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THIS TELLS YOU HOW

OF WORKING.

At last scientists seem to be on the

the brain when a person thinks. It has

long been known that the brain is the

thinking organ, but just how the mak-

ing of thought comes about has been

solved the matter offhand by raying

that the brain secretes thought as the

liver secretes bile. This rerse saying

passed into common use, but soon cam-

to be recognized as a clever speech

rather than an explanation of the mys-

tery. Now, however, the most recent

researches of the microscopists are

making it appear that after all the say-

ing is not so far wrong, but that, cor-

rectly interpreted, it in some measure

expresses the facts. Of course, thought

being intangible, is not properly to be

cal substance, but it appears that the

processes in the brain which produc-

thought, and without which thinking is

impossible, are comparable to those

changes in the liver and other organs

which produce the tangible secretions.

A committee of British physicians.

acting jointly, have been giving par-

ticular attention to this topic for some

years, and their researches, though not

yet altogether complete, already show

some very interesting results, which

taken together with those of investi-

gators on the continent, let us see a

long way into the intricacies of the

WEAR OF BRAIN CELLS.

It is shown unequivocally, for ex-

tually loses part of its substance

ample, that a brain cell which is the

really important part of the brain,

ompared with bile or any other physi-

puzzle. The celebrated Cabonis

Function of Sleep.

From the New York Sun.

Quality,

## The Story of Two Ciphers.

Ober Jarret was a hard man. He | everybody looked quite happy, includrather gloried in his hardness. A hard man was a man who couldn't be fooled. Obed Jarrett never was fooled. In his private opinion the world was made up of a few honest men, and a great many fools and knaves. An honest man was one who paid his way and neither asked nor gave favors. Fools might call him hard, and knaves might snart because he wasn't gullible. but what cared Ober Jarret?

The honest man sat at his desk that June afternoon with his pen loosely dangling in his fingers, and his check book open before him. He was in no hurry. To give away money was so new a sensation that he felt justified in prolonging it. Not but that he could amply afford to give the sum he had fixed upon; it was the principle of the thing that held him irresolute.

He was worth close to \$80,000, There was a memorandum slip in the upper right hand drawer that showed this total in round figures. He could have told the amount within a dollar or two. It was a gilt-edged property-stocks. mortgages, cash and a little real es-

"If I was sold out tomorrow," said Obed, smiling grimly, "it would bring every penny that I've totaled it at." He had won this comfortable property by shrewdness rather than harl

work. For more than 20 years he had bought mortgages and loaned money, and snapped up unconsidered financial triffes, in that same old office. He slept in the rooms above It, and sometimes for days together he didn't leave the building. There had been few episodes to enliven the duliness of this moneygrubbing life, but tomorrow one of them was to take place. Tomorrow his son, his only child, was to be married.

Instinctively his eyes turned to the portrait above his desk. The portrait of a brown haired young woman with smiling eves and slightly parted lips. As he looked upon the gentle face he felt a little tightening about the heart. Dead four and twenty years. on was four and twenty, and he married tomorrow. Their son, Had he done his duty by their son? He thought so, He had certainly given him a good schooling. The boy had gone through college with credit to himself and his father-and had helped to pay his way, too. Obed had wanted him to study law, but he had a love for chemistry, and, in company with a fellow student, had set up an office of his own. They started in as consulting chemists and assayers, and were-from all Obed could learn-building up a fairly remunerative business. He was certainly a good boy, though perhaps a little lacking in that respect for his father which begets confidence. It seemed but a day or two ago that he had come

to him and said: "Father, I am going to marry." It was like a blow to Obed. "Well, well," he presently said in his

testy way, "since it's all settled, why "Because I think you should know

' said Arthur stoutly. You didn't think to consult me be-

fore you took this step," said the old man, grimly, 'You couldn't expect that, father," said the son. "I am no longer a boy, you can't belo but approve of

her. She's the dearest girl. Her name is Alma Truman, and her father is chief accountant with Fancher & Co. She's the eldest of six, and they're awfully broken up at the idea of her oing. That's the kind to marry, father. The kind that is missed at home. But you must see her." How do you expect to support

her?" Inquired Obed, dryly. "With these two hands, and the ex-

cellent education you have given me,

The boy had taken him around to the Trumans' house one evening, but there eere so many Trumans, and it was only a short call, and he had scarcely caught a glimpse of the girl. And now the boy was going to marry and leave him, he felt, forever. Their boy! Had he always remem-

bered that Arthur was their boy? Would things have been different if she had lived? Would he, himself, have become the dry, old, moneymaking machine he was? God only

