

PORTABLE FOUNTAIN WATER CLOSET.

The article shown in the annexed engraving is one that should form a part of the furniture of every house, and is especially valuable for invalids and the aged. It is also a great convenience for persons in health, particularly in the country, in cold and inclement weather and at night; and as a sanitary provision it will prove beneficial in several ways. It will permit of a prompt obedience to nature's laws, and thus save both health and the cost of medicines and medical attendance. It is perfectly air tight, and is consequently odorless. It is readily moved from one room to another, and if it becomes necessary to pack it for storage or for transportation, all of the parts may be placed in its lower casing.

The inventor has arranged the fountain in connection with the lower portion of the casing, so that it may be used as a shower bath, a perforated nozzle being provided for this purpose.

The device is contrived so that it may be concealed in

joint between the bowl and valve is practically air tight, and the water always left in the bowl seals the joint perfectly. All other joints in the apparatus are sealed with flexible rubber packing rings.



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In connection with the fountain an enema jet is provided, which can be used without the slightest inconvenience.

We are informed that a number of these closets have been in use in cottages at watering places and in other summer resorts, giving great satisfaction. They also attracted a great deal of attention at the late Fair of the American Institute, and were awarded a diploma.

This invention was recently patented, and is being manufactured at No. 243 Water street, by the Portable Fountain Water Closet Company, M. J. B. McQuillin, manager. The post-office address of the company is Box 2279, New York city.

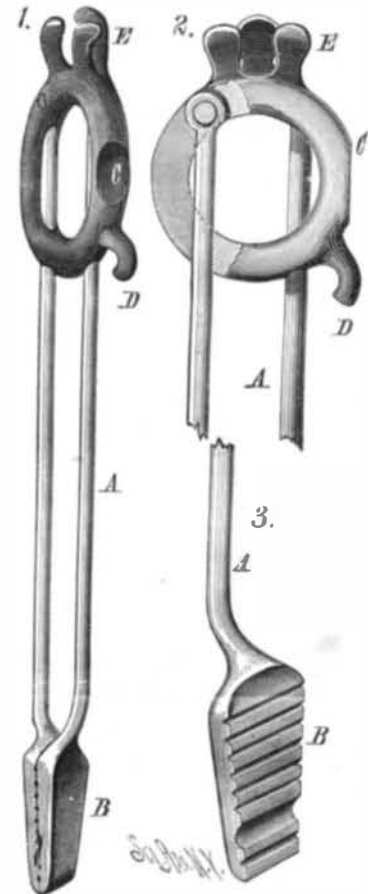
STEAMBOATS FOR SOUTH AMERICAN RIVERS.

Messrs. Yarrow & Co., Poplar, the well known builders of swift torpedo boats, have been recently building two shallow draught stern-wheel steamers, intended for the conveyance of the mails on the river Magdalena, for the Government of the United States of Colombia. These vessels are put together temporarily in the yard at Poplar, and are then taken to pieces and shipped out to their destination. Each vessel is 130 feet long, has 28 feet breadth of beam, and draws 16 inches of water when without cargo and having the steam up, but 26 inches with 90 tons of cargo aboard. The hull is built of steel varying from three-sixteenths inch to one-fourth inch in thickness. It is divided into eighteen water-tight compartments, so as to localize any damage through being penetrated by rocks or snags. All the forward part of the vessel below water is treble riveted, as an extra precaution. The boiler, which is of the locomotive type, is placed on the main deck forward, and the engines on the main deck aft, and thus easily accessible. To obtain the greatest economy of fuel the engines are made on the compound surface condensing system, and for the sake of lightness all the working parts are of steel. They are probably the first compound engines ever fitted to stern-wheel steamers. The cylinders lie one at each side of the vessel, and work direct with a connecting rod on cranks at each end of the axle of the wheel. They are expected to develop 350 to 400 horse power, and have some peculiar arrangements to adapt them for the service. The vessels have what may be termed spoon bows; the sterns retain their full breadth,

