

working of an inscrutable providence; and we must be resigned to our fate if we do not insure against it. The fire hazard has been very accurately computed, and it is known approximately just how many persons will insure their property, and how high it is necessary to put the premium in order to pay the losses and expenses. Whenever a tremendous conflagration like that of Chicago or Boston breaks forth, these estimates are entirely wrong, and many companies are forced to the wall. It is impossible, however, to allow for such calamities; and it is probable, that, excepting some minor changes, no radical change in fire insurance has occurred on account of those fires.

Tornado Risk.

If we knew, approximately even, just the loss from tornadoes, and could place the insurance where the loss of houses blown down and the expense of insurance would not be greater than the gain in premiums, we would have an ideal state of insurance, and we could tell just the amount each householder should pay. Or if we knew just the average loss per year in the tornado States, and could persuade enough people to take up this kind of insurance, it is plain the business could be carried on profitably. One difficulty now encountered is, that people do not ordinarily see that the risk is any thing like that represented (which is true), and consequently only a small fraction of this kind of insurance is taken as compared with fire insurance. It would take a great many years to determine tornado risks with sufficient accuracy to estimate the amount of premium needed; but we can make a comparison with the risks and losses by fire, and thus arrive at an approximate solution of the question. It should be noted, however, that these risks are of very different characters. The fire risk is ever present and a perpetual menace. Moreover, it is one which is in great danger of propagating itself, or becoming enormously great by communication from house to house. A tornado is more like an accident: it happens at the rarest intervals, and there is no spreading. We might compare these risks as those coming to a man's life in going to a fever district and in going to a tornado district respectively, as was done above. It may be objected that we cannot compare fire insurance with that for tornadoes, in that fire losses are much greater in large cities, where the population is denser than in the country. The objection is not a serious one, for the reason that the greatest destruction from tornadoes has been in our large cities; and, again, the protection against fire is much more perfect in the city than in the country; in fact, insurance premiums are less in the city than in the country on a great many kinds of property.

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NOTES AND NEWS.

THE *Open Court* of Chicago has republished in a volume entitled "Wheelbarrow" a series of articles and discussions on the labor question that have been appearing in its columns for some time past. The anonymous author of the work tells us in his introductory chapter that he was for a considerable part of his life a manual laborer, though he has since risen to higher positions. Hence he speaks of the workingman's life from actual experience, and so far is qualified for the work he has here undertaken. But unfortunately he has not taken the trouble to study the scientific aspect of the subjects he deals with, and even confesses his mental

incapacity to do so. He has, however, many sound and sensible ideas, though none of them are new. He is opposed to all forms of communism and anarchism, and equally so to Henry Georgeism, and animadverts severely on the monopolistic spirit of the trades unions. But he writes in a coarse style, and often in a tone of arrogance and of bitterness towards capitalists that repels the reader. On the whole, we cannot see that he has contributed any thing to the solution of the labor problem.

—It is a well-known fact in biology that bacteria and bacilli absorb aniline and are killed by it. Two German observers—Stilling and Wortmann—have recently considered the possibility of utilizing this property in medical treatment (Humboldt). The diffusibility and harmlessness of violet aniline dyes (called, for brevity, "methyl-violet") without arsenic, in small doses, were first demonstrated on rabbits and guinea-pigs, as we learn from *Nature* of June 26. Then certain eye-disorders were produced in those animals, and treated with aniline solution, the results being excellent. The authors proceeded to operate on the human subject. A skin ulcer on a scrofulous child, which had been treated for a month with the ordinary antiseptic agents without success, was gradually healed by daily dropping a little aniline solution on the sore, and similar good results were had with bad cases of eye-disease. It soon appeared that many surgical cases were open to successful treatment in this way, and that, in general, wounds and sores developing suppuration could be sterilized with aniline. It is also thought that cases of internal inflammation, as in pleuritis and peritonitis, may prove to be not beyond the reach of this order of treatment.

