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NEW INVESTIGATIONS ON THE EARTH'S HEAT.

The theory ordinarily accepted as accounting for the eation and present condition of the earth is based on nebur hypothesis, and assumes that the globe, at one time gas ous, subsequently became molten, and is in that state now rith the exception of a comparatively thin crust, estimated be about to be about 60 miles in thickness. Our knowedge of the interior condition of the earth, however, is ainly speculative; and the strongest support to the above neory is met with in the increase of temperature noted on escending into mines and like excavations. This increase is stimated to be about 100° per mile; so that, supposing it to ontinue through a distance of but 100 miles, or $\frac{1}{35}$ part of ne earth's radius, a temperature of no less than 10,000° ah. must exist at that depth below us. Such a temperature rould liquefy all solid substances with which we are ac uainted, and vaporize many solid elements. On the other and, it may questioned whether the effect of the immense ressure on the earth's interior, due to the action of the imrisoned vapors and to the superincumbent weight, must ot suffice to remove the limits of the solid crust far below he above estimate: so that liquefaction may begin only at a istance of several hundred miles from the surface, and nere may be still sufficient viscosity in a large part of the emaining interior portion to prevent free movement of the quid nucleus.

We have said that our knowledge is but speculative, and s principal confirmation is found in the fact that, wherver excavations have been made, the increase of temperature oted is met with. From this, however, it follows that, if the interior of the globe is in a state of fusion, the relative distances necessary to descend in order to produce like augmentations of heat must be comparatively less as the center of the earth is approached. The heat coming from the interior, transmits itself by conduction while traversing spheres more and more vast; and supposing the conductibility of the mass to be uniform, the temperature of the exterior, layers of the globe should diminish in proportion as their volume augments.

Recent investigations by Professor Mohr, of Bonne, at the deepest well in the world, have adduced results altogether at variance with the preconceived estimates referred to above, and which, if hereafter substantiated in other localities, will tend to throw grave doubts on the igneous theory of the earth. The well in question is located at Speremberg, near Berlin, Prussia, and has been sunk to a depth of 4,000 feet. The thermometric record is as follows:

Depth	Thermometer (Réaumur)	Increase per 100 feet
700 feet	15·654°	
900 "	17·849°	1·097°
1.100 "	19·943°	1·047°
1.300 "	21·939°	0·997°
1 500 "	23·830°	0.946°
1.700 "	25.823	0.896°
1.900 "	27·315°	0.846°
2.100 "	28.906.	0.795°
3,390 "	36·756°	0.608°

The third column decreases in arithmetical proportion, showing for each descent of 100 feet equal differences of 0.050° or $\frac{1}{20}^{\circ}$ Réaumur, equal to 0.11° Fah. Applying this ratio to the depths below 700 feet, and between 2,100 and 3,390 feet, Professor Mohr forms a table as follows :

Depth	Increase per 100 feet	Depth	Increase per 100 feet
100 to 200 feet	1·35°	1,500 to 1,700	0·896°
200 " 300 "	1·30°	1,700 " 1,900	0·846°
300 " 400 "	1·25°	1,900 " 2,100	0 ·7 95°
400 " 500 "	1·20°	2,100 " 2,300	0·745°
500 " 600 "	1·15°	2,300 " 2,500	0.692°
600 " 7 00 "	1·10°	2,500 " 2,700	0.642°
700 " 900 "	1·097°	2,700 " 2,900	0·595°
900 " 1.100 "	1·047°	2,900 " 3,100	0·545°
1,100 " 1,300 "	0·997°	3,100 " 3.300	0·495°
1,300 " 1,500 "	0.946°	3,300 " 3,390	0·445°

Continuing this, the author finally determines that, at a depth of 5,170 feet, there will be no further increase of temperature, and that the heat indicated at that distance will be true to the centerof the earth. Obviously also this temperature will not very greatly exceed that marked by the thermometer at 3,390 feet, or 35.756° Réaumur, equaling 114.701° Fah.; so that, according to these observations, the highest internal heat of the globe falls below that of boiling water.

for the working classes is one with which students of social

provided, the epidemics which yearly afflict the denizens of tenements, and are due most frequently to foul and impure air, may be expected. Nor can we hope to materially decrease the number of the intemperate so long as the attractions of the bar room are set off against cheerless and comfortless homes.

There are two ways of accomplishing the required end, namely, either the workmen may coöperate or capitalists can promote the matter as an investment. Both plans have been successfully tried in England. It is certain that to wait for philanthropy to do the work is not wise. On one hand, philanthropists like George Peabody, or Peter Cooper, or Baroness Coutts are few and far between; and on the other, a majority of working men possess a feeling of independence to which the notion of accepting any benefit savoring of charity is especially repellent. Experience has shown that the working man will prefer poor and even unhealthy quarters to the best accommodations, so long as the latter savor of the almshouse in disguise. While such schemes are necessarily based on philanthropy, that fact is best kept in the background, and the project should be put on a dollars and cents basis, which precludes the idea of obligation.

