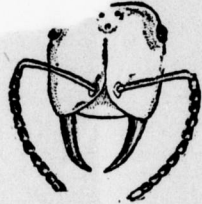
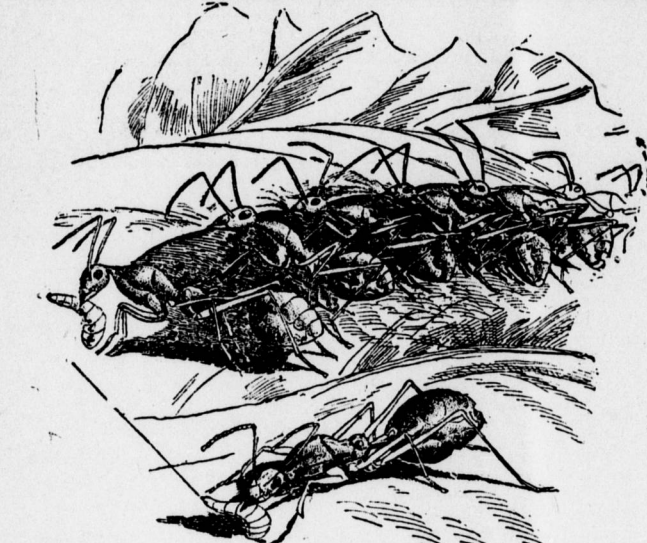


adult ant possesses nothing with which to secure the edge of the leaves together after they have been brought into the required position; but its larva is furnished with glands that secrete an abundance of adhesive, gelatinous substance, by the aid of which it forms its cocoon, and these intelligent insects actually make animated mullage brushes of their larvae in order to effect their purpose. A number of the ants, seizing the edges of the leaves in their mandibles, bring them together into the form needed and hold them there, while other ants, each one of which bears a larva in its jaws, apply the mouths of the larvae to such parts of the leaves as require to be cemented together, and induce their offspring to discharge as much sticky material as they find necessary to accomplish the desired result.—Scientific American.



HEAD OF WARRIOR ANT
Showing pointed and curved mandibles united for work.

so entirely to military affairs, and have so entirely lost the arts of peace and efficiency in domestic matters, that they are not only obliged to depend upon their slaves to care for the young in the formicary, but to have the food

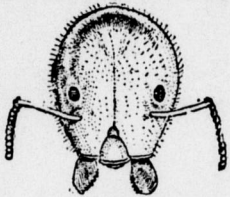


WORKERS HOLDING LEAVES IN PLACE WHILE OTHERS USE LARVAE TO BIND AND CEMENT THE LEAVES.

inclined those who study it the closest to believe that, making allowance for the great inferiority of the class of invertebrates, the Formicidae certainly hold among invertebrates a rank commensurate with that sustained by primates, including man, among vertebrates.

Taking into account the comparatively enormous masses of brain matter belonging to a number of large animals which exhibit a marked degree of incogitance, and the intelligence manifested by members of this division of Hymenoptera, the claim made by Darwin that the anterior ganglion in the head of an ant constituting its brain "is the most marvelous atom of matter in the world," is justified.

It is interesting to notice how diverse are the methods adopted by invertebrate intelligence from that of man in attaining a desired result. For instance, men make the tools they require for carving or for digging, in-



HEAD OF WORKING ANT
Showing toothed mandibles.

sects grow them; vessels being needed as receptacles for liquid food, man learns the art of the potter, but the curious honey ants transform themselves into living bottles, to which the working members of the commune resort for refreshment.

The tools of insects, exquisitely fashioned and finished, are much more perfectly adapted for the purposes they serve than are any contrived and manufactured by human beings, but there is a disadvantage connected with them—they cannot be laid aside. The tools dominate the tool-bearers and check development in any direction not connected with their use.

This leads to the extreme specialization we find among insects. The egg producer, the queen of the termites, although she possesses the usual number of limbs belonging to her species, is totally incapable of locomotion, as are the living bottles of the honey ants. The queen lays eggs; she can do nothing else; the living bottles store up and yield food to other members of the formicary, and are as incapable of per-

forming other uses as if they were mere lifeless cells in a honeycomb. Among the Formicidae this tendency to specialization has resulted in es-

common occurrence in Eastern Asia, forms shelters by bending the edges of the leaves of the trees upon which it lives and fastening them together. The

placed in their own warlike mouths, and were thus not done.

