

*Results.*—The largest number of patients, relatively, have been epileptics, and they have been found the least amenable to treatment. Of the others, all were in a more or less advanced stage of the disease; in fact some only came to the hospital to die. But in twenty-three the disease was effectually checked and their condition much improved. Two, in addition to the marked improvement in their lungs and general health, recovered from their insanity and were discharged.

Practically all the suspects improve so much in general health as to justify their return to the general wards.

But the benefit to the institution has not been limited to the remedial measures applied to those about to fall into decline and the actually diseased. Some margin of good has doubtless resulted from the mere isolation, for since its introduction the death rate from phthisis in the asylum has been reduced by nearly a half.

For reasons already indicated perfect isolation of all consumptives has never yet been possible here, although it soon will be. Yet allowing for this, as well as some margin for the possibility of mere coincidence in the diminished death rate, we think that the results indicate that isolation and hygienic treatment of phthisis are to some extent effectual, and as applicable to the insane in asylums as to any other class in the community.

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*The Feelings.* By HARRY CAMPBELL, M.D.Lond.

I. PSYCHOLOGICAL.

IT is convenient to regard the mental part of man, or his *ego*, as being made up of feeling, will, and thought. Feeling I place first, because it takes precedence in evolution, and because it may be said to constitute the foundation of mind.

There is little need to define these three terms. By *thought* we understand the formulation of ideas; and the end of every mental process being action, the determining of the action we speak of as being performed by the *will*. Of neither of these do I propose to treat here, but of the *feelings*—a subject of

wide interest to the physician. I shall first seek to show how large a part of the mental personality is made up of them, and then inquire into the bodily conditions which underlie them ; and here let me observe that I shall treat the subject from the strictly practical point of view, and shall refrain altogether from psychological subtleties.

What, then, are the feelings? They embrace the sensations and the emotions.<sup>(1)</sup> When the skin is pricked, when light falls upon the eye, or when a piece of sugar is sucked, so many *sensations* are felt ; when a person flies into a rage or is stricken with fear, he experiences an *emotion*. Some contend that such elementary emotions are primitive unanalysable states of mind, but it is more probable that they, and indeed all the emotions, are compounded of sensations—that they are, in fact, so many chords of sensations. It is well known (hence, indeed, the origin of the term “emotion”) that every emotion tends to be accompanied by a commotion of the body, *e. g.* cardiac disturbance, dilatation or contraction of arteries, a pouring out or drying up of secretions, spasm or paralysis of muscles. Now these various bodily changes, peculiar for each emotion, are necessarily accompanied by sensations felt in the parts commoted, and there can be little doubt that these sensations enter into the feeling which constitutes the emotion. I shall assume (with Lange and James) that they constitute the *whole* of the feeling, and that if all these sensations were struck out, as would happen in the case of total anæsthesia of the body, nothing would remain of the emotion. It is true that the feeling we term an emotion may seem to have very little sensory element in it which can be definitely felt in the body ; and it is for this reason that *emotions* are sometimes spoken of as feelings of the mind, in contradistinction to the *sensations* which are definitely felt in the body. Thus we speak of grief as being a mental pain, and of joy as a mental pleasure, in contradistinction to such a pain as that caused by indigestion, or such a pleasure as the relish of food, which are said to be physical or bodily. Nevertheless it is probable that all emotions, whether simple, as in the case of anger and grief, or complex, as in the emotion of love and the æsthetic emotions, are made up of simple bodily sensations—more particularly of the sensations pertaining to the parts of the body emotionally agitated. Space does not allow me to give my full reasons for adopting this view.

This conclusion has important practical bearings. It is a matter of common observation that vigorous health, with the pleasurable bodily sensations which go along with it, predisposes to pleasant emotions; while, on the contrary, disturbed health with its accompanying unpleasant bodily sensations is prone to beget unpleasant emotions. At the end of a fagging day, when a man feels tired and exhausted, when, in short, his general bodily sensations are unpleasant, he is wont to get irritable, *i. e.* to experience a certain measure of the painful emotion of anger, but by the time he has been refreshed by food and feels rested and comfortable, he is disposed to more pleasurable emotions. Now this is just what our conclusion would lead us to suspect. If the emotions are compounded of bodily sensations, then pleasant bodily sensations, providing as they do the ingredients of pleasant emotions, will predispose to these, while painful bodily sensations, furnishing the materials of painful emotions, will tend to call forth these. Indeed I would go further, and contend that when the entire body is permeated, so to say, with unpleasant sensations, it is impossible to experience a pleasurable emotion, and contrariwise. This must be the case if our premises are correct. I say *permeated*, for when a pleasurable or a painful sensation involves only a limited part of the body, as when one sucks a sweet, or cuts one's finger, such sensation is quite consistent with the concurrence of emotions of the opposite order.

It may be thought that this principle, though in the main true, does not admit of universal application. Thus a person possessed by a feeling of exuberant well-being might, on hearing bad news, suddenly be plunged into painful emotion. Let us not forget, however, that a depressing emotion of this kind tends to destroy for the time being the pleasurable bodily sensations; but directly the latter reassert themselves the painful emotion tends to fade away. Similarly a person pervaded with a profound sense of *malaise* may by good news, cheery conversation, or stirring music, be temporarily roused into a pleasing emotional state, which for a time mitigates or removes the painful bodily feeling; but in proportion as the latter revives, in that proportion does the pleasing emotion tend to grow faint and disappear.

*Individuals differ greatly in regard to the Nature and Range of their Feelings.*

Individuals differ greatly in the nature and range of their feelings. It is because of these differences that men differ in temperament and disposition. Individuality depends essentially upon the feelings. If all men felt exactly the same, differing only in thinking power, each man would seem to be mentally very like all others.

