the time comes for quiet, he cannot command repose.

These unfortunates apply for help to the doctor, and he gives them prescriptions for one sleep-producing drug or another. The poison, whatever it may be, helps them for a while, but it has a tendency to lose its effect, and so the dose must be constantly increased. Once the habit is gained, sleep becomes impossible without the aid of the drug, and the last state of the victim is vastly worse than the first. Drugs, indeed, are the curse of this day and generation. People are fed with them from babyhood up, whereas, if common-sense governed, as little medicine as possible would be taken, the main reliance being placed in Nature.

Both alcohol and tobacco overstimulate the nerve-centres and render them irritable, thus tending to cause sleeplessness. Imprudences in diet have a like effect. There is too much late eating and drinking. Fashionable people, after the play, go to a restaurant and indulge in a hearty—and generally indigestible—supper. At some balls nowadays there are two suppers, one early and one late. Naturally, as a result of such abuse, the digestive functions are upset, the nervous system is forced into an unwholesome activity, and sleep is made difficult.

At the midnight hour the cafes of a big city are full of gay people eating lobsters and salads, and washing them down with champagne and burgundy. Many of them will not be able to sleep without a dose of brandy before going to bed. The next morning they wake up with an inactive liver, a feeling of lassitude, and a great desire for a cocktail as a "braver." Nature will not endure such abuse beyond a certain point, and these people, who have such a good time while it lasts, drift after a few years into asylums and sanitariums.

During slumber nothing is asleep except the brain, and certain elements of that organ appear still to remain awake even in such circumstances. Marie de Manaceine, a writer of high reputation on this subject, speaks of the fact that a sleeper will change his position whenever he happens to be uncomfortable, and, without waking, will assume an easier posture. He will brush a fly off his face, or draw up the bedclothes which have left his person partly exposed. These are rational acts. It is an old story that soldiers frequently sleep while on the march, and dangerous feats are sometimes performed by somnambulists.

Not only does the body remain awake during sleep, but it is beyond question that the brain-centres connected with seeing, hearing, smelling and tasting retain their activities, to a considerable extent at all events—else how, in dreams, should we have visual and other sensory impressions? What is it, then, that sleeps in the brain? The spinal cord and nerves are awake, and parts at least of the mind organ are alert. Where are we to suppose that the "sleeper" is located?

This is one of the most interesting questions in all the domain of psychology. Some day, in all likelihood, we shall know a great deal more about such things than we do to-day. Science is making a special study of the phenomena of sleep, and, for one point, it is said to have been ascertained, as a result of recent experiments, that the deepest slumber is reached about an hour and a-quarter after one falls into unconsciousness, and that it diminishes in soundness gradually from this time on.

When one sleeps, the heart slows down and beats more feebly. The skin, on the other hand, acts more energetically, throwing off impurities—which is the reason why the air in bedrooms becomes foul more rapidly than that of living rooms. Young people talk more during sleep than do their elders. A study of two hundred college students of both sexes, not long ago, showed that forty per cent. of them were more or less addicted to talking in their sleep.

But the most important phenomenon connected with sleep is the outflow of blood from the brain, which seems to be not only an incident of slumber, but actually, in a certain sense, the cause of it. If we were able to examine the mind organ of a human being under such conditions—as has been done in the case of a dog, by removing a piece of the skull and replacing it with a watch-glass—we should see it grow pale and diminish in volume as slumber fell upon the person under observation.

Such being the case, it is evident that, in trying to cure insomnia, our efforts should be directed to getting rid, by one means or another, of the tendency to congestion of the brain, which, whatever the cause of it, is usually the real mischief. Drugs may serve for a while as palliatives, but their good effects are only temporary, and in the long run they are harmful and even dangerous. For which reason we should look to Nature for a cure, confident that, if one remedy does not serve, another will prove successful. Of such natural remedies there are a good many, and in these few remarks I have endeavoured to suggest some which afford a choice of methods whereby sufferers may hopefully and safely seek the blessed boon of peaceful and refreshing sleep.