The mandibles of these ants, *Polyergus rufescens* and *P. lucidus*, the former a European, the latter an American species, are entirely unfitted for work. They can neither crush, cut nor saw; but, being sharply pointed and curved, they make most serviceable weapons; with them in attacking an enemy, *Polyergus* seizes the head of her foe between the points of these curved polgnards and penetrates the brain at once.

A number of ants among those of very different species are distinguished by possessing relatively large heads, the use of which is extremely problematical.

And yet the smaller members of the commonwealth find a use for the great creatures. Numbers of them may often be seen riding about, as human beings do upon elephants, upon the backs and heads of their gigantic confederates. Even this use, however, does not account for the disproportionately large heads of the giants. But the *Colobopsis* ants, which burrow in branches, seem to have discovered how to profitably employ the big-heads among them. They are placed at the entrances of the Formican dwellings, their great heads fitting in and filling the doorways. As a worker belonging to the household approaches she is recognized by "the animated and intelligent front door," which draws back sufficiently to admit the entrance of its friend and then resumes its double office of sentry and of barrier.

The *Eciton* are the Arabs of the ant tribes, always at war with all other animals, with no settled places of abode, but ever wandering in journeys that have no end. Yet in their temporary resting places the necessities and instincts common to the whole Formican family impel these nomads to habitations which conform to the character and style of the fixed and permanent abodes of ordinary ants. As, however, both the time and natural apparatus for digging possessed by the latter are wanting to excavate galleries and apartments necessary for feeding and sheltering larvae and pupae, these remarkable animals overcome the difficulty in a most astonishing manner by constructing living habitations, using their own bodies as building materials.

But the most amusing instance of the manner in which an ant left by nature to her own devices overcomes a difficulty is perhaps that of the *Oecophylla smaragdina*. This ant, one of

separate the "nibs," or crushed nuts, from the shells. The nibs are then ground to a fine meal; this is put in sacks and put in a powerful press,

where it is subjected to heat and pressure, and the fat, known as "cocoa butter," is squeezed out, and the hard substance left if the sack has only to be broken or powdered to become the pure chocolate, and this more or less adulterated is the chocolate of commerce.—Scientific American.



COCOA PODS ON THE TREE.

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Author Reveals Spider's Methods. Professor D. Hess has just published an interesting treatise on house insects, with especial reference to spiders and flies. The spider, he says, is a blood-thirsty insect of prey. But she is also a great artist and a most

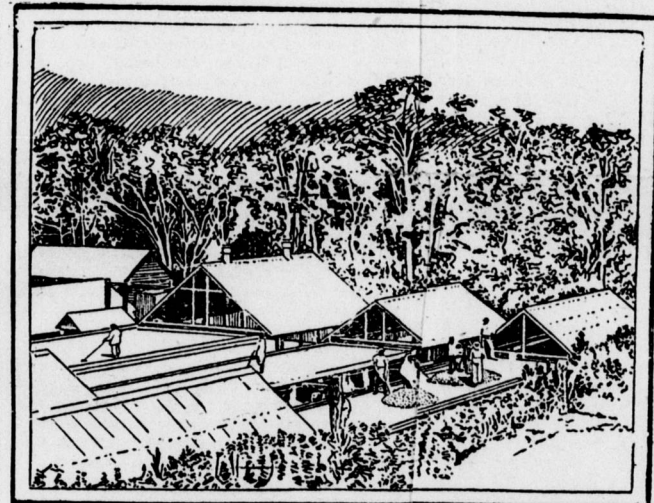


tender mother, fiercely defending her eggs on her young ones. First, he says, the spider weaves a silken basket like repository for the eggs, using the rearmost part of her body as a form. In the basket she lays the eggs, piling them up carefully and neatly. Then she covers the exposed eggs with a fabric of silk threads, the whole forming a minute hall within which the egglets snugly and well protect-

THE CULTIVATION OF COCOA IN THE WEST INDIA ISLANDS

TO the active young man possessed of a limited amount of capital, who is looking for an occupation as well as investment, in the Lesser Antilles or in many parts of Venezuela, the cultivation of cocoa is at the present time the most inviting of the agricultural pursuits. The island of Trinidad, which is the one most familiar to the writer, produces cocoa of a quality second to none, and only equaled by that grown in the vicinity of Caracas, and always brings the highest price in the London market. Considerable patience is required to grow it from the seedlings, as it takes five or six years of cultivation before there is a harvest worth mentioning, and seven or eight years before a full crop can be realized, but when the trees are once full grown they will continue to bear fruit for an almost indefinite time.

