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OVER-DENSITY OF POPULATION IN CITIES.

The great and growing question as to the dangers, both to life and health, that result from an overcrowding of the population in large cities, has lately received a new treatment at the hands of the learned Dr. Parr, by the labors of whom the subject has been reduced to a science of almost mathematical exactness. In a paper entitled "Density or Proximity of Population, its Advantages and Disadvantages," recently presented to the Congress at Cheltenham, England, by this excellent authority, the statistics shown are somewhat startling, and put forth in such a way as to prove exceedingly interesting and instructive. Dr. Parr's principle is this "Observe the effects of the population-density; as a rule, the greater this density the shorter the duration of life; and Government retains the privilege of using any patented inthis life-duration is seen to follow a ratio appreciable by simple arithmetic."

'That man by his very nature is gregarious in his habits, and that, following the dictates of his nature, it is his wont to congregate in dense communities, is a fact so well known, and one that has been so often commented upon, as to anpear trite in its repetition. We cannot, perhaps, expect to accomplish much in the way of changing his habits in this respect by moral suasion, the best we can do being to exhibit the results that modern science has arrived at in its investigations of the subject of overcrowding, not so much to the sufferersthemselves from this state of things, as to the authorities whom they have elected to look after their welfare. The gist of the matter is given by Dr. Parr in the following words: "The nearer people live to each other the shorter their lives are," and the relations of this proximity to the duration of life are ascertained to be as follows:

"In round numbers, where we stand on an average 400 feet off from each other, we live on an average 50 years; where we are 300 feet off, we live 40 years; where we come within 60 feet of each other, we live but 30 years; and where we are but 20 feet off, we live but 25 years. It does not feet we could prolong the average of life beyond 50 years; had only one tenth part of an acre on an average; and where 39 died, each had only one one-hundredth part of an acre. The writer then goes on to show that, as regards the intermediate cases, the regularity of the rule is sufficiently precise." It further appears that the densest and most unwholesome of the districts in England is Liverpool, where a square mile holds no less than 63,823 human beings—an average of about one hundredth of an acre to each, or equivalent to a space of 12 by 12 feet. Thus it may be readily seen that if the men, women, and children of the lower order were to be placed on a surface of level country, each person being 12 feet from the next, and if the dirt, destitution, intemperance, and disease, coupled, of course, with the toil of this class, were conditions present in full force, 39 out of 1,000, or say 1 out of 25, must die annually. In other words, the average duration of human life must be as low as 25 years.

Such are some of the more important of the interesting facts given us by Dr. Parr in his valuable paper. The Architect, habits in various ways, whether in labor or in idleness." While there is no doubt that such conditions as these exerno doubt that the death rates in such communities are pretty certain indices of the perfection or imperfection of municipal arrangements in regard to sanitary matters.

Without pretending to state the cause, we may call attention, in connection with this subject, to the following fact: Statistic Office, giving the mortality per 1,000 inhabitants in the chief cities of the world, we learn that the death rate in the city of New York is about one third greater than that of London, and a fraction greater than that of Liverpool, which, as Dr. Parr has shown, is the most unfavorable district in England.

PATENTS IN NEW SOUTH WALES.

A bill to amend the laws relating to patents has been introduced in the Parliament of New South Wales. It pro than meteorological causes; but when such do happen, they

vides for the establishment of a patent office, the appoint ment of a "Patents Officer," and the issuing of patents for inventions, and the publication of the patent specifications. Any person may obtain a patent for his invention, giving him an exclusive property therein, provided the invention has not been in public use in New South Wales for more than one year, or has not been patented in any other country more than one year. But if any one in New South Wales shall have begun to manufacture an article before the patent is granted, such person may continue to manufacture and sell such article notwithstanding the patent. The life of a patent is to be five, ten, or fifteen years, at the option of the patentee, the respective fees being \$25, \$50, and \$75. The vention on paying to the patentee such sum as the Patents Officer may decide to be a reasonable compensation therefor. Patents are assignable, wholly or in part, the assignment to be registered in the Patent Office. In case of infringements, the Supreme Court adjudges damages and costs.

SUN SPOTS AND COMMERCIAL CRISES.

To the numerous explanations that have hitherto been given by various writers on commercial topics, to account for the present depressed state of trade, there has recently been added another—this time from the pen of Prof. W. Stanley Jevons, who, in a late number of Nature, treats the matter at some length from a scientific standpoint.

The fact has long attracted attention that commercial crises, like the one through which we are passing, are marked by a certain periodicity in their. occurrence, and they have been associated, not unreasonably, to a certain extent with a deficiency of crops, and such deficiencies again have in recent years been supposed to be in some way connected with the "sun spot period."