Vagaries of Mathematics.

"As dull as arithmetic" is a phrase that is familiar to almost every schoolboy, and is a figure of comparison that is frequently evoked by those sages who hold down empty cracker-boxes in rural general stores. The fact is, however, that arithmetic is not always half so dull as it looks. Like some of those persons who earn a livelihood by teaching it to the young, it has a dry humour and a few vagaries of its own.

One of these vagaries has to do with the figure 9, and it is thus described by William Walsh in his "Handy Book of Literary Curiosities".

It is a most romantic number, and a most persistent self-willed, and obstinate one. You cannot multiply it away or get rid of it anyhow. Whatever you do, it is sure to turn up again, as did the body of Eugene Aram's victim.

Mr. W. Green, who died in 1794, is said to have first called attention to the fact that all through the multiplication table the product of nine comes to nine. Multiply by any figure you like, and the sum of the resultant digits will invariably add up as nine. Thus, twice nine is 18; add the digits together, and 1 and 8 makes 9. Three times 9 is 27; and 2 and 7 is 9. So it goes on up to 11 times 9, which gives 99. Very good. Add the digits together, and 9 and 9 is 18, and 8 and 1 is 9.

Go on to any extent, and you will find it impossible to get away from the figure 9. Take an example at random. Nine times 339 is 3,051; add the digits together, and they make 9. Or, again, 9 times 2,127 is 19,143; add the digits together, they make 18, and 8 and 1 is 9. Or still again, 9 times 5,071 is 45,639; the sum of these digits is 27; and 2 and 7 is 9.

This seems startling enough. Yet there are other queer examples of the same form of persistence. It was M. de Maivan who discovered that if you take any row of figures, and, reversing their order, make a subtraction sum of obverse and reverse, the final result of adding up the digits of the answer will always be 9. As, for example:

```
          2941
Reverse,  1492
          ----
          1449
```

Now, 1 plus 4 plus 4 plus 9 equals 18; and 1 plus 8 equals 9.

The same result is obtained if you raise the numbers so changed to their squares or cubes. Start anew, for example, with 62; reversing it, you get 26. Now, 62—26 equals 36, and 3 plus 6 equals 9. The squares of 26 and 62 are, respectively, 676 and 3844. Subtract one from the other, and you get 3168 equals 18, and 1 plus 8 equals 9.

So with the cubes of 26 and 62, which are 17,576 and 238,328. Subtracting, the result is 220,752 equals 18, and 1 plus 8 equals 9.

Again, you are confronted with the same puzzling peculiarity in another form. Write down any number, as, for example, 7,549,132, subtract therefrom the sum of its digits, and, no matter what figure you start with, the digits of the products will always come to 9.

```
7549132, sum of digits equals 31.
     31
-------
7549101  sum of digits equals 27,
         and 2 plus 7 equals 9.
```

Again, set the figure 9 down in multiplication, thus:

```
 1 multiplied by 9 equals  9
 2 multiplied by 9 equals 18
 3 multiplied by 9 equals 27
 4 multiplied by 9 equals 36
 5 multiplied by 9 equals 45
 6 multiplied by 9 equals 54
 7 multiplied by 9 equals 63
 8 multiplied by 9 equals 72
 9 multiplied by 9 equals 81
10 multiplied by 9 equals 90
```

Now you will see that the tens column reads down 1, 2, 3, 4, 5, 6, 7, 8, 9, and the units column up 1, 2, 3, 4, 5, 6, 7, 8, 9.

