

MORE VIOLENT AS YEARS PASS

THE CHARACTERISTICS OF VOLCANIC ERUPTIONS.

Earthquakes Caused by Weight Shifting and Disturbing Equilibrium—Cooling the Cause of Eruption.

One of the results of the recent California earthquake, a result which will doubtless be further stimulated by the present seismic disturbances in Chili, has been to revive scientific interest in the problem of the physical state of the interior of the earth. Although man has been living on this globe for many thousands of years, yet the actual composition of the earth and the state of its interior is still a mystery. We know a great deal more about the sun and moon and our brother planet than we do of conditions miles away, than we do of conditions a hundred miles beneath our feet.

The earth, while an insignificant member of the universe, is really an enormous body as compared to man, else we could dig up a sample of the interior of our globe and find out exactly what it is like. We have bored some pretty deep holes in the earth, one artesian well being a mile and a quarter in depth, but it does not begin to penetrate into the interior of the earth, our planet is nearly 8,000 miles in diameter. A comparison may help us to appreciate the enormous mass of the earth and what a short distance we have actually penetrated into its depths. If we should take a large apple to represent the earth, then the skin of the apple would correspond to a crust fully fifteen miles thick. The next time you eat an apple, peel off a piece of the skin, not a microbe so infinitesimally thin that even little thicker than the paper on which these words are printed, then contemplate your insignificance. Imagine yourself as a microbe so infinitesimally tiny that even with the aid of the chinery you cannot pick one-twelfth of the distance through the skin of the apple on which you live. You will then appreciate the fruitfulness of trying to tell by introspection what the interior of our great apple is composed of.

LOOK UP TO STUDY EARTH.
It may seem strange, but it is nevertheless true, that we have learned more about the state of the earth's interior from examining its behavior with respect to the sun and the moon than from any actual samples of its interior. Samples from the depths of the earth are ejected every once and a while by volcanoes, but these have given us very erroneous ideas of the make-up of our planet. We used to be taught in school that the earth is a molten mass surrounded by a thin crust of solid matter. This was a natural inference, based on the lava thrown out from the volcano. Furthermore, it has long been known that the earth grows hotter the further we penetrate into the interior. For every 50 feet of depth there is a rise in temperature of one degree Fahrenheit, so that at 100 miles below the surface we would reach a heat sufficient to melt and vaporize all known elements. But astronomers tell us that, notwithstanding this evidence the earth cannot be fluid inside, for if it were the moon and sun would raise great tides in the molten sea, tides so powerful that were the crust of the earth 100 miles thick and of solid steel it would bend under the enormous pressure and rise and fall just as do the tides of the ocean. One of the very best proofs that the earth does not bend in this way is the fact that the ocean does have tides, because if the floor of the ocean were bulged up just as much as is the surface, the depth of water would

always remain the same, and there would be no visible tide. Undoubtedly the earth is distorted a trifle under the attraction of the moon, but just how much it is rather difficult to discover.

MORE RIGID THAN GLASS.

Fully forty years ago Lord Kelvin studied this question and came to the conclusion that the earth must be more rigid than glass. Later Sir George Darwin extended the investigation and showed that the earth must be more rigid than steel. Just now Professor T. J. J. See, of the United States Naval Observatory, has published his recent exhaustive investigations, by which he arrived at the conclusion that this earth, as a whole, must be as rigid as nickel-steel, the metal used for the armor of battleships, and which is one of the hardest materials we know. He has demonstrated that near the surface the earth is about as rigid as granite, which is one-sixth of that of steel, while at the center the earth is fully three times as rigid as nickel-steel. This does not mean that the interior of the earth is not hot, nor even that the materials in it will not flow. A glass marble seems like a very rigid body. We may examine it most carefully with a microscope, and yet discover no flattening due to its weight. It will hold its shape perfectly. But, to use an illustration of Professor See's, if this marble were twenty miles in diameter its weight would be so great that it would flow out at the bottom like pitch. Ice is also a very rigid substance, yet in glaciers, where it is subjected to great weights, it flows down a curved channel just as would a river of water.

Now the heat in the interior of the earth is supposedly caused by the gradual contraction of the earth the contraction being due to the weight of the materials which have been and still are falling slowly toward the center of the earth. But the contraction imposes such a pressure on the matter in the interior that it acts just like a solid. When water is heated to a temperature of 212 degrees Fahrenheit it becomes steam. But if the water is under pressure it must be heated to a much higher temperature before it will turn to steam. Furthermore, if the water be sealed in a heavy steel vessel it can be heated to an extreme heat known as the "critical temperature," at which it will turn to a gas regardless of further pressure.

