NEW YORK, AUGUST 18, 1849.

To Our Subscribers.

Four numbers more will complete the present volume of the Scientific American. We hope that our subscribers will forward their subscriptions before the last number is issued, in order that we may transfer their names in season. We also hope that each subscriber will try and get another, to extend our circulation. It is true that our circulation is the largest of any other paper of the same nature in the world, but we should have a larger circulation than we have, and we will, if each subscriber, without any expense or outlay, just takes a little trouble to introduce our paper. Although we say this, as a request, we cannot but thank our subscribers for their kindness and interest in the welfare of the Scientific American. This is now our fourth volume; steadily have we increased in circulation, and with such an increase, we have added improvement after improvement, in the character of our paper. Let any subscriber take up the 1st, 2d and 3d volumes, and compare them with the present one, and the difference will at once be perceived. We want to add still greater improvements to volume 5, and our subscribers can enable us to do this The Scientific American is allowed on all hands, to occupy the foreground of all other periodicals, in disseminating interesting and useful information, promoting the cause of science, advocating the rights of the ingenious and industrious, and in presenting good engravings and descriptions of new inventions, and illustrations of operations in the sciences and arts, and it does so in the plainest and most common sense manner. We know that business has not been very brisk this summer, but there is no man but can pay the amount of our subscription, almost at any moment. No man who has the ambition to keep up with the intelligence of the age, can be without it. All the valuable home and foreign scientific news, first finds its way into our columns. We possess the best means of obtaining the most recent information on patents, inventions and discoveries in science and art. Therefore every person who would consult his own interest should subscribe now for volume 5 of the Scientific American.

With this number we send our prospectus. Those who publish it, will be pleased to mark the advertisement, and if they fail to receive the Scientific American through some oversight, we hope that they will let us know of the same. A few mistakes of this kind have occurred with us, but none of them intentional, and we always regret when any thing of the kind does take place.

Horse Power of Engines and the Economy of working Steam Expansively.

Since the practice of working steam expansively has come into use, the problem of calculating the power of an engine has become somewhat more intricate.

When the steam was admitted during the whole stroke, the pressure on the piston was allowed to be the same as in the boiler, but to obtain the mean effective pressure when the steam acts expansively becomes a subject of calculation; after this result is obtained the process of calculating the power becomes quite simple, as heretofore.

Since it is the same for estimating the power of all engines, the results must of course be similar, hence it is not in the process, that engineers differ so much in their results.

33,000 is now universally received as a divisor in this country, consequently the disagreement must arise in the per cent loss due to escape and condensed steam, difference in the pressure in the boiler and on the piston, friction of the engine, &c.

Now if some definite per cent loss should be universally received, engineers would all agree in their results. It is customary with some of the first shops in this country, and many in Great Britain, to deduct 40 per cent or take 60 per cent from the theoretical results.

If this practice was universally observed by engineers, we should be able to obtain and establish the number of horse power required to drive all the various kinds of machinery.

The first inquiry of a purchaser is, what number of horse power is required to drive his work. Such information (if obtained from different shops) seldom agrees.

The first class engine builders in this country, have now arrived to such a degree of perfection in building engines, that there is no practical difference in the amount of power which the same sized engines are capable of transmitting, hence the crude opinion that has existed since the early history of the engine, that no two engines can be made to perform alike, or to produce the same effect, should, and ought to be entirely disregarded.

ECONOMY OF EXPANSION.

Whether the idea of working steam expansively was suggested by the fact, (which is alike discoverable by all) that the force of steam is not much, if any reduced, by passing through the cylinder, or whether it was deduced by theoretical investigation, is of little importance, but we obtain results by theory which would require a long time to be established by practice.

It is of course understood, the earlier the supply of steam is cut off, the less the mean effective pressure, hence to produce the same effect, the area of the cylinder must be proportionately larger. It will not, however, be necessary to increase the size of the boilers, but they may on the contrary be decreased as the consumption of steam is less. It would require too much space in your paper to enter into a calculation to show these relations. We will, however, give the result of a calculation showing the economy in fuel derived from expansion. It will of course be understood, that the quantity of fuel consumed, will vary as the quantity of steam expended.