rounding up gradually from the flat bottom to above the water line, and thence upward square. There are three rudders at the stern before the wheels, the center one being a balanced rudder and the other two of ordinary form, the shaft or rudder head extending up from the center one, and the side rudders moving parallel to the middle rudder by means of a connecting link. In the bow, before the boiler, there is fitted a steam capstan for heaving or working the vessel, if necessary, past a rapid. Alongside the boiler, in connection with the fan engine, is to be fitted a circular saw for cutting up the wood fuel. A speed of between fifteen and sixteen miles an hour, at least, on a continuous run, is anticipated from these boats. This, considering the extremely light draught of water, will be a very remarkable result.

IMPROVED TONGS.

The engraving shows an improved tongs designed expressly for household use, and containing several useful implements in one. A ring, forming the head of the tongs, receives the fixed and the movable leg, and has three projections, E, at the top forming a plate lifter, a hook, D, for lifting stove covers and pots and kettles, and a flat roughened, C, forming a hammer face. The jaws of the tongs



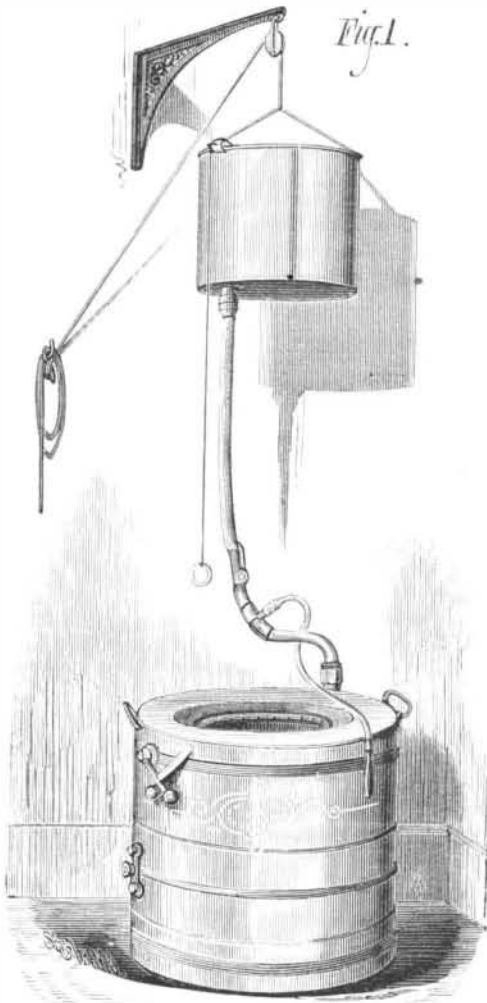
BOARDMAN'S TONGS.

are made angular and oblong in form, so that either of them may be used as a stove cover lifter.

This invention was recently patented by Mr. I. R. L. Boardman, of Snedekerville, Pa.

