one had four. The reports from the laboratories were so inconsistent and the reports from the same laboratory varied so extremely in cases of repeated examinations that an analysis is practically impossible.

Table 1 presents the results of all the tests made by the serologists on normal persons and nonsyphilitic patients, together with the number of tests performed by each. Analysis shows that a positive Wassermann test was obtained in from 2.6 to 18.1 per cent.

Table 2 presents the serologic findings in primary, secondary and tertiary syphilis; the percentage of positive tests in active syphilis varies from 50 to 100 per cent.

Table 3 summarizes the comparative results obtained in 168 series of tests, made by each of five serologists. An analysis shows that all the laboratories agree in their findings in 47 per cent. They vary in one result in 20 per cent., in two results in 12 per cent., and in more than two in 21 per cent. In other words, if a specimen of blood from the same individual be submitted to five serologists, there is one chance in two that the reports will agree.

In fifty-six cases, ten reports were received in each case from seven serologists. They have been classified according to a positive, negative or doubtful clinical expectancy, in each case. It will be observed that the laboratories reporting the greatest number of positive reactions, in cases in which a positive reaction was expected, also reported the greatest number of positive reactions when the clinical expectancy was negative or doubtful.

Analyzing the reports, we find that all the laboratories agreed in 21 per cent., they disagreed materially in 19 per cent., and varied in from one to four of the ten results in 60 per cent. Of the latter, 20 per cent. varied in one test, 20 per cent. in two tests, 12 per cent. in three tests, and 8 per cent. in four tests. In other words, if a specimen of blood from the same individual be submitted to ten tests by different serologists, there is one chance in five that the tests will agree.

Space does not permit of detailing the technic of each serologist; however, four used only specific antigen, one submitted two reports in each case using two different cholesterinized antigens, another submitted three reports, using two cholesterinized and one specific antigen. Comparing the positive reports submitted by each laboratory with the total positive results in all cases, they vary from 9.1 per cent. to 58.5 per cent. With two exceptions, the lowest percentages of positive reactions were obtained by the laboratories using specific antigen, and at the same time they agree more consistently with the clinical expectancy.

After carefully considering the results of the Wassermann test, the clinician cannot help but be disappointed in its accuracy. When we consider that various representative serologists report positive findings in from 2 to 18 per cent. of normal individuals, and that in active syphilis, in which the clinical diagnosis is certain, some serologists report only 50 per cent. of positive results, there is every reason to discredit the diagnostic value of the test. In suspected latent syphilis and in syphilis under active treatment, the most extreme variations occur, and in these conditions, in which the clinician needs its help the most, it is the least accurate. Notwithstanding the numerous discrepancies in the Wassermann reports, our experience with this test over a period of several years has

convinced us that it is of great value and should be regarded only as a link in the chain of evidence for or against the disease.

From the experiments undertaken, we have proved to our own satisfaction, and to the satisfaction of the serologists associated in this work, that it makes no difference whether the blood is collected in a sterile or nonsterile test tube; whether infected with the above-mentioned pathogenic organisms or not infected; whether the specimen is one or several days old, or whether the blood is collected when the stomach is full or empty. In a few instances marked acidosis was present, but it did not influence the test from the standpoint of clinical expectancy. We are firmly convinced that the antigen used by the serologists is not wholly responsible for the discrepancies in the Wassermann report, and there is every reason to believe that a cholesterinized antigen will give a higher percentage of positive reports than a specific antigen. Leaving aside the element of personal equation, serologists cannot obtain uniform results unless a standardized antigen is employed and a uniform technic agreed on.

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DELUSIONS OF PERSECUTION AS A BIOLOGIC DEFENSE REACTION*

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The life of the individual is a constant struggle, and is made up of a series of reactions having as their end the opposing of influences which tend to limit this life, or at least to prevent its development along the most favorable lines. Psychologists have come to believe that these reactions, which in their sum go to make up human conduct, are determined, in the main, by inherited tendencies which have been evolved in the struggle for existence of a long line of ancestors dating from the lowest forms. These tendencies have been developed in order to carry out the three great ends of organized beings; namely, defense from danger, procuring of food, and reproduction. The mechanisms to accomplish the first of these ends, requiring the most prompt and active reaction — protective mechanisms — were earliest and most firmly established.