How happy they had been that brief year. How ambitious he was for her sake. How he toiled and planned. And he remembered how she would come to him and lay her soft, cool hands on his and draw the pen away and turn him tound in his chair and command him to rest. Was she smiling down on him now, as she had smiled down upon him thes, and as she almost seemed to smile upon him from the lifeless can-

Four and twenty years, and here he sat, an old man, preparing a wedding gift for their son, who was to be married tomorrow. A gift for their son. Yes, yes. It was a custom-foolish. perhaps. He would give him a check for a hundred dollars. It was a tidy sum, and pretty nearly as much cash as the boy's father had when he married. A hundred dollars. Surely a lib-

eral gift for-for their boy. Their boy. He bent forward suddenly and dip? ped his pen in the ink. It was strange low dim the lines on the check seemed. He wrote the date. Four and twenty years ago. Why, the room seemed full Was she leaning over his shoulder again. He slowly made the figure "I" and the two ciphers. Their boy! Was that the touch of her soft, cool hands on his Was-was she guiding his pen? The lines were dimindeed, as he slowly wrote. Then he paused and stared down at his work

and carefully added his signature. He dropped back in his chair and brushed his hand across his eyes, and for a moment was very still. When he looked up again at the portrait he smiled. Then he briskly tore out the check, pushed back the book, shut down the desk, and seizing his hat,

Ten minutes later he confronted the serious-faced teller of the Sixth National and thrust the check at him

across the plate glass shelf. "Certify that, please," he said, in his

The teller picked up the slip of paper in his preoccupied manner and glanced at it. Then his face suddenly

'Why, that's fine!" he cried, and certified it in a hurry.

Obed said nothing. It was a quiet little home wedding. Only the relatives were present, but there were such a lot of them on the Truman side. It was a nice wedding if it was quiet. The house was beautified with flowers, and vines, and ribis, under the supervision of the sis-

ter who was in the school of art, and

ing the younger Trumans, who were bearing up bravely

Arthur took his father with him to he house, and then left him in the hall in charge of an usher,

There is usually, I think," said Oled to the usher, "a place set aside for the gifts to the-the happy pair. Am I right?"

"You are," said the smiling usher. "This way." And he led him upstairs to the little room where the modest were displayed. Fortunately for Obed, there was nobody in the apart-ment at the moment, and when the usher's back was turned he slipped the check from his pocket and laid it under the edge of a plaque on the Then he softly stole down table.

After the ceremony he came slowly forward, following the others who had offered their congratulations, and took' his son's hand and pressed it warmly. Then he turned to his new daughter, surprised at a look that passed between the happy pair, and wondering what

it meant. "Father Jarrett," said Alma, as she raised her face and the old man quite without forethought stooped and kissed her, "Father Jarrett, you know that nobody can refuse a bride's request, And Arthur and I want you to promise to come and live with us just as soon is we are settled in our flat."

"No, no," said the astonished Obed.

I—I should be in your way."
"That's no answer," said Aima; "say, t least, that you will come and try it? The old man hesitated. She certainly

vas a dear girl. "I will promise to try it," he smilingy said, and somehow his heart felt lighter than it had for many years.

"And to think," he muttered to himelf as he stepped back, "that she invited me without knowing a blessed thing about that check!" A few moments later his son called

"Father." he said, "some up with us and look at the presents. It's a good time, everybody is busy talking, and Alma wants you to see how nice and

So they went up to the little room, and there Alma began her rapid history of the gifts and their donors. Suddenly they were interrupted by a

kind her friends have been."

ry from Arthur. He had discovered

"What's this!" he stammered, "Pay o the order of Arthur Jarrets \$10,000? Why, father

"Oh, oh! Now we can have a home of our own!" cried the delighted girl, who vas looking over Arthur's shoulder. But you know, Father Jarrett, that cou would have been just as welcome

"Yes, yes, I know," he answered. Then he added a little brokenly: "I want to be perfectly honest about this noney. One hundred dollars is from me, the rest from Arthur's mother." They looked at him wonderingly, and ne turned suddenly away.

When he looked around he said with his grim old smile; "Slip it in your pocket, my boy; the money will be there when you get back."

But after Alma and Arthur had started on their two weeks' wedding ourney, and the old man was walking back to his lonely rooms, he suddenly traightened up and said half aloud "It will only be two weeks."-W. R. Rose, in Cleveland Plain Dealer,

## DOBLEY'S MAN

WITH THE HOE.

