

New and Interesting Facts from Science and Life

Putting WAVES to WORK

JUST to show that there is a way to harness the industrial ocean waves and breakers, two California inventors have worked out what seems to be a start in the right direction. Two distinct types of wave motors, which have been installed at Long Beach, Cal., are intended to develop considerable power and to show that it is possible to develop electrical energy more cheaply than by burning coal or by other means.

The unique feature of the new machine shown in the illustration is described by Charles W. Geiger in the Electrical Experiment, as a compound uni-directional or free-draw and release clutch. This clutch is an achievement in rotating a power shaft in such a manner as to free the same from all dead centre action, as well as creating rolling energy with the condition of no given stroke. So perfect is the action of the clutch employed, it is said, that any vibrational action is immediately transformed into a continuous rotary impulse. The machinery employed utilizes for its driving energy the reciprocating action of the ground swell occurring in ocean water. This action being caused by volumetric displacement as the wave moves forward setting up compound actions in opposite, a feature that no other motor possesses.

Substantially the machine consists of a multiple number of large bull-wheels each actuated by an

impulse paddle, well covered by water at low tide. These wheels, by the merit of the novel clutch used, have an absolute freedom and independence one from the other, even though they play on a common power shaft. In this manner any vibrating tendency of the swell is immediately disposed of as driving energy on power generating units. The machine now being installed will, when fully completed, present an ultimate capacity of some three to four thousand horsepower.

This machine, aside from presenting the required feature of being a continuous power producer operating irrespective of surface action, also possesses the merit of being a storm resistant machine, being the only one of its kind having no resistance to start, and at no time experiencing back pressure effects. The device was thoroughly tested and proven by the operation of a demonstrating plant which experienced the action of two of the heaviest storms that have occurred on the Pacific coast for a period of 25 years, without the slightest damage.

With its wave power equipment the company anticipates the production of electric energy on a wholesale basis, at about 90 per cent. of the cost of production by steam, and 75 per cent. of the cost of production by present-day hydro-electric methods. According to the best of authority it



Perspective View of New Hydraulic Transmission and Regulation Type of Wave Motor.

will be possible even under the present stressed condition of the steel market to install these plants at the surprising figure of \$30 per horsepower.

In actuating the power shaft, oscillating bull-wheels are connected by heavy three-quarter-inch plough-steel cables, which engage the impulse wheels actuating the clutch units by multiple series of turns on the same. By direct connection on side and reverse connection on the opposite side, the continual rotation of the power shaft is readily maintained. The bull-wheels employed in driving the power shaft are of six-sector bridged are type, 24 feet in diameter, built to resist fractious stress on two one-inch steel cables. These wheels are so disposed as six units to incorporate within the machine the action of two ground swells at any one time, taking varied action so as to afford a steadied maintenance of power at all times.

The second type of wave-motor is of the hydraulic transmission and regulation type. The paddles are actuated with any kind of a wave, and either forward or backward movements of the paddle are transmitted into energy. The paddle is connected to a pendulum shaft with a sprocket as shown. This sprocket actuates a chain that is connected with a sprocket on the shaft that drives the pumps. On the drive shaft is a crank connected with the pumps by means of a connecting rod. These pumps were designed for this special work in this special position. A chain and cog-wheel drives the crankshaft. Each movement of the paddle moves this crankshaft and by means of the connecting rod works the pumps. There are two pumps to each pendulum. There is another

crank-shaft on the end of the drive-shaft that actuates the pump. There are four pumps all together in this unit and two pendulums.

As the water is compressed by the pumps, it passes through a large pressure tank. This takes the pulsating effect of the pumps out of the water and leaves a perfectly steady stream for the water wheels. This water, under 120 pounds pressure,

runs a water turbine which in turn is connected to the electric generator.

The power thus generated is at present used for lighting purposes and for a large searchlight. The generator is also connected to storage batteries, which are charged when there is plenty of water power in preparation for the time when the ocean may be comparatively calm.

