

SCIENCE AND INDUSTRY.

It is computed that one inch of water on an acre of surface is 27,152 gallons or 113 tons, weight.

A number of young filbert trees have been sent to the agricultural department from Greece. The nuts from these trees are the largest and have the finest flavor of any filberts the department has yet discovered, and every effort is to be made to encourage their growing.

In an open London suburb a scientist found 20,000 dust particles in a cubic centimetre of air—equal to about 0.061 of a cubic inch—while in a ward in the centre of London the number amounted to 500,000. The air was loaded to the extent of about 900 percent more in the city than in the suburb.

Absolute zero is the point at which as has been determined from experiments with gases, matter would be without a trace of heat—could be cooled no farther. This point is 273 degrees below centigrade zero. A degree of cold so intense as this is, however, absolutely unattainable. Even the meteorites which swarm in interstellar space must be heated to some extent by the radiance of the stars.

American material for the building of railroads, tramways, etc., continues to be exclusively employed in Mexico. The latest order in that line placed in the United States amounted to a large figure, for it was destined for three lines of tramway around Medina, in the state of Yucatan. A company was formed for the building and operating of these tramways, with a capital of \$400,000, and it has applied to the state legislature for the concession, which, using a purely formal affair, the official conclusion of it was not waited for by the tramway company.

The Faroe islands are remarkable for the immense numbers of birds that frequent them, and which furnish an important supply of feathers to commerce. The most valuable of these birds for its feathers is the puffin, about 100,000 of which are caught annually. Perpendicular cliffs of rock, facing westward, are known as fowling cliffs, because of the birds that cover their shelves. During part of the summer the birds are so numerous around the cliffs that they are said to resemble a thick snowstorm. Very few birds are found about cliffs that do not have a western exposure.

The indigo industry of Bengal is suffering severely from the competition of the manufactured German dye, huge quantities of which are being exported to India and the other markets hitherto controlled by the Indian industry. The German synthetic indigo is considered to be superior and is much cheaper. It is also stated that if the native indigo manufacturers were to conduct their work upon a more scientific basis, and were to extract the maximum quantity of dye from each plant, they would be in a position to meet the German competition. With a view to encouraging the industry, the government of Bengal has voted \$22,500 for research work, with a view to facilitating and improving the existent process of manufacture.

GERMANY'S NEW OIL ENGINE.

It Operates Without the Use of Boilers, Furnaces or Chimneys.

Great things are expected of the Diesel engine, the latest thing in German engineering, the first working of which in England a London Express representative was permitted to see at Guidebridge, near Manchester, recently.

Economy in fuel and space is the chief merit of the Diesel, commending it to makers of automobiles and small marine craft as an engine with a future. Its claim to originality lies in the fact that it works with crude oil, without smell or dirt, perfectly consuming all the products of combustion. Unlike other oil engines, it requires no ignition point. Compressed air from cylinders starts the Diesel. Oil and air are then admitted to the cylinder, when the compression of the air by the return stroke so raises the temperature that the oil flashes and the forward stroke is delivered.

The exhaust is perfectly clean and free from odor. Thus the claim made for the Diesel is that no boilers, furnaces or chimneys are required. Great economy of space and fuel is effected, as it can be used with any kind of liquid fuel or furnace gas—the waste product of blast furnaces. Hopes are entertained that the Diesel will be used on a very large scale, those who are introducing it to England claiming for it the ability to run a vessel as large as the Oceanic. Already an order has been placed by the French government for an engine of this type, to be used in a submarine boat.

If the Diesel frees the streets from the smell of the motor car and yacht decks and ladies' dresses from the cinders of a steamer funnel, the German inventor will have claim on the gratitude of mankind. If, as seems likely, it will encourage the establishment of small plants in rural districts, where gas is not obtainable and coal is dear, it may do much more than this for industrial England.

The Dean's Joke.

"Some one has stolen the telescopes," reported the astronomy professor.

"That ought to be an easy thing to look up," said the dean, and the astronomy professor, in duty bound, laughed comically. — Indianapolis Press.



An Important Garden Crop.

Lima beans make one of the most important crops that is grown in a garden. The bush varieties should be planted for an early supply, but the pole varieties are preferred by some as a main crop. It is not too soon to prepare the ground and apply the manure, but the seed should not be planted until the ground is quite warm. In place of poles wire fencing may be used as supports.

