countermeasures which can generate significant response as measured by the polygraph instrument and which can be accomplished subtly enough to avoid characterisitic artifacts in the charts which are customarily associated with countermeasures.

The seven participants of the study were all well qualified polygraph examiners. Polygraph experience for the subjects ranged from seven to twenty-two years, with the exception of one examiner with only one year of experience. All instruments were Lafayette Ambassadors equipped with electronically enhanced double pneumographs, GSR, CAM and electronically enhanced cardiosphygmographs.

The participants acted alternately as examinee and examiner and no two worked together throughout the study. Random assignments dictated which participants worked together at any given time. The subjects were advised that in some series, there would be no attempt by the examinee to induce a response, while in others there would be one or

more questions at which the examinee would attempt to use countermeasures. The examinees were not coached in the practice of countermeasures. They were, obviously, knowledgeable of polygraph examination procedures, but no specific training was given regarding countermeasures use. Just prior to the polygraph examination the Research Director and the examinee would decide upon a specific activity to be employed. The examinee was not given the opportunity to practice the countermeasure nor were instructions in its use given. No attempt to judge increased skill levels in producing response factors has been made at this time, although this factor may be studied in the future. Existing records would permit a partial analysis of this factor.

The study involved twenty-nine series consisting of three polygrams each, for a total of eighty-seven polygrams. The countermeasures used by the subjects included muscularly induced response, physical movement, self induced pain, erotic or exciting imagery, and respiration manipulation.

The Research Director and the subject acting as the examinee agreed in advance as to the specific countermeasure(s), if any, to be employed and at which question the activity would be attempted. Sufficient controls were utilized to insure that the subject acting as examiner would not have knowledge of the planned activity until after the evaluation. In addition to this procedure, blind evaluations of randomly selected series were made by other examiners not participating

in that particular examination. Again, controls were utilized to insure that the blind evaluator could not know at which question(s) countermeasures(s) were employed by the examinee.

Four series were evaluated by the original examiner only. Eight series were evaluated by the original subject acting as examiner and were then evaluated by three other examiners who did not have knowledge of that examination. The remaining seventeen series were evaluated by the subject acting as examiner and by one additional polygraph examiner. This resulted in a total of seventy separate evaluations of the twenty-nine series (eighty-seven polygrams).

The question sequence consisted of nine questions on the first two charts and ten questions on the third chart. The tenth question was, "Have you done anything to defeat this test?" Initially, the question sequences consisted only of irrelevant questions, but it became apparent that induced responses were readily identifiable simply because they produced the greatest physiological response. In an attempt to elicit greater physiological responses, questions designed to be emotionally evoking were used after series eight. In the subsequent twenty-one series, emotion evoking questions were used in seventeen series and irrelevants in four series.

While greater responses were observable in the series using emotion evoking questions, the induced responses continued to be generally

greater than other questions. This lack of question intensity allowed countermeasures to be readily identifiable simply because they were the most significant responses. The Research Director felt that this did not obscure the original intent of the study, i.e., to determine if countermeasures can be identified as countermeasures by experienced polygraph examiners. If this question were answered in the affirmative, then it would be possible to isolate the induced response as something different than a normal response. This result would suggest that the use of counter-countermeasures by the examiner was not necessary as the attempted use of countermeasures by the examinee could readily be detected during the polygraph examination. As part of the polygram evaluation, the subject acting as examiner and the blind evaluators, were asked to indicate whether they would identify the response they thought to be a countermeasure as having characteristics of "distortion" or "legitimate response factor." Furthermore, they were asked to identify what specific countermeasure activity they would attribute as the cause of the suspected response.

No more than two questions were selected in a given series at which an induced response was attempted. It was considered appropriate to have some sequences in which no countermeasures were attempted. In nineteen series the induced response was attempted at two different questions. In five series the induced response was attempted at only one question. In the remaining five series there was no attempt to use

countermeasures. (Due to split evaluations on several polygrams the total will not sum to the total number of polygrams produced in the study).

In only six evaluations of the seventy total were countermeasures employed and not detected by the examiner; however, this is not a valid indicator since countermeasures were easily detected simply because they were the greater responses on the chart. (See above on question construction).

In the majority of the evaluations the examiner was unable to identify the specific causal factor for the response which he identified as a countermeasure. Of the sixty-two evaluations which identified the use of the countermeasure by the examinee, 51 or 82.3% could not be attributed to a specific causal factor.

In sixteen evaluations in which an attempt was made to identify the specific countermeasures utilized by the examinee, the subject acting as examiner or the blind evaluator could only correctly identify the countermeasure six times. Ten attempted identifications by examiners of the countermeasure used by the examinee attributed the physiological response to a countermeasure other than the true countermeasure. In other words, 73% of the time the identification by the examiner of the suspected countermeasure was incorrect.

Eight evaluations by subjects acting as examiners indicated no use of countermeasures. Of these, only two were series in which no countermeasures were actually used. In the other six series, countermeasures were used and not detected by the examiner.

Probably the most significant aspect of the study is the limited number of responses which were identified as distortion. Even though countermeasures were "detected" and, in some cases, identified as to causal factors those same responses were considered to be of such a nature that if seen in a normal operational examination they would be considered as a "normal" response rather than being suspect. Part of the evaluative process called for the examiner to indicate whether he would identify the response factor he thought to be a countermeasure as "distortion" or characteristic of legitimate response factor.

Of the sample involved, three evaluations which considered countermeasures as "detected" and would evaluate the factors as "distortion" rather than legitimate response were cases in which no countermeasures were employed - so, in three cases distortion, for whatever reason, was attributed to countermeasure activity. Only nine evaluations, total, labelled induced responses as "distortion" so we are left with only six cases in which an induced response was considered something other than legitimate response.

In these six cases, some of the induced responses involved gross physical movement which would have been apparent to almost any polygraph examiner regardless of experience. They were nevertheless, included as identifiable induced responses. The critical factor here is that 91.5% of the induced responses were not identifiable as induced responses. If encountered in an operational setting, they would have been considered "normal" responses.

The incidence of false positives should also be mentioned. In four cases, more countermeasures were "detected" than were used. More significantly, of the five series, in a total of ten evaluations, in which no countermeasures were employed only two evaluations indicated no countermeasures in use. In the remaining cases false positives occurred, ranging from one to three questions in the series being identified as induced responses. This results in a false positive rate of 83.3% overall and 80% if we consider only those cases in which no countermeasures were employed. As indicated earlier, examiners were advised that in some cases no countermeasures were to be used. Even so, there is probably some bias in this aspect of the study since, realistically, examiners were looking for countermeasures.

This study strongly suggests that induced responses, unless they are very clumsy indeed, may not be identifiable in operational situations through historically posited ways i.e., chart artifacts and/or observation of the examinee.

One or two other factors should be considered here. First, on the negative side, these countermeasures were not practiced. The Research Director and examinee randomly decided on a specific activity and the examinee "tried it" on the test. So, no examinee was really adept at inducing response. Obviously, very little practice is required to produce a convincing response which would stand little chance of detection through use of chart artifacts.

On a more positive note, it is difficult to estimate the effect of an actual operational procedure, with the attendant emotional intensity, on an individual's ability to consistently practice countermeasures throughout the examination.

TABLE OF ILLUSTRATIONS

TABLE OF ILLUSTRATIONS (CONTINUED)

TABLE OF ILLUSTRATIONS (CONTINUED)

Illustration 1.

Example of typical GSR activity induced by continuous erotic imagery. Seldom encountered if in
used selectively.

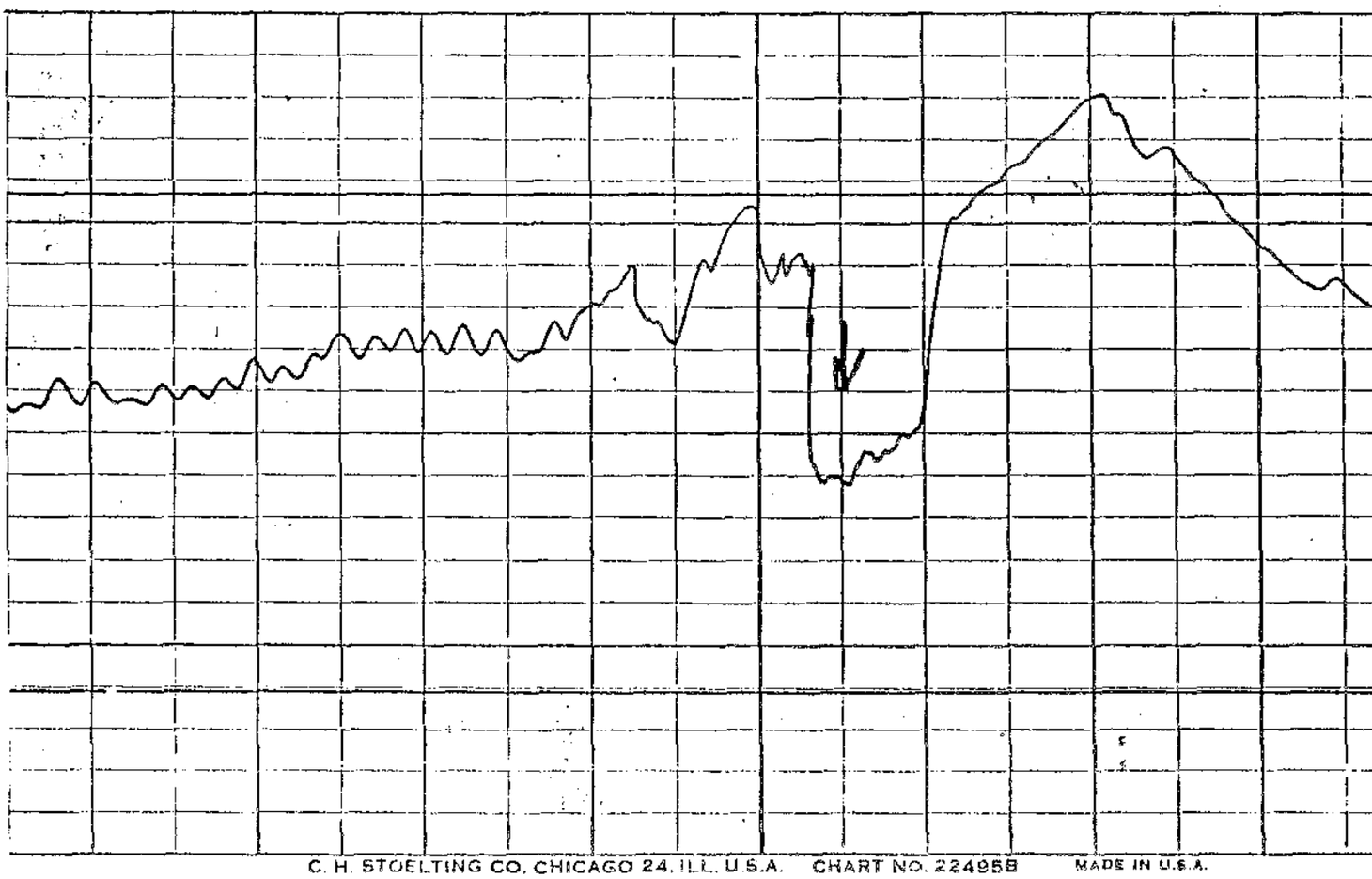


Illustration 2.

Countermeasures employed at Question 5 - erotic imagery.

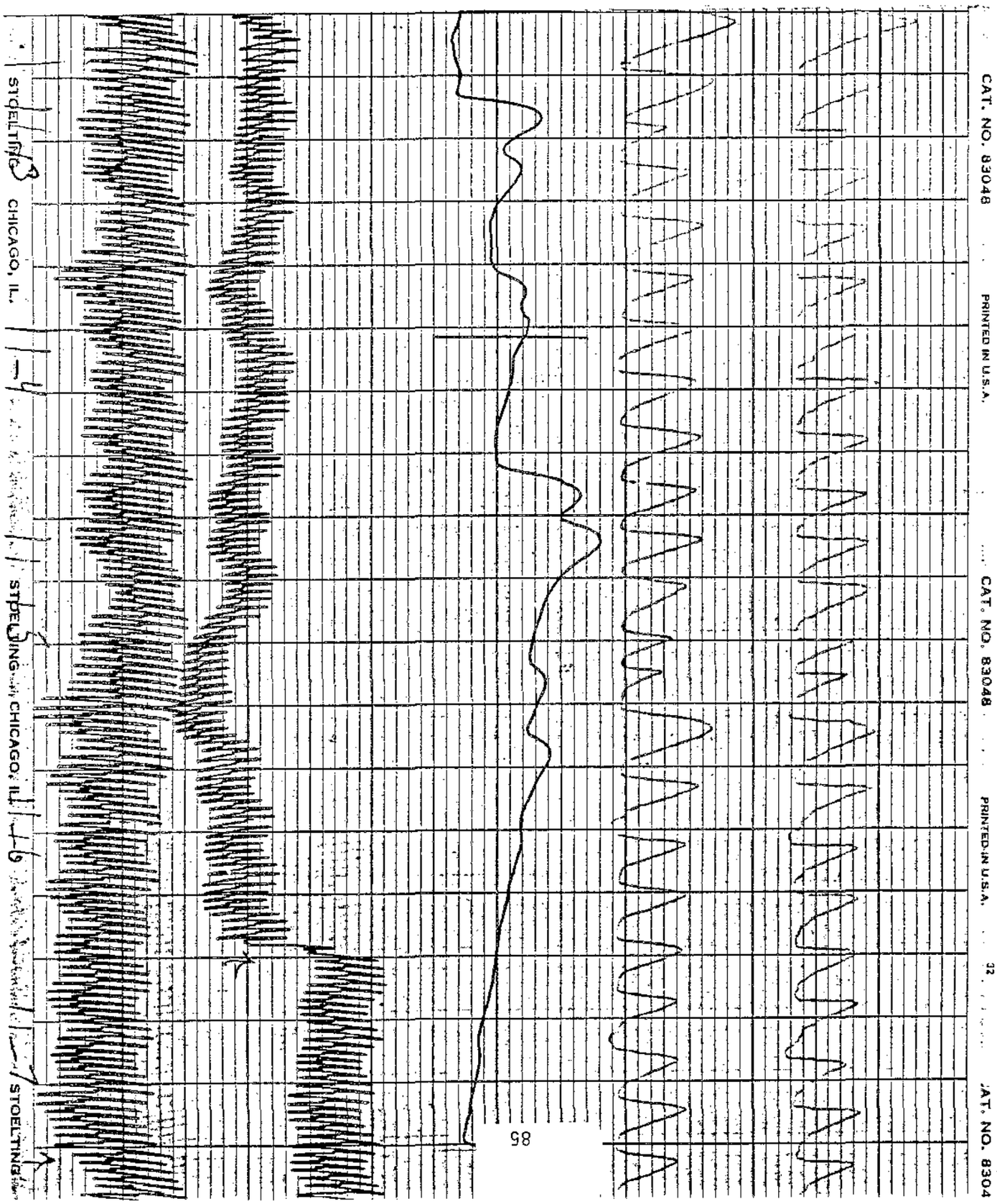


Illustration 3.

Countermeasures in use at Question 5. In this case erotic imagery, but any exciting imagery can produce similar responses.

