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—A Condenser of Variable Capacity.

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VI. NATURAL HISTORY, GEOLOGY, ETC.—The phylloxera. By Professor C. V. RILEY. The complete history of the insect, with 10 engravings. The wingless sedectary female. The migratory female, both idustrated. The sexed phylloxera, with 4 views. The most favorable opportunity to destroy the insect, and a red-pefor an insecticide mixture—Sponge Borings in Marble—The Apple Tree Borer Remedy.—Fertilization of the Queen Bee. By T. B. MINER—The Largest Flower in the World, Conophallus Titanum, 1 figure.—The Pith Plant.—The Walled Lake in Iowa.

VII. AGRICULTURE, HORTICULTURE ETC.—Cows and their Butter. How to select dairy stock. Care of cows. Proper temperature of milk and for churning. Hints on working the butter. Being a description of actual practice. The superiority of the Jersey breed for butter. Bone meal for cows.

SCIENCE TO SOLVE INDUSTRIAL PROBLEMS.

a thousand others—but the profoundest of all was that which ranging between 1780 to 25 61 candles, with a 26 candle gas. related to the condition and prospects of labor. After reviewing the conditions of labor and of laboring men in the of light resulting from the use of globes of different kinds past and at present, the speaker said that the real social and of various shapes. The loss is always considerable, in problem was to maintain the freedom of labor, and with it many cases excessive, and it results partly from the absorpthe equilibrium of the industrial forces, and of their results. tion of light from the material of the globe, and partly from Many solutions to this problem have been offered, chief the draught caused by the ascension of the heated air in the among them these three: the moral solution, the political so confined space. As regards material, a piece of clear winlution, and the economic or social solution—all important, dow glass, held in front of a gas flame, diminishes the light but only one efficient.

reach the object of its solicitude-individuals; while the evils the surface furthest from the photometer. Globes frosted to be remedied were many of them organic, and could be or ground all over, technically known as "moons," absorb cured only by organic remedies.

The political solution was but the old form of state intervention, another name for despotism. Not a government on thickness and quality of the glass. The following results were earth can take charge of itself, much less the people; all of obtained with globes of different sizes ground all over, and them are bankrupt. The people must take care of them- show the effect of increased draught in diminishing the light selves. The duty of government is to maintain the conditions of liberty, justice, and progress, but there to stop; every step beyond is either toward anarchy or tyranny.

There is but one way of meeting the evils of society, the speaker went on to say, and that was to learn scientifically the laws of social phenomena, and to apply them to all social arrangements and procedures. Do such laws exist? Who can doubt it that has studied statistics, or watched the uniformity of social results? Because man is a being of free will, he is none the less a source and subject of law. His processes, especially the action of large numbers acting together, are not wholly arbitrary and capricious. They can be counted on generally with as much confidence as we count on the rise of the tides or the revolutions of the stars. Because these phenomena are more complicated than natural phenomena, we know less about them; but we shall know more of them in time. How many great minds and noble hearts are now at work to find the key of social science, to unravel its mysteries, to bring the seeming chaos into order? Something has been done in this direction, but much more remains to be done. The publicists and the economists have given us glimpses of the field—the scientists will of Emigration for the year 1878 shows there came to this soon open it to the husbandman and his golden harvests.

ECONOMY IN GAS BURNING.

True economy in gas burning implies the use of burners capable of developing as nearly as possible the full illuminating power of the gas consumed. Judged by this standard, it is safe to say that the great majority of those who think they are most economical in the use of gas are really the most wasteful. In the majority of New York houses the burners used are old and small. When new such burners were not capable of developing half the actual illuminating power of the gas that passed through them, and, worn and rusted as they are in the average house, it is a question whether it would not be an overstatement to say that they get one third as much light from the gas they burn as proper burners would give. In other words, multitudes who are constantly complaining of the magnitude of their gas bills are simply wasting twice as much gas as would suffice to light their apartments. Properly burned, the gas they pay for would give them three times the light they now have; or the same amount of light could easily be got from one third the quantity of gas that passes through their burners. When the burners are inclosed in old-fashioned globes with narrow openings at the bottom, the illumination is still more reduced.

A few weeks ago, Dr. William Wallace, F.R.S.E., read in burners in the English market, under varying conditions of pressure and quality of gas, proving most conclusively that the light obtained depended not so much upon the quantity of gas consumed as upon the conditions under which it was

comparatively low pressure. With this burner and a pres- means, and mostly men of families. Many of them are sure of half an inch, 7·1 cubic feet of gas gave an illuminating effect of 40 63 candles, or 28 6 candles for 5 cubic feet. ing out of work, have drawn their deposits out of the banks, The smallest burner of the series, burning 2 cubic feet of and, rather than stay in the East and cat up their accumulagas at 1½ inch pressure, gave an illuminating effect of 3.21 tions, have taken their money and furniture West and begun candles, or 8 candles for 5 cubic feet.

twice as much light was got from a given volume of rich way to make a competence. gas at the pressure of ½ inch, as at the pressure of 1½ inch. With common gas the difference was found to be still more Texas, Kansas, Dakota, Nebraska, Minnesota, and Califorremarkable, in some instances only one fourth the obtainable nia, in the order named; but some have gone to Florida, illumination being developed. This with approved burners Arkansas, Colorado, Iowa, New Mexico, and the regions bein good condition. With poor burners out of condition, youd the Rocky Mountains." such as we commonly see in this city, the waste of illuminating power must be much greater.