The cultivation of cocoa consists largely of draining the land, keeping down the undergrowth of bush and weeds, and trimming the trees. The flowers occur in clusters on the main branches and on the trunk of the trees, usually only one of each cluster reaching maturity. The fruit, which is seen in the illustration, is a hard pod six or seven inches long, resembling a cucumber, growing from the trunk or large branches, and looks very much as though it were artificially attached. Buds, blossoms and fruit,



COCOA DRY-HOUSES IN TRINIDAD—FIXING THE BEANS.

In all stages, occur side by side, and ripened fruit is harvested at all times of the year. The main crop, however, matures in the dry season, and is usually harvested in February, only small quantities ripening during the remainder of the year.

The pods each contain five rows of seeds or beans, quite similar to a large, thick Lima bean, embedded in a pink, acid pulp. These seeds are the cocoa beans of commerce. The harvesting consists of cutting off the mature pods by means of a knife on a long bamboo pole, gathering them into heaps on the ground, where they are allowed to lie for about twenty-four hours. They are then cut open with a cutlass, the seeds and pulp coming out in a mass; these are carried to the dry house.

As soon as the beans reach the dry-house, they are placed in the "sweat box" or pit, where they are closed up tight and allowed to ferment for some time.

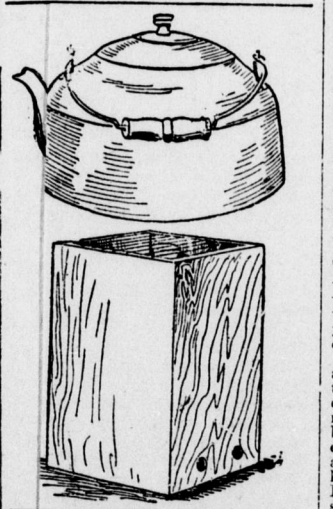
The next process is the drying, which is accomplished by spreading the beans in a layer over the platform and drying them in the sun. Laborers are kept constantly stirring them, while exposed to the sun, with a wooden rake, so that they will dry evenly. Each morning, during the early stages of the drying process, the beans are gathered into a heap in the middle of the floor and given a thorough mixing. This is sometimes accomplished by the laborers mixing and kneading them by treading them with their bare feet, as shown in the illustration. This is known as "dancing the cocoa" and renders the beans smooth and uniform in color. It usually requires ten days or two weeks to finish the drying, depending on the weather. The dried beans, when ready for market, are put in canvas bags holding about 150 pounds, and the name of the plantation stenciled on the bags, these names or brands at times becoming very prominent in the market for the quality of cocoa the plantation is reputed to produce.

The manufacturing, which is invariably done in Northern factories, consists of roasting the beans in a revolving cylinder; this develops the aroma and fits them for crushing. After the beans are crushed they are screened to

free from cold, etc. If this be instinct, a good deal of what is called "human intelligence" should be called "instinct, too," says the author.

Keeping Up the Heat. The top of the stove is often crowded. The dishes that are cooked, but not kept warm. This can be accomplished by the device shown in the cut.

A b just a bit higher than a hand.



lmmas both top and bottom removed. Across the top are stretched wire. The box is then set down over a b, and the kettle or dish is set upon wires, where its heat will be maintained.

Device will often prove of the great service, and can be made by any in ten minutes.

Quite Like a Jewelry Store. In Kansas town the other day Mr Ruby Opal entertained Miss PeDiamond. They were seen roving on the emerald green of the law with sparkles of fun shooting forth their turquoise eyes.—Denver Post

man who shakes hands most is really the hardest to shake.