These protective mechanisms vary immensely, from the methods of concealment of the lower forms of animals, through the armor of the turtle and armadillo, the venom of the serpent, the offensive odor of the skunk, the fleetness of the hare and the antelope, the teeth, the claws, and the strength of the tiger, to the capacity of man through his superior knowledge and reasoning power to invent weapons which more than compensate his lack of speed and strength.

Not the least of these human defense mechanisms, however, is developed in the ability of man to analyze the conduct of his fellows and to provide against any manifestations of hostility on their part. This ability varies immensely in different individuals, depending on their mental makeup, education and environment, state of health, good or ill fortune, etc., and in accordance with the laws of adaptation it tends to be sharpened by adversity and dulled by ease and comfort.

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Also, for the development of the critical faculty, we are largely dependent on the harmonious working of the somatic and the psychic functions. The deformed or sickly individual is only too apt to be exaggeratedly sensitive and, expecting slights and opposition, to react excessively to trivial causes, and a similar attitude is even more frequently dependent on defective mental makeup. From the other side, an actually unfriendly attitude sharpens the critical faculty, and, in a person of morose and suspicious temperament, the reaction may assume a pathologic intensity. These instinctive defensive reactions, being earliest and most strongly developed, are apt to persist longest, and, in mental disorganization unchecked by normal inhibition, may be set off by stimuli ordinarily inadequate.

Our study of the somatic symptoms having failed to enlighten us greatly with regard to the phenomena observed in insanity, the tendency of late has been to return to the mental symptoms and to investigate them in the light of the reaction of the individual to influences from within and from without. To have pointed out this way is not the least service of the psycho-analytic school.

Certainly, among the most striking of all the symptoms of mental alienation is the development of delusional ideas. Among these ideas, those of persecution are especially frequent, and while they are particularly characteristic of paranoia, they are present, at times, in practically all forms of insanity.

Different as may be the modes of life of different peoples, ideas of persecution present, the world over, certain general similarities which alone would seem to indicate that they have some common basis.

In common with other delusions, they center about the personality, the ego, of the subject, and have, as their content, the notion that influences inimical to him are at work, to the prejudice of his person, his rights or his honor, or are endeavoring to injure him through those dear to him. The means supposedly employed to this end have varied greatly with the state of culture and environment, the sorcerer and the demon having today largely given place to the forces of nature as utilized in electric apparatus, wireless telegraphy, the dictograph, etc., though the rôle of poison is still as important as ever.

The mechanism of delusion formation has been much disputed, but all authorities are agreed on the importance, in the genesis of delusions, of fallacious perceptions, and particularly of the affective state of the subject. Into the causation of hallucinations we cannot enter here. It is, however, common experience that actual perceptions are greatly modified by the emotional condition of the individual at the time and may be wrongly interpreted if this state varies greatly from the normal. Conceptions arising on a basis of actual, though falsely interpreted, perceptions are themselves falsified and are readily connected into a delusional system. Since delusions are not the product of previous experience, they cannot be corrected by reference to it, but they are doubtless modified by the strong hereditary tendencies already alluded to. For their development and formation, a total alteration of consciousness is necessary, so delusion formation indicates a "general disturbance of the total psychic condition Delusions are aroused by the variation of the affective condition which translates slumbering hopes and fears into conceptions. That these conceptions become delusions is due to the failure of judgment, this in some cases, through pathological emo-

tional excitement, in others through clouding of consciousness, in still others through a weakness of the understanding." (Kraepelin). Now all of our reactions are originally determined by sensations arising from within and from without.