—The commission appointed to consider the question of coal-waste in the State of Pennsylvania,—J. A. Price, E. B. Cox, and P. W. Sheaffer,—who may be addressed at Scranton, Penn., are desirous of making the investigation as comprehensive and as exhaustive as possible. It is of course absolutely necessary to obtain the results of all the best practical experience upon the subject, so as to, as far as possible, diminish in the future the waste, and to encourage the utilization of what are now waste products. This commission would be very glad to have a full expression of views upon any of the following divisions of the subject which they have adopted for the study of this most important problem. The divisions are as follows: geological and statistical waste, including estimate of the original geological coal-field and waste of erosion, estimate of existing coal-field before coal-mining began, estimate of amount worked to the present year, and estimate of the total amount that it is possible to take from the earth by any known system of mining (giving the amount that must be left in the ground in shape of pillars, etc., or what may be regarded as permanent structural waste); waste of producing and marketing, including investigation of the underground waste of mining, investigation of the waste of preparation (including all processes in which the commercial size has been continually reduced, the amount of culm in sight at place of preparation, and the annual product of culm), and investigation of the marketing of the pea, buckwheat, bird's-eye or rice, and dust, and the uses to which the several sizes or conditions are put; utilization of coal-waste, including examination of the whole briquette system, duly recorded tests under responsible supervision, patent office records, specimen forms, and chemical analyses, accumulation of the record of all the practical mechanical appliances by which the waste is utilized without mechanical preparation (such as devices of furnaces, grates, blowers, etc.), investigation of the use of waste after mechanical preparation for combustion (as in pulverized conditions, etc.), and examination of the gasifying processes into water-gas and producer-gas, also in the destruction of garbage or cremating work, also in agricultural experimentation.

—According to a newspaper bulletin just issued by Dr. C. M. Weed, entomologist of the Ohio Experiment Station, the maple bark-louse has become destructively numerous over a large portion of Ohio, and is creating much alarm by its presence. It is especially at work upon the shade-trees of cities and villages, and unless checked there is every indication that the trees will be seriously injured. The insect has been reported as very abundant

in Cleveland and Canton, and is present in many parts of Columbus. It probably occurs, also, in a large number of other cities and towns of the State. The presence of the pests is shown by the occurrence upon the twigs of maple-trees, especially on the under side, of a brown, circular, leathery scale about one-quarter of an inch in diameter, beneath which is a fluffy, cottony mass, that at this time is alive with hundreds of young lice, appearing to the unaided eye as minute white specks moving about. About six years ago there was a similar outbreak of this insect in Ohio, Illinois, Michigan, and adjacent States, when many trees were rendered unsightly and filthy by the presence of the lice, and some were killed by the attack. This maple bark-louse is an insect belonging to a family of peculiar habits and histories. Under each of the scales there was a month ago from 700 to 1,000 small white eggs. These eggs have since hatched into young lice, which are now scattering over the trees, and will soon fix themselves upon the leaves, where they will remain throughout the season. They insert a tiny beak into the leaf, and suck the sap. In autumn before the foliage drops they desert the leaves, and fasten themselves to the twigs. Much of the sap that is sucked from the foliage passes through the bodies, and falls to the ground. This is frequently called honey-dew. Some of the most intelligent citizens of Columbus report that during the outbreak of 1884 they cleared their shade-trees of the scales and young lice by using a stream of water from the hose, forcing it into the trees, and washing them off. When this simple water treatment is not practicable, the next method would be spraying with what is known as kerosene emulsion. These bark-lice have various natural enemies, which prey upon them. These enemies checked the outbreak quite suddenly in 1885, and probably in a year or two they will reduce their present numbers below the danger line; but in the mean while artificial remedies should be used as much as practicable.

—*Das Wetter* for May contains an article by Dr. P. Perlewitz upon the influence of the town of Berlin upon its climate. He finds, as given in *Nature*, that the difference of the mean temperature between the town and the open country outside differs, in various months, from 0.7° to 2.3° , the town being always warmer. The smallest differences are in spring and winter. The greatest daily differences are found to be in the evening, owing to a retardation of radiation in the town. From this time the difference decreases until about mid-day, when there is no perceptible difference between the two localities. Dr. Hann has found similar results for Vienna; but the differences there are smaller, owing to the better exposure of the town station. The humidity is less in the town than in the country. In the evening, in June and July, the difference amounts to above 19 per cent. No appreciable effect appears to be exerted by the town upon the rainfall, as compared with that of the country stations.