Professor Jevons, in his present paper, endeavors to establish a direct relation between the latter periods and times of seem likely that by extending our interspace beyond the 400 trade depression; and, although his studies have not as yet allowed him to fix the exact nature of the connection, the but it is very clear that if we contract the interspace beyond | data that he furnishes exhibit at least some curious coincithe limit of 20 feet we must rapidly reduce the mean of 25 dences. After some preliminary accounts of what has been years to 20, to 15, to 10, and before long, so to speak, to done in this field of research, both by himself and others, nothing. That is to say, there is a certain population-density in former years, Professor Jevons says: "It is impossible in with which, in the ordinary circumstances attending such a; this place to state properly the facts which I possess; I can condition, human life could not be sustained at all; and from only briefly mention what I hope to establish by future more this melancholy zero there rises a scale of progression, obey- thorough inquiry. . . . Deferring, however, for the ing, of course, a recondite, but intelligible mathematical law, present, any minuter inquiry, I permit myself to assume that whereby we may measure off in a moment, according to the there were, about the years 1742 and 1752, fluctuations of number of lives per acre, the number of years of life." trade which connect the undoubted decennial series of 1711, Again, from Dr. Parr's actual figures we learn that "during | 1721, and 1732 with that commencing again in the most unthe decennial period from 1861 to 1870 inclusive, the death- questionable manner in 1763. Thus the whole series of derate of certain of the most favorably situated districts of cennial crises may be stated as follows: 1701 (?), 1711, 1721, England, taken at per 1,000 of the population, proved to be 1731-32, 1742 (?), 1752 (?), 1763, 1772-3, 1783, 1793, 1804-5 (?), 17 per annum, 16, and even so low as 15; whereas in certain 1815, 1825, 1836-9 (1837 in the United States), 1847, 1857, other places it stood at 31, 33, and even 39 per 1,000 per an- 1866, 1878. A series of this sort is not, like a chain, as weak num. He then tells us that in those cases where 16 died in as its weakest part; on the contrary, the strong parts add 1,000, each individual had to himself, on an average, 4 acres: strength to the weak parts. In spite, therefore, of the doubtwhere 15 died, each had 3 acres; whereas where 31 died, each | ful existence of some of the crises, as marked in the list, I can entertain no doubt whatever that the principal commercial crises do fall into a series having an average period of about 10 446 years. Moreover, the almost perfect coincidence of this period with Mr. J. A. Broun's estimate of the sun spot period-10.45 years-is by itself strong evidence that the phenomena are casually connected."

Hyde, Clarke, Wilson, and Danson all argued, 30 or 40 years ago, that commercial fluctuations must be governed by physical causes; but the difficulty that has beset the theory is that hitherto no one has been able to detect a clear periodic variation in the price of corn. Sir William Herschel endeavored to do this at the beginning of the present century in his inquiry as to the economic effects of the sun spots: but his facts are too meager to justify any certain inference. Professor Jevons confesses that as yet his own inquiries have been equally without result on this point. "The fact is," he says, "I believe that cereal crops, as grown and gathered in Europe, depend for their success to which we are indebted for an abstract of these conclusions, upon very complicated conditions, so that the solar influremarks very truly that "no doubt the local circumstances ence is disguised. But it does not follow that other crops of any particular community must always exercise a consid- in other latitudes may not manifest the decennial period. erable influence on the death rate. It is scarcely neces- Dr. Schuster has already pointed out in Nature a coincidence sary to say that it is not so much the crowd that kills, as it between good vintages and minima of sun spots, which can is the conditions under which the crowd accumulates; the hardly be due to accident. "Now, if we may assume Dr. conditions of soil and climate, of the contamination of air Hunter's famine theory to be true, there is little difficulty in and water, of the disposal of refuse, of food supply, of the explaining the remarkable series of periodic crises which I consumption of strong drinks, and of social character and have pointed out." The author goes on to show that the trade of Western Europe has always been strongly affected by communication with the Indies, several crises being discise a large influence on mortality in large cities, there is also tinctly traceable to this cause; thus the crisis of 1878 is clearly connected with the recent famines in India and China, and these famines are confidently attributed to solar influence. He states, then, that it is his present belief that to trade with India, China, and other parts of the tropical and semi-tropical regions, must be attributed the principal From the figures lately published by the German Imperial fluctuations of European commerce, although the decennial fluctuations ought not to be wholly laid to the account of Indian trade; it being quite possible that tropical Africa, America, the West Indies, and even the Levant are affected by the same meteorological influences which occasion the famines in India. Thus it is the nations which trade most largely with those parts of the world, and which give long credits to their customers, which suffer most from these crises. Professor Jevons sees nothing in his theory inconsistent with the fact that crises and panics arise from other extension of the true decennial crises.

and minima of sun spots.

mercial world contained in the Times will be cablegrams and our despondency and ruin in commercial collapse."

