

# Will Swell their Heads Not Figuratively, but Literally, Is What Professor Gates Does.

## A College Where Guinea Pigs Are Taught Painting, Music and Common Sense.

### Like Experience a Hard School, but a Fool or a Guinea Pig Will Learn at No Other.

#### CUT OPEN COMMENCEMENT DAY.

#### New Method of Biological Study—The Infusoria Problem and How It Is Hoped to Solve It.

Washington, Jan. 4.—There is to be a new college in Washington. It will be unlike any other college in the world. Instead of youths or maidens, the freshmen, sophomores, juniors and seniors will be guinea pigs, cats, dogs and monkeys. The alumni will be mostly dead.

The name of the institution will be the College of Psychology and Mind Art. It will be under the direction of Professor Elmer Gates, who has earned distinction as a Brain Builder. It will be quite an important affair. Already two hundred applications have been received from embry scientists who desire to study the students in Professor Gates's college. There will be six laboratories. A site will be selected just outside the city.

The commencement exercises will consist of the cutting open of the heads of the graduates, to find out how they could possibly have learned so much. That is why it is announced above that the alumni will be mostly dead.

A regular business will be made of teaching the animals in kindergarten fashion, with a view to building up and improving their mental powers. Special attention will be devoted to monkeys, because they are capable of higher training than any other beasts. One monkey, which was under Professor Gates's tuition for quite a while, became able to converse with his master actually. He could distinguish sixty-eight words, going into another room and fetching therefrom a ball, a hat, a turnip, a shoe, an apple, or almost any other article that could be named. At the same time, he could make twenty-two sounds which his instructor could understand.

Professor Gates's discoveries have contradicted the conclusions of Weismann and other Neo-Darwinists who assert that physical traits acquired by individual animals are not transmitted to their descendants. For many centuries the Chinese women have deformed their feet, and yet their children have feet that are entirely normal. Weismann took the trouble to cut off the tails of monkeys for a number of successive generations, but they showed no tendency to be born with defective caudal appendages. Professor Gates says that acquired physical traits can be transmitted through several generations, provided the mental processes, improved brains, he declares, may certainly be handed down from parent to offspring.

Guinea pigs are notoriously stupid animals. Professor Gates takes an ordinary pair of them, and in four years, by education through the use of a printing press, he produces guinea pigs that are intellectual giants—for guinea pigs. In other words, by the use of his printing press, structure has become hereditary. These new structures represent new mental activities.

But let it not be imagined that the lot of the educated guinea pig is one of unalloyed joy. In connection with the printing press, which exhibits symptoms of an intellectuality quite foreign to the guinea pig character, one looks upon the world from a new point of view, and one who high mental achievements might be expected—than the learned Professor claims—cuts its tail, and is returned to the world among its gray matter with a microscope and other things.

At the College of Mind Art several courses will be opened to guinea pigs. One of these will be devoted to cultivating their minds through the scientific study of guinea pigs. In this class will be compelled from birth to base their daily activities upon their ability to distinguish and discriminate among colors. They will be obliged to consider colors pretty nearly all the time during many hours each day, until they become parents of another generation. The same work is followed out with the second generation, and so on continuously, until after the fifth or sixth generation guinea pigs are born with the seeing area of their brains abnormally developed. Viewed under the microscope, these areas are found to contain more brain cells and a more complicated system of nerve fibres, the latter being the telegraphic wires, so to speak, by which intelligence is communicated from the gray matter.

One of the methods adopted for teaching colors to the guinea pig is to place the animal's food under a number of small inverted pans. These pans are red, say, but they are scattered among blue, green and yellow pans of the same size, which have nothing under them. So the little beast learns after a while that there is food only beneath the red pans, and it does not take the trouble to turn over any of the others. Only a trifling quantity of the food is placed under each red pan, so that the guinea pig must turn over 100 or more of them to get a meal. After a bit, red having become sufficiently familiar, the food is put under blue pans, and so on. Finally the pans are made all of one color, green, for instance, but of different shades, and the guinea pig is required to pick out the shades. Doing this for six or eight hours a day furnishes a lot of education in a few weeks.

More than forty different ways are adopted for obliging animals to exercise constantly various mental functions. For example, a hallway is constructed with a flooring of metal tiles of different colors, so arranged that any of them may be connected at will with a galvanic battery. The guinea pig is obliged constantly to go through this hallway, and it soon learns that it gets a little shock every time it touches a tile that is not red. Consequently it adopts the practice of jumping from red tile to red tile. When it has thus become well acquainted with red, the blue tiles are made the safe ones by an alteration of the electrical connections, and the guinea pig is obliged to gain a knowledge of that color. So, also, with other colors, and finally, with a differentiation of shades.

