VISUAL FIELDS

 Duncan, Okla.

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Quantitative analysis has shown that no given amount of any alkaloid, drug or other agent poisonous to the human organism will produce any specific stage of resulting intoxication. Individual tolerance creates a wide variance in this. It has been determined, however, what specific signs and symptoms will be manifested when a person reaches the various stages, regardless of the amount of the toxic agent required to produce it.

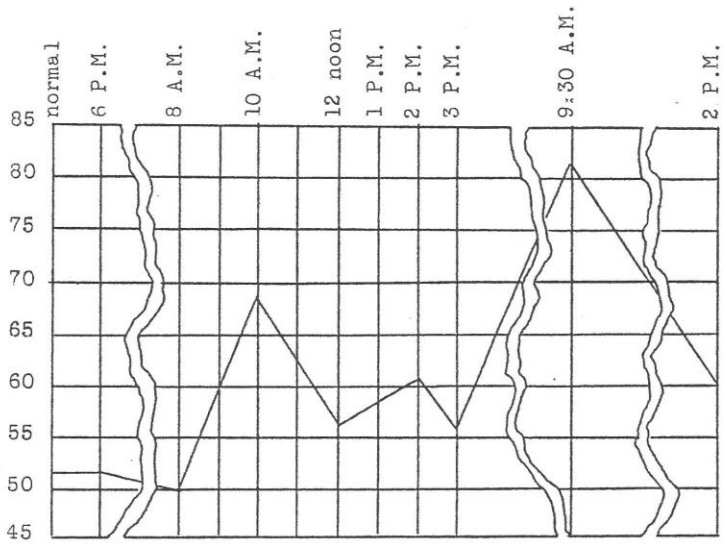
To illustrate this point let us follow the findings in an experimental case of voluntary intoxication from the alkaloid caffeine for the purpose of recording results on specific bodily functions. In order to render the findings valid, norms first had to be established in this individual for the functions beings watched. This was carefully done over a period of time ad when linked with the history they become interesting and important.

The patient was a healthy male, 26 years of age who was a non-smoker, abstainer from alcoholic beverages, non-user of beverages containing caffeine except an occasional cola drink, and was not taking any medicines or drugs. Visual analysis three years earlier had shown him to have a fatigue problem in the "B2" category for which he had been corrected. Objective and subjective findings proved him to be in better visual condition at this time than ever before. Reading rate was 425 words per minute with a comprehension ability of 90%. Over this same period of time perimetric tests had proven him to have normal visual fields, even tending to be larger than average. Pulse rate, systolic and diastolic blood pressure, tonus of ductions, phorias, focus findings of spherical components only at 15 feet were all taken morning and evening for three successive days, after a period of rest, and they were averaged to obtain a near norm. Fields were also taken at each of these times and they remained perfectly normal. The table gives these figures and their comparisons during the stages of intoxication.

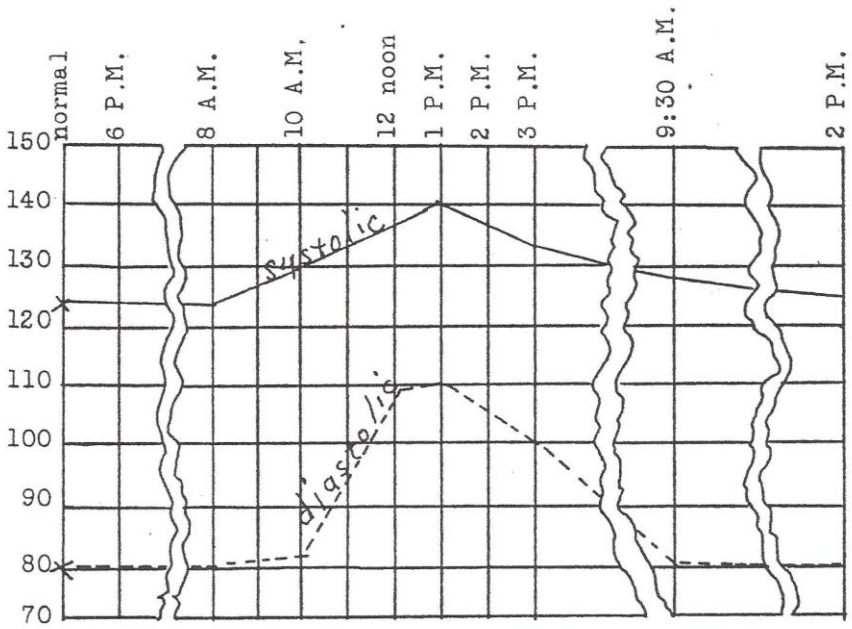
Beginning on April 29, 1938 at 7:00 A.M. the patient took, in capsule form three grains of caffeine* each hour until 3:00 P.M. Tests of the various functions were made throughout the day to show the effect of caffeine.

*Three grains of caffeine is the amount found in an average cup of coffee, although it may vary from 1 ½ to 7 grains, depending on the quantity used per given amount of water and on the manner ad length of time of brewing.