Crile has developed this idea in his recent works on "Anoci-Association" and "The Emotions." He asserts that trauma to the chest and abdomen stands first in the production of shock, and suggests that this is because these regions are the most abundantly supplied with "nociceptors," probably since they were originally the special points of attack of beasts of prey; hence stimulation here calls forth the most energetic neuromuscular defense reaction, and results in the greatest nervous exhaustion, which is translated as shock. This reactive tendency, transmitted through countless ancestors, has become so fixed that it persists today though the necessity for it no longer exists.

For Crile, the emotion of fear is the "representation of injury" and calls forth the same defensive mechanisms of muscular tension, increased adrenal and thyroid secretion, etc. These may be excited not only by actual physical contact, but also through the distant receptors, as by sight, hearing and smell.

Darwin long ago called attention to the fact that men through countless generations have attempted to escape from their enemies by fight, or by flight, and that the great exertions necessary in either case have, as their final result, palpitation of the heart, sweating, pallor, trembling and the prostration of complete exhaustion, phenomena identical with those of fear, and suggested that when fear is strongly felt, though there is no exertion, the same results tend to appear, through the influence of inheritance and association.

Cannon has shown that emotional states, such as fear, are accompanied by greatly increased adrenal secretion, which has the function of raising the blood pressure and energizing the muscles, while Crile's examination of the brain cells in animals subjected to fear alone, without trauma, has disclosed changes similar to those found after exhaustion and trauma. According to the last-named author, an animal "driven strongly by emotion" shows (1) mobilization of the energy-giving compound in the brain cells; (2) increase of epinephrin, thyroid secretion and glycogen, increased power of oxidation in the muscles; (3) accelerated circulation and respiration and raised temperature; (4) altered metabolism. All these to increase the motor efficiency while other organs not contributing to this end have their function inhibited.

Phylogenetic influences are so strong that though an enemy is not attacked physically, these weapons are nevertheless made ready. The emotion of fear cannot but suggest the idea of danger.

In the majority of cases of insanity, the earliest symptoms are unrest, sleeplessness and often disturbing dreams. The patient may be aware of a certain alteration in his consciousness of self and often enough we hear the complaint that "things look strange," and "everything is changed." We have all experienced the feeling of apprehension and unrest which seems dependent on sensations apparently rising up from the abdominal cavity, and the emotions so aroused are certainly akin to fear. Now, fear, being the emotional condition associated with the perception of danger, would naturally give rise to defense reactions, and if the cause for fear is unclear, no enemy being in sight, this defense reaction will not proceed to the actual physical preparations for combat, but only to the awak-

ening of conceptions of danger which, on account of disordered judgment-forming capacity, take definite form as ideas of persecution.

It may be objected that in paranoia, the form of insanity characterized *par excellence* by delusions of persecution, the genesis of these delusions is slow and gradual, and can hardly be connected with an emotional state. Also, fallacious perceptions, though frequently present, are usually developed later than the delusions. Now, the paranoiac possesses an originally defective mental constitution, in some ways resembling uncivilized man in his egotism and lack of altruism. He is naturally distrustful and suspicious, and, while his reasoning power may be good, he misinterprets ordinary happenings in the sense of his exaggerated ego and is ever ready to see opposition, if not danger, and to react to these misinterpretations, much as the savage does to the unfamiliar, by a defense reaction, that is, by ideas of persecution. Again, according to the views of Specht, paranoia has in its evolution the closest relations with manic depressive insanity, the ideas of grandeur developing in connection with the exaltation and increased feeling of self of the manic phase, those of persecution being similarly connected with the affective tone of the depressed phase.

Such are the considerations which suggest to me that delusions of persecutions should be looked on as a species of defense reaction traceable to the inherited instinct of self-protection.

From the work of Cannon and others it would appear that the internal secretions, especially those of the adrenal, the thyroid gland and the liver, play a part in the preparation for defense and are increased in strong emotions, notably in that of fear. May it not be possible that we have in this fact some explanation of the circumstances that delusional conditions, especially delusions of persecution, are so frequent at the times of presumably greatest change in the function of the ductless glands, namely, about puberty and the climacteric?