This sort of education is carried to a surprising length. When a green disk appears suddenly on the wall of the room, the properly trained guinea pig knows that it will be able to get water by passing through a certain door. The animal learns eventually to differentiate sounds by taste and smell, and even to associate ideas, as a sound with a color. This taste sense is cultivated by obliging the guinea pig to partake many times a day of food flavored in a great variety of ways, and water likewise. At length it learns to pick and choose with much accuracy of discrimination, and in the course of generations its descendants become regular epicures, their brains exhibiting great complexity of structure in those parts of the cortex which are known to represent the physical basis of the sense of taste.

Other methods more or less agreeable to the guinea pig are employed for cultivating the sense of smell. In this direction a beginning is made by teaching the guinea pig that when its nostrils distinguish a particular kind of scent it had better run, or it will be whipped. Prof. Gates's ex-

periments have proved that lower animals distinguish many kinds of scents with which human beings are not acquainted. He has demonstrated, also, that, as has long been suspected, some of them at all events can hear sounds which are not distinguished by the human ear.

For educating the ear of the guinea pig Prof. Gates has an instrument of which an essential part is a series of electrical tuning-forks. These produce all pitches of sound up to and beyond the limit of human audibility. The guinea pig is taught that when the instrument sings it must run, or it will be whipped. If beyond a certain note the trained guinea pig fails to respond by running, obviously the hearing limit of the animal has been reached and passed. Prof. Gates has succeeded in raising this limit of audibility in guinea pigs several octaves, actually extending their range of hearing that much.

Dogs and cats, of course, are naturally more intelligent than guinea pigs. Professor Gates has taught them to distinguish musical chords actually, in response to a certain chord Fido would run downstairs with the expectation of getting something to eat, while another harmonious combination of notes would induce Tabby to seek food in a closet upstairs. Cats are harder to train than dogs, because they have less power of attention, but they seem to be equally intelligent.

Monkeys are more satisfactory than any other animals; they are more easily trained, and it takes less effort and less time to produce in them a given amount of artificial brain structure. For, be it understood, the purpose of all this work, which requires an immense amount of labor, is not to improve the intelligence of lower animals, but to discover the relations between mental functions and physical brain structures. The brains of lower animals are more or less like those of human beings. Respecting the latter, psychologists already know something about the areas of the cortex which are responsible for certain sorts of perceptions. But this knowledge does not amount to much, and Professor Gates is trying to develop it.

His experiments show that when a certain sort of mental activity has been encouraged through several generations, the improved development is transmitted to the offspring. It is then practicable to subject the brain to microscopical examination, with a view to determining with accuracy the physical results accomplished by the education of the mind during life. This is a new method of biological study, the purpose of which is to determine what mind really is. Incidentally it has been found that a dog trained from birth in the manner described is able to distinguish fifteen different shades of any color, except purple or red. As to red and purple, it would appear that the canine race is hopelessly color-blind.

### The Warning Note of the Tuning Fork.

(Sketched from life.)



Such single-cell organisms are sensitive to sound—that is to say, to concussion. They are exposed to this influence by means of electrical tuning-forks, which are focussed with the aid of a "sound lens." Such a lens serves for sound in the same purpose that a glass lens does in concentrating light. It is a lens-shaped bag filled with carbonic acid gas and covered with goldbeater's skin. With the assistance of this device the heart-beat of a man can be heard across a room. The organism which do not run away from the sound are killed, while the more sensitive are used for breeding, and this is kept up for many generations until the final organisms are extraordinarily sensitive. These, being examined under the microscope, exhibit peculiarities of structure, which account for their acute sound perceptions. By similar methods some organisms are made to respond to yellow rays of light, others to blue rays, and so on.

Professor Gates's private office in the new College of Mind Art will be provided with an electrical apparatus communicating with the rug on which his chair is placed in front of his desk. He asserts that it is as important to keep any living room in proper condition electrically as to maintain the temperature at a desirable point. By keeping himself charged to a certain degree with the electric fluid he feels better and is able to accomplish more work. In other words, electricity conserves organic energy.

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# Death in Our Breath.