DR. TALMAGE'S SERMON

SUNDAY'S DISCOURSE BY THE NOTED DIVINE.

Subject: Control Your Temper—Why One May Have a Wholesome Indignation—Sins That We Should Be Angry With—Pity the Sinner.

WASHINGTON, D. C. A delicate and difficult duty by Dr. Talmage in this discourse urged upon all and especially upon those given to quick temper; text, Ephesians iv, 26, "Be ye angry and sin not."

Equipose of temper, kindness, patience, forbearance, are extolled by most of the radiant pens of inspiration, but my text contains that which at first sight is startling. A certain kind of anger is approved; and, we are commanded to indulge in it. The most of us have no need to cultivate high temper, and how often we say things and do things under affronted impulse which we are sorry for when perhaps it is too late to make effective apology. Why, then, should the apostle Paul dip his pen in the ink horn and trace upon paper for all ages, the injunction, "Be ye angry and sin not?"

My text commends a wholesome indignation, it discriminates between the offense and the offender, the sin and the sinner, the crime and the criminal.

To illustrate, alcoholism has ruined more fortunes, blasted more homes, destroyed more souls than any evil that I think of. It pours a river of poison and fire through the nations. Millions have died because of it, and millions are dying now, and others will die. Intemperance is an old sin. The great Cyrus, writing to the Lacedaemonians of himself, boasted of many of his qualities, among others that he could drink and bear more wine than his distinguished brother, Louis X. and Alexander the Great did drink. The Parliament of Edinburgh in 1661 is called in history "the drunken Parliament." Hugh Miller, first stonemason and afterward a world renowned geologist, writes of the drinking habits of his day, saying: "When the foundation was laid, they drank. When the walls were leveled for laying, they drank. When the building was finished, they drank. When an apprentice joined, they drank." In the eighteenth century the giver of an entertainment boasted that none of the guests went home sober. Now, the first ship captain, was wrecked not in the ark, for that was safely landed, but he was wrecked with strong drink. Every man or woman rightly constructed will blush with indignation at the national and international and hemispheric and planetary curse that is good to be aroused against it. You come out of that condition a better man or a better woman. Be ye angry at that abomination, and the more anger the more elevation to character. But that aroused feeling becomes sinful when it extends to the victim of this great evil. Drunkenness you are to hate with a vivid hatred, but the drunkard you are to pity, to help to re-educate.

Just take into consideration that there are men and women who once were as upright as yourself who have been prostrated by alcoholism. Perhaps it came of a physician's prescription for the relief of some ailment, or perhaps it came of a continuance of the remedy. Perhaps the grandfathers was an inebriate, and the temptation to inebriety, leaping over a generation, has swooped on this unfortunate. Perhaps it was a very gradual coming on of the man with the beverage which was thought to be a servant, when one day it announced itself master. Be humble now, and admit that there is a strong probability that under the same circumstances you yourself might have been captured. The two appropriate emotions for you to allow are indignation at the intoxicant which enthralled and sympathy for the victim. Try to get the sufferer out of his present environment. Recommend any hygienic relief that you know of, and, above all, implore the divine rescue for the struggle in which so many of the noblest and grandest have been worsted. Do not give yourself up to the philippic about what the man ought to have been and ought to have done. While your cheek flushes with wrath at the foe that has brought the ruin, let your eye be moistened with tears of pity for the sufferer. In that way you will have fulfilled the injunction of the text, "Be ye angry and sin not."