These differences in feeling are shown alike in respect of the simplest sensations and of the most highly elaborated emotions. How profoundly, for instance, do individuals differ in their taste sensations! What is agreeable to one may be disgusting to another, and it is probable that the range or scale of taste sensations differs much in different individuals. And the same applies to other sensations, visual, auditory, sexual, and so forth; just as some have an exquisitely delicate colour-sense, while others are colour-blind; and just as some have a keen sense for appreciating musical sounds, while others are practically music-deaf; so some may have powerful erotic feelings, while others are altogether devoid of them.

As further illustrating how individuals differ in regard to their sensations, I may refer to those groups of sensations which go to make up the feeling of physical well-being and ill-being. These feelings have a special interest for the physician, whose chief life-work is to bring about the one and drive away the other. This is, indeed, the final end of all human effort. If all of us were imbued with an exuberant sense of well-being, this would indeed be a happy world.

There are different kinds of well-feeling—that is to say, we do not always feel well in exactly the same way; and there are still more numerous varieties of unwell-feeling, or *malaise*.<sup>(2)</sup> We may feel ill in many different ways. Let us, however, for convenience regard well-feeling on the one hand, and *malaise* on the other, as being always the same in nature and differing only in degree. We may then construct a scale representing the various degrees of well-feeling and *malaise*. In the centre we place the indifferent feelings, passing thence upwards through ever-increasing heights of well-feeling, and downwards through ever-increasing depths of *malaise*.

Now, neglecting temporary variations, we may say that every individual has his own particular note of feeling in this scale. The habitual note of some is one of exuberant well-being ; of others—quite a large number—a feeling of indifference ; of others, again, a feeling of *malaise*.

The sense of exuberant well-being is most characteristically met with in young people ; after adult life is reached it tends to get less and less, being only exceptionally found in the aged. That such a deterioration in the realm of feeling does actually occur we gather from the testimony of individuals themselves, and also from their conduct. The sense of exuberant well-being always expresses itself by muscular activity, just as the sense of *malaise* conduces to quiescence ; and it is certain that the steady decline of muscular activity which takes place with advancing years is marked by a parallel descent in the gamut of feeling. All animals are most active during their growing years, when they indulge in activity for mere activity's sake, and it is then that they feel most exuberantly well. Very few, even during their physical prime, much less as they approach or actually enter upon the period of decay, experience that intense joy of living which belongs to the young. How soon it departs depends upon various circumstances. It probably goes sooner in the civilised than the uncivilised ; in the sedentary town-dweller than in the country-dweller leading an active outdoor life ; in the poor than in the well-provided. In the poor of large towns it departs very soon, and it may safely be asserted that the second and third generations of very poor town-bred people never feel exuberantly well, if, indeed, they can be said to feel well at all ; their habitual note of feeling is very low down in the scale. It disappears in women before men. A large number of women lose it soon after they have reached womanhood, seldom feeling more than moderately well from this time till after fifty, which is past the age for exuberant well-feeling.

It is this atrophied sense of well-being, and not merely the disappointment of abandoned hopes and unrealised ideals, that makes a person in later life exclaim with the poet—

" But yet I know, where'er I go,  
There has passed a glory from the earth."

When a person gets *blasé*, it is not so much that he is surfeited with pleasure, as that his keen sense of well-being has

been blunted. It is surely impossible to feel acutely well and *blasé* at one and the same time.

The pessimists of this world are those whose habitual note is one of *malaise*; feeling bad themselves, they take a gloomy view of things in general; while the sanguine and the hopeful are those who feel acutely well, and who look upon the world in the light of their own feelings. A sense of exuberant well-feeling is, indeed, incompatible with painful emotions or painful thoughts. It is largely on this account that children cannot remain sad for any length of time, or harbour gloomy thoughts.

"A simple child,  
That lightly draws its breath,  
And feels its life in every limb—  
What should it know of death?"

Some few—and they are chiefly, perhaps, men—retain to extreme old age an acute sense of well-feeling and the pleasurable emotions that go along with it. They are still capable, as they walk by the sea-shore or gaze upon a sunset, of that same emotional thrill which stirred them in the first flush of youth; they believe that this *is* a beautiful world, that life *is* worth living, even to the very end. This is normal. Those who scarcely ever rise to the height of well-feeling, but remain habitually in the depths of *malaise*, are abnormal. Life to many of these is not worth living; nay, it may be a painful thralldom from which they seek escape by self-destruction.

It need scarcely be said that those who seldom feel downright well are greatly handicapped in their life's work; they are apt to lack assurance and initiative, though we find not a few notable exceptions. It is a remarkable fact that people get accustomed to not feeling well.

Coming to the region of the emotions we find the same differences obtaining. Observe, for instance, how great they are in regard to the religious and æsthetic emotions. Some have no religious feeling; they cannot sit out a service, actually chafing under conditions which produce in others a deep calm or an ecstasy of happiness. And among those possessing the religious temperament, what differences! Whether a man is a Ritualist, Low Churchman, or a Salvationist, depends fundamentally upon his feelings. Watch a group of Salvationists and a group of Low Churchmen conducting an open-air service, and you will best realise how profoundly they differ in their feelings;

and these differences, as I shall argue later, depend chiefly upon differences in metabolism and blood-composition.