## Poison Lurks in the Air Which Man Exhales.

### Human Beings Who Kill Like the Deadly Gila Monster.

#### Queer Experiments by Which Several Startling Facts Are Revealed.

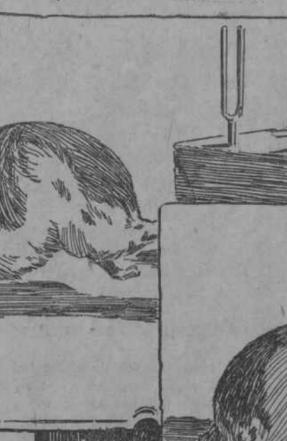
#### MODERN THEORIES SWEEP AWAY.

#### A Mysterious "Something" That Kills, but What It Is No One Has Been Able to Learn.

#### Is human breath poisonous?

The breath of the Gila monster is alleged to have poisonous properties. How about man? Does the air exhaled from his lungs contain a peculiar organic poison dangerous to life?

It seems an extraordinary idea, yet the Smithsonian Institution has recently spent several thousand dollars for the purpose



of finding out whether it is correct or not. The investigation of this problem was placed by the Smithsonian Institution in the hands of Drs. J. S. Billings, S. Weir Mitchell and D. H. Bergey. These experts performed an elaborate series of experiments upon human beings and lower animals, such as mice, guinea pigs and sparrows. The animals they shut up in glass receivers and metal tanks, furnishing them with measured quantities of oxygen and other gases, and notes were taken as to the hours and minutes which elapsed before they succumbed. Carbonic acid gas was injected into their jugular veins and under their skins. One experiment consisted in confining several rabbits in a series of metal tanks connected by rubber

### Life and Food Under the Red Plate.

(Sketched from life.)

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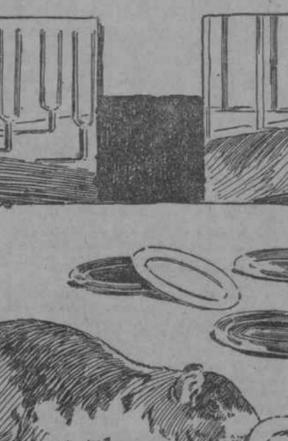
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tubing, through which the air passed in such a manner that the rabbit in the last case was obliged to breathe an atmosphere that had traversed with impurities from the lungs of the other rabbits. Of course, this rabbit did not survive very long.

The Smithsonian experimenters desired to find out if there were any microbes in the exhaled breath. So they got a mass to breathe for half an hour through sterilized gelatine, which thereupon was corked up and put away. If the man's breath had contained any microbe organisms, they would have adhered to the gelatine and bred on it, so that they might have been examined and identified by means of the microscope, but no microbes appeared, the gelatine remaining barren. Trials for the purpose of determining the amount of ammonia in the breath were made with a healthy man, with the individual suffering from tracheal fistula, and with a consumptive patient. In each case the quantity of ammonia proved to be extremely small. It was noted that more ammonia was present in the breath of a person with decayed teeth than in that of an individual whose teeth were sound.

From these and many other experiments were drawn conclusions which Drs. Billings, Mitchell and Bergey sum up as follows:

The breath of healthy human beings, rabbits, guinea pigs, sparrows and mice contains no organic poison. The injurious effects of such exhaled air are due mainly to want of oxygen. Being deprived of its healthy man, with the individual suffering from tracheal fistula, and with a consumptive patient. In each case the quantity of ammonia proved to be extremely small. It was noted that more ammonia was present in the breath of a person with decayed teeth than in that of an individual whose teeth were sound.

The cause of the unpleasant, musty odor which is perceptible on passing from the outer air into a crowded, unventilated room, is unknown. It may be due in part to volatile products of decomposition contained in the exhaled breath of persons having decayed teeth or digestive disorders. In part, also, it is attributable to volatile fatty acids exuded from the perspiration and from clothing soiled with perspiration. The odor referred to may produce nausea and other disagreeable sensations, through which the air passed in such a manner that the rabbit in the last case was obliged to breathe an atmosphere that had traversed with impurities from the lungs of the other rabbits. Of course, this rabbit did not survive very long.

### Dodging the Electric Tiles of Blue.

(Sketched from life.)