We will select a cylinder 4 feet in length and 1 foot area. In the first instance, we will allow the pressure of steam in the cylinder to be the same as in the boiler, which we will suppose to be 40 pounds per square inch. After this we will cut off the supply at 3-4, 1-2 and 1-4 respectively, then the quantity of steam expended during each stroke of the piston, will be respectively 4, 3, 2 and 1 cubic feet and the effect produced from each of these quantities of steam will be 40, 38 68-100, 34 8-100 and 24 28-100 pounds. Now it is quite certain that the quantity of fuel consumed will vary as the quantity of steam produced, hence the quantity of fuel consumed will vary as the effect produced and the consumption of steam jointly, which when resolved, gives the following quantity of fuel required to produce the same effect in all the different cases. 100, 77, 58 and 41 pounds. This is 100 pounds of coal produces no greater effect when the steam does not act expansively than 41 pounds does when the steam is cut off at 1-4 of the stroke or when the piston has moved 9 inches.

The great difference in the quantity of fuel consumed is due to the difference in the pressure of the steam when it leaves the cylinder. In the first instance it left under a pressure of 40 pounds per inch, of course possessing great mechanical power which is entirely lost, when cut off at 1-4 stroke it leaves the cylinder, (according to Marriott's law, not taking into account the difference in density due to the change of temperature) under a pressure of 10 pounds. There is a limit, however, beyond which expansion cannot be carried to advantage.

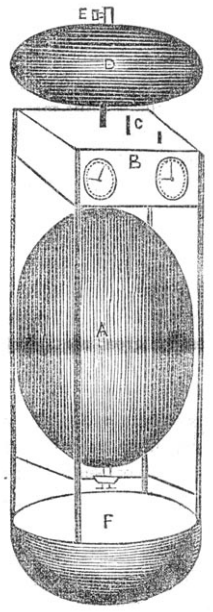
Tredgold justly remarks that the final pressure should never be less than that required to overcome the friction of the engine, for if it should be carried beyond this, there would be a moment at the end of each stroke, in which the motive power of the engine would be entirely withdrawn.

The final pressure on the non-condensing engine should not be less than 8 or 10 pounds, this would admit steam of 60 pounds to be cut off at about 1-6 of the stroke, quite early enough. With the condensing engine the final pressure may be carried as low as 3 or 4 pounds because there is a vacuum of 14 pounds to be added. Here the advantage of the condensing over the high pressure engine becomes striking. C. E. L.

New York Mechanics Institute.

This Institute has been removed from the old miserable cellar in the City Hall, to No. 105 Bowery, (between Hester and Grand sts.) where rooms have been fitted up, which for neatness and utility, greatly excel those which the Institute has hitherto occupied. The Reading Room, as formerly, will be supplied with all the newepapers and Magazines of respectability. Extensive additions to the Library are being made, and a programme of a course of interesting and instructive Lectures to be given during the approaching fall and winter, is under consideration. We hope that our mechanics will for their own credit sake resuscitate this Institution and place it upon a splendid and permanent basis. Here in a great city with nearly half a million of inhabitants, we have not been able to support a Mechanics Institute well. Our mechanics should awake to some sense of their culpable negligence in reference to their own honor. We would like if employers would give their influence in this cause. If *they* looked to the greater respectability of their apprentices and journeymen, for belonging to such an institution, the same as our merchants look upon their clerks who are members of the Mercantile Association, we would soon see a flourishing Mechanics Institute in this city.

Apparatus for Deep Sea Sounding.



A, is a copper receiver for holding condensed air. B, is an air tight box containing a lock for opening the air valves, the trigger for that purpose passing through a collar of leathers to the outside at C, and a time piece with two faces, the pointer of one face to be stopped by the mainspring of the lock, the moment the machine arrives at the bottom; and the time piece to be stopped the moment the machine is drawn back to the surface of the water. D, is a flexible receiver for holding the air in a more expanded form, to reverse the specific gravity. E, is a pipe upon which the receiver is folded during its descent to prevent the too rapid descent of the machine. F, is a piece of metal attached to the machine by four rods which slide up and down about two inches. A quantity of air is let into the receiver and the machine is then let down into the water, when the weight F, touches the bottom and the trigger C, strikes D, and stops one time piece, and then when the machine reaches the top the other time piece is stopped. Thus the one time piece would check the other in relation to the time of ascent and descent. A line does not of itself give an accurate measurement of distance from the surface after a certain depth. E. J.