But it is perhaps in regard to the æsthetic emotions that the differences in feeling capacity among men are most marked. Very few realise the extent of these differences. Contrast in this respect the great seer, to whom the meanest flower that blows gives thoughts that often lie too deep for tears, with the "wild rude carl," to whom a primrose by the river brim is a yellow primrose and nothing more. To a large number of people, indeed, the beauty of nature and the great realm of art are as a sealed book. The ordinary person can no more enter into the feelings of the poet or the painter in his moments of inspiration, than can a man born blind form an idea of colour or of light. We, as a nation, seem to lack the sense of colour and of form, or how could we come to build or to tolerate those dreary miles of drab streets which make our large towns so often the "abomination of desolation" to the sensitive eye? There are, on the other hand, unhappy individuals so constituted that to dwell in a mean street at the East End of London, or even in one of the gimcrack "villas" of its more prosperous suburbs, would sap their mental vigour and crush all gaiety from their spirits. The minds of such can no more thrive in an atmosphere of ugliness than can their bodies keep healthy in poisoned air. I have known a child who was sent up from a pretty country village to a particularly unlovely part of the city brought perilously near to melancholia. Burne-Jones was intensely sensitive to the weather. He could do no work on an "ugly" day and many who are not greatly susceptible to æsthetic impressions show this peculiarity.

*The Diversity in Feeling Capacity viewed Sociologically.*

One of the results of the diversity of feeling capacity of different individuals is that it prevents them from properly understanding one another. To understand a person you must be capable of yourself feeling his feelings, *i. e.* you must be able to *feel with*, to sympathise with, him. Half, nay nine tenths, of the misunderstandings and frictions in our social life depend upon these differences in feeling capacity. "How can two" (even) "walk together except they be agreed!" When two people feel very differently they can never know one another,

they have no common basis to go upon ; neither can properly enter into the mental world of the other ; they remain, in spite it may be of making a large part of the life-journey together in the most intimate relations, as husband and wife perhaps, or as parent and child, strangers to the end.

It is manifest that those who have the widest range of feelings, and therefore the widest sympathies, have also the deepest insight into human nature. A man with a limited feeling capacity, be his intellect never so great, must be out of touch with mankind at large, must ever remain isolated among his fellows, shut out from any real communication with them. Hence it is that the genius of a Shakespeare lies quite as much in the extraordinary scope and variety of his feelings as in the magnitude and subtlety of his intellect. Without such breadth of feeling not only would he lack the real poetic touch, but his characters would move like so many puppets, not with the true human impulse.

Let, then, the physician try to realise how his patients feel, and so get into some sort of touch with them. Indeed, unless he does, he will often fail in his diagnosis and still more in his treatment. I am not advocating any maudlin sympathy ; quite the contrary ; sympathy, like the gold of the decorator, should be used with great delicacy—never “laid on thick,” if I may be permitted the expression ; but it is necessary to be alive to the danger the physician runs of becoming a mere learned man who regards his patients as so many “cases,” interesting or otherwise, instead of so many instances of concrete suffering depending on him for help.

*The Influence of the Feelings on the Thoughts.*

I have said that mental individuality depends essentially upon the feelings, and this statement will be the more readily accepted when we reflect that the feelings not only constitute a large part of the *ego*, but also (*a*) control thought and (*b*) influence conduct.

(*a*) When a person has some special task in hand, a business occupation it may be, or the thinking out of some problem, the current of the thought is mainly determined by the task before him, though even then the thoughts themselves are liable to be coloured by the feelings. When, however, they are not thus



kept in definite channels, but are left to pursue, so to speak, their own course, we shall find that they are very largely determined by the feelings of the moment.<sup>(3)</sup> The hungry man thinks of his next meal, the erotic man has erotic thoughts, the vindictive man revolves schemes of revenge, the man inflated with ambition lays plans for the conquest of the world. How different the trend of thought in the artist and the Philistine! Observe, too, how a highly complex dream may be engendered by, and centre round, some bodily sensation. Witness, again, how the thoughts are influenced by the feeling of well-being and *malaise*; when a man feels strong and well, when his whole frame is pervaded by a buoyant feeling and pleasing emotions arise, the thoughts turn on pleasing subjects; but when he feels weak, exhausted, and mentally depressed, he thinks gloomy thoughts. These differences are strikingly shown in insanity. The melancholic not only suffers from sadness, which is an emotional state, but likewise from a number of unpleasant bodily sensations; indeed, I believe the sadness is the outcome of these, and is incompatible with a feeling of health and strength in every fibre of the body. These unpleasant bodily sensations are for the most part massive, subdued (*i. e.* not intense), and vague, by which I mean that it is difficult to describe them or refer them to definite regions of the body. This vague, massive, subdued sensorial pain begets emotional pain, whereupon the mind is set thinking on painful subjects, which, as might be expected, refer mainly, if not wholly, to himself. He dwells upon his own wretchedness, his incompetence, his unworthiness; his feelings suggesting these thoughts. By-and-by, as the intellect becomes disorganised, the gloom is intensified, and the thoughts partake of the nature of true delusions; he is not merely incompetent, but wicked; he has committed a sin so awful that it can never be forgiven; he is being pursued by some avenging power and is doomed to punishment eternal. How different is the case with the general paralytic in the "happy" phase of the disease. Here there is a feeling of bodily health and strength which engenders a pleasing emotionality—happiness. These pleasant feelings beget unwonted self-assurance; his ideas turn on his own importance; he believes himself capable of undertaking all sorts of difficult things, and his thoughts run in the direction of great schemes. These, later, when the intellect gets disorganised,

take the shape of grandiose delusions, and while his melancholic brother is prostrate with the thought of his own unworthiness, and racked with the fear of eternal torment, he on his part is glorifying in the belief that he is the lord of the heavens and the earth. And in this case, again, there can be no doubt that the current of the thoughts is determined by the feelings.