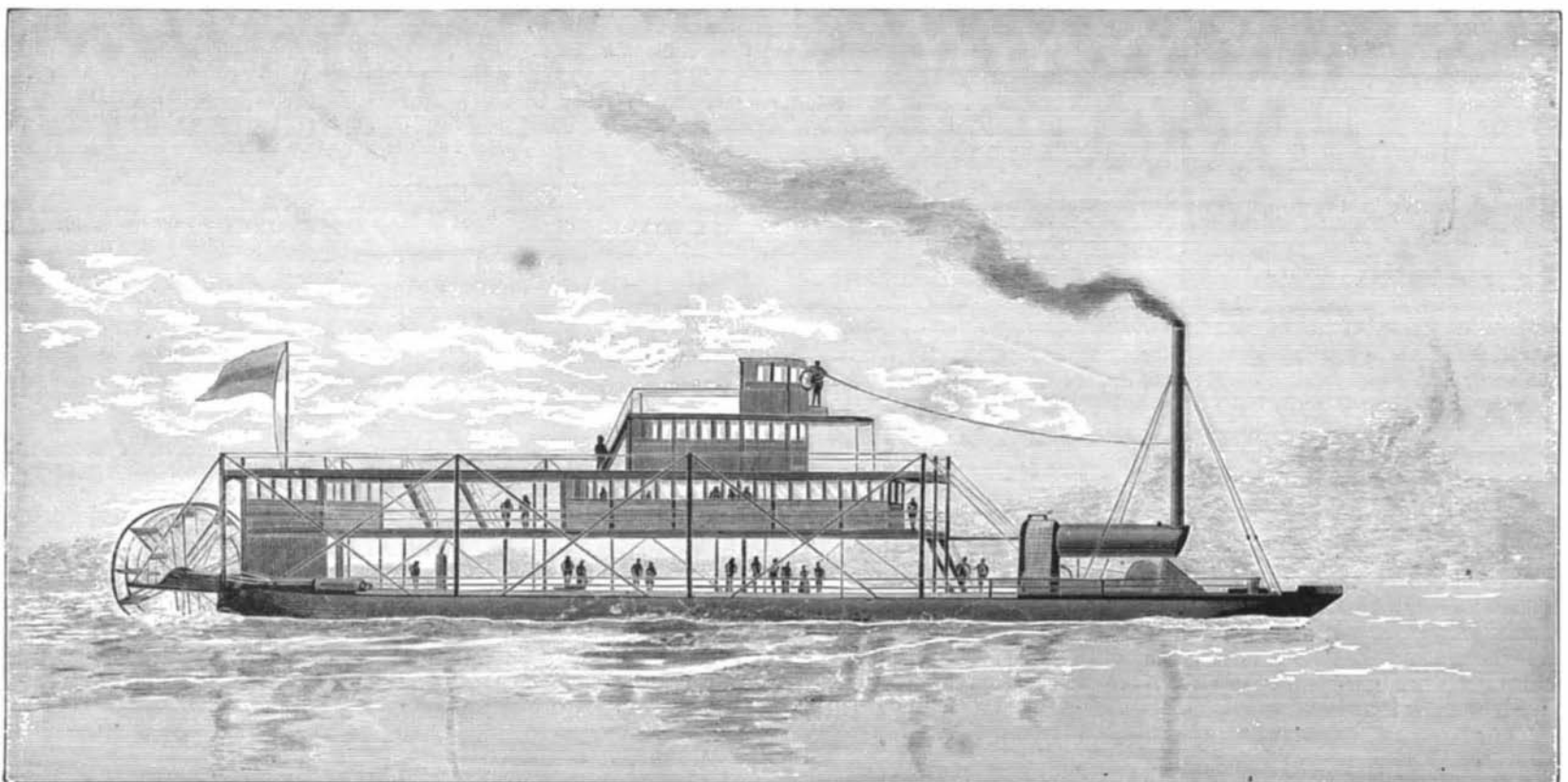
Prolongation of Life.

Some years ago the French Ministry addressed a circular to all the prefects, desiring them to institute inquiries as to the conditions which appeared peculiarly to favor longevity



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an ottoman or easy chair. The bowl, A, is furnished with a circular perforated pipe at the top, through which water is admitted from the flexible pipe connected with the fountain. The valve, B, at the lower end of the bowl is operated by the lever, C, which when raised first drops the valve, then swings it to one side. When this lever is depressed it first brings the valve under the bowl and then raises it up against the soft rubber packing at the bottom of the bowl. The



STERN-WHEEL STEAMER OF STEEL FOR RIVER MAGDALENA SOUTH AMERICA.

in their several districts, and the replies are said to have almost unanimously indicated as the leading elements or influences great sobriety, regular labor and usually in the open air, daily exercise short of fatigue, early hours, a comparatively well-to-do life, calmness of mind in meeting troubles, moderate intellectual powers, and a family life. The beneficial influence of marriage on the duration of life is universally admitted, and remarriage does not seem to be unfavorable. The prefects also indicate heredity as a frequent cause, and the influence of climate is likewise admitted; this latter, however, is separable with difficulty from other causes which may be operating simultaneously; but if all things were otherwise equal, it would seem that southern are less favorable to longevity than northern climates.