Tobacco a good Protection for Hot House Plants.

In England tobacco is used to fumigate the plants in hot houses to free them from numerous amphides that are so destructive to the tender plants. The tobacco is cultivated there for that purpose and has been found to be the only safe remedy. Many smoke the leaves of household plants for this purpose.

German Silver.

This metal is composed of one part of nickel, one part of spelter or zinc, and three parts of copper; but all these substances have to be pure, and be exposed to a great heat before they mix among themselves. The zinc metal, which is of a volatile nature, is not put into the pot until after the first two metals have been well united together. The refractory nature of nickel and the difficulty of obtaining the metal free of arsenic, iron and cobalt are causes that not unfrequently we see German silver spoons of gold yellow color, while German silver prepared from pure metals, will equal in whiteness sterling silver, and will not tarnish. Tea and table spoons knives and forks, pocket combs, musical and surgical instruments, firemen's and ship captain's speaking trumpets, pocket book clasps, tea sets, lamps, and gun mountings, are now mostly made with German Silver. Upwards of 50,000 lbs. of this composition is manufactured in this country annually, for which the nickel is imported from Germany and England. There are but three localities of nickel ore in this country;—an ore from Chatham, in Connecticut, yields about three per cent nickel; another ore from the mine La Motte, in Missouri, yields about ten per cent nickel; and lately a nickel ore has been discovered among the copper ore on Lake Superior.

German silver was introduced into the United States by Dr. Feuchtwanger of New York, who was obliged to pay on his arrival in this country, the custom-house duties of silver, the inspectors not knowing any difference.—He is the first manufacturer of the German silver in the United States.

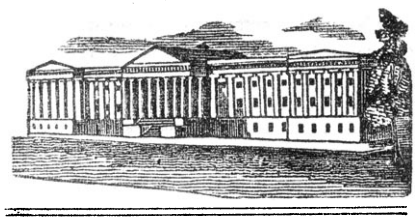
In 1837, the Doctor petitioned Congress to grant him permission of issuing $30,000 worth of pennies made of his composition, as an experiment to substitute the German silver for the copper currency; and Mr. John Quincy Adams in the House and Mr. Benton of the Senate, spoke in the highest terms of this proposition, and it met with the approbation of the President of the United States, Mr. Van Buren, and the members of both Houses. He failed, nevertheless, in that also on account of the unfavorable report from the Director of the United States Mint, who stated that the right of coinage belongs to the United States government, and that it required some skill to analyze the German silver.

Remarkable Statement about Cholera.

An eminent physician of Paris, Dr. Ronet, has written to a professional brother in Liverpool, statements so startling in reference to the results of a very simple mode of treating in the worst stage, the disease now so fatally prevalent in Paris, that we deem it our duty at once to lay it before the public. The letter, of which the following is a translation, is dated Paris June 18:—"I think it my duty to inform my professional brethren, that in a great number of patients affected with cholera in the last stage, that is to say when the pulse is absent, and in the commencement of the blue stage, I have succeeded in restoring the action of the heart and recovering the patient from the blue stage by administering at intervals of half an hour four cups of a hot and sweetened infusion of the common lime tree, mint, balm or chamomile, &c. in each of which cup of infusion were four drops of volatile alkali, making 16 drops, which the patient may take in two hours. The reaction is almost instantaneous. The pulse commences instantaneously to beat, rather irregularly at first it is true, but afterwards with force; the blue state disappears; the body, face and extremities are covered with hot and copious sweat, and in a few hours the patient is entirely out of danger. It is frequently necessary to combat the reaction when it becomes too strong, by the assistance of bleeding."

One of our Generals residing in Washington in affluent circumstances, has been wise enough to learn his well educated son a trade, and the youth, with all the true dignity of one of nature's noblemen, is wielding the axe and jack plane This is a noble novelty which merits commendation. "Give a boy a trade and you give him an estate."

Gum camphor laid in the track of ants is said to be excellent for keeping away these troublesome insects.



LIST OF PATENTS.

ISSUED FROM THE UNITED STATES PATENT OFFICE,

For the week ending August 7, 1849.

To Thomas Davison, of New York City, for improvement in Salting Meats. Patented August 7, 1849.

To Horatio G. Sickel, of Philadelphia, Pa., for improvement in Gas Lamps. Patented August 7, 1849.