HEAT OF EARTH'S INTERIOR.
Apparently the heat in the interior of the earth is so great that were there no moisture there it would show itself in a red or white hot steam, which, however, would be so dense as to have many of the properties of a liquid or even solid. In the same way metals and rocks are probably heated far about their melting point, but owing to the pressure are kept in the solid state, or if fluid are so dense as to act like solids. Very probably there are cavities in the interior of the earth where the pressure is not quite so great, and these are filled with a more fluid material.

Whether the earth is still slowly contracting is a question. Some people point to earthquakes and volcanoes as evidences

Does fit
Doesn't
shrink

Pen-Angle Underwear has the soft warm feel the skin enjoys. Doesn't it? Made for men, women and little folks, in a variety of styles, fabrics and prices.

We authorize every dealer in Pen-Angle Underwear to replace, at our cost, any garment faulty in material or making.

Heart, Throat, Liver and Skin

DR. AGNEW'S FOUR FAMOUS SPECIFICS CURE COMPLETELY THE WORST DISEASES OF THESE PARTS—DREADFUL HEART DISEASE RELIEVED IN THIRTY MINUTES.

Heart disease will affect people differently, but in all cases it must be viewed with great alarm. Dr. Agnew's Cure for the Heart is the only remedy that can be safely depended upon in times of trouble. It will give relief in thirty minutes.

Mr. Thomas Petty, of Aylmer, Que., was troubled with severe heart complaint for five years, the pain, at times, being so severe that he could not attend to business. Every other remedy failed until he tried Dr. Agnew's Cure for the Heart, which gave immediate relief, and his words are these: "I have now taken four bottles of the remedy and am entirely free from every symptom of heart disease."

A cold in the head need not be trifled with, for it is catarrh in an incipient condition, and catarrh is not to be trifled with. Dr. Agnew's Catarrhal Powder, as scores of clergymen, members of parliament, and prominent citizens in the Dominion have borne testimony, drives away a cold in the head like magic, and where this has assumed the shape of aggravated catarrh, producing deafness and throat trouble, it effects a permanent cure.

It is not always safe to take pills for liver trouble. They not infrequently create other troubles that are serious. Dr. Agnew's Liver Pills, whilst thoroughly certain of removing all liver trouble, give no difficulty either at the time or afterwards. They are pleasant to take and cost only 10 cents.

The faculty that Dr. Agnew has displayed in getting at the seat of trouble is manifest in his Ointment, as in the other three remedies. This contains the elements that give speedy and permanent relief in all skin diseases and is peculiarly effective in curing piles. 35 cents.

SOLD BY C. McALLUM AND CAL LARD & McLACHLAN.

RRR
Was recommended to me by one of Toronto's Judges as a valuable household remedy. This writes a prominent citizen of that place.

Radway's Ready Relief
For External and Internal Use

CURES

Sore Muscles	Toothache	Nervous	Sore Throat
Spasms	Strains	Headache	Coughs
Brucis	Backache	Grip	Measles
Good for	Pain in the Chest	Lumbago	Nervous
Athletes	Pain in the Kidneys	Sciatica	Rheumatism

For over FIFTY YEARS this wonderful Remedy has proved itself the best, safest and surest antidote for pain in the world. In every family this invaluable Specific Remedy for all inflammatory diseases should be constantly kept on hand. The expense is a mere trifle, and saves more than twenty times the amount in doctors' ordinary bills.

Dear Sir: R. R. has had a place in our home for the past twenty years and would not be without it for five times its cost. Yours very truly,
R. R. O'FLYNN, Toronto, Ont.

RADWAY & CO., Ltd., Montreal, Canada.

of contraction. It has been shown that if the earth should contract only one twenty-fifth of an inch in diameter it would account for five hundred volcanic eruptions, each throwing out 13,000,000,000 cubic yards of material. It is now, however, the generally accepted theory that volcanoes and earthquakes are caused by local disturbances. The materials composing the earth are held in a state of constant equilibrium. By action of the sea vast deposits of rock or sand are gradually piled up in certain localities, while from other regions large quantities of materials are washed away. This destroys the equilibrium, and in regaining the proper balance an earthquake or a volcanic eruption takes place. Volcanoes and earthquakes are supposed to be kindred phenomena, and they usually occur along the coast, seldom inland.