Nothing in history approaches the horrors subsequently recounted by the survivors of that night. They cried for mercy, strove to burst the door, and even offered large bribes to their jailers. But the answer was that nothing could be done without the Nawab's orders, that the Nawab was asleep, and he would be angry if anybody awoke him. Then the prisoners went mad with despair. They trampled each other down, fought for the places at the windows, raved, prayed, blasphemed, and even implored the guards to fire among them. The jailers in the meantime held lights to the bars and shouted with laughter at the frantic struggles of their victims. At length the tumult died away in low gasping and moanings.

The day broke. The Nawab had slept of his debauch and permitted the door to be opened. It was some time before the soldiers could make a line for the survivors by piling up on each side the heaps of corpses, upon which the effect of the burning climate was already apparent. When at length a passage was made, twenty-three ghastly figures, such as their own mothers would not have known, staggered one by one out of the charnel house. A pit was instantly dug. The dead bodies, with the number of white shrouds, were flung into it and covered up.

It is improbable that the minute quantities of organic matter contained in air exhaled from human lungs have any injurious effect upon individuals who inhale such air in ordinary rooms. The small amount of ammonia found in the condensed vapor of human breath is largely due to products of the decomposition of organic matter constantly going on in the mouth and pharynx. In ordinary breathing, no bacteria or particles of dead tissue are contained in the exhaled air. In the act of coughing or sneezing, such organisms or particles may be thrown out.

The effect produced upon animals and men by an atmosphere contaminated by

the breath and by matter derived from their bodies, are of two kinds, acute and chronic. The acute effect may be death in a few minutes or hours, as in the case of the victims of the London duff and of the Black Hole of Calcutta. The chronic effect is observable in the sickly condition of most persons who live in badly ventilated rooms. Among persons who dwell amid still surroundings pneumonia and consumption are very common. These diseases are not caused by poor ventilation directly, but because bad air and filth are favorable to the propagation of the germs which produce them. Furthermore, persons living under such conditions are less able to resist infection.

The discomforts felt in badly ventilated rooms by those not accustomed to them are due, not to excess of carbonic acid, nor to bacteria, but mainly to high temperature and unpleasant odors. Such rooms are generally overheated, the bodies of the occupants contributing to the warmth. The fainting of women in crowded places is commonly caused by tight lacing, which interferes with their breathing. The results of this investigation indicate that some of the theories upon which modern systems of ventilation are based are either without foundation or doubtful.

The best illustration history affords of the absolute necessity of fresh air for the preservation of human life is furnished by the tragic incident of the Black Hole of Calcutta. The great province of Bengal was long ago governed by a victory named Alivardi Khan, who was a Hindu and an independent sovereign. He died in 1756, and the sovereignty descended to his grandson, the English. He selected a minister, the English, the called Surajah Dowlah. Oriental despots are perhaps the worst class of human beings, and this boy was one of the worst in his class. His understanding was feeble and his temper unamiable. Early debauchery had enfeebled his body and his mind. A favorite amusement of his was the torturing of beasts and birds.

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# Monsters to Order.

## An Extraordinary Factory for the Manufacture of Living Freaks.

### The Fungus-Covered Nihilist and the Human Snake Who Sheds His Skin.

#### Only Takes Two Hours to Make Tattooed People, and You Can Become Ossified While You Wait.

#### SCENES IN A CHAMBER OF HORRORS.

#### How an Ossified Man is Constructed. The Marvellous Tattooing Process Revealed—Making an Albino. Other Secrets Told.

There is a freak factory in the "200 block" of East One Hundred and Eighteenth street which daily adds fresh monstrosities to the list of dime museum attractions. A more gruesome place would be difficult to find. Heinous anatomical sketches adorn the walls. The human frightfully distorted, is visible ever. The dissecting room of a medical has an air of cheer as compared

place. It is a thorough proof, too, into E. T. Hamm's assertion that American public loves to be humbugged.

Nature is not sufficiently prolific of it to satisfy the demand of the exhibit thereof. Therefore they are made order, and it is no small tax on the "Yankee" ingenuity of these objects of interest to satisfy the constant demand for something new. The presiding genius of the factory referred to revealed a few secrets of the profession the other day, which, to say the least, are startling.

There will be one brand-new and notable freak on exhibition in 1896. It will be known on canvas and billboard as the ex-Nihilist, whose person is a living picture of the frightful horrors of the Siberian dungeons.

"This newcomer among freaks is to be a palid specimen of humanity on the order of the living skeleton whose entire body will be covered with a fungus growth, the result of a disease which is now being cultivated in the laboratory of the factory. The human frightfully distorted, is visible ever. The dissecting room of a medical has an air of cheer as compared

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