Using Fertilizers More Than Once.

Fertilizers may be used more than once on a crop. Unless heavy applications are made early in the season more fertilizer should be applied later. The kind of fertilizer must be considered, however. If nitrate of soda is used early it will be found profitable to use a little more when the crop is nearly grown. The proportion of moisture secured will have some influence on the crop, for should the season be very dry there may not be enough moisture to dissolve the plant food for the crop.

Planting the Corn Crop.

The corn crop is the most important and valuable of all staple crops on the farm, as the fodder is considered equal to the grain as stock food on all well managed farms. Corn is a gross feeder and will take any amount of manure. It thrives best when the land has been plowed to the greatest depth consistent with the nature of the soil and then well harrowed. It is better to use fertilizers broadcast for corn rather than in the hill, and a mixture of 150 pounds of nitrate of soda, 100 pounds sulphate of potash and 250 pounds acidulated phosphate rock, per acre, will be found excellent for corn. Unless given good cultivation, however, corn will not produce the highest yield. Simply stirring the top soil with the cultivator to the depth of two inches after the corn plants are up has been found better than deep cultivation by some, but it is possible that many soils should be worked deeper. The loose top soil protects against drought, while the frequent cultivation keeps the grass and weeds under control.

An Easy Method of Growing Turnips.

The great objection to growing turnips on a large scale for stock is the great amount of hard work required in weeding. In growing by this new plan the land is best plowed in the fall and manured through the winter, provided cut straw was used for litter. If it is not convenient to use a piece of fall plowed ground, a mellow piece of land may be plowed this spring, and surface manured immediately. If fine manure cannot be had, plow under coarse manure with a gang plow about two inches deep. After plowing and manuring, the earlier in spring the better, the ground must be well harrowed every week until the time for sowing the seed. Sow rutabagas or swedes from June 15 to 25 and turnips from June 20 to July 1.

The grain drill may be used to sow the turnip seed. Close up some of the drill holes so as to sow 28 inches. Sow about one pound of good seed per acre. As soon as the turnips are well up go twice across the rows with a weeder to thin the plants. In a week's time go over the ground again with the weeder, always across the rows. It is wonderful how the weeder thins out the plants and destroys the weeds with even more satisfaction than may be done by hand. The number of times the weeder may be used will largely depend upon the thickness of the plants in the row. There will be little use for the horse cultivator, but it may be used after the crop is several inches high. A good way is to use the horse cultivator and follow with the weeder across the rows. Acid phosphate is the best fertilizer for the turnip crop, and should be applied broadcast.—J. A. McDonald, in New England Homestead.

Common Sense Stable Sanitation.

The three essentials in building a cow stable are light, temperature and ventilation. Stables built north and south and provided with plenty of windows will receive sun nearly all day. This is important, as sunlight is the best germicide known. Build the barns so that the direct rays can get in. Otherwise it will be impossible to keep the stable in best condition. Of course a large amount of window surface means a cold stable. This can be avoided by using double windows or hanging curtains inside the single windows, which practically amounts to double windows. The temperature of the cow stable must be kept uniform. I used to think that a temperature of 50 degrees was about right, but now I keep my stables from 54 to 60 degrees. I know this is high, but I believe we get better results than from a lower temperature. Don't build a stable too high, as the higher the ceiling the more difficult to keep the barn warm and to keep the cows from taking cold. I have figured out that 500 cubic feet of air space for each animal is sufficient. My own stable is 36 feet wide and about 90 feet long. It contains stalls three and one-half feet wide placed so that the heads of the cattle are toward the wall. This makes cleaning less laborious and in every way I like this arrangement better than having the heads toward the middle of the building. In making floors for cow stables I like a cement floor. The objections

to cement are that it is cold and slippery. The way to get around the first objection is to bed the cattle liberally and the second to roughen the last coat of cement before it has set. This will prevent slipping. Provide three or four box stalls in every barn.

Ventilation of the stable should be sufficient to carry out all moisture. The tube system suggested by Professor King is undoubtedly the most practical. These tubes must be tight, else they will not cause circulation of air will come in just below the eaves, be carried up into the rafters and allowed to settle toward the bottom, becoming partially warm before it reaches the cows. The in-take tubes should be sufficiently numerous to provide a five-inch tube for each cow.—H. E. C., in American Agriculturist.