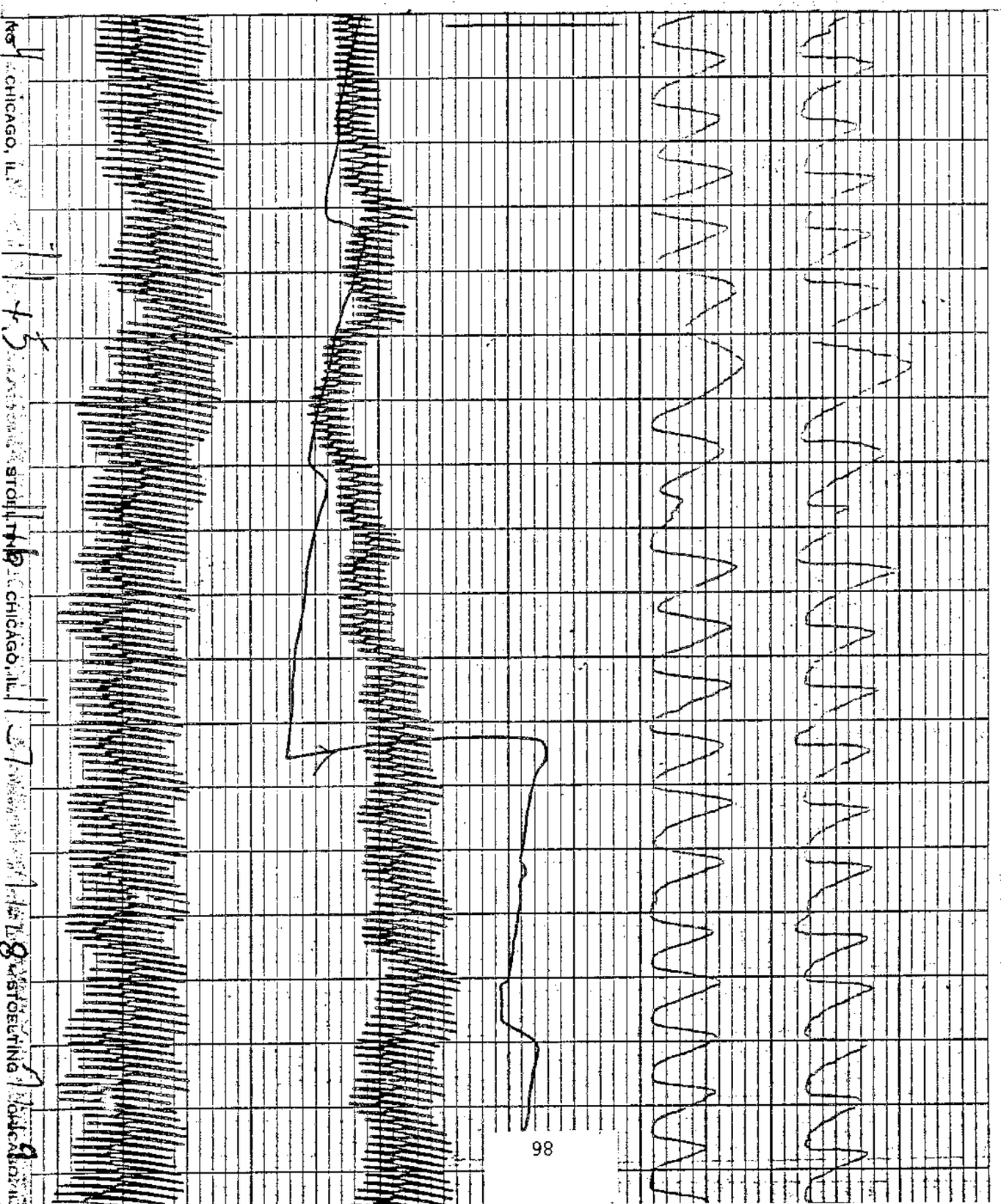


Illustration 4.

Countermeasures in use at Question 3 in form of erotic imagery. No GSR buildup.

Illustration 5.

Erotic imagery in use at Question 3; however, note the GSR build up which occurred as the examinee began the use too early. This build up of GSR activity is typical of continuing erotic imagery and if used throughout test sequence it can be seen. Usually absent when imagery used only at selected questions.

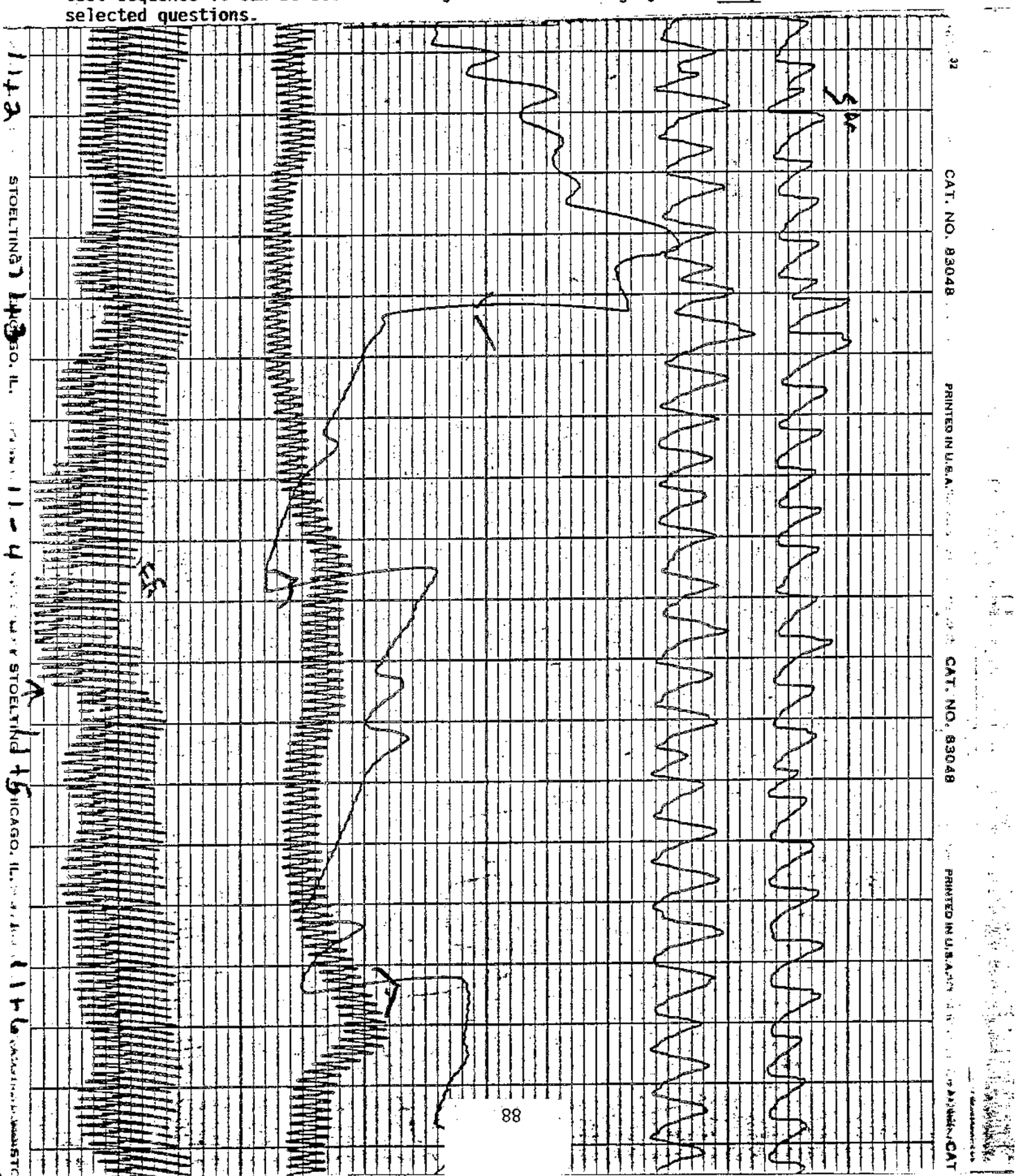


Illustration 6.

Exciting imagery in use at Question 3. Note early pneumo which is often indicative of countermeasures use.

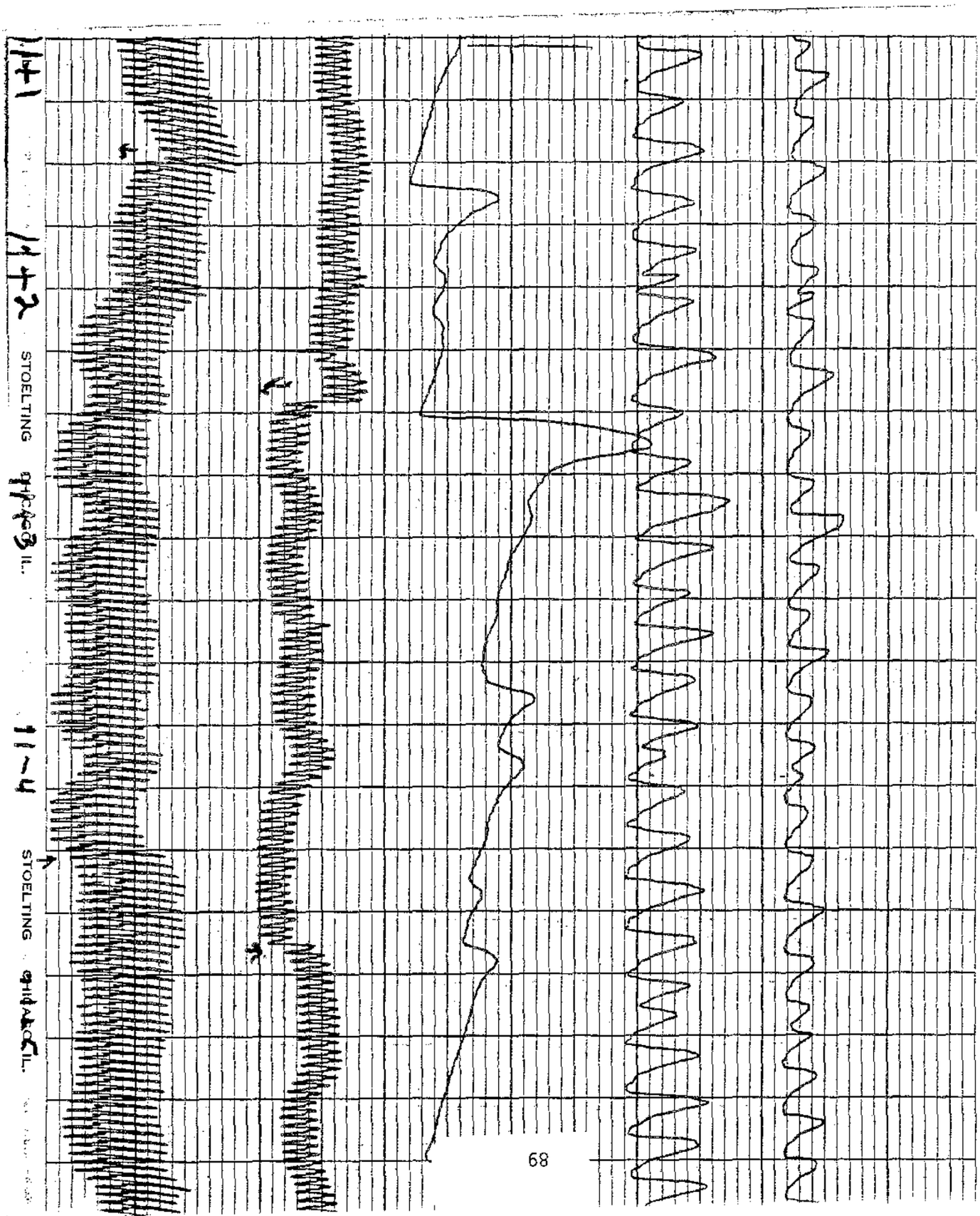


Illustration 7.

Question 2 shows typically disproportionate pneumo when attempting to simulate pneumo change criteria - this case an attempt to create an ascending stair case.

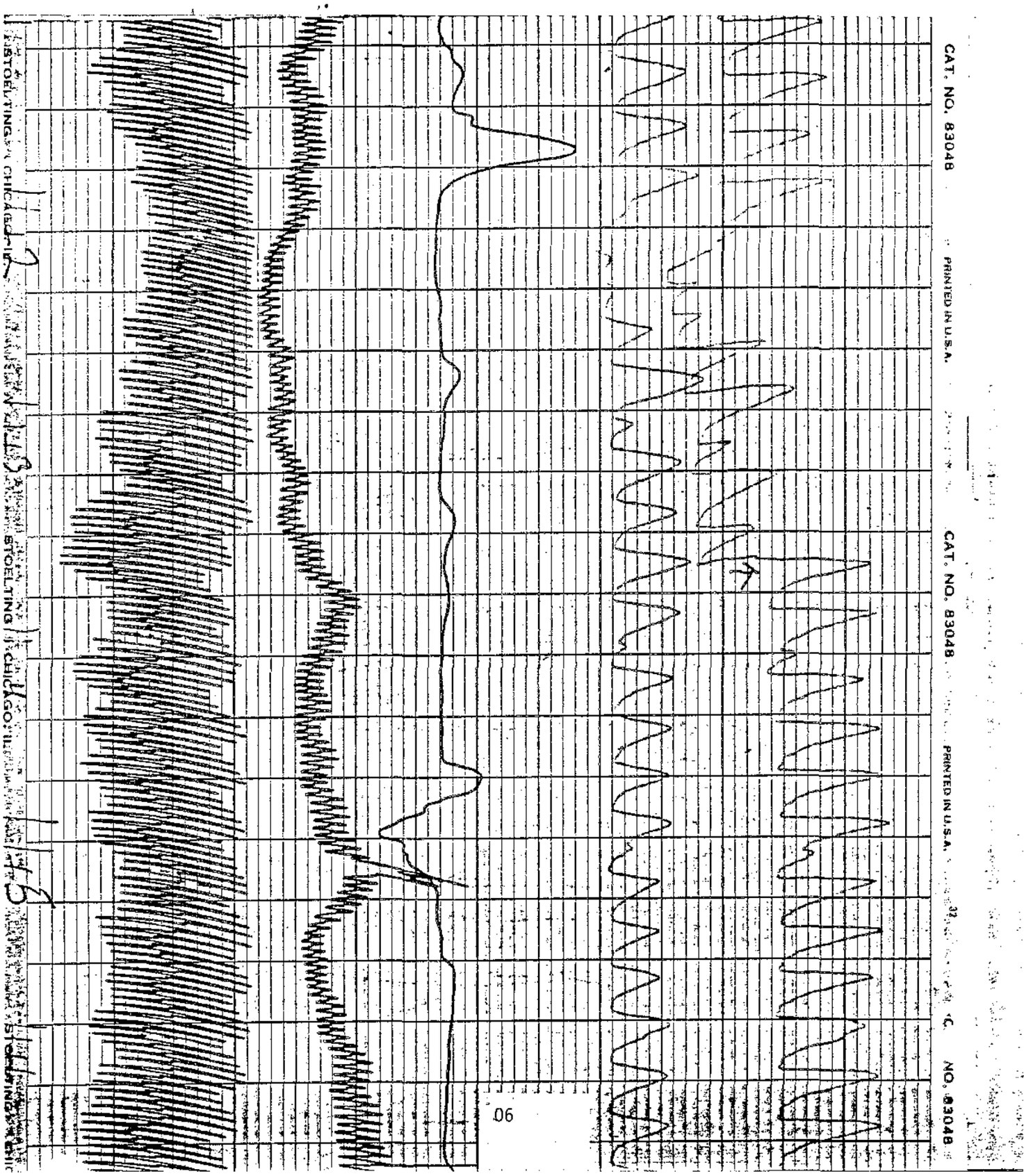


Illustration 8.

Question 4 shows the typical disproportionate pneumo change when attempting to simulate pneumo changes; in this case apnea. Note active GSR.