How DYES Are MADE

THE United States has declared emphatically its chemical independence of the world. No more may it be said that America cannot get along without the chemical productions of Germany or any other land. Within less than three years this independence has been demonstrated to the satisfaction, not only of Americans, but also to the civilized world, to which the products of American laboratories are being shipped by the ton.

A noted German chemist once said: "America is the natural home of the coal tar industry." It remained for the war to bring the United States into its own. Up to that time coal tar was shipped

which was the by-product of American coke ovens and gas works.

In the early days of 1915, when the stringency in dyestuffs was first making itself felt, there was only seven concerns trying to make dyes, after a fashion. Today there are 117 concerns manufacturing dyes of all kinds, capitalised at something more than two hundred million dollars. It is estimated that there are 18,000 chemists working both within and outside American factories to perfect all of the processes by which dyes and a thousand other products may be extracted for the benefit of the country and for the prosecution of the war to a successful issue.

When the story of American development during the war is written one of its most notable chapters will necessarily deal with the amazing development of chemical industries, and especially in the department of dyes.

It is freely admitted that it was impossible for America, notwithstanding the resourcefulness and skill of her many thousand chemists, to make all of the shades that have been evolved by Germany in forty years within the short space of two years. The Germans had a list of something like fifteen hundred different colors and shades, the result of endless experiments and years of experience. The years of experience.

American color-makers very wisely decided to develop the staple colors first, and they have succeeded, past all the dreams of the early months of experimentation, in solving more than three hundred of the main colors and shades. They have made the blues, greens, reds, yellows, saffrons, violets, purples, browns, etc., and concentrated upon these and their variations. As one color and its shades were perfected, they took up another color and its shades, adding constantly to the list of fast and brilliant colorings which were necessary for American industries of all kinds from paints to fabrics, from calicoes to silks.

One of the greatest difficulties with which American dye manufacturers have had to contend was the securing of enough of what are termed "intermediates." These can be made profitably only upon a very large scale, and, strangely enough, the great munition factories have in their machinery just the equipment necessary for their manufacture. The enormous munition factories of the United States which have been added to so greatly for the making of powder and other explosives will be ready for undertaking the work of manufacturing these "intermediates" the moment that they stop making explosives, and even now one company has announced that it is ready to supply many of the materials needed, and that it will embark upon the manufacture of dyestuffs upon a very extensive scale.

Prof. H. Gardner McKerrow, one of the leading experts of the country, states that the dyes manufactured by American makers are all in all respects as fast and reliable as any that were ever imported. He claims also that much of the misapprehension which exists regarding the quality of American dyes is due to insidious suggestions of foreign manufacturers who wish to retain their hold upon the American market. As an expert he states that there is no such thing as an absolutely "fast" dye. Some are fast for washing, some for sunlight, but none are universally under all conditions secure against loss of color.

CHILL STARTS COLD WAS SICK FOUR WEEKS JUST ABLE TO CRAWL ABOUT

Mr. Weldon T. Hawkes, Curryville, N. B., writes: "Last spring I was taken very ill with a severe cold. I got wet, and it started with a chill. I was sick four weeks, and was just able to crawl about. People all said I had inflammation of the lungs, and I think I did. I told a friend to get me two bottles of Dr. Wood's Norway Pine Syrup, and before the first one was taken my cold and cough were broken up, and the second did the work completely. I am raising a family and I find that it is a good medicine for the children." There is no remedy that will cure stubborn colds or coughs, the kind that won't let go, like Dr. Wood's Norway Pine Syrup.

It allays the inflammation, soothes the irritation, heals the diseased mucous lining of the lungs and bronchial tubes, and rids the system completely of all the bad effects of lingering coughs and colds.

There are so many spurious "Pine" preparations on the market that you should see you get "Dr. Wood's" when you ask for it. Put up in a yellow wrapper; three pine trees the trade mark; price 35c and 50c; manufactured only by The T. J. Millburn Co., Limited, Toronto, Ont.

Glass of Hot Water Before Breakfast a Splendid Habit

Open sluices of the system each morning and wash away the poisonous, stagnant matter.