IMPROVEMENT IN MACHINE GUNS.

In machine guns the heating of the barrels has limited the number of charges that could be rapidly fired before they become too hot for use, so that after a period of rapid firing the gun would become dangerous if not allowed to cool. The engraving shows a device for keeping the barrels cool by surrounding them with water under atmospheric pressure, thus preventing the temperature from rising above the boiling point of water. A temperature not exceeding 212° Fah. does not impair the action of the gun.

The barrels are inclosed in a metallic water-tight casing having a vent for the escape of steam. The casing is filled from time to time during firing, as may be required. The mechanism for rapidly loading and firing is omitted in the engraving. This invention was recently patented by Mr. E. G. Parkhurst, of Hartford, Conn.

HOWE'S CAVE.

BY H. C. HOVEY.

The most massive and prominent rocks in Schoharie County, N. Y., are, first, the Water limestones, then the Pentamerus limestone, and above that the Delthyris shale. These all belong to the Helderberg division of the Silurian system. From the Water limestones immense quantities of cement are made. The rock lies in rather thin strata, and is easily acted on by the elements. The Pentamerus limestone is firm and compact, and abounds in fossils. The Delthyris shale is really granular gray or blue limestone, rich in coralline remains. These formations are so related to each other as to favor the excavation of deep valleys, flanked by cliffs and mural escarpments, the hills rising by successive terraces to mountainous proportions.

Several caves had already been found in this region, the largest of them being the one known as Ball's Cave, when in May, 1842, Mr. Lester Howe resolved to open what had previously been called the Otsgarage Cavern, but which now bears his own name. A stream of considerable size had long been observed flowing from it by several outlets. This subterranean river was the agent that had made the cavern; but it had afterward obstructed it by *débris*.

Mr. Howe hit on an ingenious plan for utilizing the water. He first loosened the clay, gravel, and broken rocks; then stopping other outlets he flooded the main channel, and thus forced the stream to sweep out its own deposits. This having been effectually done, he reopened the side passages, and made a dry path for 350 yards to Cataract Hall, where the waste water is now chiefly drained away through a transverse crevice. Another drain is at the Whirlpool, 100 yards beyond. These seem formidable terms to be applied to localities not in any way frightful to those visiting the cave in summer; but the guide assured me that during a rainy season the names were appropriate, and that there were times when the whole cavern would be filled, and, as he said, "pour forth a mighty flood."

The pathway beyond the drains crosses and recrosses the rapid, musical stream by stepping stones, until at a point about 1,350 paces from the entrance a double dam has been built, forming a pretty reservoir of extremely pure and lim-

allowed to be eaten through by rust. We would, however, recommend the substitution of electric lights.

It is due to Hon. J. H. Ramsey, the present owner of the cave, and Mr. J. M. Russell, the lessee of the premises, to say that every consideration is shown for the safety and comfort of guests, and that especial facilities were granted to us as explorers.

Our guide, Van Dyke, pointed out noteworthy objects, having an incident or legend to tell associated with each. Several romantic people have been married in a room 150 yards within the cave, called for that reason the "Bridal Chamber." It is reached by a long flight of steps, and ends in two or three interesting domes about 40 feet high. The temperature, which was 63° Fah. at the entrance, had here fallen to 50°, and that was found by repeated experiments to be the mean temperature of the cave. The mercury rose in certain places to 52°, and in others fell to 48°, the variation being probably attributable to atmospheric currents. The average is about 6° colder than the temperature of Mammoth Cave, nearly corresponding in each case with the mean temperature of the earth.