—Mr. Belebubsky, professor at the Institute of Roads and Waterways at St. Petersburg, was some time ago instructed by the minister of public works to make an examination of the suspension bridge over the Dnieper at Kiew, which was erected some forty years ago by the late Mr. Charles B. Vignoles, and to give an opinion as to the quality of the metal used in its construction. Luckily, from a scientific point of view, a number of extra links which had been provided at the time of the erection of the bridge, were still in store, and it was thus possible to determine by comparative tests what changes the material of the links of the bridge had undergone in their forty years of service. The links in question, according to *Engineering* of June 20, were about 11 feet 9 inches long, by $11\frac{1}{2}$ inches broad, by 1 inch thick. Stated briefly, the results of the tests show that the iron has not at all deteriorated during its long service. The mean of four specimens of links taken from the bridge gave an ultimate strength of 20.7 tons per square inch, with an elongation of 14.5 per cent on 8 inches, while an equal number of tests of specimens from unused links gave a breaking stress of 22.2 tons per square inch, with an elongation of 13.4 per cent in 8 inches.

—There is a disease in Japan known as *kakke*, a disorder of the kidneys communicated by bacilli, and closely related to the more virulent *beri-beri*. From the distribution of *kakke*, M. Gueit, as

related in *Nature*, has drawn conclusions as to the ethnic composition of the present population of Japan. The fact that Chinese always escape the disease, even in localities where it is very prevalent, indicates (in his opinion) that the Chinese or Mongolian element is not the dominant one. He finds three constituents in the population: (1) descendants of Ainos; (2) descendants of Negritos; and (3) a Malayan element, which is the most prominent. Wherever the Malayan goes, he brings with him the *beri-beri* order of disease, his liability to this being probably due to the Hindoo blood in him. From India we find *beri-beri* spread, like the Malays, to Madagascar on the one side, and to Japan on the other; we meet with it also in Java, Sumatra, etc. According to the proportion of Malay blood in the natives of Japan is the frequency of the malady, which occurs in various forms and under different names. As to the Negrito element in Japan, M. Gueit found an interesting proof of it in the island of Sikok, in the form of a small statuette of Buddha, having the characteristic nose and hair of the Negritos.

—The long imprisonment of beetles within furniture is treated of in the last report issued by the New York State Museum of Natural History. It is suggested that when such cases occur, the conditions may bring about a lethargic state in which respiration and accompanying phenomena are almost or entirely suspended through the complete exclusion of air by the rubbing, oiling, and varnishing or other polishing the furniture has undergone. This instance of the imprisonment of a beetle is cited, says *The Illustrated American*: "In 1786 a son of Gen. Israel Putnam, residing at Williamstown, Mass., had a table made from one of his apple-trees. Many years afterwards the gnawing of an insect was heard in the leaves of this table, which noise continued for a year or two, when a large, long-horned beetle made its exit therefrom. Subsequently the same noise was heard again, and a second insect, and afterward a third, all of the same kind, issued from this table-leaf; the first one coming out twenty, and the last one twenty-eight, years after the tree was cut down."