The heat of volcanoes is claimed to be merely the heat stored up in past ages, the compression of the earth when it was cooling, and which has not been able to escape, except very slowly, through the surface layer of earth and rock.

THE HEAT OF VOLCANOES

The latest theory to account for the heat of volcanoes is that of Dr. Elihu Thomson. In his opinion the heat is generated by friction. When water flows through a pipe a small amount of heat is produced due to its friction against the walls of the pipe. If the water is forced through the pipe at a high pressure this is proportionately increased, and if the pipe is surrounded by asbestos to prevent it from radiating off the heat, the water

will emerge quite warm. By putting the heat through the pipe and forcing the water through, it may be made to actually boil. Now, it is Dr. Thomson's idea that hot springs are thus produced by the friction of the water forced through a long, tortuous channel, and not by the heat stored in the interior of the earth. In the case of a volcano a readjustment of the earth's crust may press up the solid matter of the interior until it finds a vent, when, by its rapid escape through the crater, it will develop sufficient heat to be immediately liquefied and turned to lava, or, if the channel is very long and tortuous the lava may be completely consumed and burned to ashes before being ejected from the crater.

One of the alarming features of Dr. Thomson's theory is that the colder or more rigid this earth grows the more violent will the volcanic eruptions be, come, though, of course, they will be less frequent. In proof of this he points to the volcanoes of the moon. The moon is now a dead world, but the marks of volcanic action are still in evidence. Some of the volcanoes were, no doubt, far worse than any we have ever witnessed. The big writing table like the papers and documents of the day only, which are carried off as soon as they have been attended to. The rule is that nothing should remain more than twenty-four hours on that table, and there is no waste paper basket.

His favorite room is his library, or libraries, of which he has four. The first imperial library was founded by Sultan Ahmed III. One of them is devoted exclusively to works on Turkey and the Ottoman dominions, in all languages. It contains a strange collection of manuscripts of books which have never been published, that were brought up in order to prevent their circulation. Another section is composed of works in Turkish, Arabic, and Persian, and these are kept in the best order, as the librarians can read the titles and catalogue them regularly, which they are incapable of doing with foreign productions.

AN EARLY RISER.

The Sultan's day begins early. In summer at five and in winter at six he rises, and if the weather is fine goes immediately into the park. This is extensive and laid out in alleys and little forests, with several artificial lakes, the largest of which has an island in the middle. On this big pond his majesty generally embarks in a caïque, or boat, which he rows himself or in either a small steam or electric launch, and repairs to the island to visit his pets. These are of all sorts—stags, roe deer, gazelles, and goats and sheep and birds of every land. They are all tame and are said to be very fond of their royal master.

At 10 o'clock the Sultan returns to his room and takes a frugal breakfast. He is served by the head butler, Osman Effendi, who tastes each dish before handing it to his master, and nobody else is present, unless it be, rarely, some of the children. After breakfast an hour as so is spent in the library, where the illustrated books are most used. Altogether there are some 10,000 volumes. At 1 o'clock punctually his majesty retires to his bedroom for a siesta while one of the eunuchs or a picked man of the Albanian Guard stands outside the door.

GUARDED AGAINST ATTACKS.
This is really the best rest he gets, as he often works late into the night, and then goes tired to bed. The siesta lasts an hour and a half, when he is softly waked, and at 2:30 repairs to the study for the labors of state. Here he works uninterruptedly, often till past midnight, with the exception of the time taken for a hasty, refreshing about sunset. All documents brought to him are first thrown into a disinfecting box, and then given to him by the first secretary, Tahsen Bey.

On Friday this programme is interrupted by the Salamlk, and after audiences to foreign diplomats in the afternoon, which generally take place in one or other of the garden kiosks. Nobody knows beforehand in which room the Sultan means to sleep, and he often only chooses himself at the last moment. It is always on the ground floor, however, and the door is always watched by some especially trusted eunuch, or Albanian, armed to the teeth.

On Wednesdays, Fridays and Sundays there is generally a theatrical representation in the court theater, though Sunday is not a regular day. The theater adjoins the dwelling rooms of the palace and communicates direct with the Sultan's apartments. The stage is roomy and well machined, but there are only three or four boxes for the spectators, the place generally filled by the pit and stalls being merely covered with a fine carpet. The royal box is so arranged that the actors shall never turn their backs to it, and for the same reason the orchestra is placed beneath it.