Expedition, under Professor Nordenskjöld, has by this time ventor. Therefore the law is unconstitutional. proved the existence of an available northern passage from The objection is forcible, but an answer is offered that monstrated, any one else could step in and use the perfected the Atlantic to the Pacific. In 1876 and 1877, Professor trademarks pertain to commerce, and that Congress has invention at no greater risk than the payment of a license Nordenskjöld succeeded in reaching the mouths of the Si- power to regulate commerce. Opponents of the law reply fee? berian rivers Obi and Yenisei by way of the Kara Sea, a feat that it is commerce among the States which Congress may never before accomplished, thus establishing a new commer- regulate, while trademarks belong primarily to domestic ing the invasion of patent rights, like this second section of cial road to the regions which those streams water. During commerce, which Congress cannot control. Friends of the Mr. Wadleigh's bill, arises from their proneness to forget the past summer, the expedition which sailed from Ham- law contend that the National Government may make treat- the grand purpose of the American patent system—the admerfest, Norway, in July, successfully traversed the Kara ies, and treaties may properly stipulate for mutual protection vancement of the useful arts by the encouragement of inven-Sea in the forepart of August, and arrived at Dickson's of trademarks of subjects of one government within tion—and the not less vital point that the only means for the port, at the mouth of the Yenisei, on the 6th. Four days the dominions of another, and therefore Congress may pass attainment of that end contemplated by the framers of the later the expedition, comprising two small but strong a general trademark law as incidental to enforcement of Constitution was the recognition of the inventor's exclusive steamers, the Lena and the Vega, began the exploration of treaties. And so the discussion slowly proceeds, with the right to the control of his invention or discovery during the the hitherto untried sea to the north and east. By August effect of creating the dilemma that claims founded on either period for which the patent should be granted. 20, the northernmost point of Asia was passed, and in a law may, at any moment, be adjudged invalid. For the week more the mouth of the Lena was safely reached. Here power of Congress, if it exists, is exclusive; if it is dissire to be infringers upon patent rights, to have the inventhe steamers parted company, the Lena to ascend the river proved, then and then only are State laws operative. The tor's exclusive right laid open to invasion. But the patent to Yakutsk, the Vega to continue the exploration of the New York Tribune, from which we select the above, con- law was not framed to meet the wants of infringers, and Siberian coast, hoping within a few months to reach Japan by cludes with everybody else interested in the matter, that the Congress has no constitutional power to alter it in their the way of Behring Strait. The greater part of the coast from subject deserves early and final determination. the Lena to Behring Strait has already been explored by sailing vessels, so that the probability of the successful passage of the Vega is very great. Should it prove feasible to navigate those seas even during a few months of each summer, that can be devised is to make it contribute to the growth of the commercial advantage of the new route between Europe new fruit to fill new cans. This is done in the following manand Eastern Asia and Western America will be considera ner: The can is pierced with one or more pin holes, and then ble. Besides, it would open up to trade the northern half sunk in the earth near the roots of the strawberry or tomatoor of the vast continent of Asia, by way of the great rivers other plants. The pin holes are to be of such size that when

vessels carrying profitable cargoes can reach the north of ranged, will extend its irrigation to the plant through a pethe Yenisei in August and September, and return with riod of several days; the can is then refilled. Practical trials marketable freight before the Kara Sea is closed by ice. Should the entire route by way of the Arctic Sea prove prace | Plants thus watered flourish and yield the most bounteous ticable, the summer voyage from Europe to the East would returns throughout the longest droughts. In all warm localbe shortened about one fourth; but that advantage would be ities, where water is scarce, the planting of old fruit cans, offset by the disadvantage of being closed by ice ten months as here indicated, will be found profitable as a regular garin the year.

In any case the new Siberian regions opened up are likely to prove of great benefit to Europe, both in furnishing large supplies of food stuffs and raw materials, and in offering a market for manufactures. Siberia has made enormous pro- Wadleigh's bill for the amendment of the patent law, it is gress in material development during recent years, and im-needful to bear in mind the broad principle that Congress is proved trade connections would give a great impetus to the empowered by the Constitution to grant to inventors the new settlements. Fortunately American manufactures are "exclusive" right to the manufacture and sale of the article highly esteemed in Siberia; and if a proper effort is made a or process patented. The right is limited in time, but it; large share of the new trade may fall to us. On the other cannot be limited in scope. In other words Congress has hand Siberia is likely to become a serious rival to us as a no power to come between the patentee and his invention, producer of breadstuffs. Vast regions there are admirably to say what he shall do with it. Whether this provision of suited for the cultivation of grain; and they will make the Constitution is wise or not is beside the question. In themselves felt in the markets of the world as soon as means our opinion it is eminently wise; but wise or foolish, there are provided for transporting the crops cheaply.