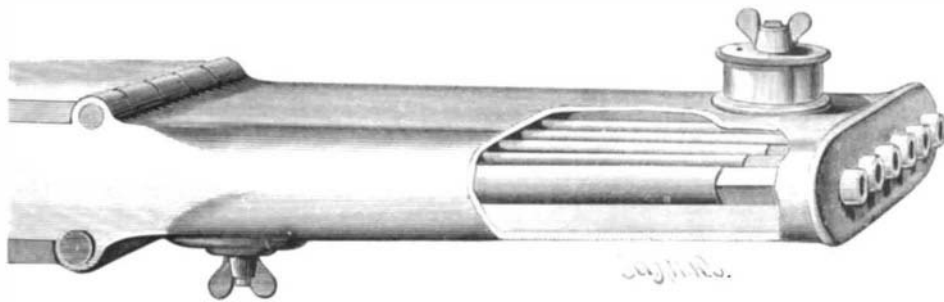
The currents of air vary considerably in intensity and direction, owing in a measure to the proximity of outlets and the windings of the cave stream. The air is chilly, and I missed the charming sense of exhilaration noted by every visitor to Mammoth and Wyandot caves, and rightly attributed to the natural oxygenation produced by chemical changes.

An incredible story is told of a young man from Georgia who was cured of pulmonary disease by dwelling three months in a dreary place called the

Consumptive's Chamber. Beyond this is a large hall called the Giant's Chapel. Howe's Pillar is a mass of yellow alabaster, 12 feet high, reached by a side passage from Cataract Hall. From a point 1,000 paces within, a stalagmite was removed in 1874 and set up as an ornament in front of the hotel. This fact I have from the guide. Applying my pocket-rule to the new stalagmite that has grown up in its place within six years, it was found to measure 13 inches in thickness and 4½ inches in height. This is a remarkably rapid growth, compared with rates observed in other caverns, and will possibly constrain us to modify our estimates of their antiquity.

In the Haunted Room the imagination may decry spectral forms. But more interesting is the strong draught indicating the nearness of some large apartment, into which an entrance has not yet been effected. The echo in Music Hall prolongs aerial vibrations for only about five seconds. The resonance of the floor, as we tread upon it, again suggests a hollow place underneath. It is asserted in a pamphlet, published fifteen years ago, that there are fractures opening "into a giant cavern below." None were pointed out to us; and if such are known it would be well to explore them, for the present cave floor is far above the natural drainage level.

The reservoir, to which we have already referred, is called the Stygian Lake, and is navigable by a small boat. It is

