United States.

The bill now before Congress contemplates: 1. The use of large, bonded warehouses for the storing exclusively of spirits "of not less than 180 per cent proof." 2. The removal of such spirits free of tax from the bonded alcohol warehouses to bonded storerooms, to be "used in manufacturing establishments, in the industrial arts, and in the manufacture of articles, preparations, compounds, acetic and other acids, and medicinal drugs or chemicals." "The manufacture of tinctures, proprietary articles, wines, liquors, cordials, bitters, or other alcoholic compounds which are used or sold as beverages," is excluded from the provisions of the act. "The commissioner of internal revenue, with the approval of the secretary of the treasury," is to make and enforce all needful regulations. The bonds for the alcohol warehouses are not to be in a less sum "than $100,000;" and those for storerooms to be not "less than $5,000;" all operations conducted in such bonded establishments to be under the supervision of revenue officers, as is now customary in all distillery warehouses. 3. The proprietor of any bonded alcohol warehouse may methylate such spirits free of tax, so as to cause them "to be unfit for use as a beverage," under prescribed proportions and regulations; and such methylated spirits may be withdrawn from the warehouse upon a permit issued in due form by any person who has complied with the provisions of the law, and filed the necessary application and bond with the collector of internal revenue in whose district the methylated spirits are to be used; the sale, removal, transportation, and use of such methylated spirits to be under prescribed regulations and bonds. Heavy penalties are prescribed for the purification, by any means, or the use, of such purified methylated spirits.

It will be seen from this review of the legislation on the subject, that the purification of methylated spirits is made unlawful, from which one might conclude that this process does not render the spirits altogether unfit for drinking-purposes when properly purified.

Having been requested by the commissioner of internal revenue to make experiments for the purpose of ascertaining whether such spirits could be demethylated, the experiments were made, and my report on the subject was published in the "Annual Report of the Commissioner of Internal Revenue," lately issued.

I now beg leave to submit to the members of the society some of the samples of distillates and artificial liquors produced, and let them judge for themselves how far I have succeeded in making a drinkable compound.

Ten per cent of the methyl alcohol was used for adulteration as being the largest amount known to me, when the experiments were carried out, as being legally permitted. The provisions of the Canadian law I did not learn of till after my report was written. As soon as I have some leisure, I intend trying to purify 25 and 50 per cent of adulteration.

The loss was, for the reasons stated in my report, much greater than would happen on a commercial scale; and, as long as there is a high tax on distilled spirits, a large loss might take place in purifying methylated alcohol, and yet render the illegal process profitable enough for unscrupulous persons to take the risk of detection.

Since the bill has been introduced a strong opposition to its provisions has been developed in the large wholesale and retail drug trade, and the *Oil, Paint, and Drug Reporter* has lately been devoting a great deal of space to the views of the most prominent dealers. They are of the general opinion that alcohol should be free to all, or not at all; that the small druggist who now prepares a great many, if not most, of his medicines, etc., would be driven out of the business, as he could not afford the bonded storeroom, etc., and be compelled to purchase from a few large firms who could readily afford to comply with all the necessary regulations; and, lastly, that the supervision at all times of revenue officers over their business is distasteful to them. A great many of them state, that, even if the alcohol was methylated, it would most certainly have to be purified before they could make use of it.

The great supporters of the measure are of course the alcohol-producers, who see in its provisions an increased market for their product.

ELECTRICAL NEWS.

Dissipation of Fog by Electricity.

SOME remarks in the editorial columns of the *London Electrician* have called forth a letter from Professor Lodge on the subject of the dissipation of the London fogs by means of electric discharges. At the Montreal meeting of the British Association, in 1884, Professor Lodge described some experiments in which he condensed smoke by means of a brush discharge from points connected with a static electric machine. The subject was an interesting one, and attracted considerable attention at the time; but it seems that no experiments on a large scale have since been attempted. A number of possible applications have been suggested, — for example, it has been proposed to use an electric discharge to dissipate the dust-particles in flour and other mills, which have been the cause of several disastrous explosions, — but the efficacy of the plan has not been tried. In the letter referred to, Professor Lodge states that he has been deterred from experimenting chiefly on account of the great initial expense necessary for a trial on a large scale, — an expense which he estimates to be in the neighborhood of five thousand dollars. As to the form of experiment, he is not sure that a battery of an enormous number of cells would not be the most likely plan. So far, the largest experiment that Professor Lodge has made has been the clearing of a smoke-filled room; but the results were so encouraging, that he does not despair of condensing the fog in a stagnant atmosphere. He has applied to the trustees of the Elizabeth Thompson fund in this country for a grant of five hundred dollars with which to continue his work, but has not yet heard the result of his application. The matter is a most interesting one. We have an entirely new field for electrical application, with a very substantial promise of reward for success. There are a number of possible applications of the process, — the clearing of smoke from tunnels, the dissipation of dust-particles in mills, and the general abatement of the smoke nuisance that is so unpleasant in manufacturing towns.