—Dr. G. Hellmann, to whom meteorologists are indebted for various interesting investigations into the history of meteorology, has contributed to *Himmel und Erde* (Heft. 3 and 4, 1890) two instructive articles on "The Beginnings of Meteorological Observations and Instruments." He divides the history of the development of observations into three periods: (1) that ending with the middle of the fifteenth century, up to which time they were of a very fragmentary and almost aimless character; (2) that in which observations were taken at least once a day; and (3) that in which they were systematically taken with instruments, dating from about the middle of the seventeenth century. It is not exactly known who first kept a regular meteorological journal; but Humboldt attributes it to Columbus, on his first voyage to America in 1492, while the Italians also appear to have made daily observations from the middle of the fifteenth century. The wind-vane is by far the oldest of the meteorological instruments. In the periods of Homer and Hesiod, in the ninth and eighth centuries B.C., the qualities of the winds were correctly described. The first arrangement for observing the wind-direction is the Temple of Winds at Athens, which was built about 100 years B.C. A picture of this tower is given by Dr. Hellmann. Eginhard, in the reign of Charlemagne, denoted the winds by the four cardinal points, and their variations. The first instrument for denoting the force of the wind is ascribed to Robert Hooke (1667). This instrument is essentially the same as that now used, and known as Wild's pendulum anemometer. The absorption or organic hygrometer was invented about the middle of the fifteenth century, by N. de Cusa, although the invention is generally ascribed to L. da Vinci. The first condensation hygrometer is attributed to the Grand Duke Ferdinand II. of Tuscany. The first continuous hygrometrical observations appear to have been by R. Boyle, at Oxford, in June, 1666. The first thermometer is attributed to G. Galilei, towards the end of the sixteenth century. Some few years later, the instrument was improved, although the freezing-point was the only fixed point determined; and the graduation was made by means of little knobs in the glass, every tenth one being enamelled. The first rain-gauge was used by B.

Castelli in 1639, although usually a later date is quoted. The discovery of the Torricellian tube, in 1643, is too well known to require special remark. These are only a few of the very interesting points referred to in Dr. Hellmann's instructive investigations.

— At the regular monthly meeting of the American Institute of Electrical Engineers, held June 17, 1890, the following resolutions, recommended by the council, were introduced by Mr. Francis B. Crocker, with the request that they be taken up for action at the next meeting of the institute in September: "Whereas it has been the custom in the nomenclature of electrical units to perpetuate the names of men who have contributed most to electrical science; and whereas, in the names thus far adopted, the eminent services of Americans have not been recognized: therefore resolved, that in the opinion of the American Institute of Electrical Engineers, a just distribution of the honors thus bestowed necessitates a recognition of the splendid contributions to electrical science of one or both of America's great electricians, — Benjamin Franklin and Joseph Henry; that this institute will gladly co-operate with other bodies in this country and abroad to secure the general adoption of these names for electrical units; that the name of 'Henry' should be given to the practical unit of self-induction, since he was the discoverer and greatest investigator of this phenomenon, and because this unit at the present time is called a quadrant, which is merely a numerical value, and not a suitable name; and that this institute recommend to electrical societies and electrical engineers the general use of the name 'Henry' for the unit of induction as being the quickest and surest way to secure its final adoption." It is unfortunate that the name of "Henry" for the unit of induction was not adopted at the Paris Electric Congress of 1889. If the attention of the congress had been forcibly called to the fact that Henry discovered self-induction, and that his work on both self and mutual induction was of the greatest importance, his name would probably have been adopted then. Henry's discovery of self-induction, which is, of course, the fact that gives the strongest claim, was made in 1832, and published the same year in *Silliman's Journal*. In that paper he described experiments showing that the spark obtained by breaking a circuit composed of battery and a long wire is greater than with a short wire, and that the spark is further increased by coiling the wire. He then clearly states that the phenomenon is due to the action of the current on itself, all of which is perfectly correct, and would be a good statement of the facts even at the present time.

— The thirty-ninth meeting of the American Association for the Advancement of Science will be held at Indianapolis, Ind., beginning on Tuesday, Aug. 19, 1890, at noon, by a meeting of the council at the Denison House, where will be the hotel headquarters of the association. By special favor of the State authorities the general sessions and the meetings of the sections will all be held in the new and commodious State House, where also will be the offices of the local committee and of the permanent secretary. This meeting will be the fiftieth anniversary of the organization of the Association of Geologists and Naturalists, the parent of the American Association, which will add to the interest of the meeting. The arrangements made by the local committee for the comfortable entertainment of the large number of members and their friends expected to be present, and the unusual accommodations offered, by which all the sections will meet in large halls under one roof, will probably make this the most important meeting ever held in the West. Indianapolis is as comfortable in August as any city away from the seacoast. Its streets are wide and well shaded, and its hotels are large and comfortable: so members need not be deterred from going there by the fear of extra heat and discomfort. On Wednesday, Aug. 20, the first general session of the meeting will begin at ten o'clock in the forenoon in the House of Representatives. After the adjournment of the general session, the several sections will organize in their respective rooms. In the afternoon the vice-presidents will give their addresses before their respective sections; and in the evening there will be a general session, when the retiring president, Professor T. C. Mendenhall, will deliver his address. The

