

earth-currents have anything to do with such dispositions of matter as the renewed deposit of ores asserted of certain dry mines and tunnels; but no rock-bed, probably, is dry enough to demand such an explanation, which itself requires a great deal of explaining.

In this connection I will add that a hexagonal crystallization in Mars, occurring to the mind of one of your correspondents, is as wild as the canal idea. The radiating lines are on too vast a scale; and there is nothing in any known crystallizations to favor the idea, unless it be the little six-rayed stars of frost spicules, from which the jump to Martian continents is too great. The radiations have their counterpart in the old volcanic surface of the moon and some analogous facts on the earth; also in mountain system "knots," Himalayan or other.

On the whole, the action of lunar and solar tides on planets while in a viscous condition, with more or less crust, is the only hypothesis that so far promises well, in explanation of the remarkable lines of the earth and Mars, notwithstanding the difficulties mentioned.

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RESIDUAL PERSONALITY.

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EVIDENCE is not wanting to show that what we call personality is an extremely complex thing, the sum of subsidiary personalities which now shift and change like the figures in a kaleidoscope, and again, becoming sharply defined under some abnormal condition, crystallize into two or more distinct groups of elements, which alternately sleep and wake or even co-exist. These complex elements may be so unstable, the groups composing them constantly breaking up and forming new combinations, that the idea of multiple personality does not naturally attach itself to them; it is only when they become stable, and especially when each exhibits a well-defined consciousness, that we begin to think of such a thing. But, besides the abnormal and diseased conditions which cause such a separation or crystallization, there are other conditions in which it appears somewhat less distinctly. To one class of these I desire to call attention very briefly—to that embracing what may be called cases of residual personality.

Residual phenomena of all kinds are particularly interesting and instructive, especially those where the few things remaining in a group after many have been removed differ widely in their collective properties from those that have been taken away, while these latter are not in any way distinguishable from those of the sum of both before the division. This is the case often with residual personality. Nothing is more common than for a group of elements in what we call a person to be differentiated in one of various ways, leaving behind a residual group differing altogether in its characteristics, though the differentiated group represents to us, and is indeed considered to be identical with, the original person.

The commonest method of such differentiation is sleep. The elements which sleep, are, as it were, subtracted from the normal personality, but there is usually left behind a very curious something—illogical, credulous, fantastic—whose nightly experiences the whole re-united person recollects in the morning as dreams. The next commonest case is that of the absent-minded person. The major part of the person being absorbed in mental processes of some sort, the residual person lives its own separate mental life, thinks, feels, and wills by itself, and perhaps carries on a train of processes which is continuous with a preceding train carried on under similar circumstances the day before. This residual person may act very mechanically; the re-united person may fail to recollect what its acts or thoughts were and be surprised to find how it has been making use of his limbs while he—what he vainly regards as the one unalterable ego—has been absorbed in thought; but, on the other hand, it may be perfectly conscious, and may carry on an entirely different train of thought of its own. Almost always, however, it is eccentric, and betrays a weakness at one point or another.

For instance, a suburban resident, whom we will call A, is accustomed on landing at the New York side of the ferry to abandon the mechanical task of walking to his office entirely to his

residual personality, and to give up the major part of himself to thought. The two personalities act often with perfect—always with practical—separateness, the residual person being quite equal to the low task of evading vehicles, steering clear of passers-by, and turning the proper corners. When the office is reached and the two persons again become one, it is often a difficult task to remember any circumstances of the walk. On one occasion, however, A left the Astor Library on Lafayette Place, as he supposed, intending to walk down Clinton Place. To do this he must turn first to the left, then to the right, and then again to the left. He turned once to the left, and after some time became dimly conscious that he had walked for a long time, and that the place for the second turn had not been reached. Coming to himself, he found himself far down Broadway. Tracing back his course mentally, he discovered that he had been in the Mercantile Library instead of the Astor; his first turn therefore had taken him down Broadway, and he of course did not reach the place for the second. Mark now the peculiarities of his residual person. It knew just where it was to turn and in what direction, and had sense enough to be uneasy when it did not come to the proper place to turn, but it had not intelligence enough to know that it was on the wrong street. Its mind was too weak to be trusted further than it was accustomed to go. This residual person, in short, was about on a par with a harmless idiot.

Again, B, a New Yorker, is walking along absorbed in a process of thought, when his residual personality sees his friend C approaching. It is not astonished, for he is near C's lodgings, but as the person supposed to be C comes nearer, it sees that he only slightly resembles C; he has on shabby clothes, and his face is entirely different. The natural conclusion would be that the person approaching was not C. The residual person, however, does not argue thus. It concludes at once that C has greatly changed; that he has become poor, and that his appearance has altered for the worse. Pity and surprise are plainly felt by the residual person. During these mental processes, so similar to those of a dream-residual, the major person has kept on with his own train of thought. Finally, however, on the close approach of the supposed C, they unite in a flash into the normal person, the two separate consciousnesses become one, and the truth is recognized at once. No doubt these cases can be paralleled by thousands of others. It seems to me that they are as true instances of double personality as any exhibited by epileptic or hypnotic persons.

Why should the residual person differ so from the normal, while the differentiated person is precisely like the normal? If we take 199 gallons of water from 200, is not the remaining gallon still water? There are many mathematical analogies. In geometry, if we draw a parallel to the base of a triangle we thereby cut off a precisely similar triangle, yet what is left has no resemblance to a triangle. This analogy, carried out, would point to a consideration of personality as a function of position or arrangement of elements, as chemical isomers are functions of the position of their constituent atoms. But an algebraic analogy, which ties us down to no such hypothesis, probably comes nearer the truth. Consider the identical equation $(X + Y) - (aX + bY) = (1 - a)X + (1 - b)Y$. If $a = b$, the ratio of the two terms of minuend, subtrahend, and remainder, each $= \frac{X}{Y}$. But if a and b differ very

little from unity and from each other, then $\frac{a}{b}$ may be sensibly unity, while $\frac{1 - a}{1 - b}$ differs greatly from it, and thus the ratio of

the terms of the subtrahend will be sensibly that of the terms of the minuend, while that of the terms of the remainder may differ greatly from both. In the same way, by extending the number of terms, we may subtract from any polynomial what is sensibly a sub-multiple of it, and yet leave a remainder whose terms bear a very great disproportion. Hence it is, no doubt, that the removal of a group of elements of personality that seems to represent one's normal self may leave a residue so different and so incongruous.

It will be observed that what has been said is entirely independent of any hypothesis as to the nature of the elements of personality and the mode of their combination.