Possibly the further study of the functions of these glands, so much in the minds of the medical profession today, may throw a more definite light on this subject.

The Cancer Death Rate in New England.—The *Public Health Bulletin* of the Massachusetts Department of Health (May-June, 1915, p. 127) observes that the New England states generally have a higher death rate from cancer than any other group of states. The census reports for 1913 showed a cancer death rate of 78.9 per hundred thousand for the entire registration area of the United States. Each of the New England states has a cancer death rate higher than this. The rate of Connecticut (85.1) is the lowest; Vermont's, which is the highest, is 111.7. The rates of the other New England states are, respectively, Maine, 107.5; New Hampshire, 104.4; Massachusetts, 101.4, and Rhode Island, 93.3. Compared with Kentucky's cancer death rate of 48, these figures seem high indeed. They indicate that 6,817 persons died of cancer in New England during 1913. The *Bulletin* remarks that these figures do not necessarily signify that the people of New England are more susceptible to cancer than those of other regions. The proportion of inhabitants over 40, or at the cancer age, is greater in the northeastern extremity of the United States than in other parts of the country; and to this fact the Census Bureau attributes the relatively high cancer death rate in the New England States. In New England as elsewhere, however, the cancer death rate is higher than it should be; and the publication of these figures from the Census Bureau has stimulated an active educational campaign against the disease.

SOME FACTS CONCERNING THE BLIND

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Some facts concerning the blind population have been gleaned from the 1910 census of the United States, and have been thought sufficiently interesting to present in greatly condensed shape. Much has, of course, been omitted.

The total blind population of the United States is 57,272. Of these, 32,443 are males, and 24,829 are females. The male majority is doubtless largely due to the extra liability of males to accidents, owing to their occupations, etc. There are 62 blind persons in every hundred thousand of the population of the United States. There are 2,390,000 blind persons in the world. Egypt has more blind persons proportionately than any country in the world, having 1,325 to every hundred thousand of population.

The twelve countries having the least blindness are as follows: Belgium (before the war) had 43 blind persons to every hundred thousand of the population; Canada, 44; Netherlands, 46; Saxony, 47; New Zealand, 47; Western Australia, 50; Hong Kong, 51; Prussia, 52; Denmark, 52; Germany, 60; New South Wales, 60, and the United States, 62.

In the United States, the twelve states having the least blindness are as follows: North Dakota, 28 blind persons to every hundred thousand of the population; Wyoming 32; Washington, 38; Nebraska, 38; Minnesota, 42; Oregon, 44; New Jersey, 44; Montana, 44; South Dakota, 45; Colorado, 47; Idaho, 48, and Connecticut, 49.

The six states having the most blindness are as follows: New Mexico, 169 blind persons in every hundred thousand of the population; Nevada, 118; Arizona, 95; Kentucky, 94; Tennessee, 89, and Virginia, 80.

The excessive blindness in these states is probably due to the prevalence of smallpox in New Mexico, Nevada and Arizona, and the ravages of trachoma in Kentucky, Tennessee and Virginia. Mining accidents in the first three states also have much to do with the number of blind persons.

About half of the blind population are over 60 years of age. This is probably due to the fact that cataract, glaucoma, etc., are largely diseases of old age. It is quite likely that these figures are not entirely correct, as it has been found difficult to collect reliable data concerning the blindness of babies, as ophthalmia neonatorum is usually considered a disgraceful disease, and parents frequently endeavor to conceal its existence.

The six foreign countries producing the most blind United States residents are as follows: Ireland, 169 blind persons to every hundred thousand of the United States population; Canada, 168; Netherlands (including Belgium and Luxemburg), 158; Mexico, 148; England and Wales, 116, and Germany, 106.

These figures are probably due to the large number of immigrants from these countries, the large number of old persons, the ignorance of the Irish and the Mexicans, the insanitary life, medical ignorance, carelessness and superstitions of the two latter countries, and the hazardous mining occupations of the Mexicans.

The six foreign countries producing the least number of blind United States residents are as follows: Hungary, 14 blind persons to every hundred thousand