Orchard Cultivation.

If cause of partial or entire fruit failure is sought, after the orchardist has fulfilled his part, it may confidently be expected to result from one of two interfering conditions. Either the fruit buds or growing fruit have been injured by untimely frost, or sufficient moisture has been lacking at some time during the growing season. Loss or damage from the latter cause is now quite as common here in the east as in the arid or semi-arid fruit-growing districts of the far west. There they have become fully convinced that no fruit need be expected without an adequate and continuous supply of moisture, either by conserving that falling during the wet season or artificially supplied, or by both methods combined. Here it will be presupposed that the orchardist has faithfully done his part in fertilizing, pruning, insect protection and, if need exist, in draining, and at June 1st has a fair setting of fruit. Up to that time, in the east and the middle west, there is but little liability of drouth. It is the period from that date till harvest that is most critical for the fruit-grower and which annually keeps the statisticians guessing as to the outcome.

Ripe fruit contains 85 to 90 percent of water. When we consider this fact, in relation to another, that the leaves of a tree are constantly exhaling moisture into the air at the rate of hundreds of tons to each acre of large and thrifty fruit trees throughout the summer season, it becomes at once apparent how necessary it is that no moisture in orchard or vineyard should go to waste. It also becomes plain why fruit often drops in crop-ruining quantities even when a drouth is of but short duration when sufficient cultivation has not been given to conserve the moisture. The tree will obey the law of self-preservation by sacrificing its fruit rather than its life.

Where special attention has not been given to moisture-conservation by cultivation, it is not generally understood how absolute a protection against evaporation of soil moisture is afforded by a dust mulch. A convincing and practical illustration of its efficacy was witnessed last season in a garden potato patch, which, after deep plowing and thorough preparatory tillage, was given conscientious stirring and cultivation from once to three times weekly. The desideratum being to allow no crust to form favorable to moisture dispersion, this was continued throughout the growth of the crop. Although the season was unusually dry, and the soil such as to be easily affected by drouth, the potatoes yielded a magnificent crop, both in size and quality. At all times during the period named moist earth could be found within two or three inches of the surface, while a half dozen feet away, on either side, where no cultivation was practiced, the soil was destitute of moisture for at least 18 inches below the surface.

Later in the season the same fact was emphasized when the writer had an opportunity to witness orchard cultivation in the far west, notably in California. There were observed tree-braking crops of splendid fruit just adjoining others of the same variety, and otherwise equally as well cared for except in the cultivation given, the latter showing only partial crops of inferior, shriveled fruit, all the way down to absolute crop failures in all cases corresponding closely to the cultivation and artificial moisture supplied. The best results were evident in that climate of constant sunshine and moisture-less atmosphere, where a dust mulch of five or six inches was provided. It was there also made evident that those depending on irrigation, without much regard to cultivation, were often no better off than the orchards unirrigated. The uninterrupted supply of moisture is an absolute necessity for the best fruit results. Just as soon as the supply fails, the fruit begins a premature ripening which is fatal to its perfect future development, even should its stem remain unparted from the parent tree.

The point I would especially emphasize is that no one with an orchard of bearing age, which at its best is capable of realizing its owner, in east or west, from \$50 to \$100 per acre, net, when properly handled, can afford to convert the moisture rightly belonging to the fruit into grass or other crops, or what is equally bad for the fruit, allow the moisture to escape into the air through the medium of a hard, unventilated soil crust.—B. F. W. Thorpe, in the Country Gentleman.

Who's Who?

"There's one characteristic in men I profoundly admire."
"What is it, Becky?"
"They can be so raging mad at each other and not show it."—Detroit Free Press.

ESCAPING FROM SIBERIA.

How Russian Convicts Manage to Secure Freedom.

Recent developments in Russia have served to direct public attention anew to the state of affairs in the vast Muscovite realm. This is the time of year when the wretched creatures condemned to a life of practical serfdom in Siberia make their most strenuous endeavors to escape. Practically in no part of Siberia is imprisonment so much to be dreaded as in the mines of Kara. Spring is considered the best time to make the break for liberty, as then the rigors of a Siberian winter are passed, and there is then more chance of success.

Many miles of desolate territory must be crossed, and in the dead of winter such attempts are worse than futile, for the despairing convict only escapes from serfdom to die of exposure or starvation on the bleak Siberian desert. Yet, foolhardy as it may seem, many do make the struggle for freedom, preferring probable death in this form to the miseries of the prison pen.

