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Author(s): F. H. Champneys

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Germany than in France, England, or the United States, and although science is baffled for the present in its search for exact results, it is of no slight importance that the causes and conditions of these states are now better understood than even by Braid. The phenomena of 'trance' and 'mediumship' are again demonstrated to consist in abnormal nervous states which any tyro can more or less control. Practical methods of treating certain forms of nervous disease are already being modified by these results. Pathological classifications and laboratory themes proposed for physiological investigations of nervous functions are likely to be affected; while psychology receives not only a valuable budget of suggestions and *aperçus*, but is strongly encouraged and confirmed in the fundamental assumption of psychophysics that all the secrets of the soul are somehow or other bound up in those of the nervous system.<sup>1</sup>

G. STANLEY HALL.

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NOTES ON AN INFANT.

THE following notes, based on Mr. Darwin's most interesting and accurate report of the unfolding of the senses, emotions, &c., in one of his own children (MIND VII.), are offered as a small contribution to this interesting subject, on which observations, so constantly at hand, ought to be more often carefully made. They concern the writer's infant son, and extend from the moment of birth through a period of 9 months.

*Sucking.*—The first thing the child did when left alone a few minutes after birth, was to suck the blanket in which he was wrapped.

When hungry, he would cram his hands into his mouth with varying precision, and suck them hard. This was observed ever since birth, and seemed to be adopted without hesitation as a means for temporarily appeasing hunger.

At 4 days old, he pushed away his mother's breast when satisfied.

The touch of a warm hand did not induce sucking movements.

No practice seemed to be required for directing the hands to the mouth.

*Sneezing* was always accompanied by violent movements of all the limbs, the thighs being flexed on the abdomen, the forearms bent, and the elbows thrust forward.

The purpose of the flexion of the thighs on the belly was probably partly to relieve the tension of the suddenly contracted abdominal muscles, but the movements of the arms (and partly those of the legs

<sup>1</sup>For two interesting popular sketches see R. Gscheidlen, "Die Erscheinungen des sogenannten thierischen Magnetismus im Lichte der Naturwissenschaft," in *Augsburger Allgemeine Zeitung*, Nos. 3, 4, and 5, 1880. Also R. Rühlmann, "Die Experimente mit dem sogenannten thierischen Magnetismus," in *Gartenlaube*, Nos. 8 and 9, 1880.

also) probably had for their cause the necessity for relief of what is called a 'nervous discharge' of great amplitude, such as a sneeze.

*Crying* was performed at first without any squaring of the mouth. The sound can be exactly expressed by "ngä" as pronounced in German. This must have been produced by closing the fauces by the contact of the pillars of the fauces and the soft palate, so as to send all the sound through the nose; the vowel sound being then produced by separating the soft palate and pillars of the fauces and allowing the sound to come through the mouth.

The child appeared to cry at first for three reasons: (1) from a feeling of loneliness or fright on awakening from sleep, which was relieved by being taken in the mother's or nurse's arms, or even by a touch; (2) from hunger; (3) from pain. The cries seemed to be all different in character.

*Smiling* was reported at 5½ weeks, but not certainly observed before the end of the 8th week. It was often accompanied by sucking movements. This shows the association of two pleasurable ideas.

*Weeping*.—Tears were shed two days before the end of the 14th week.

*Seeing*.—The eyes were first fixed on a candle when a week old. On the same day, the eyes were fixed on one of the parents for the first time.

Opening of the eyes was accompanied by wrinkling of the skin of the forehead; the wrinkles, being horizontal, were due to the frontalis muscle. They resembled those produced in adults during an effort to open the eyes when tightly closed, either on account of very dazzling light or of a foreign body in the eye; but were probably only necessitated by redundancy of skin, which is very observable in a young child and most young animals. This wrinkling gradually ceased.

The 9th day was the first on which anything like habitual opening of the eyes occurred.

It was not before the 14th day that the child *took notice* of persons or moving objects.

From the time that he began to use his eyes, bright light gave him much pleasure, and he never blinked except on a change from comparative darkness to bright light; when the moment of this change was past, he would gaze for a long time with much apparent delight and with wide-open eyes at a lamp or at the gas, however bright. This fact makes it unlikely that the frowning mentioned above was due to being dazzled. He was first able to see himself in the glass at 8 weeks old, the experiment having been often used before.

*Hearing*.—During the first week the child would not start at any noise however sudden, when unaccompanied by vibration of the room or bed. For instance, no notice was taken of hands loudly clapped close to his ear; but slamming of a door made him start. Just the same starting was observed immediately after birth when the scale in which he was being weighed went down with a jerk.