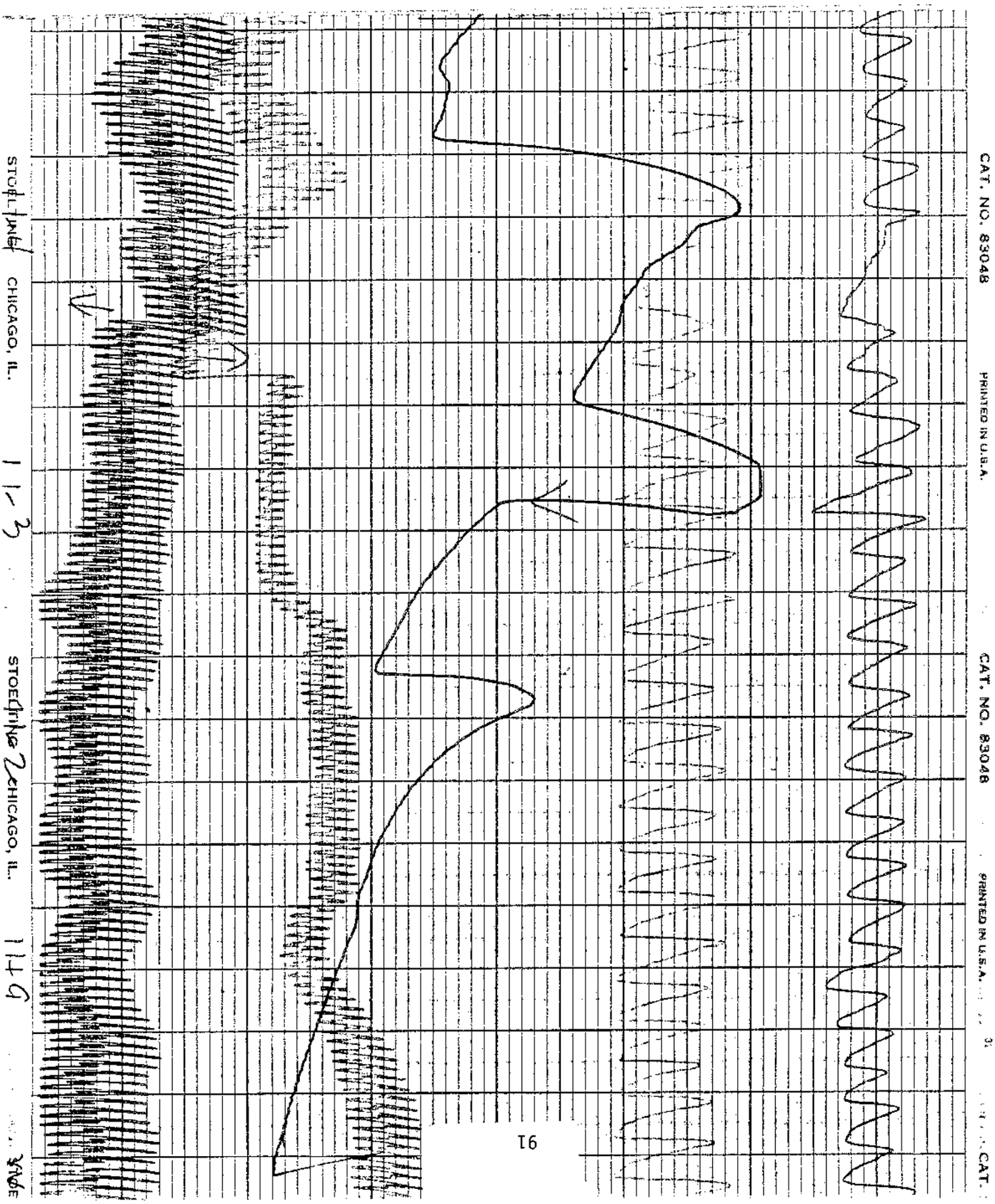


Illustration 9.
Countermeasure attempt at Question 4. Attempt to simulate apnea resulting in completely disproportionate pneumo activity. Typical of attempts to manipulate respiratory function which are usually readily identifiable. The exception is switching from thoracic to abdominal breathing and vice versa, which is usually smooth. Note the typically very active GSR.

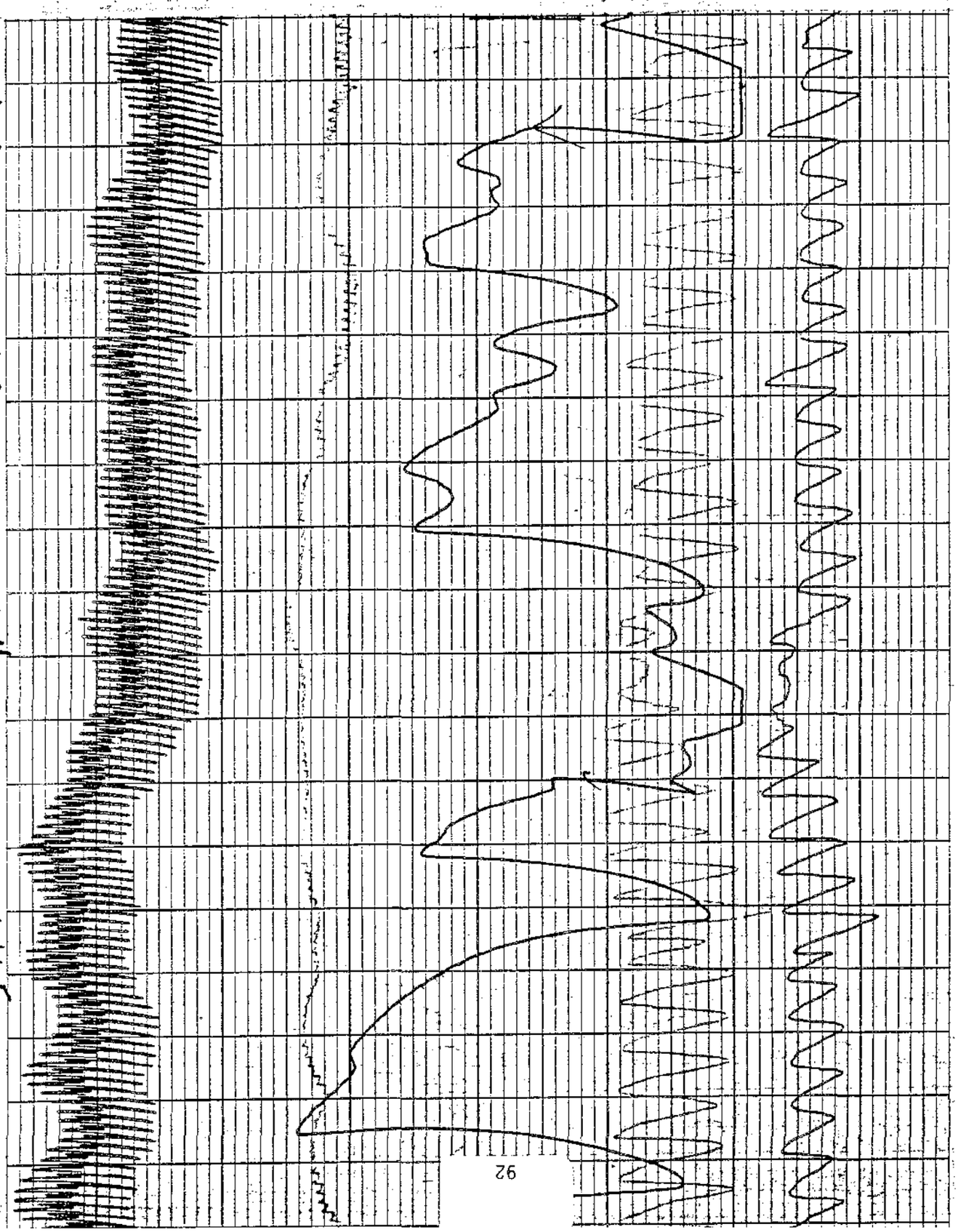


Illustration 10.

Countermeasure in use at Question 3. This is an attempt to simulate a change in I and E ratio. Result is an obviously disproportionate pneumo change typical of attempts to manipulate pneumo tracing. The exception to this is switching from thoracic to abdominal breathing and vice versa, which usually results in pneumo changes which are smooth and rather difficult to identify.

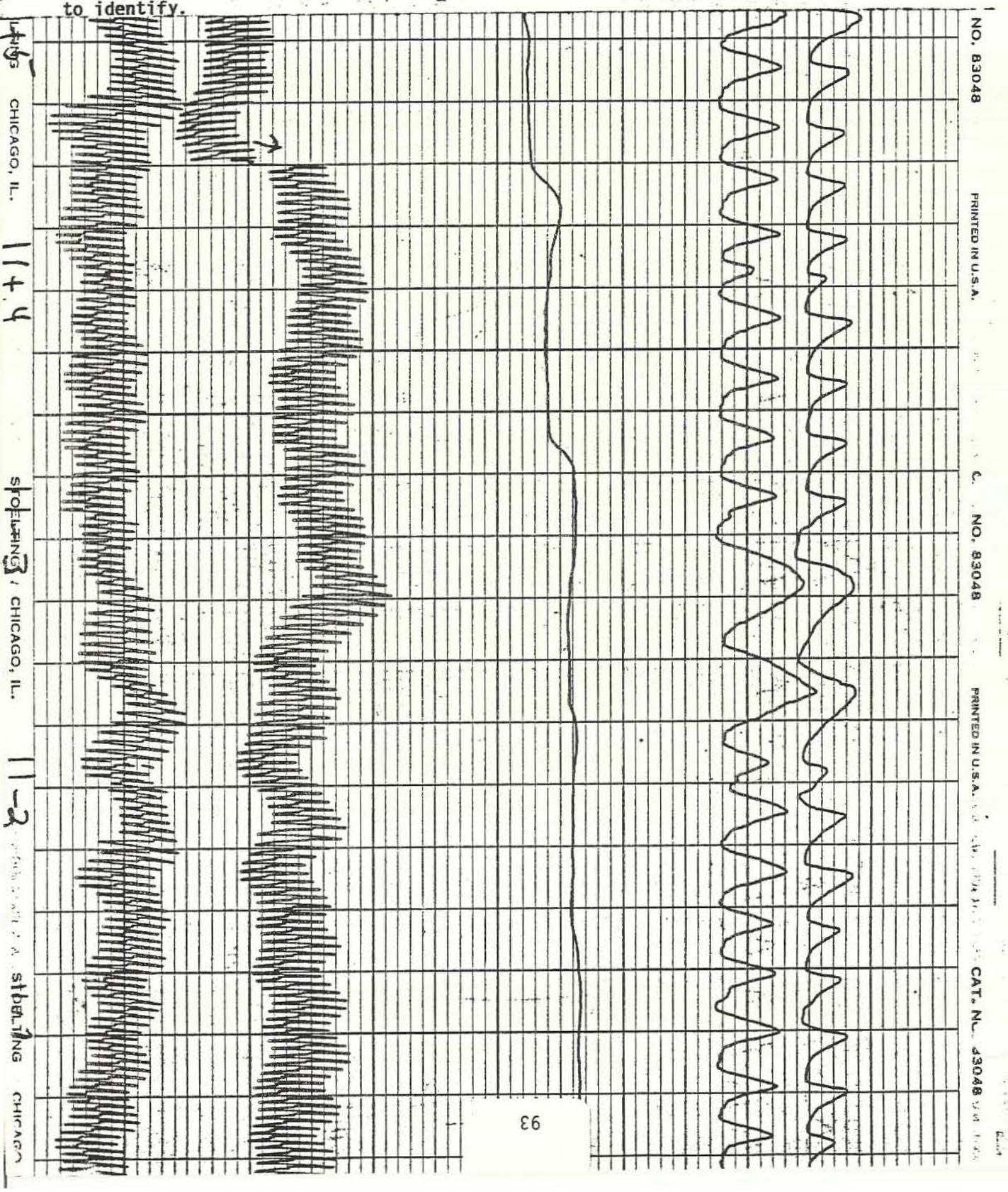
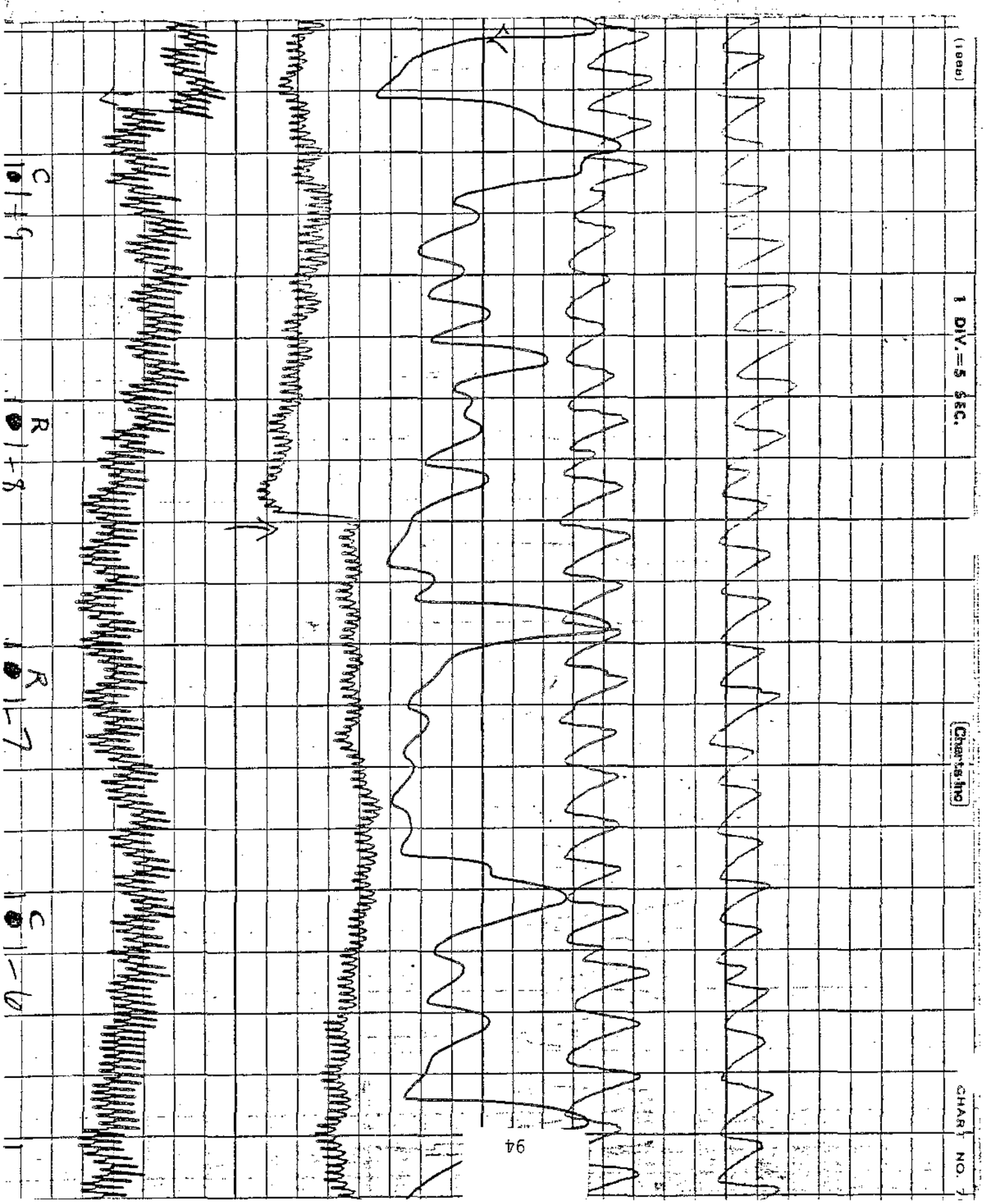


Illustration 11.

Countermeasures employed at Questions 6 and 9. Examinee switched from thoracic to abdominal breathing at Question 6 and vice versa at Question 9.



