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Physiologic Effects of the Emotions

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CARELESS NEWS REPORTS.—Permit me first to say an introductory word about newspaper reports of scientific investigations. It seems to me that every newspaper that aspires to report current scientific progress should have a science-editor competent to pass judgment upon the contributions of news-writers and journalists; and in all instances, where a report is made upon the work of a serious investigator, the article should be submitted to him for correction as to the truth of the statements regarding matters of fact. It is not probable that a hurried reporter can sufficiently digest the work of a specialist in a few hours to enable him to give a correct account thereof; and it moreover frequently happens that a news-correspondent is wholly unfamiliar with the specialty which he is called upon to write up at a day's notice. A little more supervision along this line would result in great good to the public, and much enhance the usefulness of the daily press as a public educator—a province which it is destined more and more to fulfill.

The immediate occasion for these remarks is the recent publication of a piece of news regarding my alleged "wonder bottle," about which I had never heard until I saw it in the daily press. This article alleges that by passing the breath through the solution in the bottle there appear colors corresponding to the emotions, and that the emotions correspond to a chromatic scale of color. Now it is true that the condensed products from the perspiration of a sad person produced different kinds of effects upon certain chemicals and these effects are different from those produced by the condensates from the breath of a happy person; and it is true that the presence of these condensed products is indicated in the test tube by filtrates and precipitates whose colors differ according to the kind of chemical used in the process of analysis, but there is no relation between the colors produced and the kind of emotion. With a certain chemical, the eliminated products of the breath from a sad person will be brown; but with a different chemical the color will be green, and might be any other

color, according to the chemical used. The colors that result on mixing chemical reagents with the moisture condensed from the breath, or with any other excretory products, is due to chemical reactions, and there is no *causal or symptomatic relation between kinds of emotions and kinds of colors*. The colored precipitate from remorse or guilt might be green, blue, or black as well as pink, according to the reagent used. About five years ago a paper announced this experiment with the headlines: "THE COLOR OF SIN IS PINK"; and a member of a religious convention said that my discovery of the relation of emotion and metabolism had scientifically demonstrated that the Bible is correct when it says: "Though your sins be as scarlet," etc. And during the same year, in another convention, it was stated that science is becoming dangerous in its tendencies because, "A Washington chemist had recently stated that the color of sin is pink, whereas, on the contrary, the Bible distinctly states that sin is not pink but scarlet!" Since then I have had frequent occasion to correct the report that I have discovered that there is a scale of emotion corresponding to a chromatic scale of color. What I really did in this line is far more interesting and instructive than these sensational fictions about it, as I will explain:

EMOTION AND METABOLISM.—A number of years ago I studied the effects of emotions on the body and especially on the chemical character of the bodily secretions and excretions; and I discovered that the sad and depressing emotions augment the amount of poisonous constituents that are eliminated from the body through the excretions; and found also that the happy and cheerful emotions augment the nutritive chemical constituents of the bodily secretions. It happened that the presence of some of these poisonous constituents in the bodily excretions was made known by chemicals which color the excretions on being analyzed, and of course the color of the precipitate or solution depends on the particular chemical reagent that is used,—being perhaps pinkish in one case and blackish in another. This was sensationally misinterpreted by certain writers, and has led to the supposition that the emotions were registered in colors, which have some kind of causal relation to the emotions; nothing can be farther from the truth than the report that I have a "wonder bottle" in which the emotions are recorded in terms of the chromatic scale.