It was very difficult to decide when the child really heard first. At 14 days old he would turn his eyes to his mother when she spoke to him, but even then did not start at sudden noises however loud, unless accompanied by jerks or vibrations; so that the apparent power of hearing his mother's voice may have depended on his feeling her breath on his face, for it was only when her face was turned towards him while she spoke that he turned his eyes towards her.

In connexion with the late appearance of this sense, we must remember that the tympanum at birth is packed with areolar tissue which only gradually becomes absorbed after birth.

*Reflex Actions.*—Among these may be noticed the spasmodic start which occurred on any jar or vibration, previously noticed, and also the fact that micturition was always or nearly always indicated by a slight shiver.

The slight provocation necessary for producing a convulsion in children is a well-known sign of their great irritability to nervous stimuli.

Exactly at 4 weeks old the child started at sudden noises if unexpected, but would not start twice at the same noise if not excessively loud.

*Taste.*—The child rejected all things given to him cold, even milk, but would take various things not especially nice (such as cod liver oil) if warm. The temperature seemed to be of more consequence to him than the taste.

*Voluntary Movements.*—The arms were far more purposive in their movements than the legs from the very first. The movements of the arms from the first were like those of striking with the fists, the fists, however, being only partially clenched.

*Walking.*—When one day less than 19 weeks old, the trial was made of supporting the child on the floor with the feet just touching the ground, and moving him forward. The movements of the legs were always alternate and purposive, each step being perfectly formed; though the feet were lifted unnecessarily high, there was no hesitation nor irregularity. Only when he was lifted too high for one or other foot to touch the ground was this alternate movement interrupted, the foot which failed to reach the ground making a fresh step. It was obvious that the contact of one foot with the ground was the stimulus for moving forward the other foot.

*Attempts at Talking.*—From 9 months the child distinctly imitated the intonation of the voice when any word or sentence was repeated in the same way several times.

About the 13th week he began to appear to attempt to join in conversation with a variety of articulate sounds, if talking was going on in the room.

*Fear.*—The first symptom of fear was noticed at about 9 months. It was excited by an unusual sound in the room, but not in the child's immediate neighbourhood; he opened his eyes very wide and burst out crying. The second occasion was at about 10 months, when sound was again the exciting cause; a toy was given him which squeaked on pressure, he burst out crying, and cried whenever it was

offered him, but in a short time he got used to it, became very fond of it, and made it squeak himself.

I have one or two remarks to make on Mr. Darwin's paper. He says: "On the 7th day I touched the naked sole of his foot with a bit of paper and he jerked it away, curling at the same time his toes, like a much older child when tickled". Such reflex movements can be provoked *in utero*, and can be utilised in obstetric operations for distinguishing a hand from a foot, the hand closing on the finger. Kicks can be excited even through the abdominal walls by sudden movements, and by direct contact in the way of tickling.

With regard to the words "mum" used by Mr. Darwin's child, and "ham" used by M. Taine's to express food, I would suggest that both were invented subsequently to the use of solid food, for Mr. Darwin's infant invented "mum" at 12 months, and M. Taine's invented "ham" at 14 months. Both words seem to be the result of a vowel sound during mastication. Let any one try to eat or move his mouth as in eating, pronouncing at the same time any vowel sound. He will find that each vowel is closed by the letter "m" which is common to "mum" and "ham". "Mum" is the result of "u" with the mouth first shut, then opened, then shut. "Ham" (probably without the "h" aspirated, especially as an aspirated "h" is too much for the recti abdominis muscles of an infant) is the result of an "a" similarly treated.

That "m" is one of the earliest acquired consonants, appears from the word "mama".

I would also suggest that the word "mumble," used of a dog growling while gnawing a bone, is probably onomatopoeitic, and to be similarly explained. I do not know the etymology of the Latin word "mando".

F. H. CHAMPNEYS.

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FREE-WILL : A REJOINDER TO DR. WARD.

I. My article, *Dr. Ward on Free-will*, in April last, MIND XVIII., has elicited an elaborate reply from Dr. Ward in the *Dublin Review* for October; in which, as might be expected, he does three things, controverts my objections, re-states his own theory, and criticises what he supposes to be mine. My answer must necessarily be brief. The plan of MIND does not admit the voluminous repetitions which are apparently but so many "congenial efforts" to the Scholastic periodical, and serve, for aught we know, like mesmeric passes to deepen the "dogmatic slumber" of the regular patients.

This being so, since I cannot go through his reply in all its detail, I must have recourse to selecting the most fundamental points, trusting that my replies on these will be sufficiently conclusive to show by implication the untenability of his positions as to the rest. I begin with the general remark that, whereas Dr. Ward frequently taxes me, wrongly as I think, with misconception of his meaning, he very frequently and palpably misconceives mine. There is one page in particular, near the beginning of his