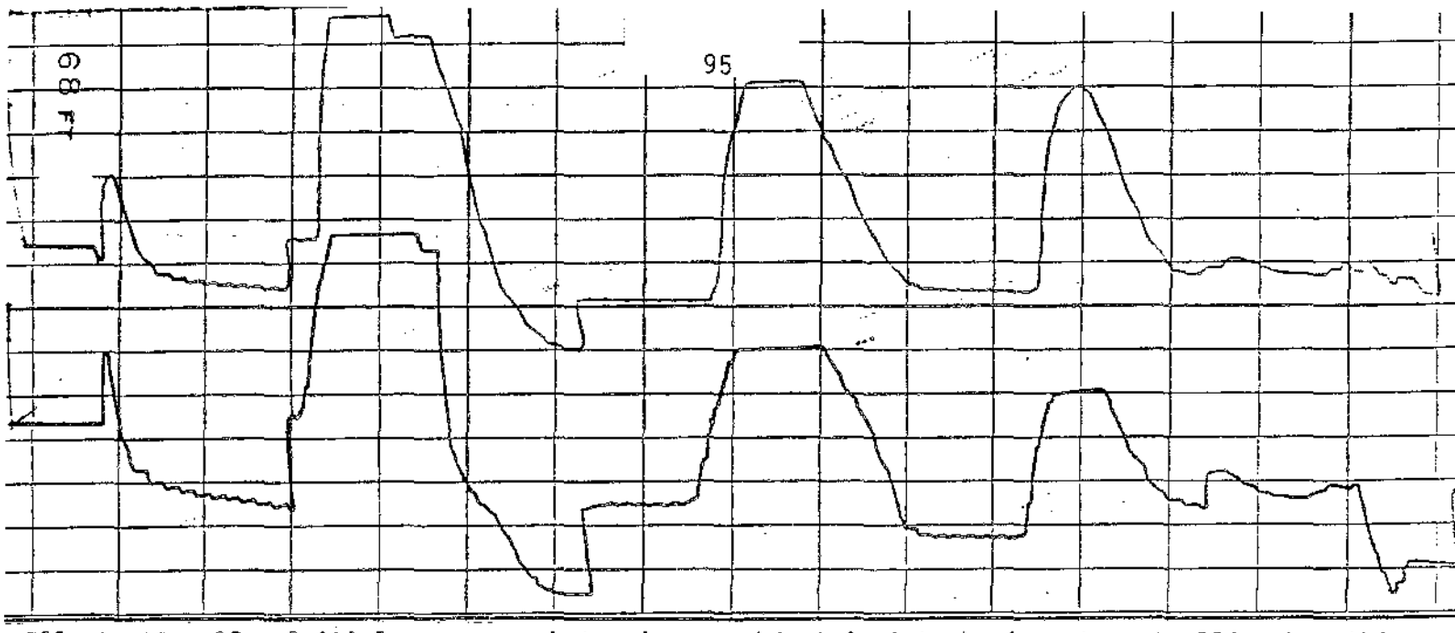


Illustration 12. Initial pneumograph tracing - subject insists he is not controlling breathing.

Illustration 13. Pneumograph tracing after initial conversation with subject about controlled breathing. Obvious improvement but not yet satisfactory.

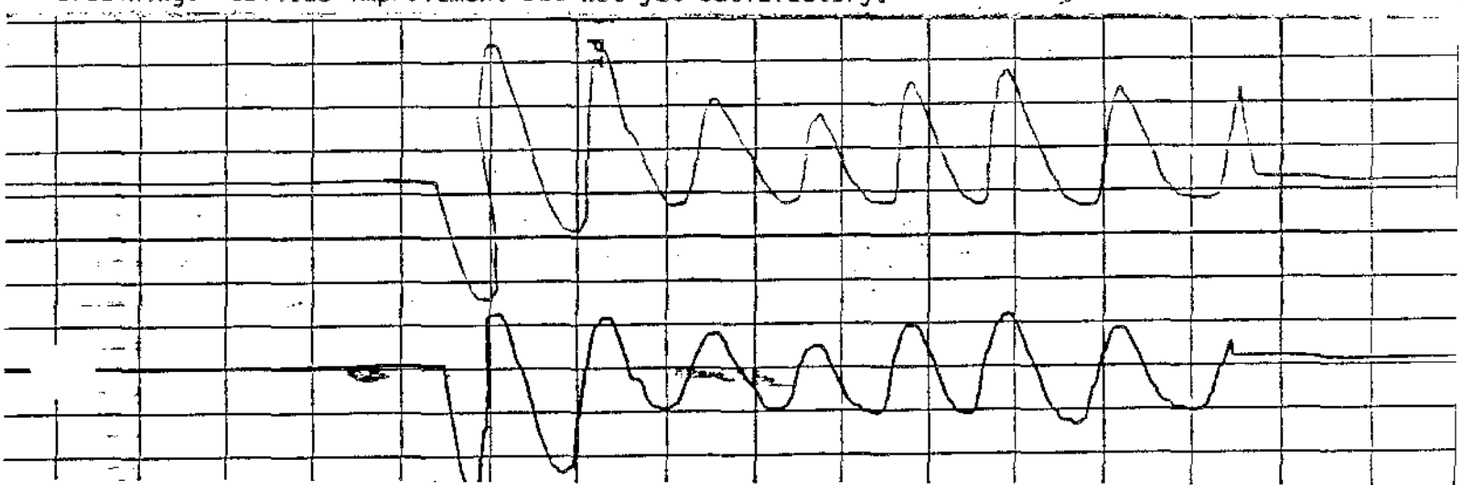


Illustration 14. Pneumograph tracing produced as Examiner stood in front of subject and talked to him forcing his attention away from respiration. Shown to subject and tracing remained of this quality throughout remainder of examination.

Illustration 15.

Countermeasures use at Question 4. Tongue pressed against roof of mouth. One of the least successful countermeasures but, even so, note pneumo and GSR changes.

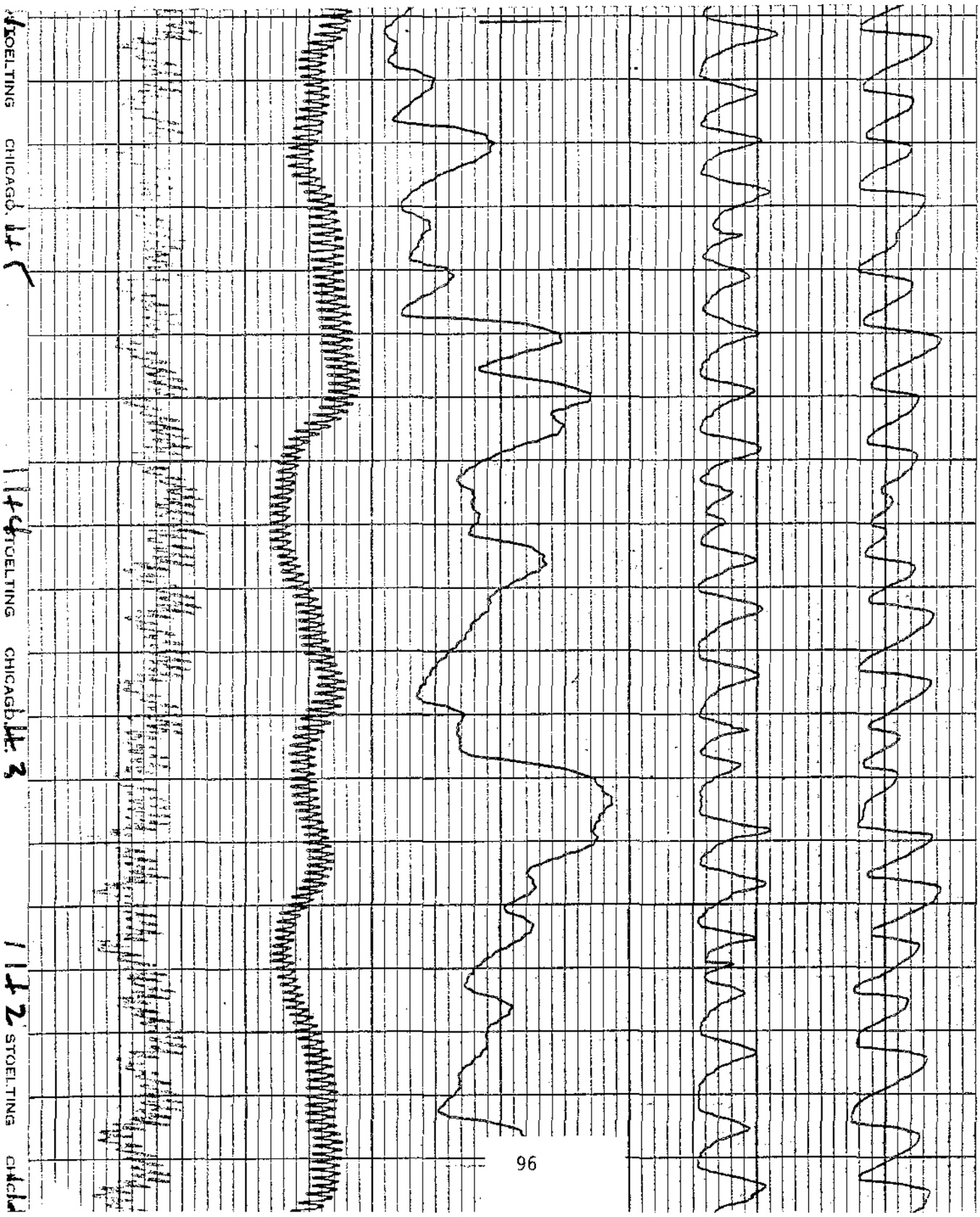


Illustration 16.

Countermeasures in use at Question 6. This is a well timed measure using scrunching up the toes. Note active GSR and pneumo, which is typical when any countermeasure is employed.

Scrunching the toes, sphincter contraction and toe pressing usually result in slightly late cardio/CAM responses. It is difficult for the examinee using these countermeasures to pr ce consistently timely cardio/CAM responses.

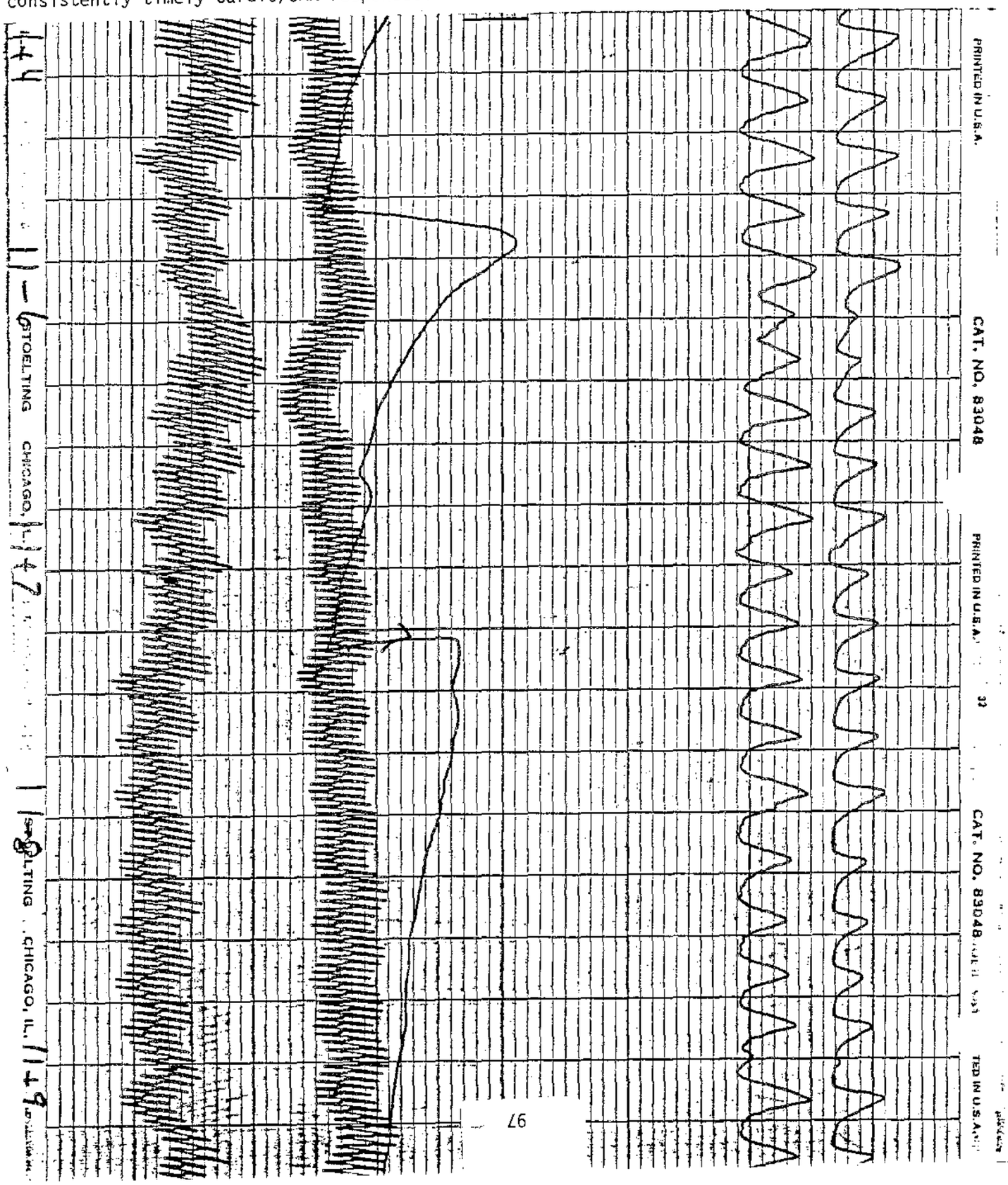


Illustration 17.

Countermeasures at Question 6 in form of toes being strunched up inside shoe. Note active GSR and pneumo which usually accompany any countermeasures use. The cardio and CAM are just a little late which is typical of countermeasures in the form of sphincter contracting, toe pressing and scrunching the toes.

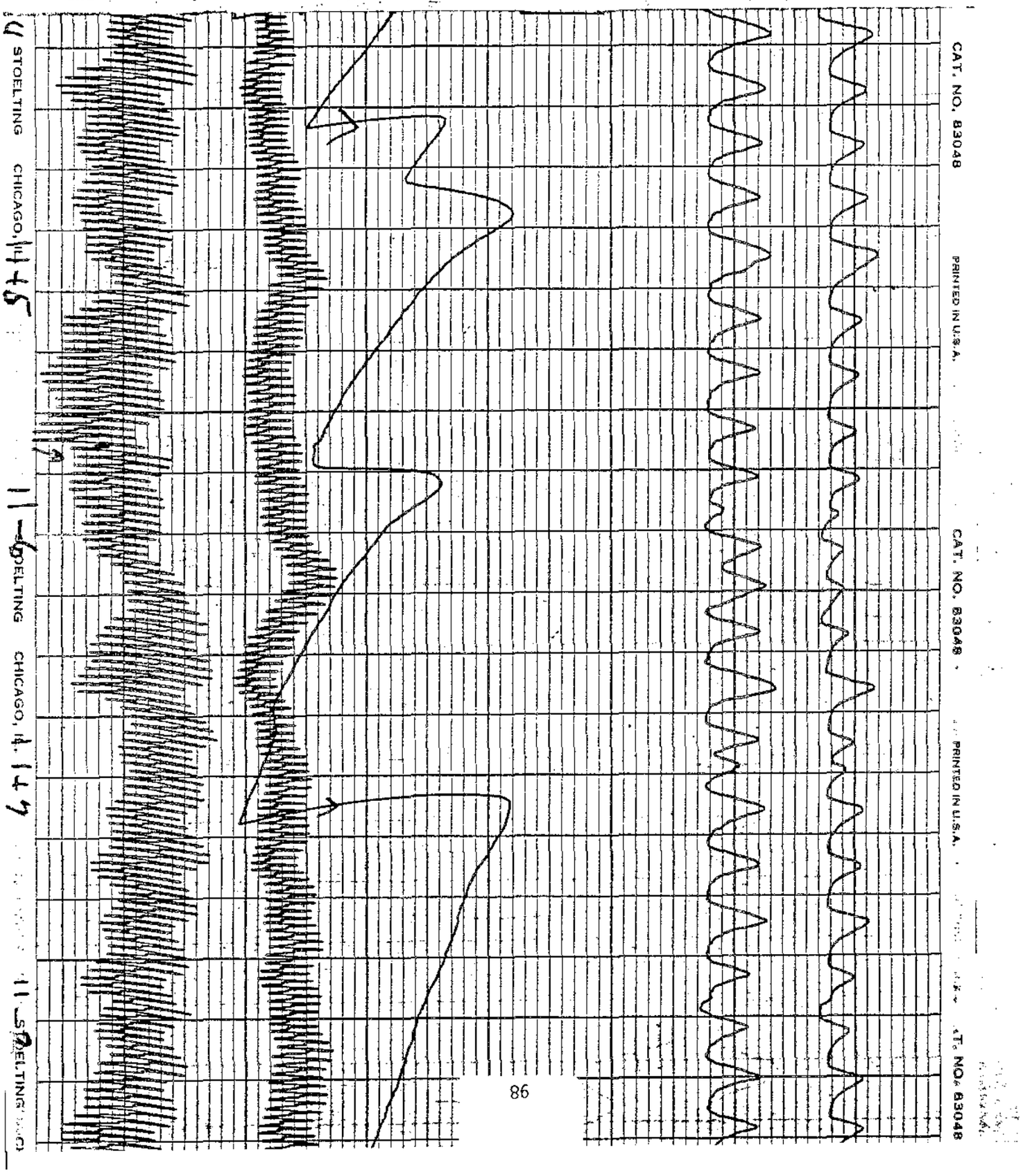


Illustration 18.