On either side of the Sultan's box is one for the harem and one for visitors, the former, of course, being shut off by a grille and netting. — London Standard.

WARSHIP THAT VANISHED.

Despatches received at Queenstown yesterday from British Columbia contain particulars of the finding of a lifebuoy at Heriot Bay, belonging to H. M. sloop Condor, which was lost, with her crew of 140 officers and men, while on a voyage from Esquimalt Harbor to Honolulu, in December, 1901, and of whose fate no definite intelligence was ever received.

The finding of the lifebuoy after a period of five years revives the sad story of the lost sloop, which sailed on her initial commission from Esquimalt for Honolulu on Dec. 3, 1901.

Th Condor was subsequently signaled passing Cape Flattery, and on the same day the steamer Mattewan also passed the cape, but neither ship was ever seen again, and the supposition at the time was that they foundered in one of the violent storms that swept the Pacific coast a few days later.

Wreckage was picked up near Vancouver Island, but it was never ascertained definitely whether it belonged to the Condor. The lifebuoy found in Heriot Bay, which was discovered by some miners, has been identified as beyond doubt belonging to the ill-fated vessel. — London Chronicle.

THE MEXICAN GOVERNMENT CHARGES ON TRANSFERS OF LAND DEEDS AMOUNT TO FROM \$40 TO \$45 MEXICAN ON \$1,000 VALUE.

According to the laws of the country it is necessary for foreigners to have their nationality mentioned in the title, otherwise they become Mexicans.

PILES CURED IN 6 TO 14 DAYS.

PAZO OINTMENT is guaranteed to cure any case of Piles, Blind, Bleeding or Protruding Piles in 6 to 14 days, or money refunded. 60c.

Send to Wells & Richardson Co., Limited, 200 Mountain street, Montreal P. Q., for valuable Dye Book and Card of Dyed Samples; free to any address.

77-u-y-2

Let thy faith be fixed in the wonderful transforming powers of DIAMOND DYES; the results they give will cheer thine heart.

Never allow any interested or wily dealer to ruin thy dye by the use of inferior imitation make of dye. If thou wilt harken to his words, he will rejoice at thy simplicity of character and will delight himself over thy wrath and bitter disappointment.

If thou wouldst avoid handling poisonous ingredients, use only the DIAMOND DYES for thy household dyeing work; they are the only harmless and pure dyes.

When times are hard and money scarce, thine heart often craves for new and stylish colors and garments. By the use of the magic DIAMOND DYES thy wardrobe is fully realized, because DIAMOND DYES recreate old dresses and make them to look like new.

If thou wouldst have a smiling face, a happy heart and an easy mind, do thy coloring at all seasons of the year with the DIAMOND DYES; they never cause worry or grief to those who make use of them.

Send to Wells & Richardson Co., Limited, 200 Mountain street, Montreal P. Q., for valuable Dye Book and Card of Dyed Samples; free to any address.

77-u-y-2

THE DAILY LIFE OF THE SULTAN

ABDUL HAMID RISES EARLY, AND GENERALLY WORKS LATE.

Is Always Carefully Guarded By Trusted Servants or Guards.

The Palace of Yildiz stands on the top of a hill and is surrounded by a thick wall. It is almost a misnomer to call it a palace, as "Yildiz" comprises a number of very modest looking whitewashed villas and kiosks, any one of which is more like a private residence than the home of a sovereign. The study in which Abdul Hamid passes a third of his life is furnished with a simplicity amounting almost to poverty. On the big writing table lie the papers and documents of the day only, which are carried off as soon as they have been attended to. The rule is that nothing should remain more than twenty-four hours on that table, and there is no waste paper basket.

His favorite room is his library, or libraries, of which he has four. The first imperial library was founded by Sultan Ahmed III. One of them is devoted exclusively to works on Turkey and the Ottoman dominions, in all languages. It contains a strange collection of manuscripts of books which have never been published, that were brought up in order to prevent their circulation. Another section is composed of works in Turkish, Arabic, and Persian, and these are kept in the best order, as the librarians can read the titles and catalogue them regularly, which they are incapable of doing with foreign productions.

AN EARLY RISER.