To John G. Webb, of Williamsburg, N. Y. for improvement in Argand Burners for Gas Lamps. Patented August 7, 1849.

To Andrew Walker, jr. of Burke, Vt., for improvement in Gas Apparatus. Patented August 7, 1849.

To Sylvester Billings, of Spring Garden, Pa. for improvement in Blocks for setting Hat Brims. Patented August 7, 1849.

To Charles Atwood, of Derby, Conn., for improvement in securing Hooks and Eyes to Tape and Dresses. Patented August 7, 1849.

To J. H. Robinson, of Charlestown, Mass. for improvement in Pessaries. Patented August 7, 1849.

To Henry Miller, of South Bend, Ind., for improvement in Bedstead Fastenings. Patented August 7, 1849.

To Munson C. Cronk, of Auburn, N. Y. for improvement in cleansing Bottles. Patented August 7, 1849.

To Willard Twitchell, of Syracuse, N. Y. for arrangement of weight and pulley for closing Gates. Patented August 7, 1849.

To John Murphy, of Kensington, Pa., for improved method of regulating the contraction of Car Wheels. Patented August 7, 1849.

To William Van Anden, of Trenton, N. J. for Machine for making Springs of Wire.—Patented August 7, 1849.

To Josiah Hayden, of Williamsburg and Rufus Hyde, of Chesterfield, Mass., for improvement in manufacture of Button Moulds. Patented August 7, 1849.

To Peter H. Niles, of Boston, Mass., for Eccentric Piano Lock. Patented August 7, 1849.

To Josiah F. Flagg, of Boston, Mass., for improvements in Locomotive Spark Arresters and Smoke Conductors. Patented August 7, 1849.

To Nicholas Mason, of Roxbury, Mass., for improvement in Cooking Stoves. Patented August 7, 1849.

To Edward Munson, of Utica, N. Y. for improvement in forming and balancing Millstones. Patented August 7, 1849.

To George P. Tewksbury, of Boston, Mass. for Reversible Life Boat. Patented August 7, 1849.

RE-ISSUE.

To Henry G. Tyer and John Helm, of New Brunswick, N. J. for improvement in the manufacture of India Rubber Goods by means of Zinc compounds. Patented January 30, 1849. Re-issued August 7, 1849.

DESIGN.

To Joseph G. Lamb and Conrad Harris, of Cincinnati, Ohio, for Design for Stoves. Patented August 7, 1849.

Wilson, the Vocalist.

The New York Mirror says that Mr. Wilson, the vocalist, who recently died at Montreal of cholera, was originally compositor in the printing office of Ballantyne & Co., Edinburgh; and in that capacity he put into type some of the earliest novels of the "great Unknown." Having a taste for music and a very fine voice, he became celebrated as a ballad-singer, as well as an operatic performer. He first came to this country with Miss Shirreff and the Seguins, and appeared at the Leonard street Theatre, then under the management of James Wallack. After an absence of several years, he returned to this country last fall, accompanied by one of his daughters who had acted as pianist at his musical entertainments, and who, by this bereavement, is left under peculiarly melancholy circumstances.

Embroidery.—Hand and Power.

(*Concluded.*)

The beautiful embroideries on muslin, with cotton, by the Indian and Candian women, are well known. The embroidery practised by the latter is curious enough: they work with their own hair, as well as that of animals, with which they make splendid representations of flowers, foliage, &c.

The negresses of Senegal, before their marriage, embroider the skins of various beasts, representing figures, flowers, and animals, in every variety of colour; and the pictures thus formed, they present as trophies of their skill to their husbands, on the morning (before sunrise) of the ninth day after marriage.

The Georgians and particularly the Turkish women, are renowned for their embroideries on the lightest and most delicate materials, such as crape and gauze, which they ornament with gold thread in a manner unequalled. Their embroideries on morrocco leather have long been esteemed, on which they work the smallest objects in gold, passing without fraying the thread. The Greek women of the present day, and the inhabitants of the islands of the Levant, are celebrated for their embroidery, principally of gold and silver. The women of Therapia on the Bosphorous excel in a most beautiful description of work: it can scarcely however, be termed embroidery, being rather a species of exquisitely fine netting. They represent flowers in relief, every petal of which is worked with the utmost exactness. These extraordinary productions of the needle, cannot be sufficiently admired for their extreme delicacy and elaborateness.