Countermeasures at Question 5. Toe scrunching which was timely. Usually, sphincter contraction, toe pressing and toe scrunching will produce slightly late cardio/CAM responses. But note very active and timely GSR and pneumo.

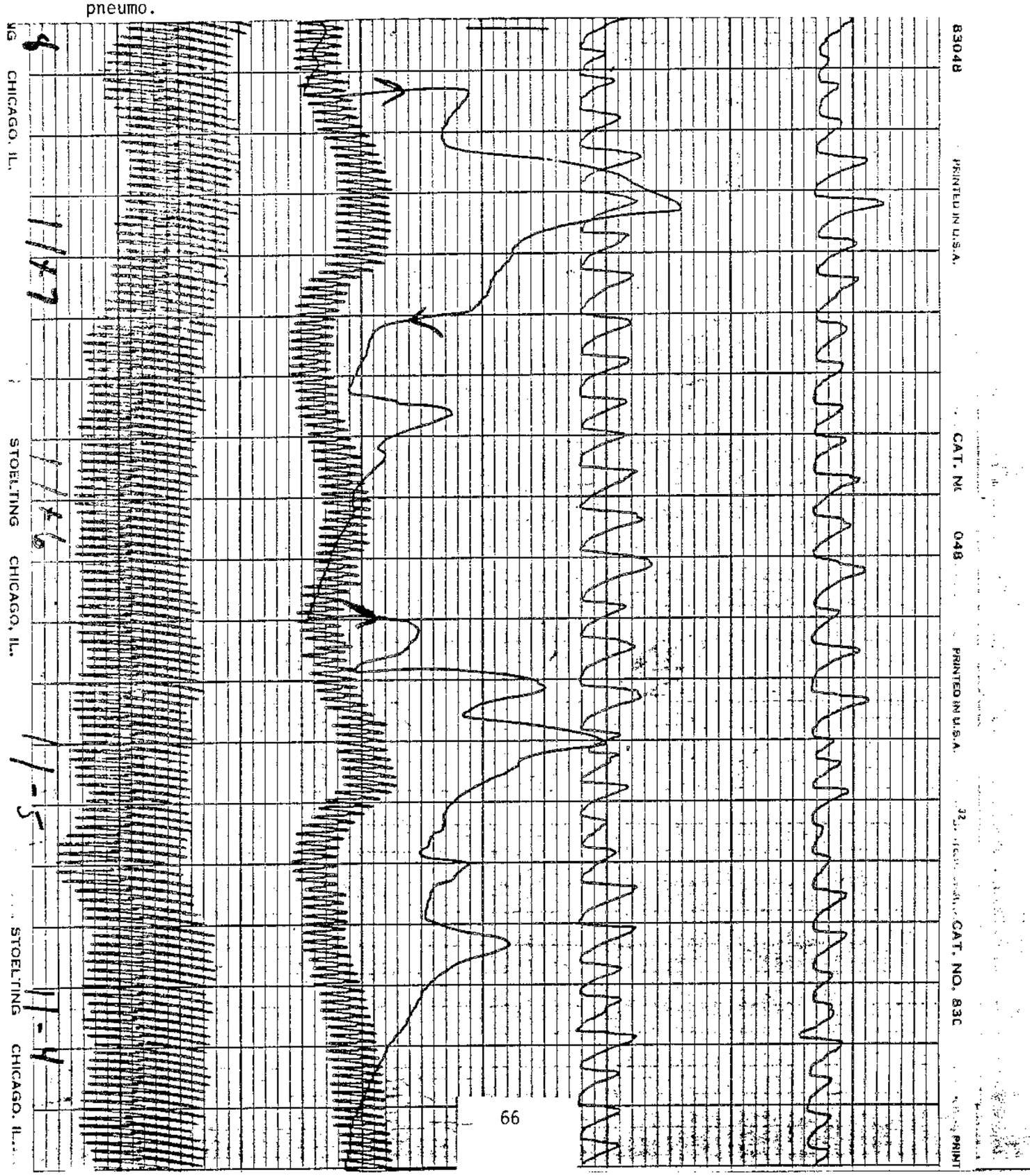


Illustration 19.
Countermeasures employed at Question 4 - pressing toes.. Timely response.
Discernable movement in cardio, but other components show no identifiable artifacts.

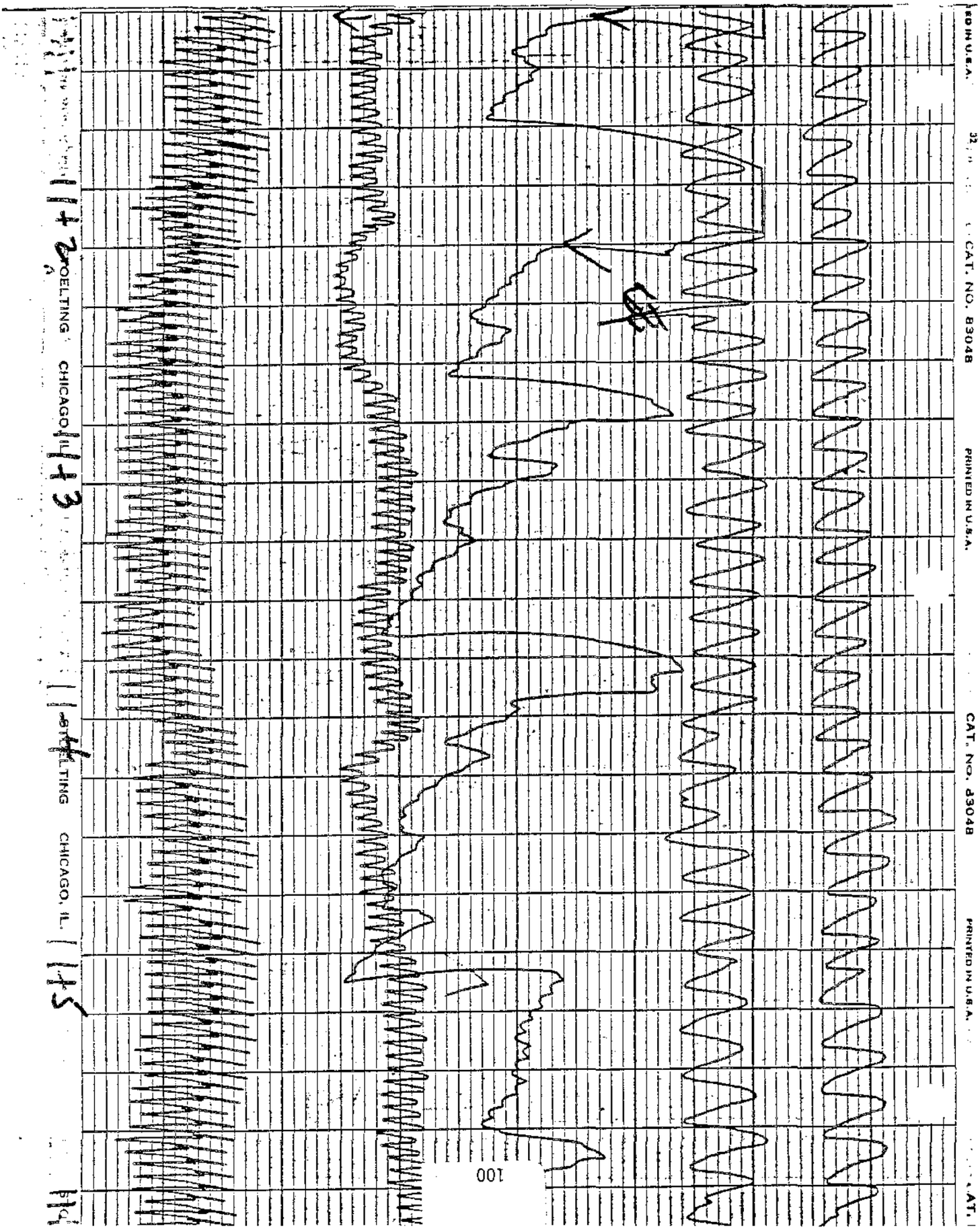


Illustration 20.

Countermeasures in use at Question 4. Timely response caused by toe pressing.

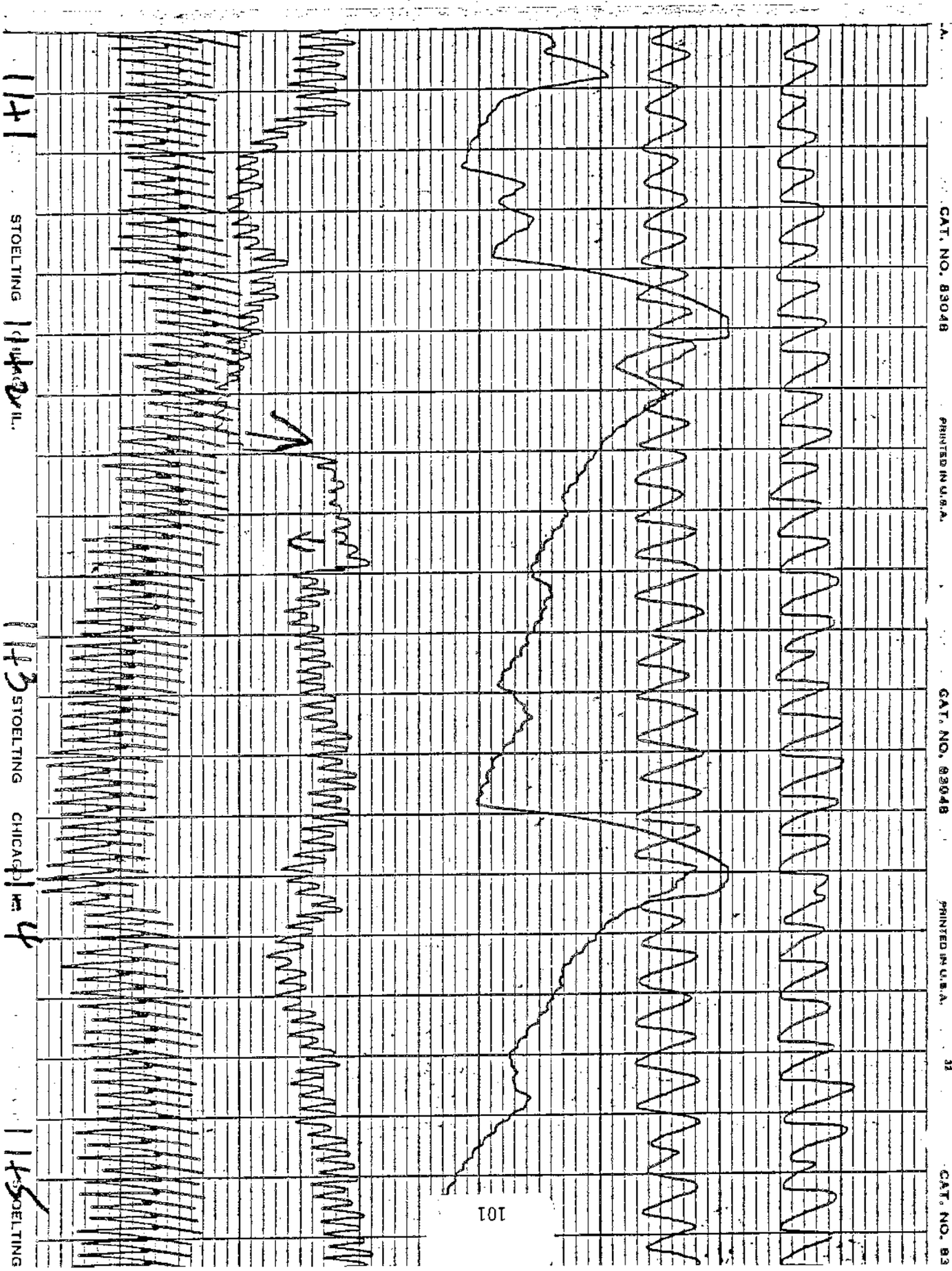


Illustration 21.

Countermeasures employed at Question 6 and 9. Examinee crossed his eyes at both questions.

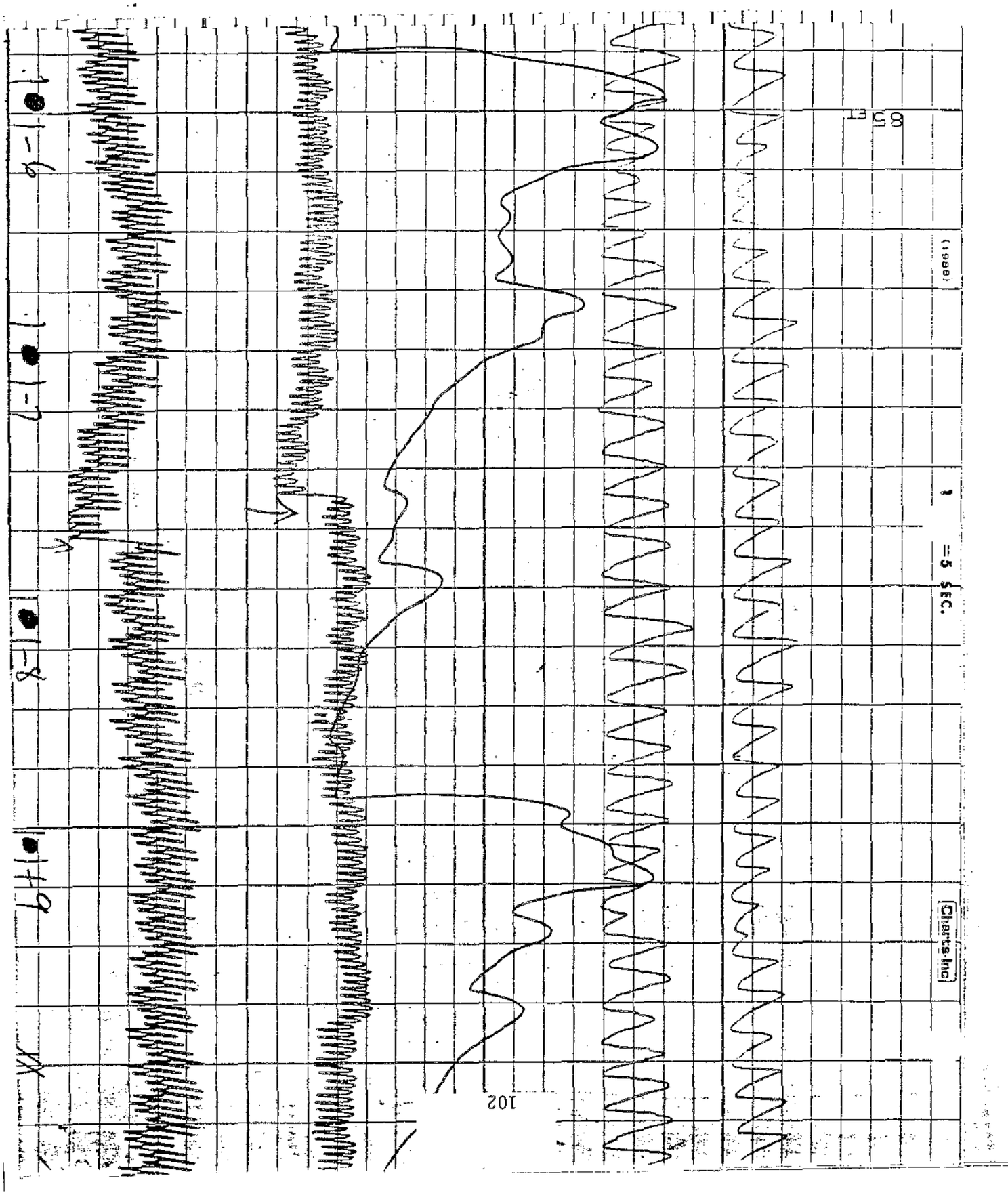


Illustration 22

Countermeasures in use at Question 6.
The countermeasure employed was crossing the eyes; however, note early pneumo which is often an indicator that countermeasures are being employed.