*The Influence of the Feelings on Conduct.*

(b) That the feelings profoundly influence conduct scarcely needs insistence. The hungry man seeks food, the thirsty man drink, and the enormous motive power of the sexual instinct is self-evident. Feelings, indeed, constitute the springs of conscious action. We are *impelled* by them to certain actions, feelings which possess this impelling power being termed *impulses*. Often this element of feeling in voluntary action is slight, so slight, indeed, as to be unrecognisable, as in an action undertaken as the result of a purely intellectual process. Actions of this kind, though in them the element of feeling is still operative, would not in ordinary language be said to be impelled by feeling, and we speak of them as being determined by the *head* in contradistinction to those which are dictated by the *heart*. But although the head is a much more trustworthy guide than the heart, and although one might expect it to be the more potent factor in determining conduct, yet, as a matter of fact, the decision of the intellect stands little chance against a powerful impulse running counter to it. History shows that men and nations are governed far more by their hearts than by their heads, and that men seldom practise what they preach: they preach what they *think*; they practise what they *feel*. Hence the frequent inconsistency between a man's public and private life, as in the case of Schopenhauer, who in actual life was very far removed from the pessimist, misogynist, and ascetic he represents himself to be in his writings.

The law which governs all conscious actions is this: *every sentient creature seeks to obtain agreeable feelings and to avoid the disagreeable*; so that it may be said that all the conscious actions of the individual are made with a view to securing pleasure and avoiding pain. This principle in the main works for the good, but not altogether, since some pleasures are injurious while some pains may be beneficial. The exceptions

to the general rule are of all animals greatest in the human, who has so widely diverged from the stereotyped ways of the instinct-led brutes.

Inasmuch as men are led to seek after the agreeable and to avoid painful feelings, and inasmuch, too, as they differ very much in regard to their feelings, it follows that they will differ much in regard to their conduct. A child seeks a sweetstuff shop, the drunkard haunts the public-house, the man in whom beautiful things produce pleasurable feelings surrounds himself with them, as far as he can, and he may take to collecting pictures, engravings, old china, furniture, or indulge some similar hobby. Others there are who, possessing the gift of public speaking, find a great pleasure in exercising it, and these seek a career as barristers, politicians, or preachers. It is needless to multiply instances. My purpose is merely to show how feeling governs conduct, how persons are always striving to secure for themselves feelings which are agreeable and to avoid those which are disagreeable, and how, since individuals differ so widely in their feelings, they are impelled in different and often opposite directions, some finding pleasure in what would cause others actual pain.

It is an interesting study to observe this principle at work among mankind; to note how differently individuals are impelled, and yet with what undeviating regularity the rule operates. Turn where we may we see the incessant struggle after the pleasurable and the avoidance of the painful. We observe it alike in the child who feeds at its mother's breast and nestles up to her for warmth, and in the old man who sits by the fire-side painfully solicitous of his creature comforts; and we shall find him guided by the same principle up to the end, and even a few hours before his death the slave of his feelings, still seeking after the pleasurable, still avoiding the painful.

Doubtless many of our impulses, tendencies, desires, have to be struggled against, because they are either hurtful, ignominious, or futile, and the restraining power varies in different individuals; but be it great or small—that is, be the character noble or ignoble,—it is certain that the bias of a man's life is, ever has been, and probably ever will be, determined by his feelings. He looks in the direction they indicate, even if he does not always move forward along that enticing path. Happy he who may do so with impunity. (\*)

*Summary.*—1. The feelings embrace the sensations and the emotions.

2. The sensations are the feelings which are definitely referred to the body.

3. The emotions, while in reality made up of sensations, in particular of certain sensations felt in the parts of the body commoted during the emotions, are not definitely referable to the body, for which reason they are sometimes spoken of as “feelings of the mind.”

4. Emotions being compounded of (bodily) sensations, when these latter are pleasurable they are apt to call up pleasurable emotions; while painful bodily sensations tend to call forth painful emotions.

5. Individuals differ greatly in their feeling capacity, both in respect of simple sensations and emotions.

6. This difference in feeling capacity (*a*) determines the differences in disposition observed among mankind; (*b*) prevents people from properly understanding one another, and is thus responsible for much social friction and misunderstanding.

7. Those with a limited range of feeling are limited in their sympathies and have but small insight into human nature; and contrariwise.

8. It is important to the physician to get into some sort of touch with the feelings of his patient, or he may fail to get a proper grip of his case and miss a valuable clue to treatment.

9. Just as the sensations tend to call up emotions in harmony with them, so the feelings in general (*i. e.* sensations and emotions) tend to excite ideas which chime in with them; pleasant feelings cause pleasant thoughts, painful feelings painful thoughts. Hence the bodily sensations greatly influence the thoughts.

10. The feelings influence conduct; conscious life is, viewed from an elevation, a constant effort to obtain pleasurable feelings and to avoid disagreeable feelings.

11. From all of which it is manifest that the feelings constitute a very large part of the mental individuality or *ego*.

In the next section I shall treat of the genesis, or coming into being of the feelings, and I shall endeavour to show how closely they depend upon the composition of the blood, and upon the metabolism of the organism at large.

## II. PSYCHO-PHYSIOLOGICAL.

*The Genesis of the Sensations.*

I now propose to consider the genesis of the sensations, *i. e.* the bodily conditions which underlie them. Wherever sensory end-organs exist, there sensations may be felt, and this means throughout the entire body. They are not present in cartilage, and they are either absent from, or very defectively supplied to, the brain and spinal cord; but we may for all practical purposes say that sensations are felt throughout the whole body.