This is what I have actually done in that line: I have studied the effects of the emotions on metabolism, and not of thought on metabolism. I must first explain what I mean by emotion. The mind is made up of the intellect, which consists of states and processes of the sensations of at least nine kinds, images, concepts, ideas, thoughts, reasonings, and introspections; by the intellect we know or cognize truth. The mind consists also of feelings; such as

the feelings of the bodily organs, the appetites, the desires, and the emotions; the mind also consists of the volitions and conations; and also of the subconscious processes that underlie all the conscious states. Now, I studied the effects of the feelings on metabolism—such feelings as pleasure and pain and the different emotions; and I did not thus study the effects of the intellectual functions which I have named, or of the volitions, etc. Metabolism is the name of all those chemical changes taking place in the bodily cells by which their nutrition is accomplished, and by which growth, repair, and the excretion of their by-products takes place. When metabolism results in growth and gain to the individual it is called anabolism, and its products are anabolins; when it takes place at a loss to the individual it is called katabolism, and its products katabolins. Now I discovered that the happy emotions augment anabolism, and I have named the products anastates; and that the painful and depressing emotions augment katabolism, and I have named the products katastates. The chemicals by which the katastates are detected produce certain colors with the excretions collected during the remorseful and sad emotions; but if a different chemical were used as the analytic reagent the color would be entirely different.

OTHER BODILY EFFECTS OF EMOTIONS.—It need not surprise anyone that the emotions of sadness and pain and grief affect the bodily secretions and excretions, because everyone must have observed that during these depressing emotions the respiration goes on at a slower rate; the circulation is retarded, digestion is impaired, the cheeks become pale, the eyes grow lusterless, and so forth; whilst on the other hand, during happy and joyous moods, the respiration and circulation are accelerated, digestion is augmented, the cheeks grow rosy and the eyes bright, and so on.

There is no more interesting way of showing the bad effects of the depressing emotions than experiment No. 36 on the fatigue point. A dynamometric spring, similar to an eight-ounce weighing scales, is fastened to an upright support, and with its lower part several inches above a stationary arm, in such a manner that by placing the thumb on the lower arm and a finger upon the spring, it can be moved up and down against the resistance of the spring, so as to pull against a constant resistance. By keeping time to a pendulum it can easily be determined how many strokes are required to produce such a degree of fatigue that it is impossible, by any effort of the will, to cause one additional movement; and that number of strokes represents the “fatigue-point.” If the experiment is repeated during an intensely depressing mood, or if the mood is induced by recalling all the sad experiences in one’s life, then the fatigue-point will be reached with a much smaller

number of strokes; and if the experiment be repeated during a happy mood a much larger number of strokes will be required. This is true not only of muscular movements, but also of every intellectual emotional and volitional process.

The system makes an effort to eliminate the metabolic products of tissue-waste, and of the depressing emotions, and it is therefore not surprising that during acute grief tears are copiously excreted; that during a sudden fear the bowels are moved and kidneys are caused to act, and that during prolonged fear the body is covered with a cold perspiration; and that during anger the mouth tastes bitter,— due largely to the increased elimination of sulpho-cyanates.

The perspiration during fear is chemically different, and even smells different, than during a happy mood.

Please note that it is not the effect of thought but of emotion that I have in this instance studied; and the proof is conclusive that we can by a mental effort induce emotions which directly alter the bodily metabolism. Let me summarize experiment No. 19 as recorded in my records. A subject submitted to urinalysis every three hours daily and nightly until the standard amount of urea and other eliminated katabolins was determined—taking account of a certain average daily range of normal variation. But when by an effort of will, he caused himself to recall all the unhappy and sad experiences of his life, so as to make the emotions of remorse, grief, and shame become dominant, there was always a notable increase in the quantity of poisons eliminated. Remember this is not due to thinking, or ideating or imaging the events of his past life, but to emotions.

By training the happy and good emotions life and health are promoted; and submission to the evil emotions obstructs and shortens life,—and thus even in its very bio-chemical nature the Universe is moral. In the course of evolution all life-destroying acts become painful and all life-promoting acts become pleasurable; and by proper training the depressing emotions can be practically eliminated from life and the good emotions rendered potently dominant. All this is extremely optimistic.

Jog on, jog on the foot-path way
And merrily hent the stile-a;
A merry heart goes all the day,
Your sad tires in a mile-a.