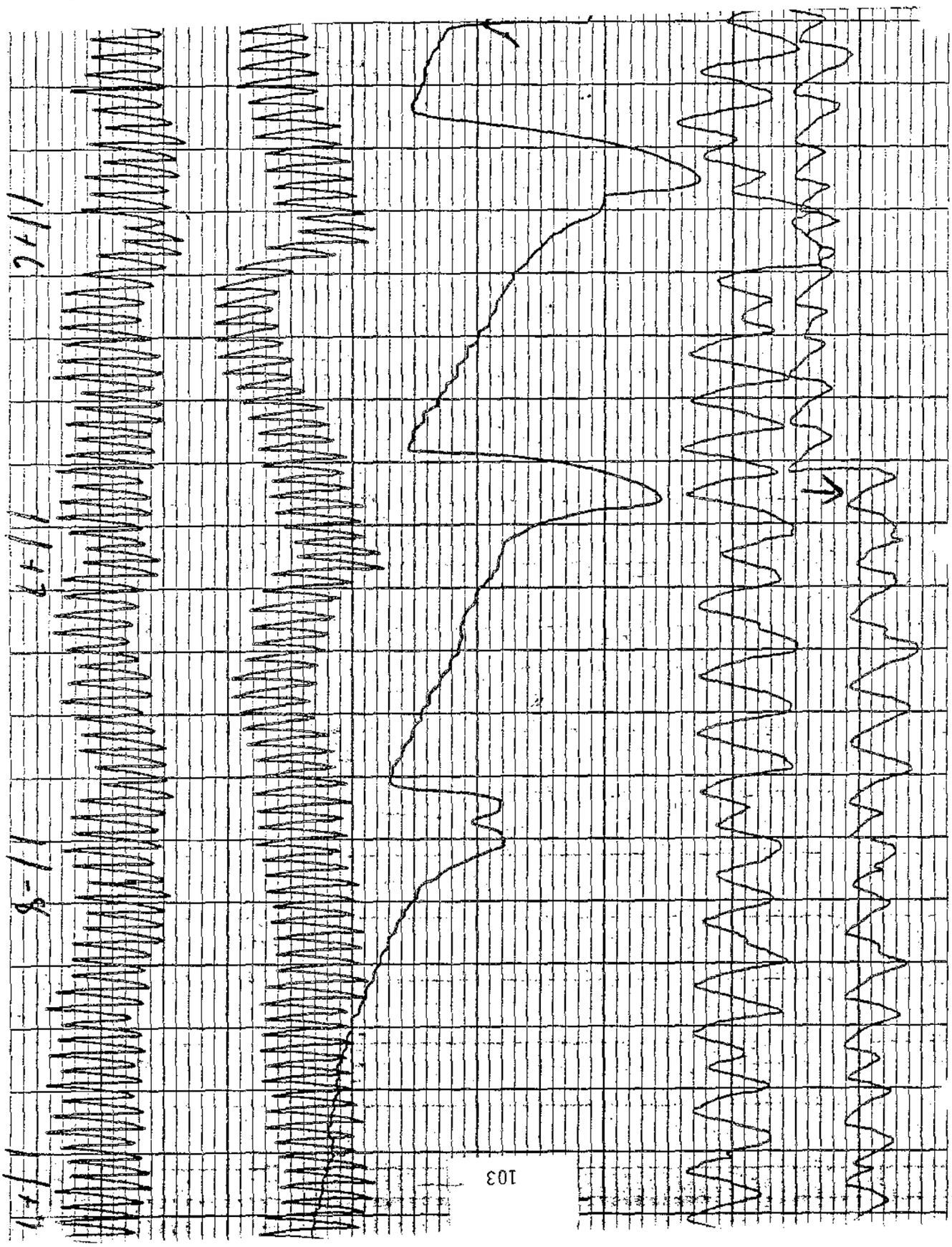


Illustration 23.

Countermeasures in use at Question 6 in form of crossing the eyes. Again, note early pneumo change which is often an indicator of countermeasures use.

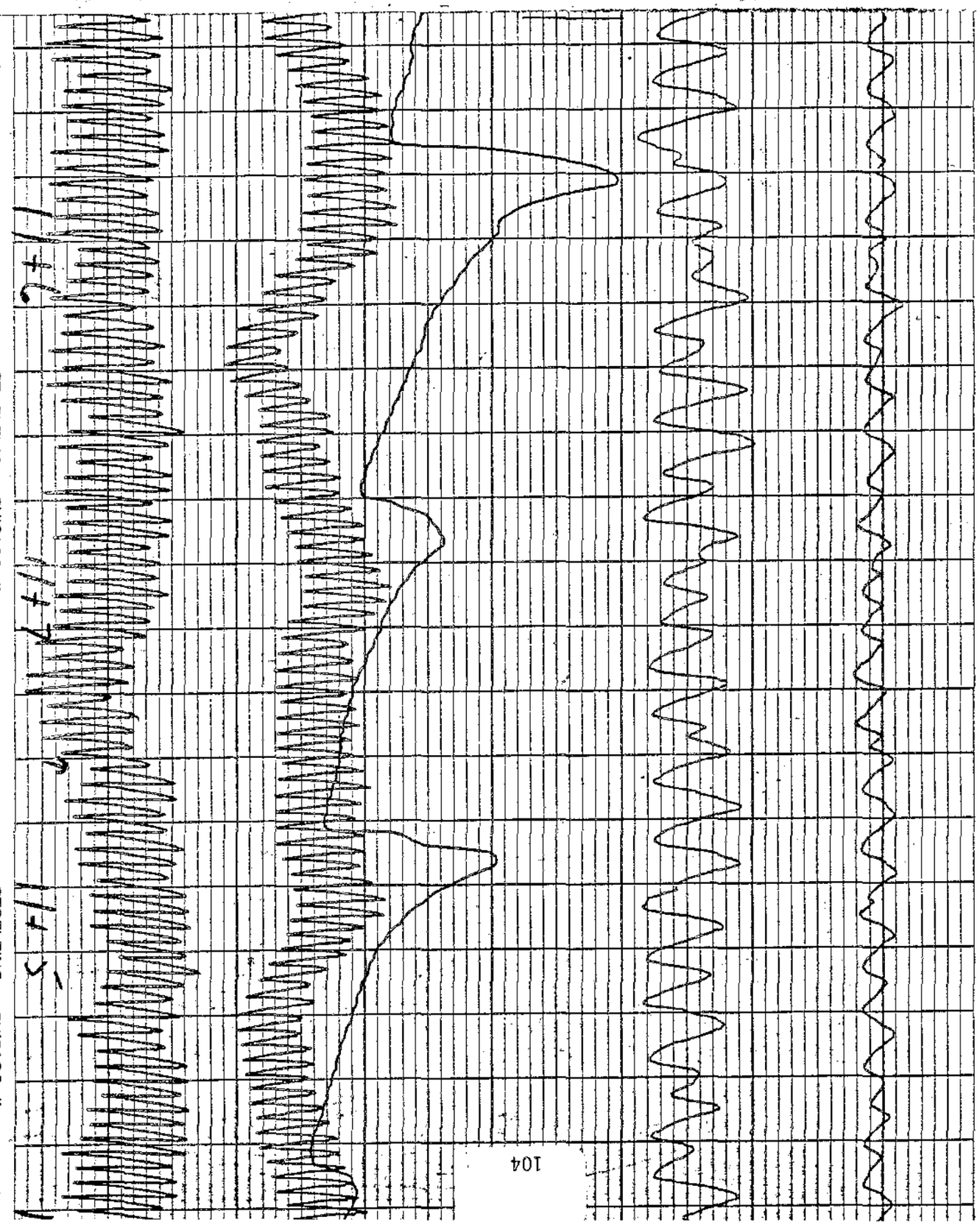


Illustration 24.

Obvious movement at Question 4. This is an example of a clumsy attempt at countermeasures often encountered when dealing with unsophisticated examinees. Even so, note pneumo change.

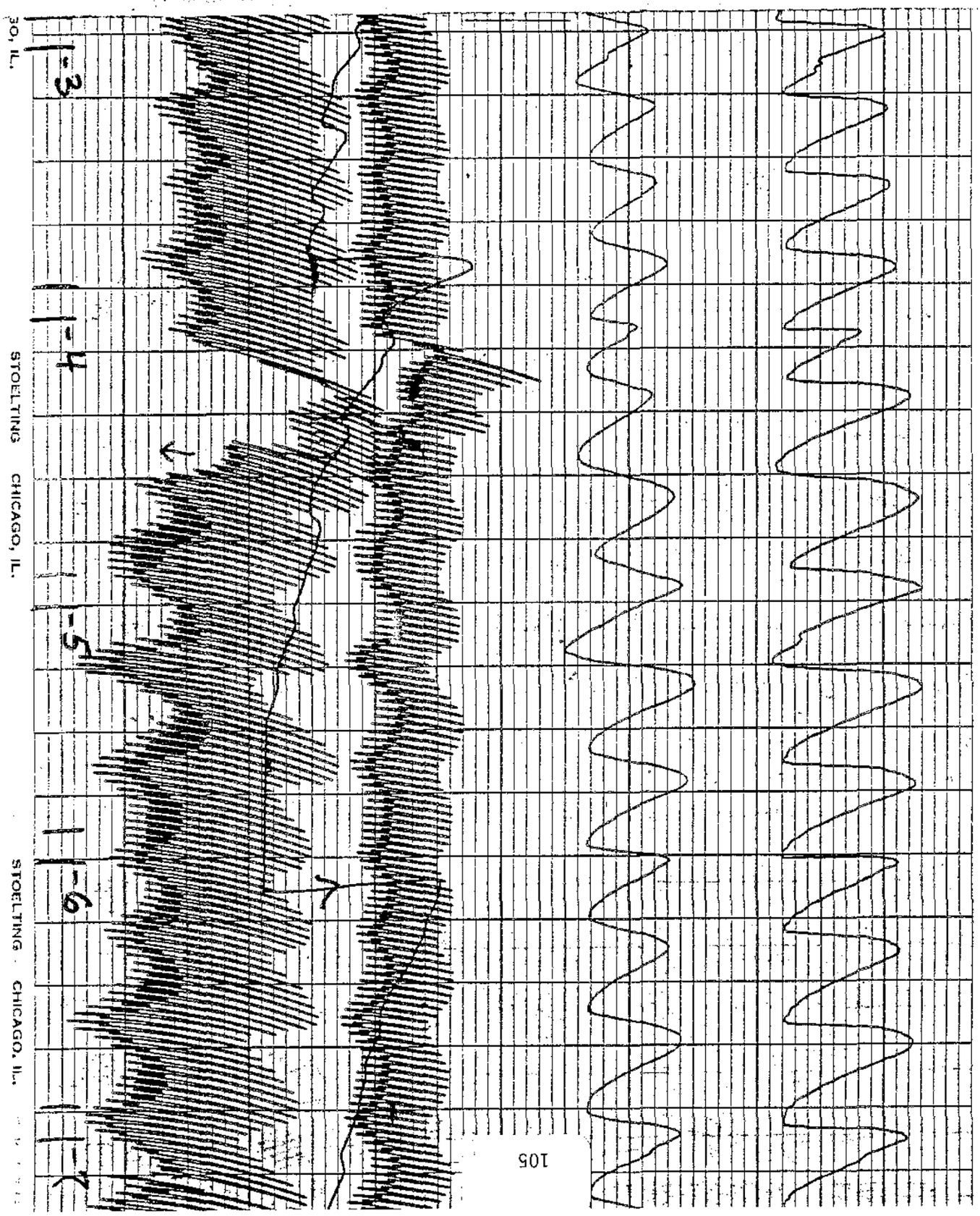


Illustration 25.

Countermeasures in use at Question 6 - pressing down on finger electrode. Not as obvious as some but still discernable as a somewhat distorted GSR tracing. Note pneumo change.

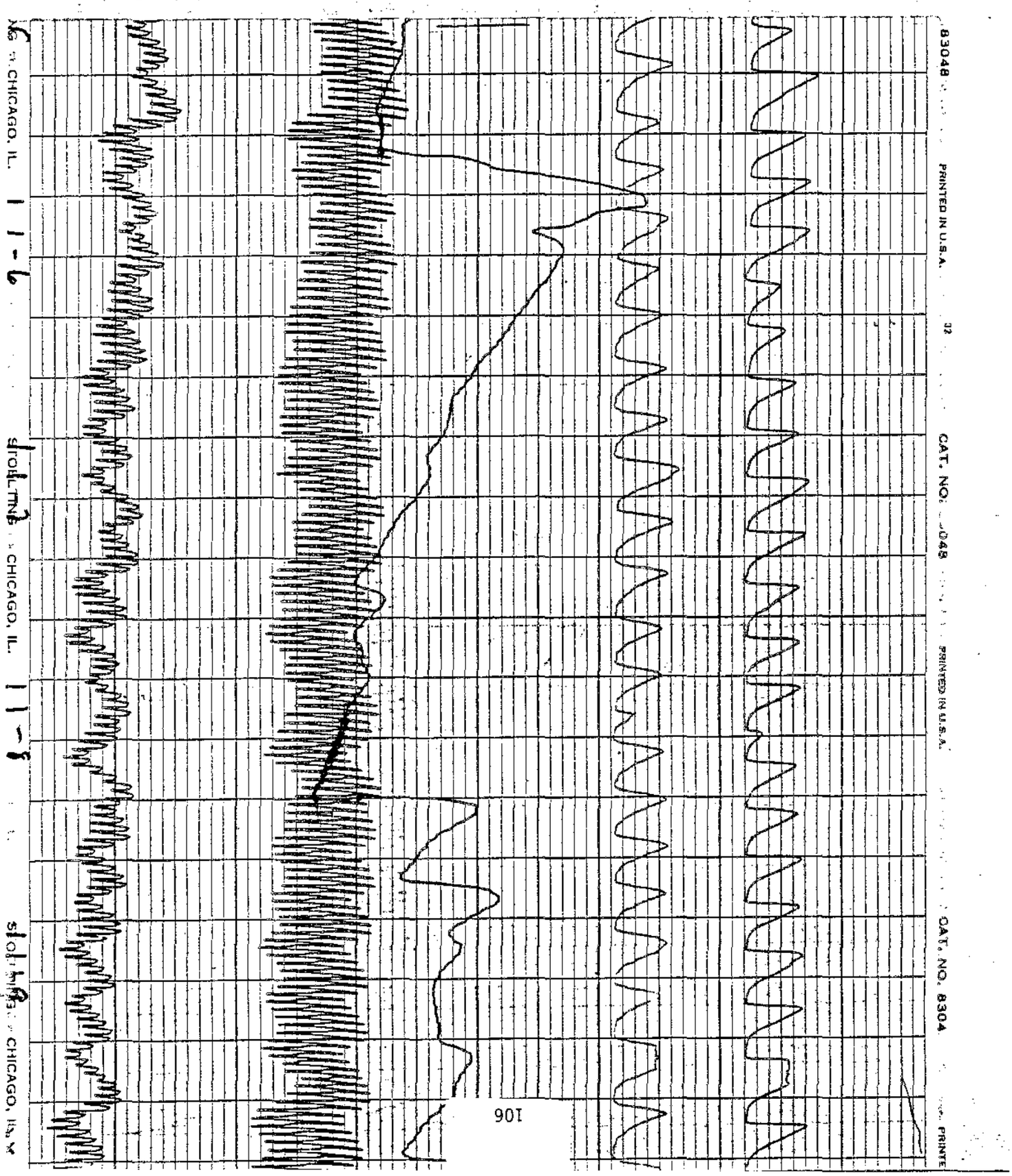


Illustration 26.

