

saved if the proper organs were brought into play. But perhaps you will confront me with the question, what if the teacher is not prepared to criticise the voice of the pupil? Even admitting the force of this difficulty, every teacher can at least apply the principle of correcting bad habits as far as he knows, and this itself will accomplish much good. We should early endeavour to train the ear, to discriminate between what it likes and what it dislikes; and when this is accomplished, the point of a higher and closer discrimination is not far distant. Once you have trained the pupil to be his own critic, the teacher's work is largely done. In recitation the voice should never be diverted from the simplest and finest tones of its ordinary use. We should aim to encourage a naturalness of tone in the grammar recitation, in the reading class, and on the playground. Was there ever committed to human care and management any instrument capable of such delicate variety and harmony as the voice? Just listen for a moment to the prattle of happy childhood; is it not pure as the morning breeze, sporting as the winged songster, and variable as the mountain stream that laughs itself into the valley? As a physical faculty the exercise of the human voice concerns itself. It tends to a healthy development of all the physical powers. In fact, if properly directed voice, culture becomes a most practical source of health and grace to the whole being. There is no relation of life upon which the voice may not be taught to reflect. In the social circle it becomes the current of revelation from the within to the without. The business man lays his voice by the side of his wares, and the eye of the purchaser harmonizes with the ear in its judgment. The public man presents himself first to the eye and ear of his audience. If his words be favorable, he sustains the position of a stranger who approaches you with a strong letter from a friend; if unfavorable, there is at once a barrier thrown between you and him. The culture of the voice should be also taught as a matter of cleanliness, as well as a matter of courtesy. If we owe our neighbor the morning salutation, we equally owe him that salutation in a pure tone of the voice. It should also be taught as an agency of moral culture. A voice of dignity and eloquence will attract to purity and truth, to virtue and religion. I believe that a new era is dawning in the history of education with reference to the human voice; more attention will be devoted to its proper cultivation; and as the human heart glows in a higher benevolence and the mind of man expands to a wider range, I believe that the voice will be found the finest to reflect the Divine image in tones such as make up the melody of heaven.

THE DANGERS OF HABITUAL HEADACHE, AND OF INTELLECTUAL EXERTION OF THE EXHAUSTED BRAIN.

The following paper, by Dr. Treichler, of Bad Lenk-Bern, was read in the section of Psychiatry and Neurology, at the fifty-second meeting of the German Association of Natural Historians and Physicians, held at Baden-Baden, 1879. (Pp. 32a, 325 of *Tageblatt*.)

School Hygiene, the youngest step-child of medicine, has, till now, only sought to ward off bodily mischief; yet, as school is chiefly concerned with brain activity, it is very probable that a rich material lies here before Psychology and Psychiatry, and a wide field of work in watching over it and raising their warning voice, that the activity and exertion of the brain be normal, and that it be not allowed to become the cause of serious illness in later life.

Learned men have been very egotistical in this respect; they observe the mischief in their own and other people's children, but they are so engrossed by their own special studies and callings that they allow the health of these young people to suffer irreparable harm; and this is especially to be lamented in the case of young women, who are far more heavily weighed than men, by the restrictions of fashion and prejudice.

According to my experience, habitual headache has considerably increased with boys and girls: it destroys much of the happiness

and cheerfulness of life, produces anæmia and want of intellectual tone, and, what is worse, it reduces many a highly gifted and poetic soul to the level of a discontented drudge. Physicians and Psychologists have paid far too little attention to this affection as well as to School Hygiene, and it would be a good work for the German Scientific Association to inaugurate a change in this respect. Although it is more difficult to collect precise statistical data on habitual headache than on myopia, yet the result of various investigations, at Darmstadt, Paris, and Neuenburg, goes to prove that one-third of the pupils suffer from it. Undoubtedly the principal cause is intellectual over-exertion, entailing work at night, and the insisting by parents on the too earnest taking up of a variety of subjects—music amongst the rest.

The pathological anatomical changes in the worst cases of this unhealthy condition I consider to be a disturbance created by anæmia in the nutrition of the ganglion cells of the cortex of the cerebrum. It is well known that a badly nourished brain is much more quickly fatigued by intellectual exertion than a brain in a normal condition, just as in the case with the muscles.

A second cause of habitual headache is a passive dilatation of the blood vessels of the brain, also connected with serious disturbances of nutrition, whereby the perivascular space round the capillary vessels is contracted, and the getting rid of used-up matter greatly impeded. Modern pathology now looks on progressive paralysis, in its earliest state, as a vasomotor disturbance of nutrition of the cortex of the cerebrum, in which the vessels of the pia-mater get into a palsied condition of dilatation, and we have degeneration of the cortex of the brain produced by stagnation of the current of lymph. If I am correct in this pathological anatomical definition of the two diseases, it is plain that they have a distant resemblance and affinity to each other, and that physicians ought by no means to ignore them. In habitual headache, the palsied condition of the brain vessels is transitory; in progressive paralysis it is usually irreparable.

A second great evil, in the more advanced schools, consists in intellectually overloading of the pupils, and in their being compelled to take up too many subjects, also in working on at night when the ganglion cells are thoroughly exhausted. This must produce the same condition in the brain as would be produced in the muscles, if, after a long day's march, a mountain climber were to continue walking far on into the night, and were to repeat this day after day.

I might here prove that the method of instruction, now-a-days, is not only a cause of disease, but also perfectly useless, because, instead of increasing knowledge, it produces mental confusion, and becomes simply a labour of the Danaides, or like carrying water in a sieve. I believe, Psychology can prove the correctness of what has been here said, if we consider the experiences given us by learned men who have suffered from senile brain atrophy, and also that, in giving a rational amount of time to work, and to the exercise of thought and memory, the gain for the pupil will be far greater than that attained by the present method.

What we call thought and impression made on the memory, are undoubtedly processes of molecular motion in the protoplasm of the intellectual brain cells, although it still remains a riddle how such a process of motion is in us transformed into thought.

When these ganglionic cells begin to be diseased by senile atrophy, the memories and scientific problems of youth are still clear, and can be reproduced, while the same ganglionic cells can no longer comprehend and work at new, though much simpler scientific problems, and while, with regard to a thing of yesterday, the memory is uncertain. From this we may draw the following conclusions:

1. That what the ganglion cells, when in their full health and vigour, have grasped, remains; so that, after the lapse of half a century, and with the beginning of disease, it may still be reproduced.

2. That the ganglion cells, diseased by old age, are, in reference to the accomplishment of work, like greatly exhausted ones, and have lost the power of understanding and abidingly taking in new and difficult ideas. The ganglion cells, therefore, can only take in new ideas, as an intellectual acquisition, so long as they are powerful, are not exhausted, and are nourished with healthy blood. The boundary line is drawn here quite as exactly as is the quantum of nourishment for the stomach of an invalid.

3. That the constant addition of fresh subjects in the teaching programme, making night-work necessary for the pupil when the ganglion cells are already exhausted, entirely defeats its object of