From the New York Sun. "I might just as well resign at once!"

exclaimed Mrs. Dobley. "I had no idea that joining a literary club meant that one had to perform in public. I simply can't do it. "What do they want you to do, my

dcar"" asked Mr. Dobley. "A song and dance or a cakewalk?" I wouldn't mind a little think like that. You can pick it up in no time." "It nothing like that," said Mrs

Dobley, passing a typewritten document over the breakfast table. "And you needn't make any fun of the matter, either. The frivolous way in which you look at everything is tiresome. Now, what am I to do" "I am sure, my dear," began Dob-

"Just read it-read it!" commanded Mrs. Dobley, and her husband read: Honora Coombs Dobley,

'Dear Madam: At the next meeting of the Literary club the topic of dis-cussion will be Markham's poem, "The "The Woman with the Rolling Pin." Man With the Hee.' As you have been selected as chief speaker of the evening, you will kindly be prepared to keep on. recite the poem and give a short sketch of the author's career. Also to give style and literary construction of the

ing to conceal the fact that he was quite as perturbed as his wife by the

letter, "Well?" "Well? Why didn't they select you? What did they send that to me for? What do I know about farming" "You forgot, my dear, that this is not an agricultural club, but a liter-

the famous poem." What poem?" "Is it possible that you haven't heard of Markham's masterpiece, 'The Man

ary society. Of course they refer to

with the Hoe?" asked Dobley, with a repreachful look over the top of his "Why, I haven't read anything but Quo Vadis this summer, and I only

half read that. You see it hurts my eyes and besides that I'm too busy, "The Man with the Hoe" He has ecome one of the most typical of- -"

"What was the matter with him? Why didn't he hoe? Where did it hap-"It began with a picture my dear,

An artist made a picture of a man in field with a hoe. "Hoeing corn, I suppose: well, what

"Well, it was a great picture-filled with depth and feeling and life-"I suppose it seemed as though he were really hoeing, did it? I've seen a picture like that-a girl gathering es-you could just see the stema

"No, it wasn't exactly that. man had stopped--"Stopped hoeing? What did he do

"He'd stopped to rest and was lean-"Gracious! A hoe isn't a bit com-

fortable to lean upon. Why didn't he

sit down?" "Why-er-it was just the artist's idea, you see. The man stopped to lean on his hoe-the inborer in the fieldden't you see '-typifying the workman of the ages-the 'empty ages,' Markham wrote.

"Was it Markham had the hoe?" "Oh, no! Markham was a poet and he saw the picture and saw the poetry in it. Then he wrote the poem and called it 'The Man with the Hoe.' " "Was it pretty""

"It was a magnificent idea-the figure of that man as typical of the workman-the patient slave ploughing the field-

"What did he have a hoe for if was ploughing?" "You don't understand. Don't you atch the idea? Labor-the farmer at work-plodding along without an idea sweating over his work-"

'You just said he'd stopped to rest." "Er-yes-but when you read it. rou'll see the splendid picture Mark-

"Excuse me, John; was Markham the artist or was he the man who had the hoe, or the man who just wrote about

'He was the post, my dear; he wrote the verse "I suppose he was paid for it, wasn't

"I suppose so, my dear." Then what was the trouble? Real-

ly, John, I can't seem to understand what all the fuss was about." 'Markham wanted to show the miserable condition of the hard working farmer-the slavery of the toiler-the-

the-fetters-Why, John Dobley, you know you nave often said you'd like to be a farmer because they have everything so Hoeing and raking is child's play, and as for ploughing it's just like riding a bicycle nowadays, You sit in a sort of a sulky and the horses know just where to go. I suppose they will have automobiles after a white." "He spoke," went on Mr. Dobley, "of the 'emptiness of ages.' There's a grand thought, The empti-

"What did he mean by that?" "Why-er-so much of that is metaphor-you see. The main idea is that the lot of the working man is hopeless. The Man with the Hoe' was a poor wretch bent with toll-a farmer whose life was-

"Why didn't he get one of the farm hands to do the hoeing?"