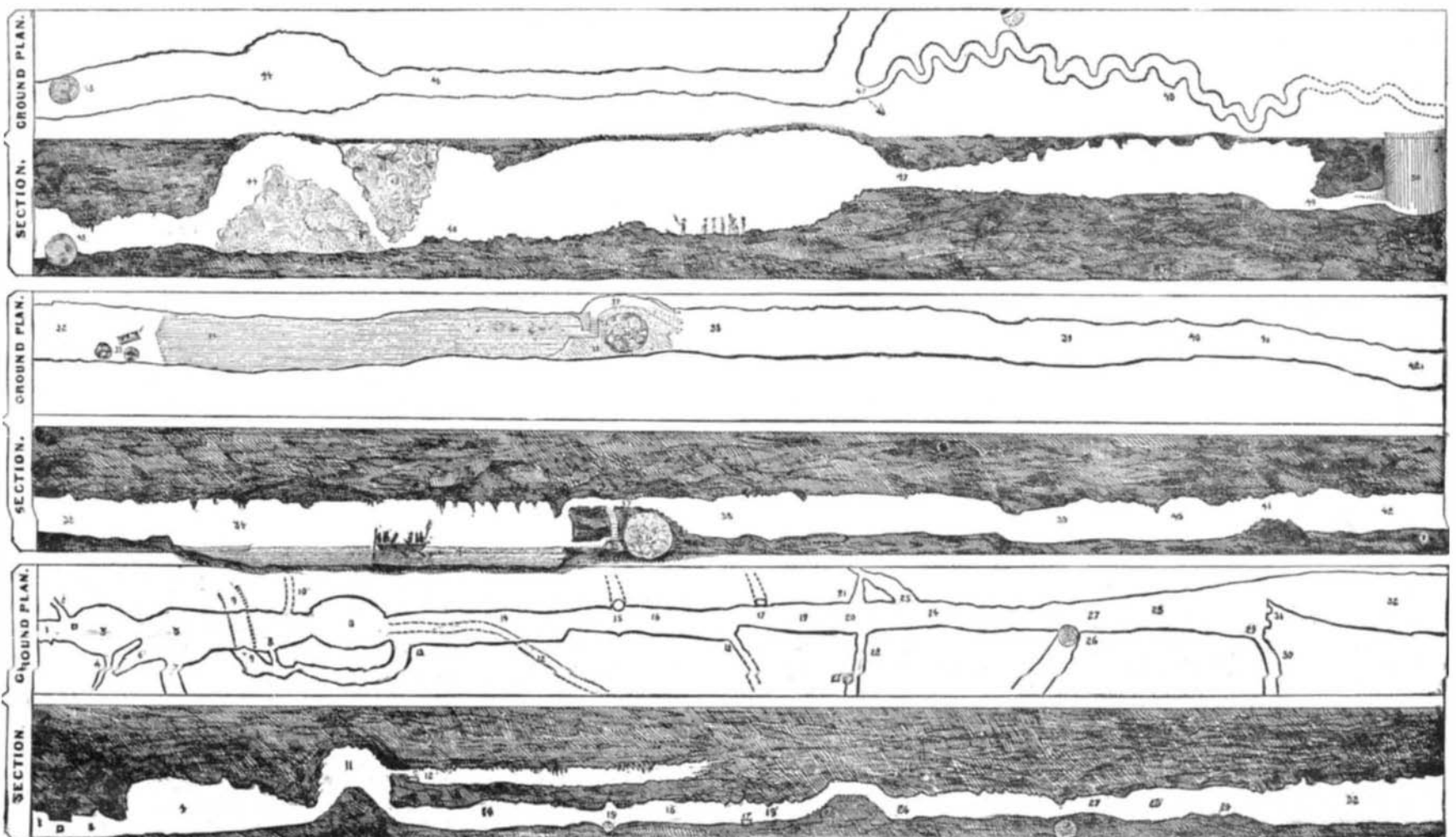


PARKHURST'S MACHINE GUN.

pid water. Iron pipes convey it out to supply numerous dwellings, a large mill, the hotel, and the tank at the railroad station. The supply has never been exhausted.

So much digging and blasting have been done between the entrance and the reservoir as to detract from the primitive wildness of the cave, and it too much resembles an unfinished railway tunnel. Gas, also, has been introduced, thus far with a pleasing effect ordinarily, though far less picturesque than torches and not free from danger. This appeared on the occasion of my first visit, which was in company with a party of 400 excursionists, many of whom caught hold of the pipes overhead to steady themselves along difficult paths. This procedure disturbed the flow of gas. A number of jets were extinguished; and although frequently relighted they could not be kept burning. The air grew heavy with escaping gas, which, being manufactured from gasoline, is very insidious, so that our first indication of peril was the fainting of several persons. I am satisfied that a fatal explosion was averted only by our resolutely shutting off the supply, thus leaving the party in darkness until torches arrived, by the light of which we withdrew to the purer and safer atmosphere above ground.

The next day we examined critically the whole system of lighting up the cave in company with Dr. Lewis, the chemist of the Boston Gas Works, our conclusion being that it is safe enough, if the pipes and jets are not tampered with nor



MAP AND PROFILE OF HOWE'S CAVE, NEW YORK.