Now as to the two practical ways: The practice of cooperation has been a favorite one among English working men for many years, and it has worked marvelous results. It is based on the sound policy of cash payments. and dividing the profits of trade among members. Land and building societies are two of its forms. A working man desiring a house joins a society, who effect the lease for him. Instead of paying his landlord, he pays a certain subscription and interest to the society; and when his subscriptions are paid up, the association buys the house and conveys it to him. Those who do not purchase houses receive a dividend and bonus on their shares. The Permanent Building Society, of Leeds, England, has furnished healthy tenements for about two hundred families. There are also towns and villages in Lancashire where very large sums have been saved. In Burnley, the Building Society, of 6,600 investors, in one year saved \$800,000. This society has assisted in hundreds of cases by advancing money on mortgages, which are repaid by easy instalments. It will be seen that these societies aid men to keep themselves by saving money to buy their own homes: and when it is considered that no such wages, even proportionately to cost of living, are paid in England as American workmen receive, the results show wonderfully the advantage of the habits of thrift thus promoted.

Passing to the second plan, this is also divisible. It may be carried out by individual employers for the benefit of their employees, or by corporations for the benefit of the whole working class in general. The former would be the course in manufacturing villages and towns, the latter in great cities like New York. We can best exemplify the working of both by example. In South Lancashire, the cotton spinning mills of the Messrs. Ashworth have been in operation for some seventy years. Owning a large tract in the vicinity, the proprietors have built complete villages The cottages are of stone, two stories, and very comfortably arranged. The rentals are at fair prices. The men are paid regularly, and they in turn as regularly pay their rent. Schools are provided. In a word, so well organized and controlled is the great establishment that crime and misery are practically unknown. Drinking shops are abolished, there has never been a case of theft in the place, and great numbers of the men have become owners of their own houses. At Saltaire, where the vast wool-spinning works of Sir Titus Salt are located, 756 houses are rented by the work people. Each house is separate in all its appointments, has every sanitary convenience, and the rent is within the operative's means. There are no drinking houses; but in their place are public laundries, baths of all kinds, libraries, schools, reading rooms, and, in fact, Saltaire is as near Utopia as the most enthusiastic social reformer might hope.

So much for single-handed work. Great as are its results, they are exceeded by those achieved by the Industrial Dwellings Company in London. Here is a corporation based on a philanthropic foundation, but conducted on business principles, which render its working a model for future emulation. Some fourteen years ago Sir Sydney H. Waterlow (who, by the way, is now in this country, serving as chairman of the ***** WORKING MEN'S HOMES SIR SYDNEY WATERLOW'S English jury on the Paper and Stationery Department of the LONDON ENTERPRISE. Centennial, and to whom we are indebted for the following The problem of providing healthy and comfortable homes facts) erected at his own expense a block of dwellings in the heart of London, provided them with every convenience, and rented them to about 80 families at sums sufficient to, yield science have largely dealt in Europe, and one which, ere very long, must in this country demand earnest and thoughta fair return on the outlay. So satisfactory were the results ful consideration. It is an undeniable fact that, so long as that a company was formed, with a capital of \$250,000, to erect more buildings on a similar plan. The capital has from working men are compelled to live in the vicinity of squalor time to time been increased, and at present the total re-sources are about \$5,000,000. The income is 11 per cent on or filth, or are crowded into tenements where every sanitary precaution is neglected, their condition, both moral and physical, must suffer; and the legitimate result is the injury the cost of the property; and for the past five years, there has been a large surplus profit after paying 5 per cent divi and depreciation of the class in whose well-being the prosperity of the community in great measure depends. For dends. There are now 1,596 tenements in occupation, ac economical reasons, if none other, society cannot afford this commodating 6,750 people; others are in progress, and the undermining of its foundation; and hence it follows that, present capital will provide 2,799 tenements, to accommodate philanthropy aside, it is to the interest of all to keep the 12,115 people. subject agitated until some amelioration of the present state The buildings are of brick, ornamented with copings of artificial stone, made on the spot by the company, from of affairs is accomplished. Portland cement and coke breeze. This is easily and cheap-Relief from the overcrowded tenement is, perhaps, nowhere more needed than in New York. Rapid transit, when ly molded into tasteful forms, and is remarkably durable. gained, will do much towards improving matters by opening The tenements, which are entirely separate, contain from two to four or five rooms; and every one, whether large or cheap homes in the suburbs; but even then an immense small, contains a compact little kitchen fitted with a range, number of people will still be obliged to live in the heart of the city. For them, and for their brethren in other popuboiler, clothes chest, and sink, and is provided with an abundance of water. The closets are detached from the tenements, lous localities, as well as for working men in factory towns, improved homes are urgently needed; and until the same are and are separately ventilated. There is also a neat contrivance

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