"He probably was a farm hand him-self working for a pittance---" "Well, he ought to have been glad he was working, I think. The idea! What

did he want? A steam hoe? "No, my dear; but the idea is what did life hold for him? Of what was he thinking as he stood there leaning on the hoe-that humble implement of

"Probably he was thinking of his dinner. I'm not a bit sorry for that man. He had nice open air work and he could stop to rest when he wanted to and probably his wife brought him his dinner every noon time, and he had nothing to do but-to hoe. And he

wasn't even doing that!" "Wait till you read the poem, Hoora. Markham calls him 'brother to

"What for?" The ox, you see, is the beast of bueden. When the poet spoke of the laborer as the brother to the ox he placed him as low in the intellectual scale as it was possible to get him. He asks. Who blew out the --- "

"No-no! 'Who blew out the light within this brain? asks Markhan

"It was just a metaphor-a figure of

'Why didn't he say what he meant? 'Well, what did he mean?"

"That the workman was a miserable

creature, whose life was like an ani-"Don't he believe in men working?" Yes-but---

"I suppose he likes tramps, then. Those men that sit around the parks. The Man with the Tomato Can' would be his idea of the ideal man. "Poets look at these things different-

"Well,I think it is silly to pity a man because he has a job. Think of all the men that can't get work. Suppose you didn't work? Where would we be?" "It's the idea of man earning his bread by the sweat of his brow-the

curse of laboring for hire-for---"Why, this man with the hoe probably had a good, steady place on the farm. Perhaps he owned it. He pro-

bably had stopped to figure out the crop. Maybe his wife took boarders and they had plenty of money." "When you read it, my dear, you will

"Oh, pshaw! I might just as well start in to idealize the cook and call 'Really, my dear, I think you will be able to talk before the club, if you

"It's the very same thing! The cook is a laboring woman, but she's a great your opinions as to the idea contained deal freer than I am. She has no soin the work, as well as the general cial obligations and no calls to make or to receive. She doesn't have to spend her time dressing and talking to "Well, my dear," said Dobley, try. folks when she doesn't want to. She has a comfortable home and just as good things to eat as we have, has two days off every week. Suppose I began to weep over her sad condition and called her 'sister to the ox.' Why she'd leave very first thing."

> "But a poet would never write about "Well, a good cook is a lot better than an old farmer who only hoes and looks pathetic. Any one could hoe

> Why, I almost believe you could hoe.' "I haven't a hoe, my dear." "That's another thing. Suppose the man didn't have a hoe? He'd have been worse off, wouldn't he? A hoe represents capital. Do you know, John Dobley, it gets sillier every minute, to think of all the sympathy your wasting on that man. It is The Man With-

> out the Hoe' you should be sorry for." "You are getting me round to your way of thinking, Honora. I recall the story now of a rich man who said he started in business picking rags, but for a week or two he nearly starved, because he had no money to buy a rag-

"What did he do?" 'He borrowed money enough, I beand twenty-five years after he told the story of the trouble he had getting some one to lend the money funniest part of it was that he

"I wonder if that man really owned hoe, or had borrowed it "" "Perhaps that is what he was think-

said he had never paid it back.

"He was probably too mean to buy a hos of his own! You know, John, I think that man was no good!" Honora, your logic is so convincing that I am beginning to agree with you

siderable of a gold brick."

during action. The brain cells of perions and of animals that have died during a period of great exhaustion from overexertion are found to be greatly changed from the condition of the normal cell during times of health and vigor. The cell of the exhausted that 'The Man with the Hoe' was con-

during the time of brain activity, pre-

cizely as coal is consumed when one It is found, further, that if an animal whose brain cells are thus ex- little wire-like fibres can be seen juthausted is permitted to rest and to sleep its cells rapidly recuperate, new material being supplied from the blood until the vacuolation has disappeared messages are sent out, much as mesand the cell is practically as good as new again. This explains why sleep s necessary to our existence. During waking hours our brains are literally vorn away, and sleep is the state during which the repair shops of the brain make good the damage of the waking hours. Thus the brain of a person who suffers from insomnia is in the condition of a locomotive which s run night and day without going to the repair shops; disaster must ultimately result.

It is not sleep alone, however, that ests the brain cell, though sleep is abolutely essential to recuperation of the brain as a whole. But not all parts of the brain are involved in any one kinof mental effort. The blood supply of the brain is so arranged that by exsansion or contraction of different areries parts of the brain may be flushed ith blood and other parts dammed off, o to speak, somewhat as the various currents of an irrigated field are reguated by the gardener. And as rapid low of blood is essential to great mental activity, this means that one part of the brain may be very actively at work while another part is resting and ecuperating. Thus it is that a person suffering from brain fatigue may leave his desk and go out into the fields with golfstick, or on the highways with bleyele, and, by diverting his mind. give the overworked cells a chance to rest and recuperate. But it must not be overlooked that such exercise involves other brain cells, which, in turn. ecome exhausted, and that, in the nd, for the recuperation of the brain is a whole, sleep is absolutely essential. No recreation, no medicine, no stimulant will take its place. The man who does not give himself sufficient hours of sleep, or who is unable to sleep when he makes the effort, is literally burning away his brain substance and can no more keep on indefinitely in this way than a locomotive can cun on indefinitely without getting fresh supplies of fuel.