Those of us who are accustomed to feel dull and heavy when we awake, splitting headache, stuffy from cold, foul tongue, nasty breath, acid stomach, lame back, can, instead, both look and feel as fresh as a daisy always by washing the poisons and toxins from the body with phosphated hot water each morning.

We should drink, before breakfast, a glass of real hot water with a teaspoonful of limestone phosphate in it to flush from the stomach, liver, kidneys and ten yards of bowels the previous day's indigestible waste, sour bile and poisonous toxins; thus cleansing, sweetening and purifying the entire alimentary tract before putting more food into the stomach.

The action of limestone phosphate and hot water on an empty stomach is wonderfully invigorating. It cleanses out all the sour fermentations, gases, waste and acidity, and gives one a splendid appetite for breakfast, and it is said to be but a little while until the roses begin to appear in the cheeks. A quarter pound of limestone phosphate will cost very little at the drug store, but is sufficient to make anyone who is bothered with biliousness, constipation, stomachic troubles, indigestion, real enthusiasm on the subject of internal sanitation. Try it and you are assured that you will look better and feel better in every way shortly.

HORLICK'S

Malted Milk for the Home

A nourishing food-drink for All Ages. Anywhere at any time. Delicious, sustaining. No cooking.

BEST FOR LIVER, BOWELS, STOMACH, HEADACHE, COLDS

They liven the liver and bowels and straighten you right up.

Don't be bilious, constipated, sick, with breath bad and stomach sour.

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SENSE of TOUCH Is FIRST SENSATION

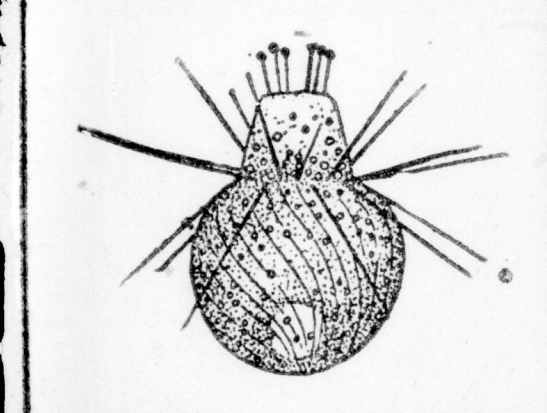
WHAT is the very first sensation in the world? Scientists have investigated this question very carefully, and with all possible safeguards as to their conclusions. They have held that if they examine the simplest type of organic life, the very beginning of animal life, that sensation which is found in the very lowest and simplest animals will certainly be the very first sensation known to any animal, high or low. They have gone, for this reason, to those animals which were actually a single cell, the protozoa, and there examining the rhizopods or the protozoa with some kind of sensing feel, have found that touch is the first and only sensation to which they respond, or from which they show reactions. Taking an amoeba, which is made up of a cell with its kernel (or heart) and protoplasm, they have found that it puts forth the little feel-like extensions upon touch, drawing the protoplasm toward the point

ing. Nothing can pass it without being felt, and this feeling is a process of education by which it develops other powers and functions in its further



Fight Between Blind Sea Creatures, Guided by "Feelers."

progress in evolution. These little animals must be able to protect themselves and the tentacles sometimes develop into real weapons of offence or defence.



Highly Magnified Primitive Sea Animal Showing "Feelers That Take the Place of Eyes."

touched, and trying in every way to push off from the touching body.

That this is the primary sensation is further proved by the fact that the very first organs developed by the lower forms of cell-animals are organs of touch, the tentacles, or very delicate little projections by which the animal veers off from opposing bodies when the sensation of touch is conveyed along these little projections into the outer world to the centre of consciousness at the centre or heart of the organism. Take, for instance, the dilates, and we find that these little tentacles surround the mouth, to give warning of anything approaching that important organ, and they have also other projecting tentacles, which extend in every direction to guide it in its progress through life.