The Sultan's day begins early. In summer at five and in winter at six he rises, and if the weather is fine goes immediately into the park. This is extensive and laid out in alleys and little forests, with several artificial lakes, the largest of which has an island in the middle. On this big pond his majesty generally embarks in a caïque, or boat, which he rows himself or in either a small steam or electric launch, and repairs to the island to visit his pets. These are of all sorts—stags, roe deer, gazelles, and goats and sheep and birds of every land. They are all tame and are said to be very fond of their royal master.

At 10 o'clock the Sultan returns to his room and takes a frugal breakfast. He is served by the head butler, Osman Effendi, who tastes each dish before handing it to his master, and nobody else is present, unless it be, rarely, some of the children. After breakfast an hour as so is spent in the library, where the illustrated books are most used. Altogether there are some 10,000 volumes. At 1 o'clock punctually his majesty retires to his bedroom for a siesta while one of the eunuchs or a picked man of the Albanian Guard stands outside the door.

GUARDED AGAINST ATTACKS.
This is really the best rest he gets, as he often works late into the night, and then goes tired to bed. The siesta lasts an hour and a half, when he is softly waked, and at 2:30 repairs to the study for the labors of state. Here he works uninterruptedly, often till past midnight, with the exception of the time taken for a hasty, refreshing about sunset. All documents brought to him are first thrown into a disinfecting box, and then given to him by the first secretary, Tahsen Bey.

On Friday this programme is interrupted by the Salamlk, and after audiences to foreign diplomats in the afternoon, which generally take place in one or other of the garden kiosks. Nobody knows beforehand in which room the Sultan means to sleep, and he often only chooses himself at the last moment. It is always on the ground floor, however, and the door is always watched by some especially trusted eunuch, or Albanian, armed to the teeth.

On Wednesdays, Fridays and Sundays there is generally a theatrical representation in the court theater, though Sunday is not a regular day. The theater adjoins the dwelling rooms of the palace and communicates direct with the Sultan's apartments. The stage is roomy and well machined, but there are only three or four boxes for the spectators, the place generally filled by the pit and stalls being merely covered with a fine carpet. The royal box is so arranged that the actors shall never turn their backs to it, and for the same reason the orchestra is placed beneath it.

On either side of the Sultan's box is one for the harem and one for visitors, the former, of course, being shut off by a grille and netting. — London Standard.

WARSHIP THAT VANISHED.

Despatches received at Queenstown yesterday from British Columbia contain particulars of the finding of a lifebuoy at Heriot Bay, belonging to H. M. sloop Condor, which was lost, with her crew of 140 officers and men, while on a voyage from Esquimalt Harbor to Honolulu, in December, 1901, and of whose fate no definite intelligence was ever received.

The finding of the lifebuoy after a period of five years revives the sad story of the lost sloop, which sailed on her initial commission from Esquimalt for Honolulu on Dec. 3, 1901.

Th Condor was subsequently signaled passing Cape Flattery, and on the same day the steamer Mattewan also passed the cape, but neither ship was ever seen again, and the supposition at the time was that they foundered in one of the violent storms that swept the Pacific coast a few days later.

Wreckage was picked up near Vancouver Island, but it was never ascertained definitely whether it belonged to the Condor. The lifebuoy found in Heriot Bay, which was discovered by some miners, has been identified as beyond doubt belonging to the ill-fated vessel. — London Chronicle.

THE MEXICAN GOVERNMENT CHARGES ON TRANSFERS OF LAND DEEDS AMOUNT TO FROM \$40 TO \$45 MEXICAN ON \$1,000 VALUE.

According to the laws of the country it is necessary for foreigners to have their nationality mentioned in the title, otherwise they become Mexicans.

PILES CURED IN 6 TO 14 DAYS.

PAZO OINTMENT is guaranteed to cure any case of Piles, Blind, Bleeding or Protruding Piles in 6 to 14 days, or money refunded. 60c.

Send to Wells & Richardson Co., Limited, 200 Mountain street, Montreal P. Q., for valuable Dye Book and Card of Dyed Samples; free to any address.

77-u-y-2

Let thy faith be fixed in the wonderful transforming powers of DIAMOND DYES; the results they give will cheer thine heart.

Never allow any interested or wily dealer to ruin thy dye by the use of inferior imitation make of dye. If thou wilt harken to his words, he will rejoice at thy simplicity of character and will delight himself over thy wrath and bitter disappointment.

If thou wouldst avoid handling poisonous ingredients, use only the DIAMOND DYES for thy household dyeing work; they are the only harmless and pure dyes.

