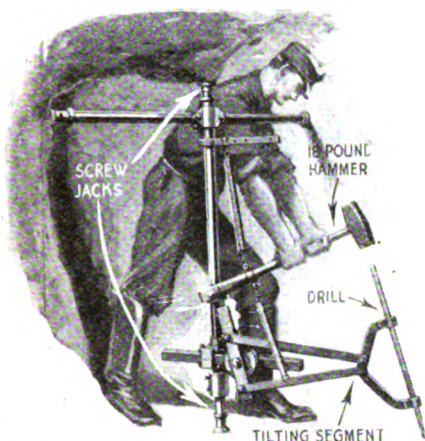


A Hand-Power Drill for Prospectors

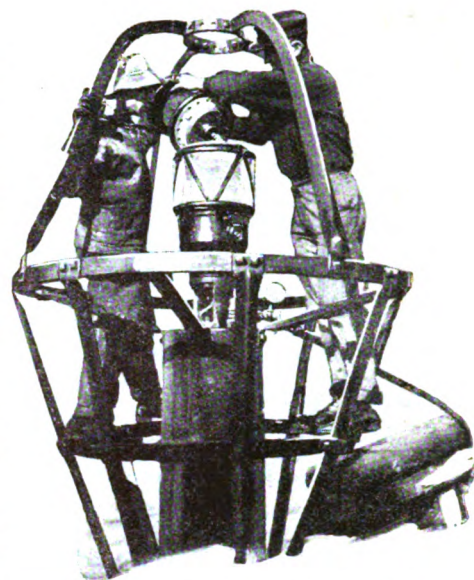


FOR over eight years John M. Calderwood sought to invent a mining-drill that would give the prospectors of the West the benefits of power drilling by a machine light enough to carry over desert country on the back of a burro and easier

and more efficient in operation than the laborious hand-drilling incident to the use of single and double jack-hammers.

The illustration shows the successful outcome of his experiments. The Calderwood drill consists of an upright column with a standard screw-jack on the top and bottom for putting the machine in position in either tunnel or shaft. Sliding on the column is a collar holding a carrier mounted on a tilting segment, which can be fastened in any position by set-screws. It will be seen that this construction permits two complete circular movements of the drilling-tool, one vertically and one horizontally; adjustments can be made to the fraction of an inch in from one to three minutes.

A hole can be drilled by one man in about half the time required by two men with the old double jack-hammers. The mechanical sledge weighs eighteen pounds, and because of the attached springs is not harder to swing than the three and a half pound single jack.



A Million Dollars Lost if This Lamp Goes Out

SAILORS rely absolutely on the fact that the ships and buoys tended by the U. S. lighthouse service will be in position with their lights burning under all conditions of weather and sea. It is rare indeed that their confidence is misplaced, and yet a buoy of the type illustrated is only supplied with fuel once a year. The crew is filling the tanks with compressed acetylene while they inspect the light mechanism which will give a ten second flash every minute for the next twelve months, and if their work is not well done it may mean the wreck of a ship worth a million dollars.

Acetylene is but one of the many fuels used for illuminating the beacons along the coast of the United States. The principal source of light is the kerosene-oil-wick type of lamp. Then comes the oil vapor lamp using vaporized kerosene oil with a mantle, and in special instances even electric arc lamps and incandescent bulbs have been adapted for use in lighthouses and lightships.

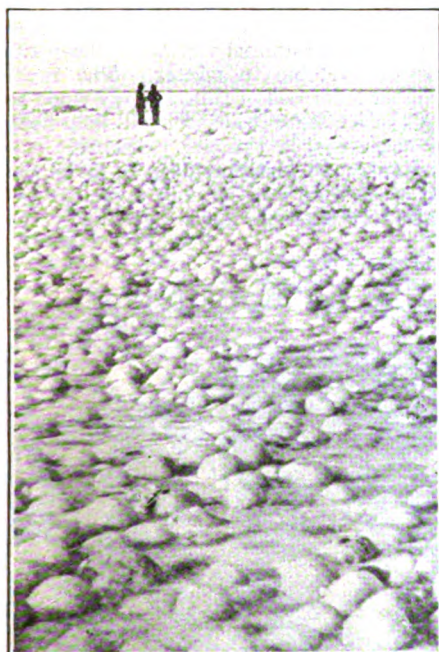
Every Pebble a Hemisphere of Ice and Life

ON the beach in winter alternate thawing and freezing may create surprising sculptures in ice. The level snow-floor, perhaps several feet above the pebbles, begins to melt and the water collects between the pebbles. This makes the snow above melt faster, and where the beach is undis-



Primitive Canoe Built of Inflated Skins

CRAFT of this type are in general use on the rivers of Peru and the interior of South America. They are built of inflated skins protected by a covering of reed mats lashed into rolls like the new balsa rafts carried by our most modern liners.



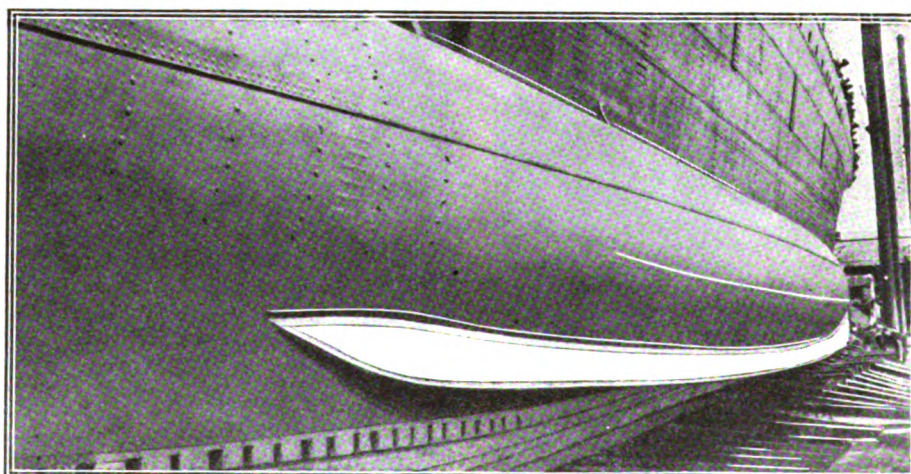
Frozen snow clinging to the pebbles gives a weird effect to this rock-strewn beach

turbed by waves, the water from the melting snow cuts away the depressions, leaving the packed snow on the pebbles in the form of hemispheres.

Curiously enough, these ice worlds are swarming with all kinds of germ life. Snow collects millions of germs in its folds, and these are present in the deposits on the pebbles.

After the snows of winter have each left their quota of bacteria in these shallow depressions along the shore, the spring sunshine brings the germs to life. Spores of plants as well as germs are deposited from the air by falling snow and rain, thus making of any beach a swarming hive of life.

Bulges on Cruiser's Sides Protect against Torpedoes



IN the British navy, where they were invented as a protection for cruisers against torpedo attacks, these bulges are known by the picturesque term of "blisters."

This particular illustration shows H.M.S. *Effingham* with one of the blister swells under her waterline. The white fin along the side of the "blister" reduces the skin resistance of the bulge and enables the ship to make better speed.

In construction these bulges are formed of a series of crosswise girders, which provide a cushioning effect in the event of a direct hit from a torpedo or the sudden shock of an aircraft bomb exploding alongside.

It is evident from published plans that the powerful Japanese battleships, *Kaga* and *Tosa*, described at length in the November Popular Science Monthly, are to be equipped with these unique protective blisters.