Look at the Medusidium scabra, and see how wonderfully it is adapted to this function of feel-

STRONG Shoes for WOMEN War WORKERS

EVER since the outbreak of war the demands made by the government for boots for our soldiers have been increasing; in fact, there is hardly a boot and shoe factory in America that is not making army footwear, and in addition to Uncle Sam's demands for millions of pairs of shoes, still other millions of pairs have been supplied to the armies of his allies. As a result of the entrance of women workers into the war, styles in feminine footwear are undergoing a great change, daintiness being sacrificed for serviceability. To such a degree is this the case (England alone has over 3,000,000 wo-

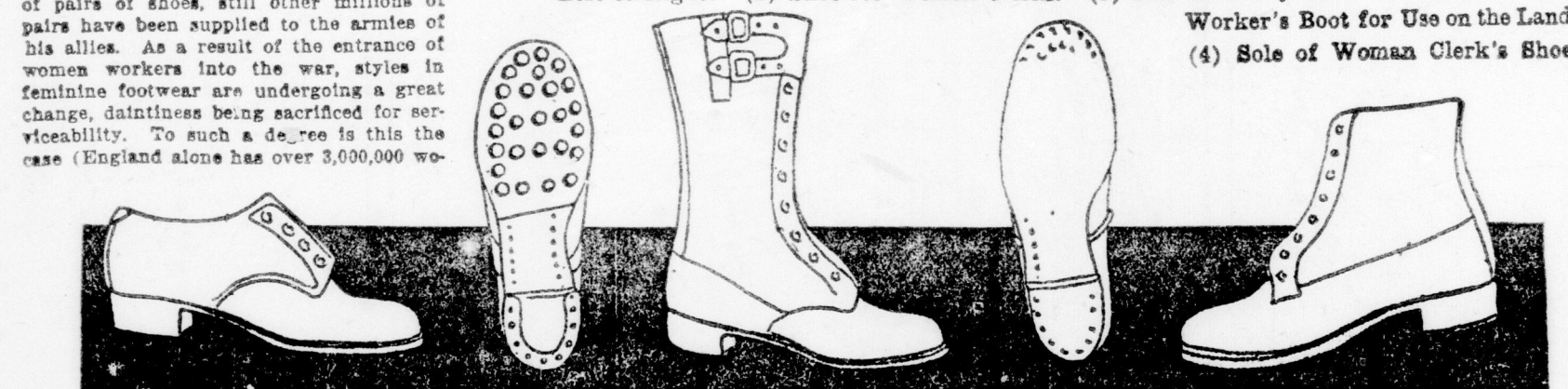
men and girls working in munition plants) that the shoe factories which are not entirely engaged on army work have had to turn their attention to government orders for heavy boots for the women workers.

Women are now everywhere eagerly filling the places left vacant by the men called to the colors, and the number of women so employed is increasing daily. Before August, 1914, there were many occupations which were regarded as being unfit for women workers, yet now there is hardly a walk in life peculiar to men in pre-

war days into which women are not entering with a zeal and energy that is a surprise to all.

In France and in England this activity is specially noticeable in agriculture. When women first engaged in work on the land they were

Left to Right: (1) Shoe for Women Clerks. (2) Sole of Heavy Boot. (3 and 4) Woman Worker's Boot for Use on the Land. (5) Sole of Woman Clerk's Shoe.



naturally unsuitably clothed and shod for such an occupation; but now most of the old hands have learned from experience what is required. But since the French and English governments have taken over the control of all heavy leathers, the correct kind of footwear for agricultural wear is almost unobtainable through the usual channels. Large orders for boots and shoes for women workers, therefore, were placed and these have been specially designed and are eminently suited for the purpose for which they are intended. To the eye unaccustomed to heavy boots

they appear very thick and stiff, but working on the land is very different from walking on paved streets.

Two different designs of boots and one kind of shoe are being made. The high-leg boot is

10½ inches high and is laced to the top. There are two buckles and straps at the top, which make it look rather like the field boot that is issued to the English artillery and cavalry. The sole in the forepart is three-eighths inch thick, the bottom is heavily nailed, and the heel has a horseshoe iron tip. All this metal on the bottom is designed to increase the wear.

The consternation with which some women would regard such boots can well be imagined, for the few years previous to the war saw a tremendous reduction in the weight of all kinds of ladies' footwear. It is an open question as to whether the reduction in weight and increased flexibility were altogether good, and many women have adopted heavier boots for ordinary wear.