THE TRADEMARKS QUANDARY.

to better the law of tra have evidently muddled the subject. A Maryland judge that it undertakes to limit the scope of the patentee's right. has pronounced the law of Congress unquestionably constitutional; and jurists will generally agree that, if it is so, it share his right with A and B, giving them a license to use has superseded State laws. But a Wisconsin judge is just his invention or discovery, C, D, and all the rest of the alas clear that the National law is a nullity; and one consequence of this decision, if sustained, would be that State laws are revived. Meanwhile the manufacturer cannot know | tire control of his invention, his purpose may be thwarted, under which law to act.

Before either law was passed courts of equity had built up mined from all the evidence in the case." a somewhat vague yet efficient system for perfecting the peculiar labels, unique designs, characteristic names, and the advancement of the useful arts through invention and fancy catchwords adopted by various manufacturers and discovery. Its object is to induce men to study and experidealers. Every producer of an article generally known to ment and invent; and it seeks to accomplish that object by be good sets a value on the trademark with which it has be- the hope held out to the inventor that by the enjoyment of come associated in the public mind, and will resist the employment of it by his competitors. The courts have sustained these claims; not so much, however, in the view that fortune than would be otherwise possible. Once secured a a trademark is property, as upon the ground of protecting patented invention is property, to be respected as other pro-

seldom, if ever, have the intensity, profundity, and wide cologne or cocoa oil, pencils or piano-fortes, shawls or shirts; the patent the owner of it shall be free from dictation or inbut if he sells them under the names and characteristic terference; so long, of course, as he uses it without direct The conclusion which the author draws from his specula-labels of old and distinguished dealers, the public are liable injury to himself or others. In other words, his right is as tion is that "if there is any truth in all these sun spot to be deceived. For the sake of the public the courts will exclusive as his right to a horse or a gun, or a house that speculations, there must be a periodic variation in the sun's stop such imitations by injunction, and if doing so also protect he has reared or bought or made. rays, of which the sun spots are a mere sign, and perhaps an tects a meritorious manufacturer in the slowly-acquired unsatisfactory one. It is possible that the real variations reputation of his wares, so much the better. This was the body which should enact a law to the effect that in case A are more regular than the sun spot variations, and thus may old equity doctrine of trademarks. But it was a long and lends his horse to B, for friendship or hire, any other man perhaps be explained the curious fact that the decennial difficult inquiry, in many of these cases, which of the rivals might use the horse on the same terms? Or in case A crises recur more regularly on the whole than the maxima was first in the use of the disputed name or emblem. To should decline to lend his horse, B's unauthorized use of relieve this difficulty, to supply proof of the original owner- the animal would be punishable only by the payment of the To determine this mooted question, then, he suggests the ship and use, is a leading object of the trademark statutes. importance of at once undertaking direct observations upon Such statutes have been passed in England, by the Legislathe varying power and character of the sun's rays; and to ture of New York, and by Congress. They enable a dealer the whole farm shall be laid open to invasion on the same this end solar observatories should be established in every when he first adopts a trademark to register it as his own; terms? Or if C wants to occupy a room in D's house he country where the sun can be observed most free from at- and having done this, he can at any time appeal to the pub- shall be allowed to do so on payment of such rental as some mospheric opacity. If from such observations it be found, lic record to establish his priority of design. Conversely, as will probably be the case, that the sun does vary. "the any one proposing to adopt a trademark can ascertain from time will come when the most important news for the com- the record whether the same design has been appropriated.

Our people have little concern with the English law; it is concerning the solar power." And he adds that certainly an the confusion between State and National faws which needs empire upon which the sun never sets cannot wisely neglect remedy. The first National law appeared in 1870, as one work of introducing it. As a rule, too, the inventor is very to keep a watch on that great fountain of energy, since chapter in a newly enacted revision of all the laws pertain-"from it we derive our strength and our weakness, our ing to patents and copyrights. This juxtaposition of sub-duce an invention so as to make it pecuniarily profitable. success and our failures, our elation in commercial mania, jects gave the impression that the taw rests upon the power Accordingly very favorable terms may well be offered to of Congress to secure to authors and inventors the exclusive the first to take hold of and work up a new invention. The right to their respective writings and discoveries. And now risks are great, and the promise of ultimate profit should be PROGRESS OF THE SWEDISH ARCTIC EXPEDITION. the objection is made that a trademark is not a writing or a correspondingly great. Would any cautious business man There is a strong probability that the Swedish Exploring discovery, and its designer is neither an author nor an in- be willing to assume such risk if he knew that when the

HOW TO UTILIZE OLD FRUIT CANS.