Sensations are provoked by stimuli acting on these *sensory end-organs*. These latter constitute the keyboard of the sensorial instrument; the cerebral cortex may be compared to the pipes, while the stimuli represent the players. The players are constantly at work, and during conscious life a voluminous, many-toned chord of sensorial music is continually being struck.

The stimuli consist of various agents, *e. g.* of ether waves in the case of the retinae, of sound vibrations in the case of the auditory expanses, of massive contact, heat and cold, in the case of the cutaneous end-organs; and in the case of the less specialised sensations which may be felt throughout the body, including the skin, the stimuli are in the main chemical, and reside in the fluids bathing the nerve-elements.

Now in considering the chords of sensations which an individual experiences at any one moment, let us disregard the more intellectual ones—those of sight, hearing, tactile sensibility of the fingers, and even the sensations of taste and smell<sup>(5)</sup>—and we have remaining a chord of comparatively unspecialised organic sensations. This chord is equivalent to what has been termed, and what I shall refer to in this essay as, *cænæsthesia*; by the Germans it is termed *das Körperliche Gefühl*. Though the cutaneous sensations which result from massive contact and from modifications of temperature doubtless enter largely into it, it is in the main a chord struck by chemical stimuli; that is to say, to produce it, the end-organs, with a few exceptions which need not be gone into, are played upon by chemical stimuli and little else; moreover, a considerable portion of that large volume of sensations derived from

the skin is due, not to the operation of external agencies, but to the chemical state of the blood circulating in the skin; witness the itching that may result from taking shell-fish, and the numbness and tingling that occur in alcoholic neuritis.

I shall hope to make it plain as I proceed what I mean by "chemical stimuli;" for the present it will suffice to say that I understand by them non-nutrient substances, or, as we may for convenience term them, drug-substances, circulating in the blood: and I shall provisionally assume that the chord of *coenæsthesia* is essentially struck by such chemical stimuli; in other words, that the mere nutritional interchange between nerve-matter and environing plasma does not constitute a stimulus. This may sound a daring proposition, but I advance it provisionally, if only for the purpose of directing attention to the important part taken by chemical stimuli in the genesis of *coenæsthesia*.

Another doubtful point needs mention here. To what extent can chemical stimuli act upon the sensory *nerve-fibres* and the *sensory cortex*, so as to evoke sensations? We know that drugs have a selective power, that urari acts upon the motor end-plates and strychnine upon the motor ganglia, and doubtless the drugs acting upon the sensory nerve elements have a similar selective power; but I have not yet had time to go deeper into this subject, and can, therefore, only reason *a priori*. I think, however, we may safely conclude, seeing that end-organs are specially adapted to receive stimuli, that the sensory instrument is struck mainly through them; but though I should expect the sensory fibres to be much less responsive to chemical stimuli, I should at the same time look for a definite response to some of them, whereas in regard to the cortex I should expect it to be wholly, or almost wholly, irresponsive. I can well imagine that the sensory cortex may be so affected by chemical substances circulating in the plasma as to modify its mode of response to impulses reaching it through nerve-fibres, but I should be inclined to doubt whether it could be induced to yield a sensation by direct chemical irritation of its ganglia; in order to get a psychical change it is necessary to have a very special and subtle form of physical change, and it is doubtful whether a direct chemical stimulus can bring this about.

That we may realise the important part played by the

sensory end-organs in the genesis of cœnæsthesia, let us imagine them to be all rendered anæsthetic. I think we shall all agree that under such circumstances cœnæsthesia could only exist in a very rudimentary form, if, indeed, it could exist at all. I am not aware of any drug that can anæsthetise the sensory end-organs without acting upon any other part of the nervous system, but if an individual were brought under the influence of such a drug we may safely conclude that he would have little, if any, sense of bodily existence.

*The Different Kinds of Cœnæsthesia.*

I proceed now to consider the different kinds of cœnæsthesia. When we reflect upon the enormous number of notes which go to form this voluminous chord of sensation, and in how many different ways those notes may be struck by the many stimuli present in the blood, we shall see at once that there must be countless varieties of it. I shall refer only to two, and these broadly contrasted :—(1) That in which there is a lively feeling of well-being and buoyancy ; (2) that in which there is a well-marked feeling of *malaise* and depression.

1. The sense of exuberant well-being is happily portrayed by Romeo, when he says :

“ My bosom's lord sits lightly on his throne,  
And all this day an unaccustomed spirit  
Lifts me above the ground with merry thoughts.”

In such a case the end-organs all over the body are stimulated in a way favourable to the induction of a pleasurable cœnæsthesia—a harmonious chord is struck, and the individual is pervaded by a feeling of health and strength. Now we have seen that the bodily sensations control the emotions, and we should therefore expect a pleasurable cœnæsthesia to call up a pleasurable emotional state. Accordingly we find that with a feeling of bodily well-being there is a pleasurable emotionality—“ an unaccustomed spirit ” as Romeo puts it. Gradually more specialised emotions appear ; thus the sense of bodily strength begets a feeling of self-assurance. These emotions carry with them their own thoughts, all of which are in a happy vein ; they are, in Romeo's words, “ merry thoughts.”

This sense of exuberant well-being and joyousness has its characteristic physical accompaniments. The respiratory move-

ments and the circulation are stimulated, and there is a tendency to spontaneous muscular movements—in short, a heightening of the bodily activities generally.

See, then, what widespread results follow upon a pleasurable cœnæsthesia, itself the result of chemical stimuli operating upon the sensory end-organs.