TRIALS OF THE SUBMARINE BOATS "GYMNOTE" AND "PERAL." — At a recent meeting of the French Academy of Sciences, Admiral Paris read a short paper on "The Submarine Boat 'Gymnote,'" which we lately described. He was most enthusiastic as to its success, and in the course of his remarks said, "In short, we are able to say that the 'Gymnote' moves and steers equally well above or below the surface, that it can be kept accurately at the desired depth, that its speed is all one could expect, that respiration is unimpeded, and that down to a certain depth it is easy to see. M. Tédé says that Captain Krebs's electric motors are marvels of lightness and precision, and that this important part of the boat has been carried out in a most masterly manner. The energy available amounts to 240 horse-power hours. So complete a success would have been impossible without the scientific ingenuity and minute care which M. Romazoff, naval engineer of Toulon, brought to bear upon every detail. Here, then, we have a solution of the submarine-boat problem. The first step has been taken. Better work will be done in the future. But, even as it is, the 'Gymnote' is capable of rendering good service." From *Engineering* we take the following: "The new Spanish submarine torpedo-boat 'Peral,' which has lately been tested with much success, is 72 feet long by 9.5 feet in diameter. It is fitted with a secondary battery of 600 cells, which supply the current to five electro-motors, two of which are of 30 horse-power each, and drive the propellers: the other three are only of 5 horse-power each. The boat has a speed of 11 knots on the surface, and 10.5 knots below. It can remain submerged for two days before the air requires to be renewed. It will be armed with Whitehead torpedoes." With the recent partially successful experiments with directable balloons, and these latest experiments with submarine boats, we may expect novel developments in warfare.

NEW RECKENZAUN TRAM-CAR. — The principal novelties in this car consist in the method of gearing the motors to the car-axles, and in the employment of a form of secondary battery on which Mr. Reckenzaun has been working for some years past. The ordinary practice of connecting the motor-shafts and car-axles is through two pairs of spur-gears, the ratios of the diameters giv-

ing the necessary reduction in speed, — about one turn of the car-wheels to ten or twelve of the motor. A single pair of gears would be sufficient for light work, but for climbing hills a single reduction would make the strain on the teeth too great. The efficiency of spur-gears is very great, and, when properly constructed, there is very little noise or jar. A much more compact arrangement, though a less efficient one, has been adopted by Mr. Reckenzaun. He uses a simple worm gearing, where the motor-shaft and car-axle are at right angles to each other. Such an arrangement has been generally avoided because of the supposed great loss through friction. From his own experiments, however, Mr. Reckenzaun concludes that the losses are greatly overestimated, and by taking especial care in the lubrication he has obtained efficiencies that compare favorably with the efficiency of spur-gears. But it is in the storage-battery that the greatest interest of the system lies. It does not seem to be any great improvement over the present battery in weight — the cells on a car weigh about two tons — or in efficiency, but it is claimed that the durability will be greater than that of the ordinary type. The plates are made by forming by pressure cylinders of active material, a sixth of an inch in diameter, and about an inch and a quarter long, putting them in a mould and casting lead around them. The cylinders are only about a tenth of an inch apart, while the thickness of the lead in which they are embedded is one-eighth of an inch. The advantages of this form of plate lie in the fact that the active material is held firmly in its place, and that the greater part of the expansion is in the direction of the length of the cylinders: so the chance of buckling is less, while a large active surface is offered to the action of the acid. The total weight of the car, with thirty passengers, is about seven tons and a half, and about five electrical horse-power is required to draw it on a level at a velocity of seven to eight miles an hour. On a hill with a grade of five per cent, the motors absorb twenty electrical horse-power. The car described has been built by Messrs. Stephens, Smith, & Co., and is for use in Melbourne, Australia.

SNOW-STORMS ON ELECTRIC ROADS. — The winter has thus far been so mild that electric railroads have hardly had a fair test as to their capability of working under adverse circumstances. One snow-storm in St. Joseph failed to stop the electric line there; and now we have news of a blizzard at Davenport, Io., through which the Sprague cars ran without interruption. In this last case the snow — of the heavy, damp variety — covered the streets to a depth of four or five inches, with drifts in places across the tracks. While this is satisfactory enough, it must be remembered that it is not the wet, slushy snow that is most to be feared, but the dry variety, that cakes on the track and prevents contact being made between the wheel and rail. The only safeguard against trouble from this last cause is to keep cleaning-cars going as long as the snow-storm continues. There is another difficulty, especially when a heavy overhead wire is used, and this is from the formation of a coating of ice or sleet, preventing the trolley from touching the wire. While in the two cases cited there has been nothing but encouragement, yet there have been rumors of troubles that occurred at Washington, at Lynn, and perhaps at Brockton, on account of snow and ice. These were no doubt caused by insufficient experience, and from neglecting common precautions, and were only small matters at the most, but they at least show that precautions must be taken.