Clumsy attempt to use countermeasure at Question 6 by pressing down on a finger electrode. Typical of attempt by naive examinee. Note pneumo change which almost always accompanies countermeasures use, regardless of type of countermeasure.

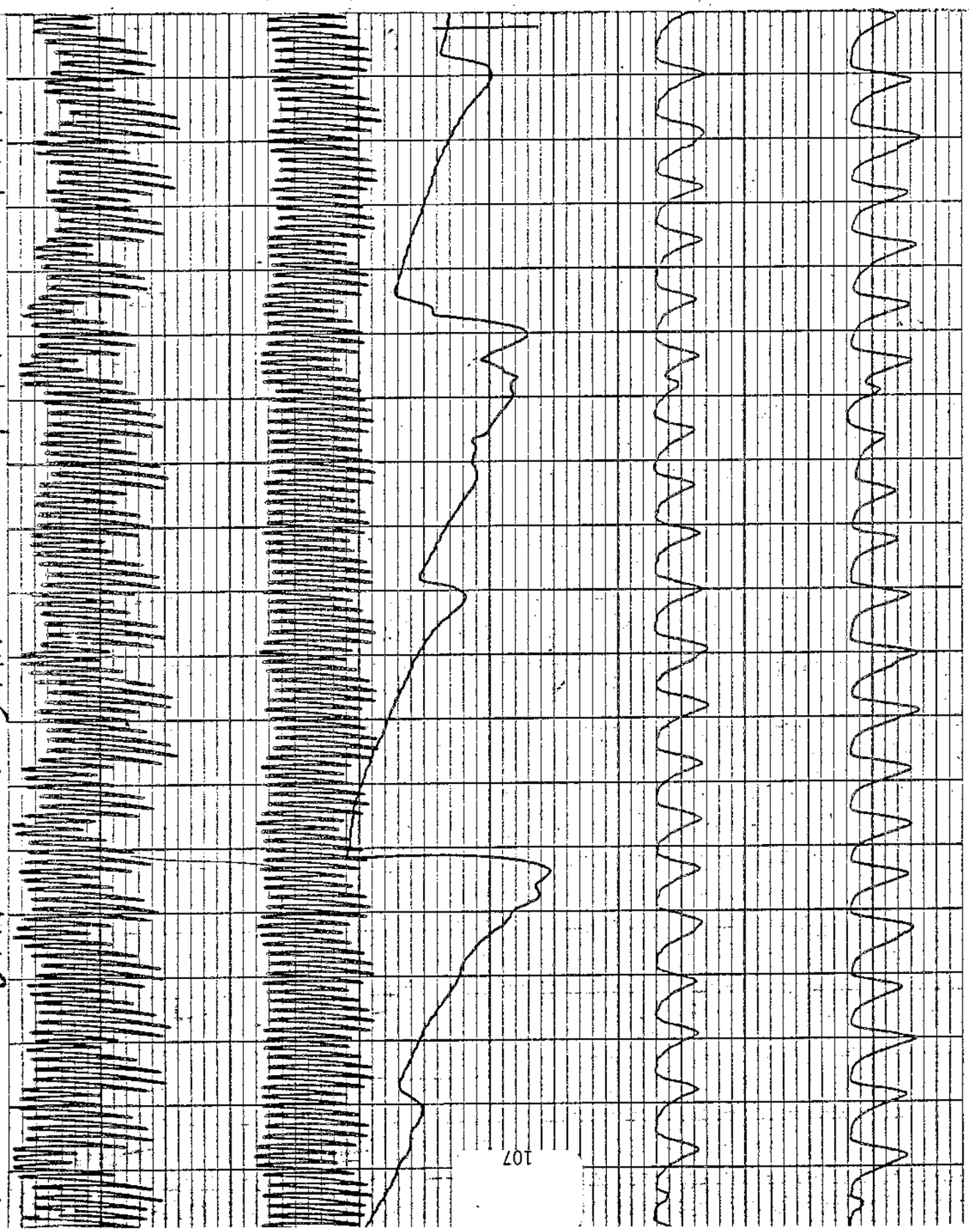


Illustration 27.

Clumsy attempt to manipulate cardio tracing at Question 6. Obvious movement often encountered when unsophisticated examinees attempt use of countermeasures. Note pneumo change which almost always accompanies any attempt at countermeasures.

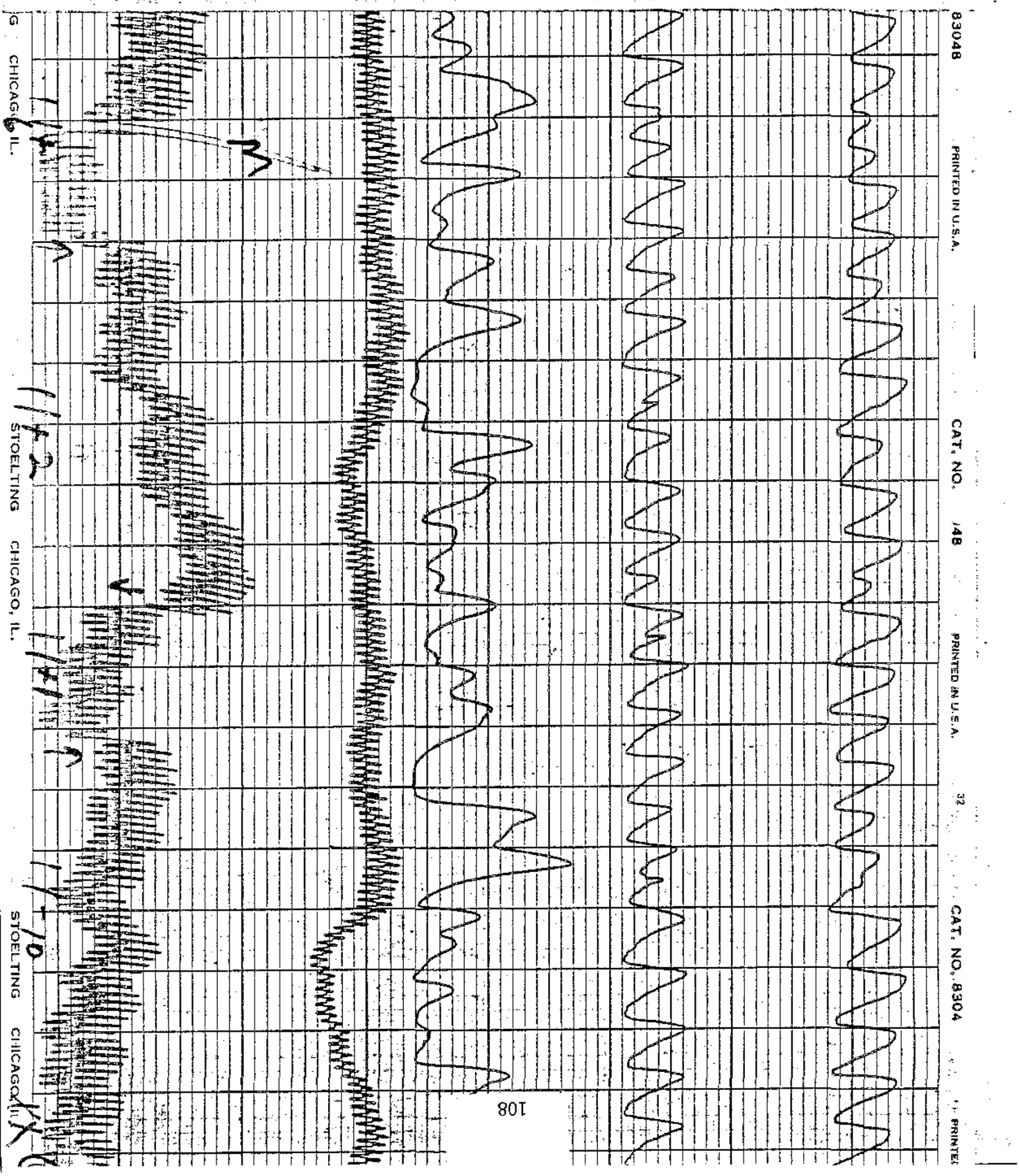


Illustration 28.

Countermeasures, tongue biting, in use at Question 5.

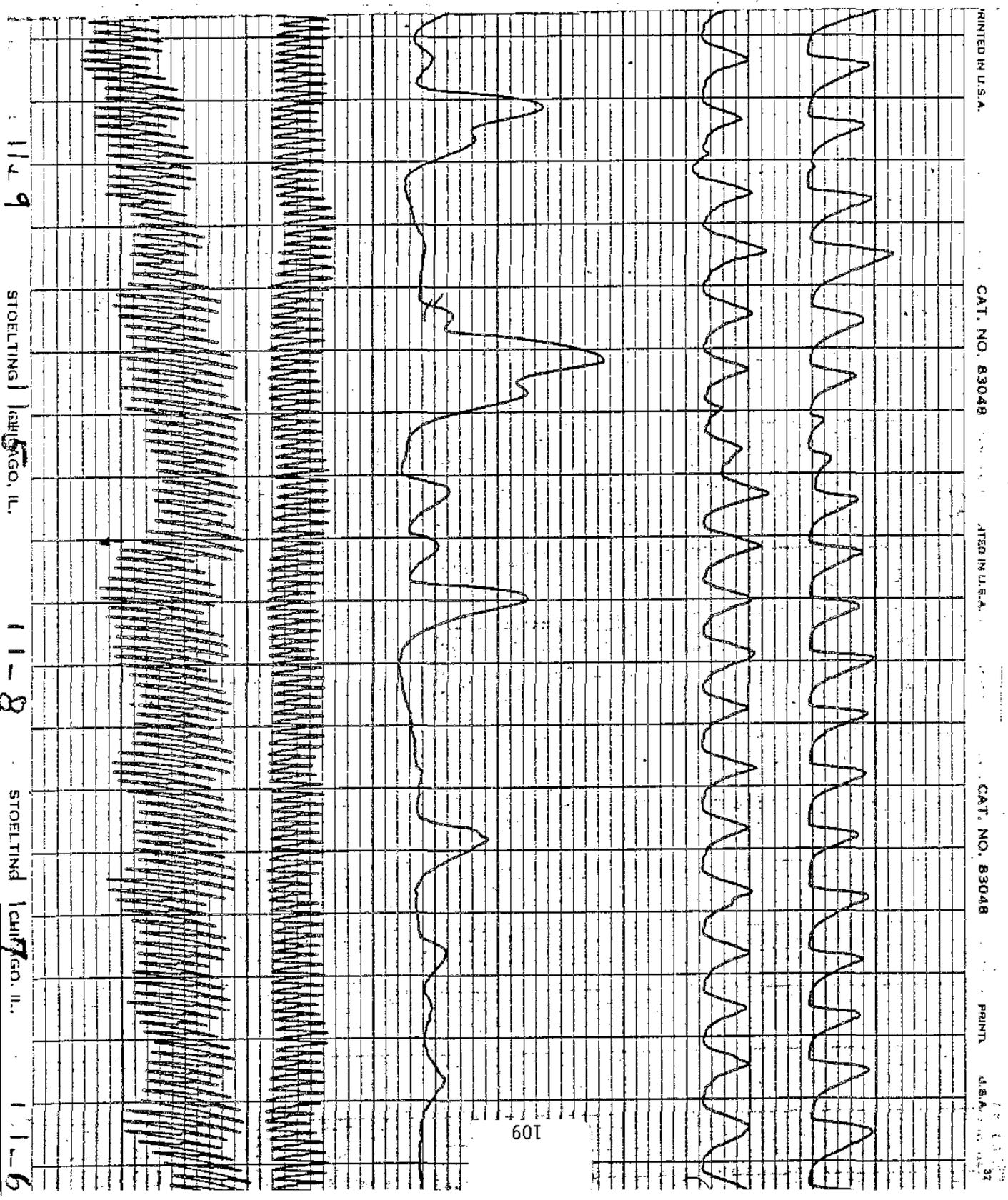


Illustration 29.

Countermeasure in use at Question 5 - tongue biting.

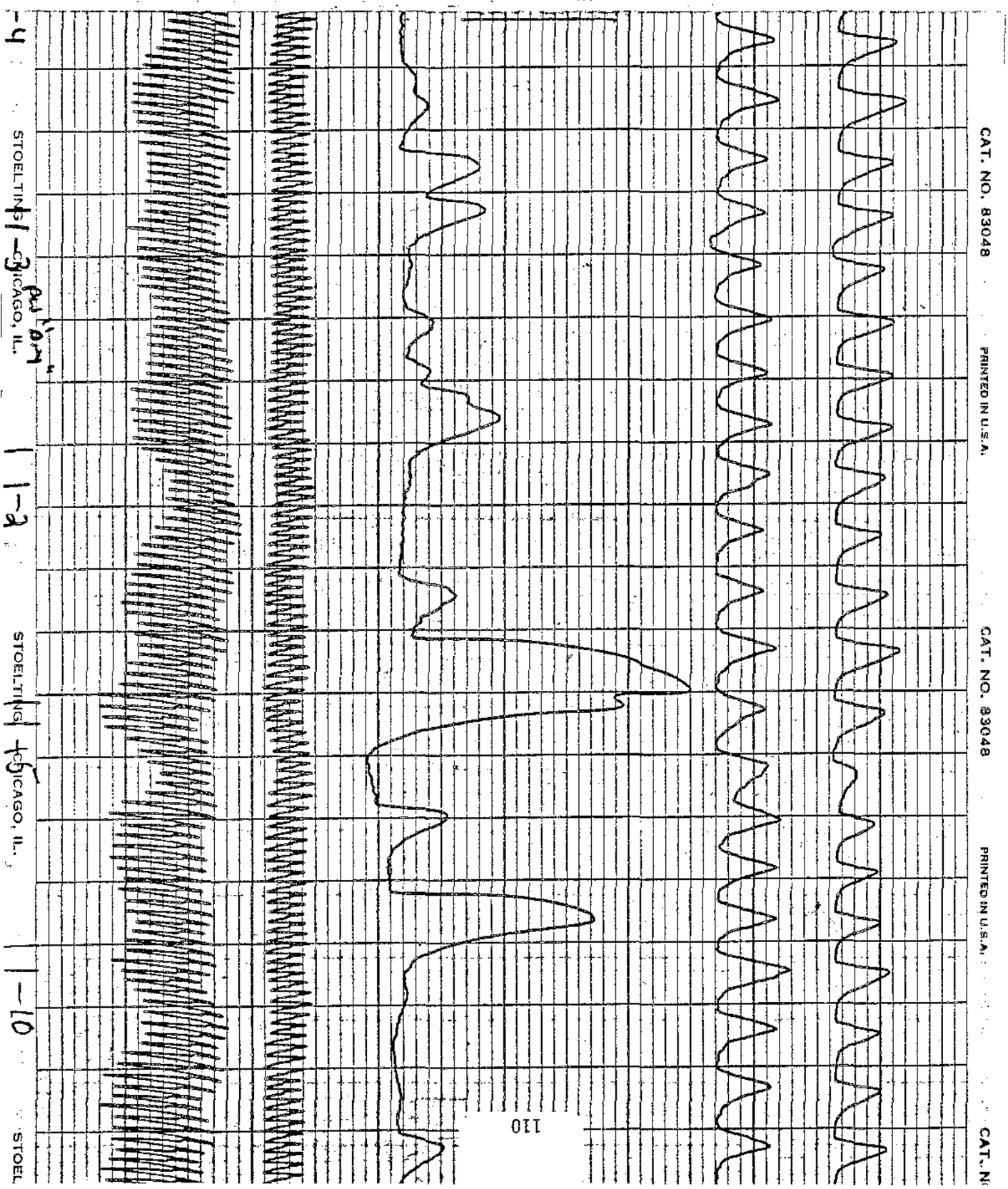


Illustration 30.