sessions will continue until the Tuesday evening following; and on Wednesday morning, Aug. 27, a meeting of the council will be held. Saturday, Aug. 23, will be given to excursions. The meeting will close with excursions extending to Aug. 30. A special circular in relation to railroads, hotels, excursions, and other matters, will be issued by the local committee; and members who are about changing their address for the summer should notify the local secretary at once, and he should be addressed upon all matters relating to local arrangements and in relation to transportation. For all matters pertaining to membership, papers, and business of the association, address the permanent secretary at Salem, Mass., up to Aug. 15. From Aug. 15 until Aug. 30, his address will be The Denison House, Indianapolis, Ind.

— The death-rate in England in 1889, according to *Medical News* of July 5, was 17.9 per 1,000; in 1888, 17.8 per 1,000. For each of the nine years 1881–89 the rate was lower than in any year prior to 1881, and the average annual rate for that period was only 18.9 per 1,000. For the ten years 1871–80, the average annual rate was 21.4 per 1,000. This shows a saving of 2.5 in every 1,000 of the population, comparing the last two decades with each other. The registrar-general of England estimates that not less than 600,000 people in England and Wales at present survive by reason of the declining mortality rate; that is, if the rate 21.4 per 1,000 had persisted in the past nine years instead of falling to 13.9, there would have been 600,000 more deaths. This improvement is no doubt largely referrible to the improved sanitary condition of the United Kingdom, more especially in the great cities. One proof of this is seen in the decreasing mortality from zymotic diseases, such as small pox, scarlet-fever, and typhoid-fever. Infant mortality, also, has shown a marked decline, and is another index of the life-saving results of an improved sanitation.

— Miss Fawcett's triumph in the mathematical tripos puts the crown on a long series of successes by lady students at Cambridge. There have now been lady "seniors" in all the important triposes (except law). Here is the list: — Moral science tripos: in 1880 Miss Jones was bracketed senior, in 1881 Miss Moberly was senior, and so in 1884 was Miss Hughes. Historical tripos: in 1886 Miss Rolleston (daughter of the late Oxford professor of zoölogy) was bracketed senior, and in 1887 Miss Blanche Paul was similarly placed. Mediæval and modern languages tripos: here there have been four lady seniors. In 1886 two ladies and no men were placed in the first class. The ladies, who were placed in alphabetical order, were Miss Chamberlain and Miss Skeat (daughter of Professor Skeat). In 1887 Miss Harvey was senior; and in 1888, Miss Tuke (whose father is well known in connection with schemes of Irish emigration). Finally, there are the successes of Miss Ramsay in the classical tripos (1887), and of Miss Fawcett in the mathematical (1890). Of these eleven lady seniors, two came from Girton (Miss Jones and Miss Ramsay), the rest from Newnham. It is often asked what becomes of lady students when they leave college. A few particulars about some of these lady seniors may therefore be added. Miss Ramsay is now Mrs. Montague Butler, the wife of the master of Trinity; Miss Moberly is head mistress of the Tunbridge Wells High School for Girls; Miss Hughes is head of a training-college at Cambridge; Miss Chamberlain is instructor in German at Bryn Mawr College, Philadelphia; and Miss Jones is moral-science lecturer at Girton. Promptly to repair the apparent neglect of legal studies came the news of the success of women law-students at Paris, where Mlle. Belcesco, a Roumanian girl, has just taken her degree as *docteur en droit* after obtaining the highest place in the licentiates' examination. A French lady and two of Russian birth also did well. The London *Daily News* tells us one or two interesting facts about Mlle. Belcesco,—that she means to practise at the bar at Bucharest, confining herself to the cases of poor women who cannot pay counsel; and that her thesis for admission to the Paris faculty contained seven hundred pages, of which two hundred were, with an exercise of prudence on the part of the lady, not read. The fact that not Portia herself would be allowed to practise in England no doubt explains why women have not yet carried off the honors of the law tripos at Cambridge.