Perhaps one of the most appropriate uses of an old fruit can the can is filled with water the fluid can only escape into Professor Nordenskjöld has already shown that trading the ground very slowly. Thus a quart can, properly arof this method of irrigation leave no doubt of its success. dening operation.

SENATE BILL 300.—SECTION 2.

In all discussions of patent rights with reference to Mr. the Constitution, not by any change in the wording of the it stands, and can be got rid of only by an amendment of patent law.

The fatal objection to Section 2 of Mr. Wadleigh's hill is It provides that if the patentee chooses for any reason to phabet may come in and enjoy the privilege on the same terms. Still worse, if the patentee elects to retain the enthe penalty for the infringement being a license iee "deter-

The purpose of the American patent law is to encourage the exclusive right to the manufacture and sale of a patthe exclusive right to the manufacture and sale of a pat-ented invention he will stand a better chance of gaining a Fly wheel, diameter, 12 ft. 4 in.; weight, 7 tons.

What would be thought of the wisdom of a legislative customary license fee of the livery stable? Similarly if A allows B to plant a potato patch in the corner of his farm, one else shall decide to be sufficient?

Is there any less absurdity or injustice in making parallel provisions with respect to invasions of patent rights?

As a rule it may be said that the work of inventing a novel and useful device is less arduous and costly than the apt to be without the means needful to develop and introprofitableness of the invention came to be successfully de-

The great trouble with the framers of devices for facilitat-

favor.

BOILER FEEDERS FOR LOCOMOTIVES, ETC.

Among the improved appliances in this line proven by practical tests to possess superior merit, the Hancock Inspirator may be especially mentioned. The company's business announcement will be found in our advertising columns. The performances of this apparatus are in some respects remarkable. E. Howard & Co., the well known watch and clock makers, have one in use which they say draws the water from a driven well, some 75 feet distant, and a perpendicular lift of 20 feet, and also forces the water, when needed, 70 feet up into a tank at the top of the building.

For locomotives they are especially useful. Mr. James K. Taylor, master mechanic of the Old Colony Railway, states that every one of twenty-three of these feeders, now in use on the locomotives of the above company, is giving great satisfaction. Not one has had to be taken off for repairs. They supply all the water required by the engines, are found more reliable and economical than any pumps, which latter they do not hesitate to remove. They are more positive in working, less liable to clog, have greater range than any other device, and require less attention from the engineer in working them. Practical indorsements of this sort are worthy of the highest consideration.

An Economical Engine.

A compound condensing pumping engine, erected for the Buffalo (N. Y.) High Service Water Works, by the Holly Manufacturing Company, of Lockport, N. Y., recently tested under the supervision of Professor Greene, President of the Troy Polytechnic Institute, developed a duty of 80,-489,638 foot pounds per 100 lbs. of coal. Following are the

High pressure cylinder, 1, diameter, inches	25
Low pressure cylinders, 3, diameter, inches	25 ·
Double-acting pump cylinders, 4. diameter, in	15.5
Length of stroke of each cylinder, inches	33.
Total number of revolutions	25.650
Duration of test	20h. 15m.
Revolutions per minute	21.12
Piston speed per minute, in feet	106.16
Pressure on water gauge, in pounds	46.76
Pressure from reservoir supply, to be deducted	•-
in pounds	5.58
Actual water pressure, or load on the pump, in lbs.	41.18
Coal consumed, no deductions, pounds	5,400
Steam pressure, pounds	61.5
Vacuum, inches	26.5
Temperature of injection water to air pumps, de-	
grees, Fah	48.
Temperature of water in hot well, degrees, Fah	92.
Temperature of feed water to boilers, deg., Fah.	170
Air pumps, two single acting, diameter, 24 in.	_••
stroke, 30 in.	
Suction and discharge nines diameter 04 in	

Duty in foot pounds, per 100 pounds of coal... 80,489,638

This engine is similar to that described in the Scientific the public from imposition. Any man may make and sell perty is. The Constitution provides that during the life of AMERICAN, vol. XXXIX., p. 95, and in SUPPLEMENT No. 140.