Here is a different property of the same number. If you arrange in a row the cardinal numbers from 1 to 9, with the single omission of 8, and multiply the sum so represented by any one of the figures multiplied by 9, the result will present a succession of figures identical with that which was multiplied by 9. Thus, if you wish a series of fives you take 5 multiplied by 9 equals 45 for a multiplier, with this result:

```
 12345679
       45
---------
 61728395
49382716
---------
555555555
```

A very curious number is 142,857, which, multiplied by 1, 2, 3, 4, 5, or 6, gives the same figures in the same order, beginning at a different point, but if multiplied by 7 gives all nines. Multiplied by 1 it gives 142,857; multiplied by 2, equals 285,714; multiplied by 3, equals 428,571; multiplied by 4, equals 571,428; multiplied by 5, equals 714,285; multiplied by 6, equals 857,142; multiplied by 7, equals 999,999.

Multiply 142,857 by 8, and you have 1,142,856. Then add the first figure to the last, and you have 142,857, the original number, the figures exactly the same as at the start.

The number 37 has this strange peculiarity; multiplied by 3, or by any multiple of 3 up to 27, it gives three figures all alike. Thus, three times 37 will be 111. Twice three times (6 times) 37 will be 222; three times three times (9 times) 37 gives three threes; four times three times (12 times) 37, three fours, and so on.

The wonderfully procreative power of figures, or, rather, their accumulative growth, has been exemplified in that familiar story of the farmer, who, undertaking to pay his farrier one grain of wheat for the first nail, two for the second, and so on, found that he had bargained to give the farrier more wheat than was grown in all England.

My beloved young friends who love to frequent the roulette table, do you know that if you begin with a dime, and were allowed to leave all your winnings on the table, five consecutive lucky guesses would give you £300,000.

Yet that would be the result of winning 35 for one five times hand-running.

Here is another example. Take the number 15, let us say. Multiply that by itself, and you get 225. Now multiply 225 by itself, and so on until fifteen products have been multiplied by themselves in turn.

You don't think that is a difficult problem? Well, you may be a clever mathematician, but it would take you about a quarter of a century to work out this simple little sum.

The final product called for contains 38,589 figures, the first of which are 1442. Allowing three figures to an inch, the answer would be over 1070ft long. To perform the operation would require about 500,000,000 figures. If they can be made at the rate of one a minute, a person working ten hours a day for three hundred days in each year would be 28 years about it.

If, in multiplying, he should make a row of ciphers, as he does in other figures, the number of figures would be more than 523,939,228. This would be the precise number of figures used if the product of the left-hand figure in each multiplicand by each figure of the multiplier was always a single figure, but, as it is most frequently, though not always, two figures, the method employed to obtain the foregoing results cannot be accurately applied.

Assuming that the cipher is used on an average once in ten times, 475,000,000,000 approximates the actual number.

Gold in Sea Water.

M. P. de Wilde, Professor at the University of Brussels, has taken up the study of the gold which is contained in sea-water. He proposes a new method of extracting it. A ton of sea-water is treated with four or five cubic centimetres of an acid and concentrated solution of chloride of tin. The whole of the gold is thus concentrated in the complex body known as purple of Cassius, which contains gold, tin, and oxygen. It is found that the purple body is fixed very strongly upon the flaky hydrate of magnesium which is set free in sea water when we pour in lime water. The hydrate falls to the bottom with the gold attached to it. The gold is set free by a cyanide of potassium solution (about 1 in 2000), thus forming a cyanide of gold. The metal can then be extracted by a number of well-known methods. Liversidge shows that when sea-water is sent in casks the wood causes the gold to precipitate, and thus none is found in the water. M. de Wilde made experiments at the seashore in France on the west coast, and found traces of gold in the water. He considers that much of the gold is thrown down to the sea bottom, and thus it escapes us. It will be remembered that Liversidge, Professor at the University of Sydney, found from ½gr to 1gr of gold per ton of sea-water from the coast of New South Wales.—"Scientific American."

Old Gotrox (to his fashionable son): You and your set thoroughly disgust me. You could get along as well without a head as with one.

Algy: Aw—Fawther—how wediculous! Why, wheah would a fellah weah his hat?