There is another evil the abhorrence of which you are all called to, and it is on the increase—the gambling practice. Recent developments show that much of this devastation is being wrought in ladies' parlors. It is an evil which sometimes is as polite and gracious as it is harmful. Indeed there never were so many people going to get money without earning it. But it is a hazardous transaction that comes down to us from the past, blighting all its way. I have seen in the archives of the nation in this national capital a large book in which one of the early Presidents of the United States kept an account in his own handwriting of gains and losses at playing cards, on one page the gains and on the other the losses, and there are many pages. In other days many of national reputation went from the halls of Congress and the Senate chamber to spend the night in notorious gambling saloons. In Spain a don lost in twenty-four hours what equals \$12,000,000. Twenty years ago it was estimated that the average gambling exchange of money throughout Christendom exceeded \$123,000,000 a year, but statistics twenty years ago would be tame compared with the present statistics if we could find any one able enough to tabulate the gains and losses of the same spirit of gambling whether the instruments are cards or the clicking chips or the turning wheel or the bids of the Stock Exchange, where people sell what they never owned and fail because they cannot get paid for it. A prominent banker tells me that he thinks 50,000 people were financially prostrated by the recent insanities in Wall street. Here and there a case is reported, but the vast majority suffer in silence and there are brought home from school; the wardrobe will be denied replenishment; the table will have scant supply; wild generosity will be turned into grim want. Forty years from now will be felt the disaster of last month's black Thursday.

But, while you are hotly indignant against the crime, how do you feel about those who were fleeced and slain? They did not know that their small boat was so near the maelstrom. Some of them were born with a tendency to recklessness and experiment and hazard. They inherited a disposition to tempt chance. Do not heap on them additional discouragements. Do not deride their losses. Help them to start again. Show them that there are more fortunes to be gained than have yet been gathered, and that with God for their friend they will be provided for here, and through the Saviour's mercy they may reign forever in the land where there are no losses and infinite gains. While you may redden in the face at the fact that gambling is the disgraceful mother of multitudinous crimes, of envies, jealousies, revenges, quarrels, cruelties, falsehoods, forgeries, suicides, murders and despair, be careful what you say to the victim of the vice and what you do. He needs more sympathy than the man who came up from inebriety and debauch and accusation, for many such repent and are saved, but confirmed gamblers never reform. During the course of a prolonged ministry I have seen thousands reformed, many of them who were clear gone to sin, by Almighty grace rescued. In all parts of the land and in some parts of other lands I have seen those who were given up as incorrigible and lost recovered for God and heaven, but how many confirmed gamblers have I seen converted from their evil ways? A thousand? No.

Five hundred? No. Fifty? No. Twenty? No. One? No. I read in a book of such rescued. I have no doubt there have been other cases, but no evil does its work so thoroughly and eternally as gambling. Such almost hopeless cases of reformation ought to call forth from you deeper sympathy than you feel for any other unfortunate. Pity, by all means, for those who, shipwrecked and bruised among the timbers, have nevertheless climbed up to the fisherman's cabin and found warmth and shelter, but more pity for those who never reach shore, but are dashed to death in the breakers. Be angry at the sin, but sympathize with its victims.

There is another sin that we are oftentimes called to be angry with, and that is fraud. We all like honesty, and when it is sacrificed we are vehement in denunciation. We hope that the detective will soon come upon the track of the absconding bank official, of the burglar who blew up the safe, of the clerk who skillfully changed the figures in the account book, of the falsifier who secured the loan on valueless property, of the agent who because of his percentage defrauded a widow of the benefit of a life insurance policy when his heart is ready to stop and who comes from an ancestry characteristically short lived. One act of fraud told of in big headlines in the morning paper might fully arouse the nation's wrath. It is the interest of every good man and good woman who reads of the crime to have it exposed and punished. Let it go unscathed, and you put a premium on fraud, you depress public morals, you induce those who are on the fence between right and wrong to go down on the wrong side, and you put the business of the world on a down grade. The constabulary and penitentiary must do their work. But while the merciless and the godless cry, "Good for him! I am glad he is within the prison doors!" be it your work to find out if that man is worth saving and what were the causes of his moral overthrow. Perhaps he started in business life under a tricky firm, who gave him wrong notions of business integrity; perhaps there was a combination of circumstances almost unparalleled for temptation, perhaps there were his moral overthrows. Perhaps he really started in business life under a tricky firm, who gave him wrong notions of business integrity; perhaps there was a combination of circumstances almost unparalleled for temptation, perhaps there were his moral overthrows. Perhaps he really started in business life under a tricky firm, who gave him wrong notions of business integrity; perhaps there was a combination of circumstances almost unparalleled for temptation, perhaps there were his moral overthrows.