Once the wretches have eluded the sharp eyes of the guards and escaped from the prison proper there is always some guide to direct them for the first hundred miles or so. Night is the time for the attempt, and in the darkness some succeed. After the prison is left behind them all traveling must be done under cover of darkness. When a village is reached all is dark and still, save at one cot, where a light is ever burning in the window. There the desperate refugee knows he may find friends and perhaps shelter during the coming day.

The system of convict pens is not condoned by the natives, and they are ready to be of any possible assistance. Of course, this must be done with the greatest secrecy, as detection might mean the same fate for the cottager and all his family. Therefore the greatest caution must be observed. In the window a little table is placed, on which stands a lamp, a plate and a jug. When the cottager and his family sit down to their frugal meal a choice morsel is selected and set on the plate, while the jug is filled for the ever expected unfortunate wayfarer.

When the hospitable night sheds her cloak of secrecy over the world the convict, leaving his place of concealment, steals up to the lighted window and, pushing it open, takes the plate and jug and refreshes himself for the next stage of his long, dreary march to liberty. But where to go? Doubtless his former happy home has been destroyed, his family scattered. He cannot return to see, for detection is doubly sure where he is known. The only resort is to plod to some neighboring village, where perchance he may learn some news of the dear ones.

And all this misery for what? Because, forsooth, he may have been suspected of disloyalty to his ruler, or he may only have incurred the hatred or ill will of the local police. Little wonder that the present uprising throughout the realm is assuming alarming proportions. The voice of civilization, official edicts, royal ukases may have ameliorated these desperate conditions somewhat, but the system of Siberian banishment is built on a poor foundation, and it can be only a matter of time when a vast upheaval will bring about a change in conditions in Russia.

Do You Know Esperanto?

The latest aspirant for honors as a universal language, the successor of Volapuk, which was agitated some years ago, is known as Esperanto. This is an artificial language, due to Dr. Zamenhof, a Russian linguist. There is no doubt that, despite the extensive translation of valuable foreign articles appearing in the technical press, in these days when every manufacturing industry is carried on along scientific and chemical lines, a wider interchange of ideas and discoveries is of the utmost importance. Such is the mission of a universal language, one in which any scholar would be able to describe and explain his discoveries so as to have a universal audience.

Esperanto grammar is said to consist of 16 simple rules, without any exceptions whatever, and there are but 17 modifications of the termination of words. It is claimed that with 10 minutes' instruction in the grammar a novice can translate Esperanto with the aid of a dictionary only, while a month's study suffices to enable him to write or speak it, the latter operation being simplified by phonetic spelling. It is said that 50,000 people in continental Europe have taken up its study.

Learning to Take People at Their Best.

One of the greatest lessons in life is to learn to take people at their best, not their worst; to look for the divine, not the human, in them; the beautiful, not the ugly; the bright, not the dark; the straight, not the crooked side.

A habit of looking for the best in everybody, and of saying kindly instead of unkindly things about them, strengthens the character, elevates the ideals, and tends to produce happiness. It also helps to create friends. We like to be with those who see the divine side of us, who see our possibilities, who do not dwell upon the dark side of our life, but upon the bright side. This is the office of a true friend, to help us discover our noblest selves.—Success.

The One She Left Behind.

"I should think that you would feel badly about leaving this place," said the housemaid to the departing cook.
"I don't; I'm glad to go. I ain't sorry to leave any of you—excepting the dog. Poor old Tiger! He always washed the plates for me."—Ohio State Journal.

Old Indian Mary

Character who lives near St. Joseph, Mich.

There is no woman in the northwest whose history stands out more prominently than does that of Mary Cochran, familiarly known as "Indian Mary"; yet she is at present residing in a hotel at the edge of the village of Stevensville, a hamlet in the outskirts of St. Joseph, Mich. She is in straitened circumstances that approach dire poverty and as she is very old and probably will not live through the present year the authorities will take notice of her case and attempt to make easy the remainder of her life. She is the most unique character in Michigan. There is not a person in Michigan who lived there in the early days of the city who does not remember "Indian Mary." Time was in the early days when she was a familiar figure on the streets of Chicago, and there was one particular period when she was lauded as a heroine and the whole city talked of her. This was during the civil war, when she saved the life of Colonel Mulligan, the famous commander of the Mulligan Brigade, or "the Irish brigade," as it was familiarly known. Colonel Mulligan was severely wounded. The battle raged all day, 2,000 federal soldiers holding back 6,000 confederates until Mulligan fell. Mulligan was removed to Island No. 10, near Lexington, where he languished for want of medical help. There was no nurse to be found ex-