In the last and preceding centuries, when embroidery, as an article of dress both for men and women, was an object of considerable importance, the Germans, but more particularly those of Vienna, disputed the palm of excellence with the French. At the same period, Milan and Venice were also celebrated for their embroidery.

The art of embroidery seems to have attained a higher degree of perfection in France, than in any other country:—it is not, however, so much practised now. Embroiderers formerly composed a great portion of the working population of the largest towns; laws were specially framed for their protection.

It would have been supposed, that embroidery could never have been worked with profit by machinery; yet, such is the case. But a few years since, M. Josue Heilmann, of Mulhausen, France, invented a machine by which a female, with the assistauce of two children, could turn off daily as much work as 20 expert hand embroiderers employed upon the common frame.

Within a few years, a number of machines for embroidering and sewing, have been invented, but nothing in the embroidery line, has as yet been able to compete with hand labor. In the North of Ireland and the West of Scotland, the females are celebrated for their skill in embroidery. The French perform finer work, but are very slow in comparison with their Island rivals. In Paisly a celebrated manufacturing town in the West of Scotland, the females are unrivalled for skill in embroidery. Many articles of dress purporting to be pure Chinese, are produced there, and surely, it is to be expected, for civilization should bring skill to the hand along with knowledge to the head, and in that manufacturing place, the skill of the needle is highly cultivated, and so is the knowledge of the head, by a fine school of design, where drawing of the highest style is taught, and a very pure taste cultivated.

Starch in Fern Plants.

Ferns (bracken) the *cryptagameous* of botanists have long been known as possessing excellent properties for a litter, or in many instances for all the purposes of straw especially among the poor in wild regions. It grows abundantly in half cleared woodlands in our country and apparently where nothing else can grow. In Lapland the deers feed on a kind of moss which is very nutritive and in many parts of the world the inhabitants make food out of plants, which with us, are allowed "to waste their fragrance on the desert air." In no country however, is there use made of the fern plant, as an article of food, and indeed, there is no plant so unprepossessing in every way, to deceive mankind in this respect, yet in the hands of science, it can be made to yield food to man in no inconsiderable quantity.

Some years ago M. Morin analyzed the fern plant and found the root to contain a fatty substance of a nauseous odour and disagreeable taste, heavier than water; gallic and acetic acids, uncrystallizable sugar, starch, tannin, and a variety of gelatine insoluble in water and alcohol. He also found in it, subcarbonate, sulphate and hydrochlorate of potassa, carbonate and phosphate of lime, alumine, silex and oxide of iron. Since that time it has been further analyzed and found to contain principally out of 7000 parts of roots and stems, starch 760, gallic acid 30, tannin 50 parts. If a quantity of the stems or roots of the fern are grated down and diffused in water, and then placed upon a thin cloth filter and washed well with water, the fluid passing through the filter, will contain the whole of the available starch of the plant. If this solution is permitted to stand undisturbed for some time, the starch will be precipitated to the bottom of the containing vessel; when washed and well dried, this forms pure starch.

If a small portion of the starch is mixed in water in a test glass, and a solution of iodine poured into it, a fine blue color, the characteristic test of starch, will be produced.

The addition of a solution of the persulphate of iron, to the liquid poured from the starch, produces a black color, indicating the presence of gallic acid in the liquid, forming gall of iron. Crystals of gallic acid may also be produced by evaporating the waste liquid to a third or fourth of its original quantity, and allowing it to stand for two or three weeks.

Arab Women and Arab Workmen.