In his experiments with rat-tail burners, under the most

English bat's wings, with tips of various material, was In a recent address to the Workingmen's Lyceum, at tested, the results ranging between 18:35 candles and 25:56 Cooper Institute, Parke Godwin said that society presented | candles, with 26 candle gas under varying conditions of size many problems-war, crime, pauperism, intemperance, and and pressure. A number of Argand burners gave results

Experiments were also made in order to ascertain the loss to the extent of about 10 per cent; but in the case of a clear The moral solution failed for two reasons: it could not globe it is, in some cases, less, owing to the reflection from about 25 per cent of the light when well shaped, and opal or "cornelian" globes, 40 to 50 per cent, according to the

All these globes had the usual opening at bottom, 134 inch in diameter. In another series of experiments, to determine the effect of the opening of the globe on the amount of light made available, clear 71/2 inch globes were emploved, giving the following results, the same burner being used at uniform gas pressure:

The naked flame gave a light of With clear globe, opening below 2\frac{3}{8} in., 15.4; loss 8.3 2\frac{1}{2} \cdot \cdot 15\cdot 2; \cdot \cdot 9\cdot 5 \cdot \cdot \cdot 19\cdot 0 \\ \frac{1}{2} \cdot \cdot 13\cdot 6; \cdot \cdot 19\cdot 0 \\ \frac{1}{2} \cdot \cdot 12\cdot 0; \cdot \cdot 28\cdot 6 \end{array} "

With openings less than two inches the light was unsteady; at one inch it was practically useless. The best results were obtained with globes having a four inch opening at bottom.

EMIGRATION AND MIGRATION.

The annual report of the New York State Commissioners port from foreign ports during the year 121,369 persons, of whom 75,347 were aliens who had never before entered the United States. These figures show a large and unexpected increase, and indicate for the whole country an immigration of not less than 150,000.

During the same year there was an unprecedented movement of population within our national borders, a heavy migration taking place from the East to the South and West. On the basis of information obtained from government reports and a large amount of special inquiry the Tribune gives the following table of land sales during recent years:

Year.	Government Sales for Fiscal Years ending June 30.	Railroad Sales for Calendar Years.	Sales in Texas, Calendar Years.	Immi ra- tion, Calendar Years.
i	Acres.	Acres.	Acres.	
. 1872	7.124.725	1,000.000	1.500.000	449.483
1873	6.288.264	980,000	1,500,000	437.004
1874	5.610.243	1.060,000	Not known.	277,593
1875	3,712,420	850.000	Not known.	209,036
1876	4.264.544	1.160.000	Not known.	182,027
1877	3,338,479	1,800,000	3.000,000	130.000
1878	7,562,246	2,950,000	3,500,000	145,000

Of the immigrants of 1878 about 80,000 went West; during the same period the westward migration of Eastern people, was, according to the Tribune's calculation, at the least **52**0,**000**.

"The heaviest migration took place from New England, before the British Society of Arts a long paper, giving the the Middle States, and Virginia. These regions have been results of some hundreds of careful tests of all the leading the most troubled with a surplus of unemployed labor, and they have been of late the scene of active canvassing for emigrants by Western land agents, who, while advertising their own lands, have also done much good by calling attention to the fertility and cheapness of the government lands, a thing they did not care to do particularly, but which was one re-For example, with 26 candle gas and a series of fish tail sult of their operations. Private advices received by the burners of the same pattern but of differing sizes, Mr. Wal- Tribune report that these persons, who have gone West and lace obtained the best results with the largest burner at a South, are in general citizens of intelligence and some small the world anew. They have gone out on the prairie, broken Thus, with burners of the same type, a difference in size up the virgin soil, so rich as not to need fertilizing, planted with difference in pressure may enable one burner to de- crops and groves of timber, and made themselves indepenvelop three and a half times as much light as another from dent of all the vicissitudes of labor and fortune in the East. a given amount of gas. With precisely the same burner, They are all, like their predecessors in that region, in a fair

"The regions to which they have principally gone are

Back Numbers and Volumes.

Subscribers to the Scientific American will be entered favorable conditions of size and pressure, Mr. Wallace on our books to commence at the date the order is received; failed to secure more than 60 per cent of the illuminating but those desiring the back numbers to the commencement power of the gas consumed. Fish-tail burners did much of the year will be supplied on their signifying a wish to better, though those of the bat's-wing type showed greater have them. Volumes of previous years may be had in sheets economy on the whole. A great variety of German and by mail at regular subscription price, namely, \$3.20.