A slightly lighter type of boot, lower in the leg, is also being made for the land-workers, and possibly this boot is more in demand than the high buckled boot. The leather in the upper is not quite so stout, the sole is somewhat thinner, and the nailing on the bottom is not so heavy. Both boots are made from leather of the same kind as is used in the army boots, but a little lighter in substance.

The women clerks that are employed in the army offices, and many of these have already gone to France for office work behind the lines, are fitted out by the government with a useful shoe. This shoe is nothing like as heavy as the boots and is quite simple in design. Of course, one of the most important items in the fit of these boots and shoes, and every care has been taken to see there is no fault in this respect. Naturally, heavy boots will not fit with the same glove-like closeness that women have grown accustomed to in light boots; moreover, such a fit would be quite useless for a shoe that is to be subjected to hard wear, for a certain amount of room is necessary.

How FLOUR Is Now ACTUALLY MADE from PIGSKINS

THROUGH a new method of cleanliness made possible by the invention of new packing processes desirable flour for bread can now be manufactured from the skin of hogs.

In every pork-packing plant there is a residue left from the process of trying out lard. It is a mixture of fatty tissues and bits of skin, called "cracklings" and is very similar to the residue obtained by housewives when frying out bits of grease. These cracklings from a packing plant come in rather dry form, the various bits having caked together in the process of squeezing out the grease. It is these cakes that the maker of pigskin flour grinds up. The resulting powder is very clean in appearance, and is slightly yellow in color like fine cornmeal. When mixed with a slightly larger portion of ordinary flour it is claimed that this substance makes very rich bread, without additional "shortening," and is considered decidedly palatable and nutritious.

Pigskin flour is the direct result of the inven-

tion of a device called a "hog de-hairing" machine, the function of which is to clean up a hog after the slaughter—thereby supplanting an old-fashioned process which made use of knives that scraped hogs razor-fashion. Porkers used to emerge from this latter process only reasonably smooth-shaven as to face, but exhibiting a sizable beard under their chins that the mechanical ly-welded knives hadn't been able to reach. For the same reason the under side of their legs was left unshaved.

With the newer kind of machine, however, the pigs emerge thoroughly cleaned up—so immaculate in fact that they are referred to in the pork-packing profession as "polished." This is accomplished by thoroughly scalding the hogs in the usual fashion, and then running them through a machine which is nothing more nor less than a battery of "beaters." The beaters are built up of thick canvas or rubber belting bent in the form of loops and studded with angular metal pieces which do the actual work of "polishing" a hog. These loops are attached to steel shafting which is re-

turned at a rapid rate by means of suitable chains and gearing.

How a hog about to be polished is made to run the gantlet of a whole row of these rapidly revolving shafts, armored as they are with their steel-studded loops of belting, is described by Lloyd E. Darling in Popular Science Monthly. The slaughtered animal is spanked, and batted, and massaged, and rolled over and over by the fly loops. They remove his whole outer skin or "scart" at the same time that the hair departs. Luckily he is dead or he might seriously object to such treatment. Some of the loops are set up and down and the others laterally, thus causing the hog in his moving around to be scoured from all angles so that every portion of his anatomy is reached.

The machines are built in a variety of forms, through some of which the hogs go vertically, through others horizontally. The machines work with great rapidity as compared with old knife-scraping forms. Some of them have a capacity of one thoroughly cleaned hog per second.

Newspaper Feature Service, 1918.

WHOOPIING COUGH

SPASMODIC CROUP BRONCHITIS ASTHMA COUGHS CROUPS

Vapo-Cresolene

Est. 1878

A simple, safe and effective treatment avoiding drugs. Vapo-Cresolene stops the attack of Whooping Cough and relieves Spasmodic Croup at once. It is a boon to sufferers from Asthma. The irritating vapors inhaled with every breath, makes breathing easy; soothes the sore throat and stops the cough, assuring restful sleep. It is invaluable to mothers with young children.

Send us postal card for descriptive booklet. Vapo-Cresolene Co., 1500 Miles Bldg., Albany, N. Y.