When I first employed the Arabs, (says Layard, in his "Nineveh and its Remains,") the women were sorely ill-treated and subjected to great hardships. I endeavored to introduce some reform in their domestic arrangements, and punished severely those who inflicted corporal punishment on their wives. In a short time the number of domestic quarrels was greatly reduced, and the women, who were at first afraid to complain of their husbands now boldly appealed to my protection. They had however, some misgivings as to the future, which were thus expressed by a deputation: "O, Bey! we are your sacrifice. May God reward you. Have we not eaten wheat bread, and even meal and butter, since we have been under thy shadow? Is there one of us that has not a colored hankerchief for her head, bracelets and ankle rings, and a striped cloak? But what shall we do when you leave us?" These poor creatures, like all Arab women, were exposed to constant hardships. They were obliged to look after the children, to make the bread, to fetch wator, and cut wood, which they brought home from afar on their heads. Moreover, they were intrusted with all the domestic duties, wove their wool and goat's hair into clothes, carpets, and tent canvass; and were left to strike and raise tents, and to load and unload the beasts of burden, when they change their camping ground. If their husbands possessed sheep or cows, they had to drive them to the pastures, and to milk them at night. When moving, they carried their children at their backs during the march, and were even troubled with this burden when employed in their domestic occupations, if the children were too young to be left alone. The men sat indolently by, smoking their pipes, or listening to a trifling story from some stray Arab of the desert who was always there to collect a group around him. At first, the women, whose husbands encamped on the mound, brought water from the river; but I released them from this labor, by employing horses and donkeys in the work. The weight of a large sheep or goat's skin filled with water is not inconsiderable. This is hung on the back by cords strapped over the shoulders, and upon it, in addition, was frequently seated the child, who could not be left in the tent, or was unable to follow its mother on foot. The bundles of firewood brought from a considerable distance were enormous, completely concealed the head and shoulders of those who tottered beneath them. And yet the women worked cheerfully, and it was seldom that their husbands had to complain of their idleness. Some were more active than others. There was a young girl named Hadla who particularly distinguished herself, and was consequently sought in marriage by all the men. Her features were handsome, and her form erect and exceedingly graceful. She carried the largest burdens, was never unemployed, and was accustomed, when she had finished the work imposed upon her by her mother, to assist her neighbors in completing theirs.

Form and Density of the Globe.

Mathematical calculation and actual admeasurement both give us this testimony that it is not a perfect sphere, but flattened at the Poles, so as to constitute an oblate spheroid.—The history of the sciences, says Humboldt, presents us with no problem second in importance to that which seeks to discover the figure of the earth. The results of the different plans employed, differ to some extent, but the circumference measured round the poles is usually stated as one-299th less than that measured round the equator, in other words the earth bulges at the equator to something like 4½ times the height of Mount Blanc. If this globe were a mass of water, the figure impressed upon it by rotation round an axis would be a regular oblate spheroid, but though the original fluidity of our planet is shown by its oblate figure, (oblateness resulting from the operation of a centrifugal force on a rotating mass,) yet the true shape stands in the same relation to a regular figure as the uneven surface of ruffled stands to the even surface of unruffled water. Our earth has not only been measured, it has been weighed also. The latest researches give its mean density 5.44, that is, the earth is very nearly 5½ times denser than pure water. Now, as the mean density of the mineral matter constituting the crust is only 2.7; and the mean density of that crust and the ocean, is no more than 1.6, we see at once how vastly the density of the interior must be increased by pressure or some other cause. We have penetrated no further than 2000 feet below the sea's level, or one 9800th of the distance between the surface and the centre. No doubt our knowledge of the contents of the earth extends to a much greater depth, for some of the chrystaline matters thrown up by volcanoes come from a depth many times greater than that which man has reached; and by the contortions of strata we are made acquainted with substances which, if no throes had disturbed their repose, would have been lying at least 12,000 feet beneath our feet. There is a regularly progressive increase of temperature with an increase of depth, and the discharge of molten minerals through gaps in the surface, declare plainly that there is an enormous heat kept alive below. The warmth of the sun is communicated at a slow rate, and to a short depth only to the earth, and there are points where the temperature is always the same. Between the parallels of 48° and 52°, on the continent of Europe the stratum of invariable temperature occurs at from 55 to 60 feet deep, whilst in tropical climates it is found at no more than a foot below the surface.

The Habit of Reading.

The young should always cultivate a habit of reading, for it may be to them, not only the means of information, but the perennial source of many of the finest enjoyments of life. They who make good books their constant companions, will never want good and faithful friends in their prosperous days, or those who will sympathise in the seasons of reverse. There can be no blank in the lives of those persons, who, from active love, hold daily fellowship with the wisest and best of their race. We think we could hardly be tempted to exchange our habit of reading for any other friend it may be our fortune to find on earth. And we are sure that any who will make this habit a friend, will ever esteem it among the wisest steps of their lives and so we counsel the young, from our own experience, among all their gettings in this world, to getting the habit, the love of reading—and always to have at hand a good book with which to fill up every leisure hour. In this way they may come to know that the gems of life are found in its waste places.