APPLICATION OF ELECTRIC MOTORS TO MINING. — At the Drane Colliery, near Osceola, Clearfield County, Penn., Mr. F. M. Lechner has devised a most interesting application of motors to mining-work. A ten-horse-power Sprague motor is mounted on a truck running on rails, so it can be easily moved from one place to another. The weight of the machine is something less than a thousand pounds. The cutter to be operated is set in position in the space to be cleared, and is connected to the motor by a $\frac{5}{8}$-inch rope belt, movable pulleys on jack-screws being so adjusted that the cutter can be operated at any angle from the motor. The latter is about thirty feet from the cutter, the tension of the belt being adjusted by moving the truck one way or the other. The machine runs easily and cuts well. By this plan three cutters can be worked from one motor, two being adjusted while the third is at work, the motor being moved from one to the other as it is needed. It was found, on a preliminary trial of this apparatus, that by its use two men could excavate one hundred tons in ten hours, and that they can move the cutter as often as desired without any auxiliary aid. The efficiency of the dynamo and motor are each over ninety per cent, and, allowing ten per cent loss on the line, between seventy and seventy-five per cent of the power delivered to the dynamo can be called on at the motor for work. It has been estimated that the cost of equipping a mine with electric power is only half of that of compressed air, while the working expenses are about in the same proportion.

SCIENTIFIC NEWS IN WASHINGTON.

Some Habits of the Omahas. — Electrical Conductivity of Glass. — Fish Commission Experiments. — The Woman's Anthropological Society. — The Survey for Irrigation. — Indian Relics from Florida.

Some Habits of the Omahas.

The following statements have just been made by an Omaha Indian (Samuel Fremont) to Rev. J. Owen Dorsey: —

The Omahas used to blow the smoke of the pipe in six directions, up, down, and to the four winds, using a prayer in each case. The exact order in which the winds were addressed has been forgotten; but the smoker could pray to the being above first, if he wished, and then to the being below, or *vice versa*. The earth itself was spoken to as if it was a person. The formula was as follows: "One of you lies on his back [i.e., the earth], the other one sits above: both of you help me!" Then followed the petition, "Oh, ye who cause the four winds to reach a place, help ye me!"

White people think that the Omahas knew nothing about Wakanda (a higher power, the Mysterious Power) before the meeting of the two races; but that is not so. They had many old sayings, used before they met the white people, such as, "Wakanda has decided for him his own (child, descendant, etc.)," "Wakanda knew," and "Wakanda seems to have aided him." These were employed when an Indian met with unexpected good luck. But the Pawnees had many more sayings about Wakanda than the Omahas had.

Before the advent of the white people, the Omahas used to get the wild honey, which they called "bee-dung." Its present name is "bee-gum." They put the comb in a kettle, in which they let it melt and boil, skimming off the impurities. They used the sirup as the white people do molasses. Unless the bees were troublesome, they did not smoke them when they took the comb.

Electrical Conductivity of Glass.

Dr. C. Barus has just completed a protracted investigation on the effect of stress (traction torsion) on the electrical conductivity of glass at different temperatures between 100° and 360°. The question is of unique importance, because the conductivity of glass is wholly electrolytic. He finds that stress of the kind given materially increases conductivity; whence it follows that the time-rate at which molecular reconstruction takes place in glass is definitely greater when this substance is longitudinally extended or twisted than when it is free from such strain. The result has a direct bearing on the viscosity of the solid.

Fish Commission Experiments.

Marshall McDonald, United States fish commissioner, is making a comprehensive experiment in salt and fresh water aquariums. He has already constructed several aquariums on the lower floor of the building, and stocked them; and he is now building a large one, 120 feet long, under a separate roof. The commissioner said to the correspondent of *Science*, "I am going to bring the seashore to Washington, and assemble here a full representation of our marine life." He has sixty or seventy species already sporting in salt and fresh water tanks, one of the latter containing specimens of the earliest type of fresh-water fish, — the ganoids.

The Woman's Anthropological Society.

One of the active scientific societies of Washington, and one whose work is of peculiar interest in that it is carried on solely by the sex sometimes supposed "incapable of generalizing," is the Woman's Anthropological Society. Despite the temporary retire-