What an opportunity you have now for obeying my text! You were angry at the misdemeanor, but you are hopeful for the recovery of the penitent. Blessed all the prison reformers! Blessed are those Governors and Presidents who are glad when they have a chance to pardon! Blessed the forgiving father who welcomes home the prodigal! Blessed the dying thief whom the Lord took to paradise to glory, saying, "This day shalt thou be with Me in paradise."

There is another evil that we ought to abhor while we try to help the victim, and that is infidelity. It unmans the lips, pre-empting the man from the man, and affords not so much as a spar or a plank as substitute. It would extinguish the only light that has ever been kindled for the troubled and the lost. Let the spirit of infidelity take the place of the spirit of the reformers! Blessed are those who have a chance to pardon! Blessed the forgiving father who welcomes home the prodigal! Blessed the dying thief whom the Lord took to paradise to glory, saying, "This day shalt thou be with Me in paradise."

I say to all young men hoping to achieve financial, moral or religious success, control your tempers. Do not let criticism or rebuff defeat you. Be a great musician, applied to become a great artist in the Conservatory of Music at Milan, and he was rejected by the director, who said that he could make nothing of the new comer, as he showed no disposition for music. But the criticism did not exasperate or defeat him. The most of those who have largely succeeded in all departments were characterized by self control. In battle they could calmly look at the bomb thrown at their feet, wondering whether it would explode. In company with them when panics smote the city, these men were placid, while others were yelling themselves hoarse at the Stock Exchange. While others nearly swooned because a certain stock had gone down, these men calmly waited until it would rise to its points up. While the opposing attorney in the courtroom frothed at the mouth with rage because of something said on the other side he of the equipose put a glass of water to his lips and drank and proceeded with the remark, "As saying when the gentleman interrupted me." Self control! What a glorious thing! We want it in the doctor feeling the pulse of one desperately ill; we want it in the engineer when the wheels of another train come round the curve on the same track; we want it in Christian men and women in times when so much in church and state seems going to demolition—self control.

Surpassing all other characters in the world's biography stands Jesus Christ, wrathful against sin, merciful to the sinner. Witness His behavior toward the robed ruffians who demanded capital punishment for an offending woman—denunciation for the crime, hypocrisy, pardon for her sweet penitence. He did not speak of Herod as "his highness" or "his royal highness," but dared to compare him to a cunning fox, saying, "Go ye and all that fox." But, alert to the cry of suffering, He finds sinners, and to many of the ten awful invalids did He give convalescence and health! Ten. Rebuilding Pharisism in the most compressed sentence in all the vocabulary of anatomy: "Ye serpents, ye vipers! How can you escape the damnation of hell?" Yet looking upon Peter with such tenderness that no word was spoken, and not a word was needed, for the look spoke louder than words. "And the Lord looked upon Peter, and Peter went out and wept bitterly."

Defying the mightiest Government of the world, the Roman Government, yet rubbing His hand just below the forehead of the blind until the optic nerve of him who was born sightless is created, and the sunlight has two new paths to tread. Best illustration the world ever saw of anger without sin, anger against the abominations which have assailed and blasted the earth from its deepest cavern to its highest cliff, but so much pity for the sinning and suffering nations that He allowed them to transfix Him upon two pieces of wood nailed across each other on a day that was dark as night, the windows of heaven shut because the immortals could not bear to look down upon the assassination of the loveliest being that ever walked the shore of the lakes or without pillow or blanket slept on the cold mountains.

Like Him, let us hate iniquity with complete hatred, but like Him may we help those who are overthrown and be willing to suffer for their restoration. Then, although at the opening of this discourse our text may have seemed to command us to do an impossible thing, we will at the close of this sermon, with a prayer to God for help, be more rigid and determined than ever before against that which is wrong, while at the same time we shall feel so kindly toward all the erring that we will work so hard for their rescue that we will realize that we have scaled the Alpine, the Himalayan height of my text, which enjoins, "Be ye angry and sin not."

STATE ELEPHANT OF THE PHEIDOLOGETON — LARGE WORKER CARRYING THE SMALLER ONES.

forming other uses as if they were mere lifeless cells in a honeycomb. Among the Formicidae this tendency to specialization has resulted in es-

common occurrence in Eastern Asia, forms shelters by bending the edges of the leaves of the trees upon which it lives and fastening them together. The