cept "Indian Mary," who was with the army. She exerted her medical knowledge over the dying colonel and her Indian medicines saved him after several weeks' nursing and careful attention. "Indian Mary" served throughout the war in the capacity of nurse and had the awful experience of seeing her husband, William H. Cochran, a private in Co. L, Thirty-third Michigan infantry, shot for desertion. Captain Thomas H. Botham, now almost 100 years old, was captain of Cochran's company.

Mary Cochran is 75 years of age. Her mother was Julia La Salle of Detroit, a full-blooded squaw, and her grandfather, Jacob La Salle, was an Indian chief. She spent her early years in Chicago and in 1861 joined the federal army in the capacity of nurse. She entered the service under Colonel James McMullen and won credit for the bravery she displayed on several occasions. During the past thirty years she has lived in this section of the country, where she has in some way acquired the reputation of being a witch.

She has not been troubled by the society of her village, and her only companion in her little shack is a small dog. As a last resort the old lady has applied, through Justice St. Clair of this city, for a pension for her service during the civil war.



INDIAN MARY AND HER DOG, RUM.

SOME VIRGINIA BLUE LAWS.

Puritan New England Not the Only Stern Commonwealth.

The official public flogging of women in Virginia has aroused much unfavorable comment and many bitter remarks about "chivalry in the Old Dominion." As a matter of fact, says the New York Tribune, the incident is nothing more than a mild revival of the "blue laws" of Colonial times—laws surpassing in severity any attributed to Connecticut or any other Puritan colony. It has long been a by-word that in Connecticut a man was forbidden to kiss his wife on Sunday. But in Virginia any young woman who was guilty of flirtation or who encouraged more than one man to pay her sentimental attention was liable to be flogged! It was forbidden to speak evil of dignitaries in New England; but in Virginia if one ventured to criticize the governor he was put into the pillory. The straitlaced religiousness of the Puritans has been made fun of; but in Cavalier Virginia it was forbidden to "disparage a minister;" to take a voyage on Sunday save go to church, or to fire a gun on Sunday, excepting to shoot an Indian. That the shooting of Indians, of course in defense of the colonists, was considered a proper function on the Sabbath is shown by the fact that every head of a family was required, under penalty to bring with him to church every Sunday a gun and plenty of ammunition. It is interesting to recall too, that speculating in the markets by "buying futures" was sternly prohibited, under penalty of fine, imprisonment and the pillory. Since in old time in the "Kingdom of Virginia" maidens were flogged for flirting, there is no especial incongruity in applying the same punishment to women convicted of gross immoralities. Nevertheless, the best judgment of mankind must be that it was a performance which reflected no credit for those responsible for it. There are those who approve of the whipping post for the punishment of wife beaters and for certain other male offenses. But the official flogging of women, no matter how much they may have forfeited their title to womanhood, is altogether revolting. It is painful to recall that it was sanctioned and ordered by the grim pioneers of Wyatt's and Yearley's time. That it should be done for any cause in the first year of the 20th century is a shame for which Virginia may well blush.

From Lewly Station to High.

The Australian Parliament has a member who was a waiter. Carl Mittermayer was elected to the Reichsrath four years ago, at a time when he was serving as a waiter in a small suburban restaurant. And there is a butcher in the British House of Commons. At least two members of parliament are grocers, and there are a dozen who were once laborers. The parliament of Vancouver has as its speaker a man who was once a coal miner in Northumberland.

Power of the Rothschilds.

Since 1850 the Rothschild family has raised for Great Britain alone more than \$1,000,000,000; for Australia, \$250,000,000; for Prussia, \$200,000,000; for France, \$400,000,000; for Italy, \$300,000,000; for Russia, \$125,000,000; for Brazil, \$70,000,000. In 1895 they took \$15,000,000 of the February loan of the United States through the Belmont-Morgan syndicate.

California state is 850 miles long, and contains 158,360 square miles.

An Easy Business to Enter. While trusts are multiplying and the centralization of capital in all business