In this new view it appears that each brain cell is a sort of storage battery, which can perform a certain amount of work and then must be recharged. This likeness to a battery is further emphabrain, instead of being plump and full sized by the fact that the nature of of nervous matter, is found to be hol- the brain cell's work consists, like that lowed out or "vacuolated," a cavity of any other battery, of the sending within its substance having formed out of charges of energy along connect and being filled with water. This ing wires, or, at least, along fibres that means that a part of the cell sub- may be likened to wires. Brain cells,

when examined under the microscope are found not to be simple globular bodies, like many other kinds of cells. On the contrary, they are irregular in shape, and when properly stained, ting out from them in various directions. It is along these fibres that the messages come to the cell, and other

sages go and come from a telephone central office.

AN APT COMPARISON. This likening of the brain to a tele hone central office is a comparison that may be carried to a remarkable length. Indeed, no other comparison serves so well to give one a correct notion of the method of brain action. But until recently there was on phase of the matter that could not be explained. How is it that the various messages that are surging through the brain are directed to proper channels among these multitudinous wires? When you call up the central office you give a certain number, and the operator connects your particular wire with that number. When you are through talking the operator breaks the circuit, and you can no longe there anything similar to this making and breaking of currents possible in the brain? Astonishing as em, the answer is yes. There is precisely such a series of changes in

the circuits of the brain cells as is of fected by the operator with the tele-The manner of it is this. studies of the brain cell, particularly | Day by day, in the paretic's brain, those made by the Spanish physioligist, Mamon Cajal, have shown that many of the wires which lead out from respondingly, the ideas that could cell do not go on uninterruptedly to termination in some other distant ell, as they were formerly supposed nds." That is to say, they point out toward other cells, but do not reach them. Such a fibre clearly cannot conyey any message, because, like a telephone wire that has been cut, it does not lead anywhere. But under cerain conditions of stimulation a very straordinary thing happens. blind" fibre, under stimulus from its central cell, lengthens out until it suches a fibre of a neighboring cell. and presto, with such contact, a circuit is completed and a message flashs between the cells. Manifestly such coming together of the "blind" fibres s precisely comparable to the operaor's connecting your telephone wit another. And as in the case of the telephones, so in the case of the cells when the communication is completed the connection is broken, the fibres retract and cease to touch one another and no further message can be sent.

BRAIN KINKS. Sometimes the telephone girl does not

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# 

THINKING IS DONE THEORY OF THE BRAIN'S WAY

Millions of Brain Cells That Operate Apparently on the Principle of a Great Telephone Exchange, with Nerves for Wires - The Great oint of finding out what happens in

USES OF SLEEP.

understand your order or reports that the number you wish is "engaged," and you cannot send your message. Simitariy, in the brain, it seems sometimes as if certain circuits one wishes to use are engaged in other channels; for how often does one "puzzle his brains" to recall a fact or a name, which he feels that he knows perfectly, but which will not come at command. And then how, perhaps hours afterward, the clusive name will float cfore him, as if the telephone girl of his brain cell had at last succeeded n getting the right connection. When ne reflects that each of these wonderful brain cells is microscopic in size, equiring, indeed, a high power of the miscroscope to make it visible, and that there are billions of them in a ubic inch of brain substance, one is ed to wonder that such mistakes of onnection or failure to connect do not cur oftener. As it is, the telephone office of the brain is easily the most wonderful structure of which we have

my knowledge. The most delicate piece of mechanism ever devised by human hands is a crude thing compared with the marvelous brain cell. In time of war it often happens that an invading army will cut the telegraph wires and destroy instruments and batteries at the central offices, so that telegraphic and telephonic communication becomes impossible. precisely similar destruction of the waln fibres and brain cells occurs under certain conditions of disease. The familiar disease paresis, for example, onsists essentially of just such a destruction of the brain structure as this. disease is making inroads upon the dolicate mechanism of the cells, and, coralone result from the activities of those cells are destroyed forever. When such destruction has gone far, involvo do, but instead terminate in "blind ing many sets of cells, it is as impossible that the paretic's mind should act normally as that a telephone system should operate with lines cut and hatteries destroyed.

## Going West?

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