I have already drawn attention to the influence of the bodily sensations upon the emotions and thoughts. Here let me insist upon the predominant influence upon thought and emotion of that vast sensorial chord which we denominate the cœnæsthesia. The sense of exuberant well-being fosters a belief in self, and constitutes, I take it, the fundamental psychic characteristic of the megalomaniac, whether as met with in everyday life or in the asylum. It is this which determines the characteristic emotions and the large delusions which are wont to appear when the intellect becomes disorganised. True, a strong character may, in spite of physical *malaise*, retain his self-assurance in regard to his mental capabilities, such as his ability to carry through a difficult scheme; but this is strength of will rather than self-assurance, and the very reverse of morbid, being the outcome of an honest, healthy belief in self; and I believe I am right in saying that the exaggerated belief in self generally, such as we see most pronounced in the general paralytic, only occurs when the individual is pervaded by a strong sense of *bien être*. No sense of *bien être*, no megalomania.

2. Let us now consider the opposite variety of cœnæsthesia. We will suppose that, not a harmonious chord but, a discord is struck, producing a painful cœnæsthesia—a sense of *malaise*. This will call up a painful emotional state, such as gloom associated with self-distrust; in consequence the thoughts will tend in an unhappy direction, so that when the intellect becomes disorganised the unfortunate victim has delusions of persecution.

The depression in the emotional sphere will have its corresponding physical expression; circulation and respiration are diminished, and there is a lowering of the vital activities generally.

Here again we see how greatly the cœnæsthesia affects the psychic and physical being, and how the psychic side of us is influenced by chemical stimuli circulating in the blood.



The influence of the cœnæsthesia on the emotions and the trend of the thoughts cannot be too strongly insisted on. Painful emotions and unhappy thoughts are incompatible with a pleasurable cœnæsthesia, while pleasurable emotions and happy thoughts are incompatible with a painful cœnæsthesia.

#### *Chemical Stimuli.*

I come now to speak of the chemical stimuli which I have assumed to play so large a part in the genesis of the cœnæsthesia. We must not think of the blood plasma as consisting merely of water holding in solution food-stuffs (albumins, fats, and saccharides), salines and deleterious waste products. The blood, as I have recently contended elsewhere, contains also a number of drug-like substances, substances which do not yield energy and which take little or no direct part in nutrition, but which are capable, after the manner of drugs artificially administered, of modifying function. These substances we may group, according to their origin, into four classes.

1. The internal secretions. These do not yield energy, and although they doubtless influence nutrition, yet they do this much in the same way as drugs artificially administered. Their essential purpose is to influence function. The adrenal secretion is strikingly drug-like in its action, being the most powerful vaso-motor constrictor known. The thyroid secretion again acts much like a drug. When the artificial extract is given there occur symptoms like those of Graves's disease, the patient becoming very nervous and suffering from palpitation, tremor, and flushes. When, however, the supply of the thyroid substance to the blood is deficient, we have the dulness and hebetude of myxœdema, in other words, the lymphatic temperament. In short, the activity of the thyroid gland largely determines whether a person is nervous and excitable on the one hand, or stolid and lymphatic on the other. The cœnæsthesia is very different in these two opposite conditions. How far this is to be attributed to the structural or nutritional state of the nervous system resulting from defect or excess of the thyroid secretion, and how far to the possible action of the thyroid secretion as a chemical stimulus to the sensory end-organs, I do not attempt to say. I think it probable, however, that the secretion may act as such a stimulus.

2. Besides nutritive substances proper, food contains a number of substances which have a direct influence on function. Among others, for instance, it contains stimulants, of which there is a specially large quantity in meat. These are absorbed into the blood and act like drugs; many of them, no doubt, upon the sensory end-organs. The modification of cœnæsthesia produced by a meal of meat is, I believe, in large measure due to the action upon the nervous system of stimulating substances contained in the meat. It is well known that meat has an intoxicating effect.

3. A large number of drug-substances are produced in the alimentary canal during the process of digestion. The most notable are the ptomaines, alkaloid substances allied to the vegetable alkaloids, such as strychnine and morphine. Many of these when absorbed in unduly large quantities into the blood are toxic, and profoundly influence cœnæsthesia, a result which we may, I think, safely conclude is due at least in part to their action on the sensory end-organs.

Now it is generally assumed that these alkaloids and allied bodies are wholly toxic in their action, or, if not toxic, at least indifferent. We must remember, however, that the physiological effects of an alkaloid depend upon the dose that is administered. Strychnine and morphine, though in large doses deadly poisons, are in minute quantities highly valuable remedies, and I see no reason why many of the alkaloids formed in the alimentary canal may not, when absorbed into the blood in small quantities, play the part of nerve-tonics and stimulants; nor does it seem improbable that other drug-substances, similarly absorbed, may even in large quantities exercise a beneficial effect. In short, I suggest that just as some drug-substances absorbed from the stomach and intestines in certain quantities produce a painful cœnæsthesia, so these same substances in different quantities, and other substances similarly absorbed, may tend to produce a pleasurable cœnæsthesia. That they are all necessarily injurious or indifferent in their action seems to me unlikely.

4. Finally, it is probable that similar drug-substances produced by the metabolism of the tissues have likewise a beneficial influence on function. I cannot think that they are all either toxic or merely innocuous. Many of them have certainly a depressing action on nerve-function, but others have probably

a stimulating and tonic effect. Uric acid, for instance, is said when swallowed to act as a stimulant.

I claim, then, that the blood normally contains a number of drug-substances, and that these play a necessary part in the bodily functions, among other things acting as chemical stimuli to the sensory end-organs, and being thus largely responsible for the cœnæsthesia.