		Amount of drug	Pulse	Systolic	Diastolic	Respiration	Ductions far	Ductions near	Phorias far	Phorias near	Subjective
3 day average A.M. & P.M.		none	54	125	80	23	B.O.30+/25 B.I. 7/3	B.O.30+/20 B.I.21/12	1 Exo.	4 Exo	+1.00
April 28th	6:00 pm	none	49	124	80	24	B.O.30+/26 B.I. 7/3	B.O.30+/21 B.I.20/12	1 "	3 "	+1.00
April 29th	8:00 am	3 gr.	59	-	-	-	-	-	1/2"	4 "	+1.00
"	10:00 am	9 gr.	68	128	82	25	-	-	-	-	-
"	12:00 noon	15 gr.	56	135	108	27	B.O.30+/30+ B.I.10/5	B.O.30+/28 B.I.24/16	ortho	2 Exo	+1.00
"	1:00 pm	18 gr.	58	140	110	27	-	-	-	-	-
"	2:00 pm	21 gr.	62	-	-	27	-	-	-	-	-
"	3:00 pm	24 gr.	56	133	100	25	B.O. 20/20 B.I. 5/2	B.O.30+/20 B.I.17/4	ortho	ortho	+.75
April 30th	9:30 am	none 18 hrs	82	127	82	28	B.O. 26/24 B.I. 8/3	B.O. 28/24 B.I. 19/10	-	-	+1.00
"	2:00 pm	none 23 hrs	60	125	80	26	-	-	-	-	-



PULSE RATE



Blood Pressure Chart

SYMPTOMS OF PATIENT

8:00 A.M. General feeling perfectly normal in every respect.

11:00 A.M. Slight vertigo, dizziness, nausea and nervousness. Muscle tonus was greatly increased. Hyper-active and irritable.

1:00 P.M. Increase in same symptoms. Also mild occipital headache.

3:00 P.M. Increase in nausea and headache. Numbness of cutaneous tissue around frontal and parietal head areas.

4:00 P.M. Excessive nausea and vertigo. Throbbing headache.

5:00 P.M. Administration of 2cc digitalis. Slight decrease in symptoms soon followed.

7:00 P.M. Gastric regurgitation several times. Excessive nausea for three hours more. 10 grains of aspirin and 10 grains of sedormid "Roche." Fair sleep.

9:00 A.M. Next morning. Though he had never had the experience he stated he felt like a "hangover from usage of alcohol."

FIELDS

The first set of fields are typical of the habitual, or normal field of the patient. It will be noted that they are of fair size and there are no overlappings or interlacings of the color outlines. At 8 o'clock in the morning there is no change sufficient to be classed as of diagnostic value. At 11:00 A.M. there is a very definite change and that is the increase in the size of the green field to where it interlaces with the outline for red, evidence of a reaction to a stimulative type of intoxication. The next set of fields taken shows a complete inversion of green over red, the maximum state of stimulation. (Note that both eyes are affected about equally, a phenomenon not always encountered, usually one eye is much more advanced than the other). At 30° when the other functions are in a state of depression, the fields show a much restricted area, and a definite collapse of green with red and blue interlacing, the field indication of the depressive stage of exogenous intoxication.

While taking the field at 3:00 PM. The patient had a very difficult time holding fixation and the attention factor was so lacking that he left, (or fell from), the perimeter three times during the procedure. This set of fields took about thirty minutes to record while the others required only about eight or ten minutes.

ANALYSIS

There is no question but that the patient suffered a very definite poisoning from caffeine. Biologic reaction bears this out as well as the generally observed symptoms. Almost immediately after administration of the first dosage a stimulative effect was noted in respirations, pulse and blood pressure. A little later when more drug had been consumed and its effect became greater, the duction findings showed a marked increase in their reactions, all ductions were higher. Phorias showed a stimulated effect in that exophoria was reduced, a step toward esophoria. The important thing to us is that while these stimulated effects were present the fields showed an increase in size and the green overlapped and finally completely surrounded red.

Next let's observe the results later in the day when even more of the drug had been taken. Ductions showed a sharp reduction, particularly in the recovery points. Phorias are even further reduced from exophoria showing greater tendency toward the classic "toxic esophoria." Now even the ordinarily less affected reflex of focus has been altered as showed by the lowering of the subjective at far. It has been reduced from plus 1.00 to plus .75. Blood pressure and respirations are descending from their stimulated phase. While these depressive conditions are present the fields show a collapse, and an interlacing of red and blue.

The next morning after freedom from the drug for 18 hours, ad fair sleep, the fields are back to normal showing definite relief from the toxic effects. Ductions and subjective are nearer normal too. No phoria as recorded at this time. Blood pressure and respirations were back only erratic finding.

One case doesn't prove anything in regards to an average of the race or another single case. This, however, is merely a concrete example entirely within keeping with the findings of thirty thousand cases of controlled research done in clinics, schools and private practice. It shows very definitely two distinct stages of intoxication before the better known results, degeneration, scotomas, etc., take palace. After degeneration has taken place Optometric care can do little if anything toward restoration, and will be practically limited to prevention of further degeneration. It is obvious that the Optometrists work will be of more benefit to the patient if he can find and eliminate such toxic sources that do affect many patient's visual efficiency. Economically he is plainly "saving" those patients who may otherwise be neglected and dissatisfied, or referred to another practitioner needlessly.

Rather than leave analytical perimetry here with a mere introduction we will carry it further to assist practitioners in applying it in their own offices without any upset in their routines. By becoming acquainted with the technique of measuring fields the rest will be as easy as A B C if the cases and analytical chart are followed as will be given. Through this simple work cases who won't respond to routine Optometric methods can be differentiated from those who will.

Some actual case histories in just how some of the various alkaloids and other toxic agents have affected vision where lenses and orthoptics wouldn't solve the problem will be shown and discussed.