When times are hard and money scarce, thine heart often craves for new and stylish colors and garments. By the use of the magic DIAMOND DYES thy wardrobe is fully realized, because DIAMOND DYES recreate old dresses and make them to look like new.

If thou wouldst have a smiling face, a happy heart and an easy mind, do thy coloring at all seasons of the year with the DIAMOND DYES; they never cause worry or grief to those who make use of them.

Send to Wells & Richardson Co., Limited, 200 Mountain street, Montreal P. Q., for valuable Dye Book and Card of Dyed Samples; free to any address.

77-u-y-2

CASTORIA

The Kind You Have Always Bought, and which has been in use for over 30 years, has borne the signature of and has been made under his personal supervision since its infancy. Allow no one to deceive you in this. All Counterfeits, Imitations and "Just-as-good" are but Experiments that trifle with and endanger the health of Infants and Children—Experience against Experiment.

What is CASTORIA

Castoria is a harmless substitute for Castor Oil, Paregoric, Drops and Soothing Syrups. It is Pleasant. It contains neither Opium, Morphine nor other Narcotic substance. Its age is its guarantee. It destroys Worms and allays Feverishness. It cures Diarrhoea and Wind Colic. It relieves Teething Troubles, cures Constipation and Flatulency. It assimilates the Food, regulates the Stomach and Bowels, giving healthy and natural sleep. The Children's Panacea—The Mother's Friend.

GENUINE CASTORIA ALWAYS

Bears the Signature of

Chas. H. Fletcher

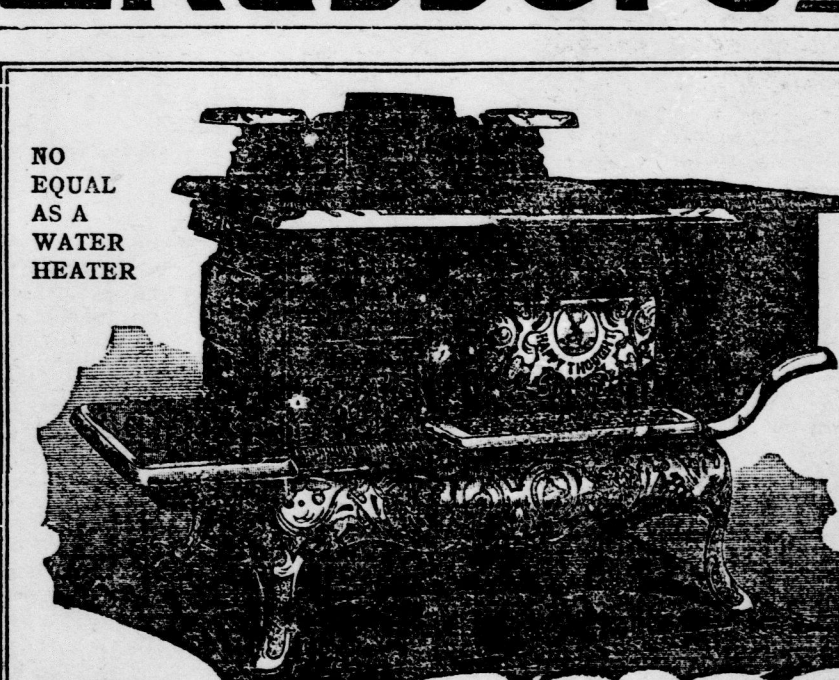
The Kind You Have Always Bought

In Use For Over 30 Years.

THE CENTAUR COMPANY, 17 MURRAY STREET, NEW YORK CITY.



Maple Leaf Rubbers



HEATS THE WATER AND KEEPS IT HOT

It's wonderful how long water stays hot in the heat-retaining reservoir of the Happy Thought Range. No luxury equals having hot water when you want it. Whether you live in the city with its water system, or in the country where you depend upon wells and pumps, the fact remains—for a reliable hot-water heater get a

HAPPY THOUGHT RANGE

New homebuilders will find this stove is the only one which works satisfactorily for the all-round purposes of cooking, heating and keeping water hot. You ought to see and read the illustrated catalogue of Happy Thoughts, sent free on application.

The WM. BUCK STOVE CO., Limited
Brantford Montreal Winnipeg
—For Sale by—
SUTHERLAND BROS
384 RICHMOND STREET.

We Make Brass, Bronze or Aluminum Castings Quick. Send your patterns

THE CANADA METAL CO., WILLIAM STREET, TORONTO