*Classification of Chemical Stimuli according to their Influence on the Cœnæsthesia.*

It would be impossible to make an elaborate classification of chemical stimuli according to their influence on cœnæsthesia, and it will be sufficient for our purpose to class them into (1) the depressants, those which produce a painful cœnæsthesia, of which the most characteristic form is a sense of ill-being or *malaise*, with mental depression; and (2) the stimulants and tonics, those which produce a pleasurable cœnæsthesia, a feeling of well-being (*bien être*), with mental exhilaration.

Supposing the nervous system to be normal, and the tissue plasma also to be normal, save in the complete absence of chemical stimuli, there is (so we may provisionally assume) neither a feeling of *bien être*, or *malaise*, but simply one of indifference. The same thing happens if the stimulants and depressants exactly neutralise one another. When, however, the stimulants preponderate there is a sense of *bien être*, while a preponderance of the depressants leads to a sense of *malaise*.

Now, no one will, I presume, demur to the statement that the blood may contain depressant substances, capable of causing painful cœnæsthesia and mental depression. It is sufficient to refer to the symptoms which may attend disordered digestion, notably disturbances in the functions of the liver, and to the influence of blue pill and black draught in removing those symptoms. But what evidence, it may be asked, have we that the blood contains stimulants independently of those we expressly take as such?

Well, there is first the unmistakable fact that the food we eat contains an abundance of stimulants; then there is the fact that some of the compounds normally manufactured in the body can be proved experimentally to have a stimulant action; and finally, we have certain phenomena of disease which we can hardly doubt

are caused by stimulant substances produced in the disease. It is well known that certain nerve-storms are often heralded by a period of exceptional well-being : instance the familiar case of megrim. Now this has been attributed to the absence from the blood of some substance (or substances) having a depressant action, but the explanation appears to me highly improbable. That such absence might conduce to a feeling of average, or as we may say normal, well-being, I can well believe, but that it should bring about a supernormal condition, an actual exaltation, I altogether refuse to admit. I think it much more likely that the feeling of well-being in these cases is caused by some stimulant substance circulating in the blood, the subsequent phenomena of the actual attack being attributable to a "reaction," such as may follow a night's debauch, or a dose of opium ; or else to the accumulation of the stimulant to an extent rendering it no longer depressant ; or still more likely to both of these causes.

The phenomena of general paralysis of the insane, again, lends support to the view that an auto-intoxication is taking place. Sir Samuel Wilks was, I believe, the first to point out the analogy between alcoholic intoxication and the symptoms of general paralysis, an analogy so striking that, once observed, the inference can scarcely be avoided, that the exuberant sense of well-being sometimes observed in this disease, with the accompanying megalomania, is the result, as in alcoholic intoxication, of some stimulating poison or poisons circulating in the blood. Dr. Mott has isolated certain poisons in cases of general paralysis, and I should not be surprised if it were discovered that some of them have an action very similar to that of alcohol. On this view the exuberant general paralytic is in a state of chronic intoxication, and his mental condition may be compared to that of a person in the earlier stages of alcoholic intoxication.

*The Relative Part played by Nervous Structure and Chemical Stimuli in determining the Nature of Cœnæsthesia.*

One other question I shall touch upon, and then I have done. It is this : Do the differences in cœnæsthesia and its attendant emotions (*i. e.* temperament, mood) in (1) different individuals, and (2) the same individual at different times,

depend upon differences in nervous structure, or differences in respect of chemical stimuli—upon differences in the instrument or in the players?

(1) Does one individual habitually feel exuberantly well and in high spirits, and another habitually inert and depressed, because the mind instrument is in the one case so constructed that it readily yields pleasant sensations and emotions, plays as it were merry tunes, and in the other is adapted rather for the expression of miserable feelings—for the minor harmonies; or is it because the instrument is differently played upon in the two cases, the blood being surcharged with stimulants in the one, and depressants in the other? According to the one view we should say a man's temperament depends chiefly upon the structure of the mind instrument; while according to the other view it would be mainly determined by his blood composition, *i. e.* by the metabolic peculiarities of his tissues. In the latter case the happy and the unhappy man would exchange temperaments if they could exchange bloods.

I do not think the question so absurd as it perhaps at first sight appears; for while it is certain that differences in sensorial organisation must largely influence temperament—witness the varying response among different individuals in regard to such an agent as alcohol, which by no means always produces its characteristic exhilarating effect—yet we must remember that any given instrument may be made to yield an infinite variety of music according to the nature of the stimuli acting upon it. A perfect instrument in the hands of an unskilled player may awaken only to discords, while the hands of a master will evoke most eloquent music, even out of an old harpsichord; and so it is with the mind instrument. When one reflects upon the widely divergent effects on it of such stimuli as haschisch, alcohol, and the toxins formed in the alimentary canal, and when one considers that a brain in an advanced stage of degeneration may by certain stimuli be made to yield up a feeling of well-being and the pleasurable emotions and thoughts belonging to it, there is no escaping the conclusion that a man's habitual temperament may be determined far more by blood constitution, or what comes to the same thing, by metabolic idiosyncrasy, than has hitherto been supposed.