Countermeasures employed at Question 4, i.e., biting the tongue. Pneumo is slightly early - often indicative of countermeasures use.

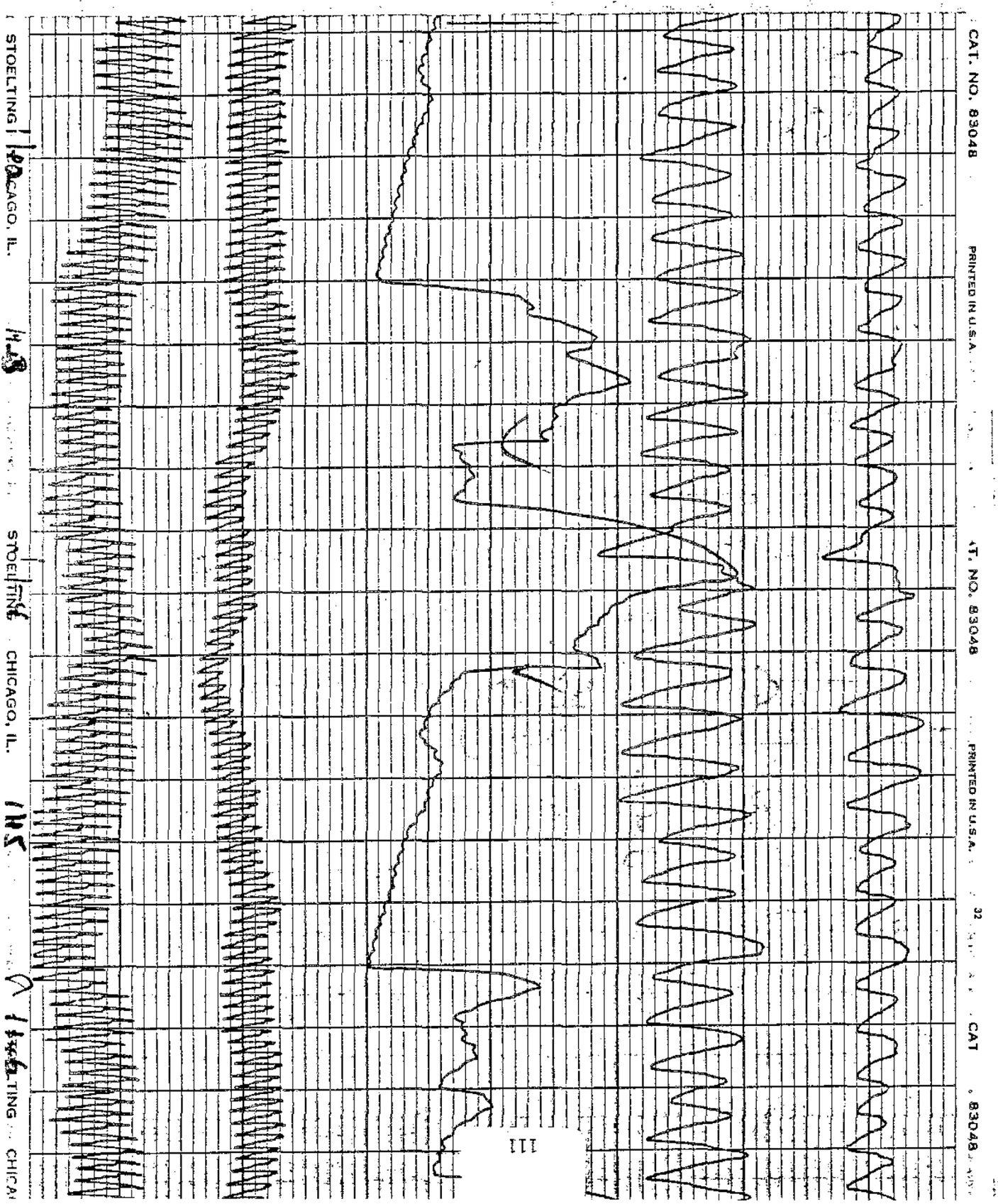


Illustration 31.

Not all countermeasures are equally effective with all people, all the time. This was the proverbial tack in the shoe. At question 7.

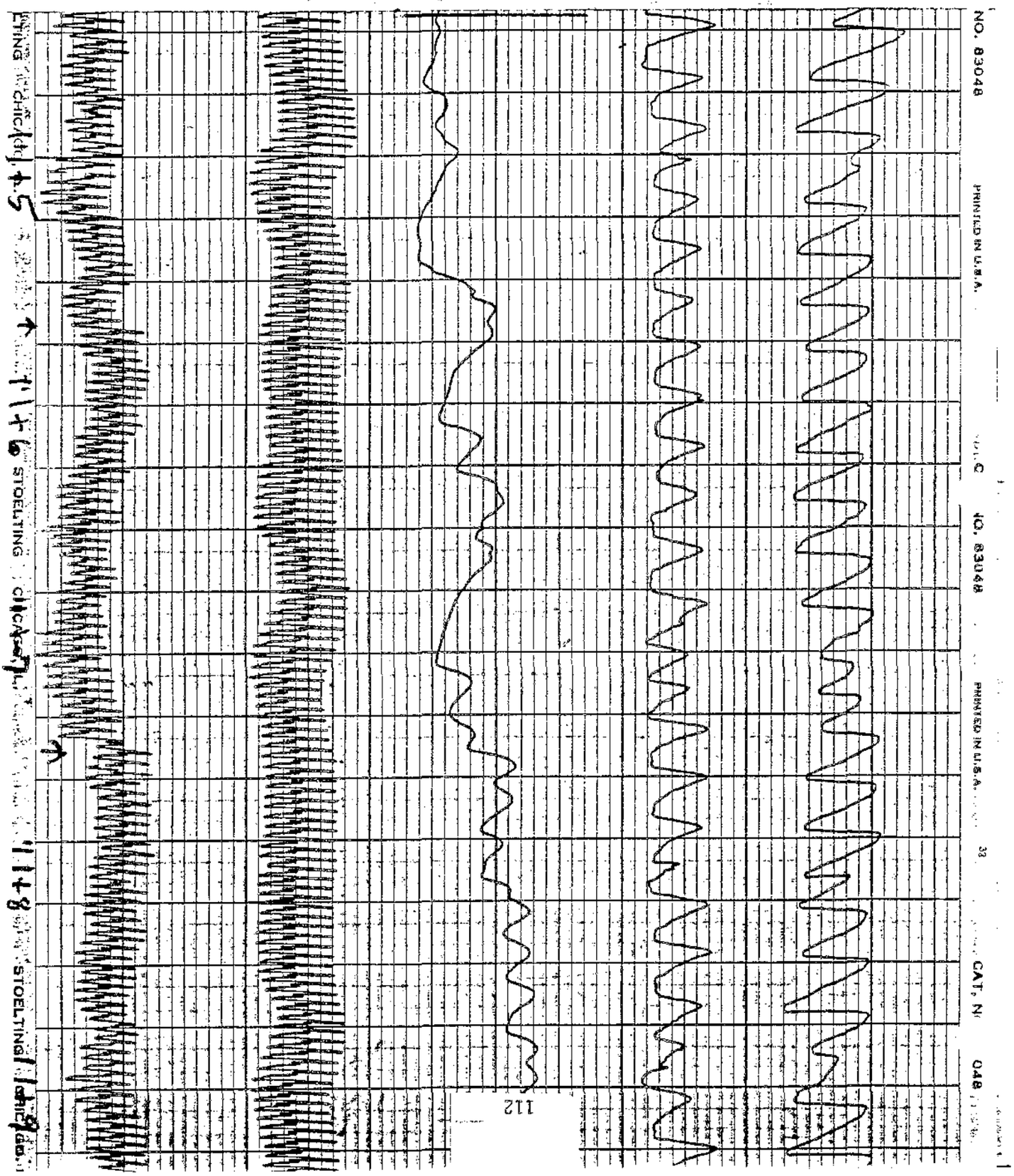


Illustration 32.

Question 7 - The well touted tack in the shoe again. Certainly induced response in GSR and pneumo.

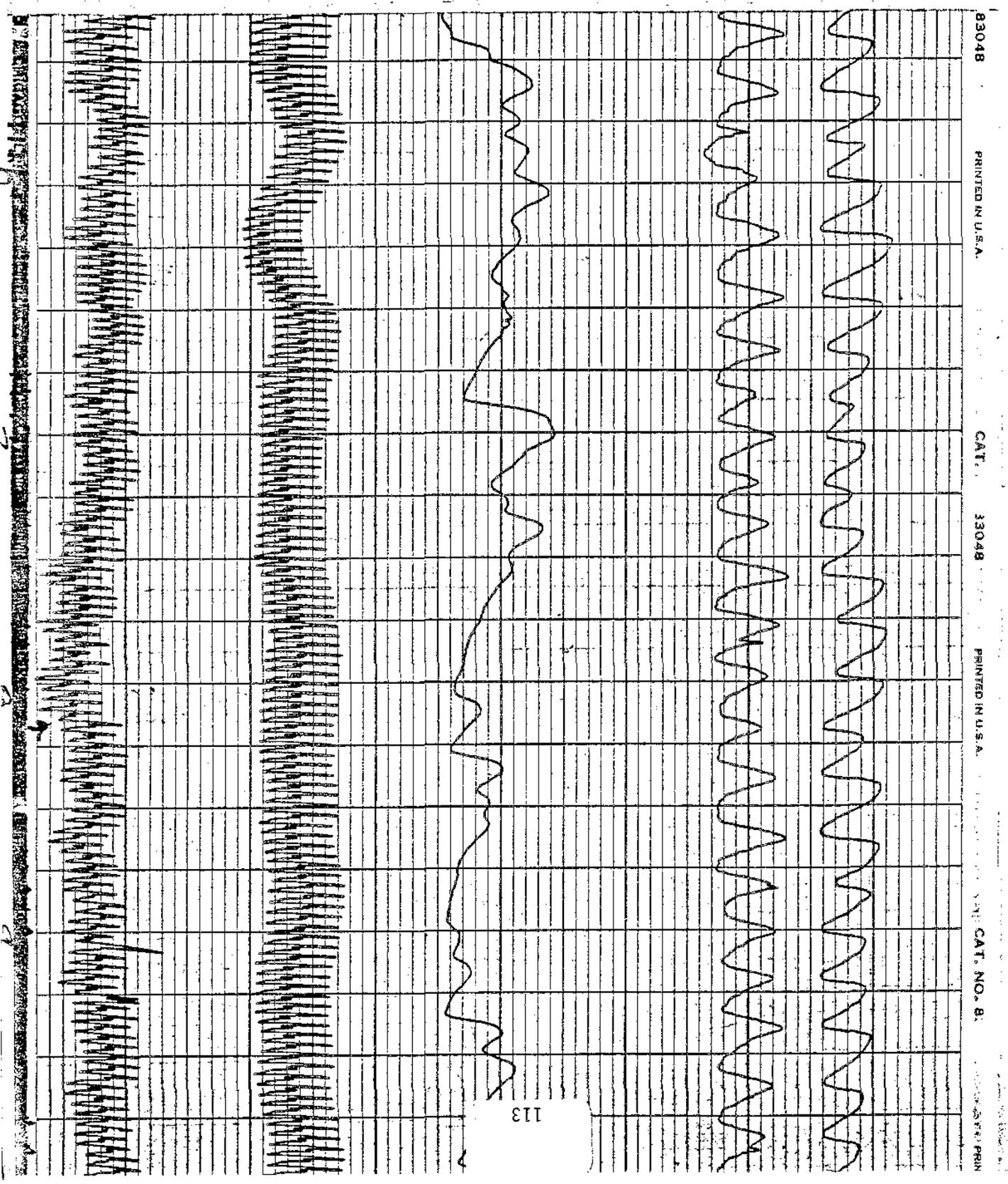


Illustration 33.

Countermeasure in use at Question 8 - Sphincter contraction. Note the typically late cardio/CAM responses and very active GSR/pneumo.

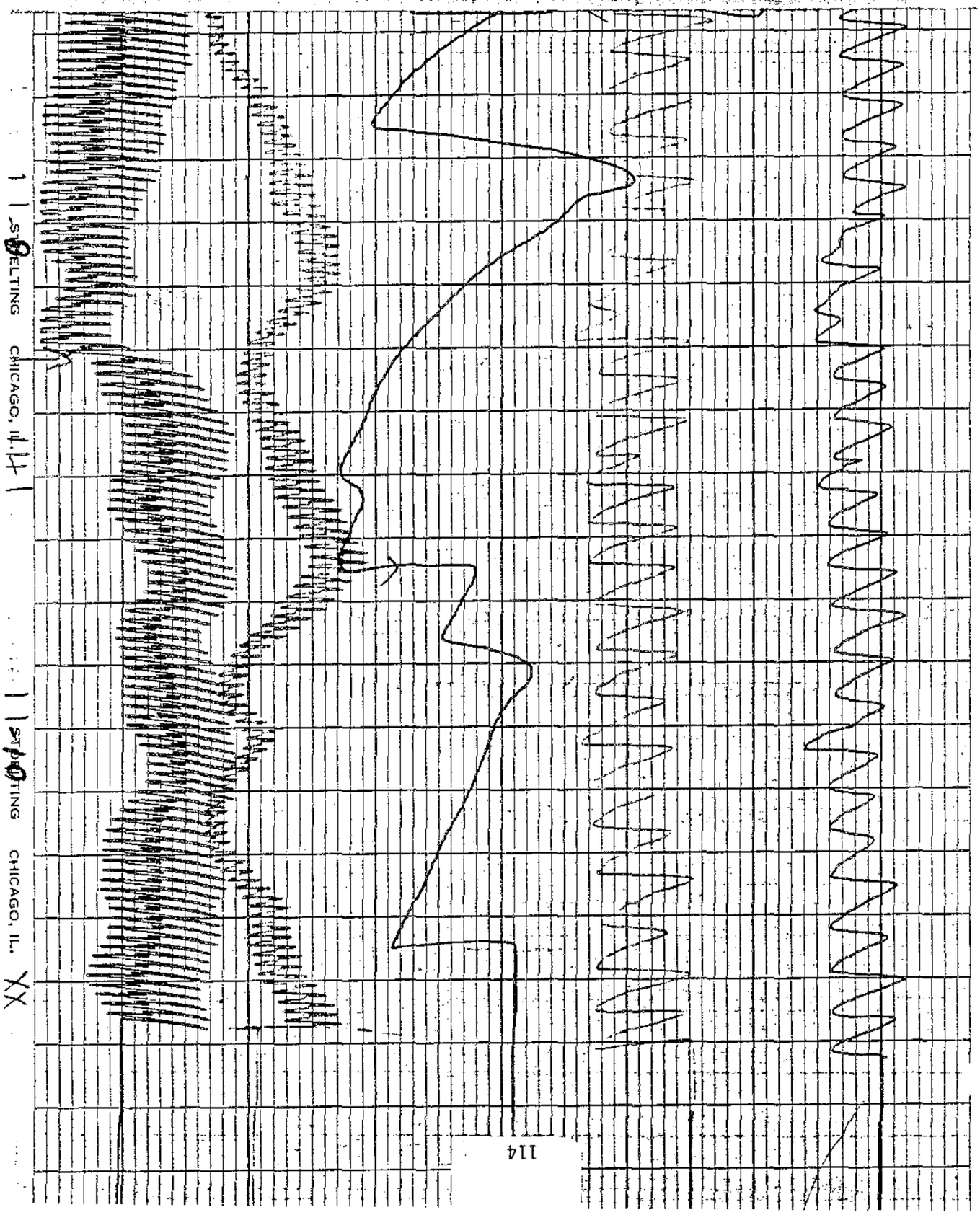


Illustration 34.

NO countermeasures in use, but note early pneumo at Question 5 which is normal anticipatory response. Remember, early pneumo responses are indicators.