PRACTICAL RESULTS—Through the skin, kidneys, lungs, and bowels there takes place, during health, a constant elimination of the waste-products and by-products of destructive tissue-

changes; and if these katobolins of waste and the katastates of depressing emotions were not thrown out of the system, death would result quickly. If the skin becomes inactive through cold, congestion of the lungs quickly follows; if the kidneys fail to excrete these poisons through the urine, the deadly uraemia sets in, and so on. Now, it can be shown in many ways that the elimination of waste products is retarded by the sad and painful emotions; nay, worse than that, these depressing emotions directly augment the amount of these poisons. Conversely, the pleasurable and happy emotions, during the time they are active, inhibit the poisonous effects of the depressing moods and cause the bodily cells to create and store up vital energy and nutritive tissue-products.

Valuable advice may be deduced from these experiments: during sadness and grief an increased effort should be volitionally made to accelerate the respiration, perspiration, and kidney action, so as to excrete the poison more rapidly. Take your grief out into the open air, work until you perspire, by bathing wash away the excreted eliminates of the skin several times daily; and above all, use all the expedients known to you—such as the drama, poetry, and other fine-arts, and direct volitional dirigation to educe the happy and pleasurable emotion. Whatever tends to produce, prolong, or intensify the sad emotions is wrong, whether it be dress, drama, or what not. Happiness is a means rather than an end—it creates energy, promotes growth and nutrition, and prolongs life. The emotions and other feelings give us all there is of enjoyment in life, and their scientific study and rational training constitutes an important step in the art of using the mind more skillfully and efficiently,—about which I will write another article.

Below is the bogus article referred to by Gates: *Philadelphia Inquirer*, date unknown.

PROF. GATES READS THOUGHTS
BY HIS WONDER BOTTLE

Remarkable Discovery Made
by Well-Known “Wizard of Chevy Chase”

SHOWS BRAIN COLORS

By This Means It Is Hoped to Prevent Carrying Out of Criminal Ideas of a
Diseased Mind

Special to The Inquirer

Washington, Dec. 20.—The latest and, if all said about it is true, the most wonderful addition to scientific knowledge in a long time is the discovery by

Professor Elmer Gates, the “Wizard of Chevy Chase,” that every thought and mood of the human brain has a relatively corresponding color in the chromatic scale, and his invention is an apparatus which reproduces in living and varying colors the changing thoughts conceived within the mind.

If practical in its operation and certain in its results, the use of the apparatus will undoubtedly have the greatest influence upon the treatment of mental diseases and prove of great value to criminologists as well.

How It Is Done

Professor Gates is well known in the scientific world as the possessor of the finest private laboratory and workshops south of New York. The apparatus consists of a tall glass jar, half filled with a colorless solution, and to which are attached two glass tubes which pass through an opening in its top. One of the tubes has an apparatus which fits over the mouth, and the other runs to a glass receptacle containing purified air.

When the apparatus is fitted over the mouth of a person and the breath passes through the liquid and thence to the glass receptacle, the varying thought within his mind are reflected in the changing colors of the liquids in the jar, this action being caused by the effect of the chemical properties of the breath upon the solution.

So far the experiments have merely determined what colors reflect certain moods, such as happiness or melancholy, but as the work progresses it is expected that the knowledge of the “brain colors” will grow correspondingly.

It is hoped that when complete knowledge and control of the working of the wonder bottle have been obtained it will be possible to differentiate the “suicide shade” from the general color which is known to indicate melancholy.

Might Prevent Suicide

This test applied in the case of a person suffering from acute melancholy and with suicidal tendencies would reveal the state of the diseased mind which now can only be determined very indefinitely in most cases and would result in making possible an accurate course of treatment and precautions to prevent a consummation of the idea dominant in the affected brain.

Mr. Gates has said that he will continue his experiments and secure more full and complete results before he makes public the details of his discovery and the composition of the fluid in the “wonder bottle.”