In this connection I would again refer to general paralysis of the insane. One may see a victim of this disease so weak

that he cannot lift his hand, actually unable to swallow, with his brain in the last stage of degeneration, and his intellect correspondingly disorganised, yet exuberantly happy and full of assurance as to his importance and his powers. Are we to suppose that this exaltation in the realm of feeling is an expression of cerebral degeneration, that the *summum bonum*, the goal of human effort,—happiness—the best music the mind instrument can sound, is the result of degraded function, as we shall have to do if we attribute it to structural alteration in the mind instrument? Shall we not rather liken the mind organ of our general paralytic to an old and broken instrument from which some music can still be got by the touch of the master hand. Surely yes, and I suggest that touch comes from some chemical stimulus; and if chemical stimuli can do so much, is not one justified in thinking that blood composition may be largely responsible for temperament?

2. Whatever may be thought about the cause of the different temperaments in different individuals, few will dispute that the varying moods of different individuals, from day to day and from hour to hour, are largely dependent upon the composition of the blood in respect of chemical stimuli. Such differences can scarcely be attributed to passing structural variations. True, the mind instrument may temporarily alter in its most intimate structure—in what may be termed its undiscoverable structure, *i. e.* in the arrangement of its atoms and molecules, just as it is said that musical instruments “play” much better some days than others (though I much suspect that the difference lies chiefly with the players); but I doubt if such structural changes are greatly responsible for temporary changes in the *cœnæsthesia*. I feel persuaded that the frequent alterations from a feeling of *bien être* to one of *malaise*—from good spirits to bad spirits, and the reverse—are largely agencies due to the action of various chemicals upon the supersensitive mind-organ. The sense of well-being often experienced after a sound night's rest, and the opposite feeling of *malaise* which may come on after a harassing day's work, are essentially due, I would say, to modifications in the blood composition. Our moments of depression result, in the main, from the action of depressants, our spells of exuberant well-being, of exhilaration, self-assurance, ambition,—when all the world seems fair and no obstacle too great to surmount, no goal too difficult to win—are really the

effects of mild auto-intoxication. So, too, it may be with the inspired hours of the genius. Is it chimerical to suggest that in those supreme moments there pass into the blood substances which stimulate the brain to its highest achievements?

*Summary.*—1. The sensorial nerve instrument—that part of the nervous system which has to do with sensation—may be compared to such an instrument as an organ. The sensory cortex is represented by the pipes, the sensory end-organs by the keyboard. When the organ keyboard is played upon, music results; when the sensory keyboard is played upon, sensation results.

2. When certain notes in the sensory keyboard are struck (*e.g.* in the retina, auditory expanse), intellectual sensations are induced (*e.g.* of sight and hearing); when the remaining notes are struck, there result comparatively unspecialised, non-intellectual sensations. These collectively constitute a voluminous sensorial chord which we designate the *cœnæsthesia*, or sense of bodily existence.

3. There are many varieties of *cœnæsthesia*, but they may be broadly divided into (*a*) the sense of well-being, and (*b*) *malaise*.

4. In Section I it was pointed out how the sensations influence the emotions, and how both influence thought and conduct. When, therefore, *cœnæsthesia* is pleasant, *i.e.* when there is a sense of well-being, a pleasant emotionality and happy thoughts arise; but when *cœnæsthesia* is painful, *i.e.* when there is *malaise*, painful emotions and unhappy thoughts come into being.

5. The agencies which, playing upon the sensory keyboard, produce *cœnæsthesia*, consist for the most part of chemical stimuli circulating in the fluids of the body.

6. These stimuli may be broadly classed into the stimulant and tonic on the one hand, and the depressant on the other. When the former predominate *cœnæsthesia* is pleasurable; when the latter are in excess it is painful.

7. From all which it follows that *cœnæsthesia* does not merely depend upon the constitution of the sensory instrument, but upon the way that instrument is played, *i.e.* upon the quantity and nature of the chemical stimuli present in the body fluids; and seeing that this factor is determined by the metabo-

lism of the body at large, it follows that such metabolism is largely responsible for the cœnæsthesia.

8. Inasmuch as the cœnæsthesia influences emotions, conduct, thought, it follows that the *ego* which is a trinity of feeling, will, and thought, is largely determined by the metabolism of the body at large.

(<sup>1</sup>) It is convenient to make the feelings embrace both the sensations and the emotions, although all psychologists do not do so.—(<sup>2</sup>) Owing to the equivocal meaning attaching to the term "ill-feeling"—which naturally suggests itself as the opposite of "well-feeling"—I am obliged to substitute the term "malaise," by which I mean to express a widely diffused feeling of unwell-ness, no matter whether this occurs in connection with well-marked disease or not.—(<sup>3</sup>) Some, indeed, appear to think that all associations take place through the feelings. See Ribot, *The Psychology of the Emotions*, p. 173.—(<sup>4</sup>) This restraining power itself constitutes an impulse, and is of the nature of a feeling.—(<sup>5</sup>) I say nothing of "muscular sense."

*On Epileptic Speech.* By A. CAMPBELL CLARK, M.D.,  
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THE speech faculty of the epileptic has hitherto received very little attention, though passing references to it have been made from time to time by several writers, viz. Kussmaul, Ross, Wylie, and others. Wylie has stated the well-known fact that temporary aphasia appears sometimes as the "aura," sometimes as an immediate consequence of a fit. Kussmaul confirms this, and Ross writes, "In some cases the warning of an epileptic attack consists of a sudden inability to speak, and it is very probable that word-deafness and word-blindness are by no means uncommon auræ." While saying so much, Ross admits what is certainly true, that motor aphasia is the more readily noticed, and, as obscuring the question of aphasic auræ, he admits the mental confusion attending the onset of unconsciousness, a factor of some importance. Bradyllalia (slow speech) and echolalia (echo speech) have also been noticed by observers at home and abroad. They are, however, so frequently observed in developmental speech, and in other nervous and mental diseases, that too much may be made of their significance.