

accumulated matter. Bookcase after bookcase is bought until the walls are no longer visible—all to lodge a treasure for which he longed when it was beyond his reach, and of which he wearies when he can call it his own.

There are times, however, when we appraise this treasure at its full value. And the appraisal usually assumes the form of the depressing discovery that what we have thought has been thought by a hundred men before. There are also times when the spirit moves us to set down our thoughts for the benefit of a presumably grateful posterity; and then we look proudly on the hundred volumes piled up around us. In order to lighten the task of writing what we have to tell, we take down a few of the works that have proven of most value, with the intention of seeking some spot less oppressive than the bookish atmosphere of a library. Good as the intention may be, its carrying out is difficult. Six or eight volumes of generous proportions are not carried without some physical exertion. Twenty or thirty volumes, which may be required during a journey, would not be transported free of charge if the ardent student is otherwise incumbered with luggage. An encyclopedia weighs a hundred pounds or so; and its imposing length covers a majestic yard or two of a bookshelf. In a word, the size and weight of our volumes hamper us everywhere. The greater the value placed by the publisher on a work, the statelier is its appearance. Paper almost as thick as cardboard in *éditions de luxe*; broad margins; large type; ample spacing—everything contributes to render the book more unwieldy.

Naturally the question arises: Shall we always be able to manufacture enough paper to meet the ever-growing demands of the insatiable author and publisher? Our forests are not inexhaustible; and wood pulp is the material from which most paper is made. Even now the primeval forests of sparsely populated regions are swept away to satisfy the intellectual needs of more thickly populated lands. But what will happen when all countries are civilized, when all nations alike will need trees?

Clearly we must soon adopt the expedient of our letter-writing forefathers. We must stint ourselves in some way—not perhaps by curtailing the number of books which we write, but by reducing their weight and size. By microscopic print the end is not to be reached. Some improved form of "foreign note paper" must be invented to meet the requirements of the printer—a paper thin but not transparent, and capable of receiving an impression on both sides. Such a paper has not yet been generally introduced; but it must come sooner or later.

That the making of a paper having the requisite properties is not a technical impossibility was proven by an interesting exhibit which probably escaped the notice of many who visited the Paris Exposition. The exhibit in question was made by the Oxford University Press and consisted in part of works printed on "Oxford India paper," remarkable for its extraordinary thinness, toughness, and opacity. Specimen pages of the Bible, Shakspeare, and the *Encyclopædia Britannica* printed on the new and on the ordinary paper and bound in volumes of the same form, proved that the size of a book could easily be reduced by one-half without impairing the legibility of the text. How this new paper is made cannot be learned. But whatever secret process may be employed, it is certain that the exhibit was made in a spirit that should commend itself to paper-makers and to book-makers.

#### PRESENT CONDITIONS IN ALASKA.

BY J. R. THOMPSON.

The month of June is the date of the opening of the summer season in Alaska, and the amount of work planned for this season devoted to developing and exploiting the resources of that vast territory far exceeds that contemplated or accomplished at any prior time. In the interior every tributary of the Yukon River has been more or less prospected and many of these stream beds and the adjacent country are being worked to a profit. The Klondike district of the Northwest Territory of Canada, just one hundred miles up the Yukon from the imaginary line which intersects the two countries, does not give promise of increasing its output of gold over that of last year, which amounted to \$12,000,000. Lack of new strikes or discoveries since the memorable find in 1896 has set a limit on the output of this famous mining camp. It was reached two years ago and is now on the decline, having at this date produced over \$80,000,000 in gold. But while the richest spots are a thing of history, the importation of modern machinery has made it possible to work to a profit low-grade propositions. Large pumping plants and heavy dredging machinery have ameliorated the condition of the mining operator and reduced expenses to a reasonable basis. One company has taken to Dawson this year 450 tons of machinery, the cost of transportation of which exceeded the original cost of the plant. Freight rates and high wages for day labor have deterred the rapid development of the Klondike district.

Now it can be safely stated that the wages for day labor will average \$4.50 and board per day. The Canadian government pays \$5 and board to all of its employes on government work.

The Nome mining district is daily increasing as a producer and is being extended over a vast expanse of territory, projecting from Golovia Bay to the Arctic Ocean and east inland from the Behring Sea as far as the difficulties of transportation will permit. As yet it has not settled to a defined limit, for prospectors are daily finding prospects in isolated districts which give evidence of substantial discoveries. The future of the northern mining camp, with its rigorous climate during all seasons of the year, is very promising. The known wealth in placer gold and the prospects of the development of the mineral veins and coal beds, of which there are ample indications, give evidence that for many years to come this section will be a great producer of valued minerals and a large consumer of produce and mercantile products.

The year just passed proved very profitable to this mining section, and as a consequence many necessary and costly works were begun. The need of water had curtailed development work heretofore, and to supply this need large ditches, tapping streams at a distance of twenty-five miles from the center of the mining section, were begun and the work vigorously pursued, until cold weather made it impracticable for further work.

One of the heavily interested corporations has now under its management one narrow-gauge railroad running out of Nome to its properties, a distance of five miles, and now has under construction a similar railroad from a point south of Nome (Golovia Bay) to Council City, the center of a mining district. This company has in operation on the bank of the Snake River, near Nome, a pumping plant costing \$75,000 at the builders' in Chicago, which delivers through a pipe line to an elevation of 800 feet, 3,000 gallons of water per minute. Another company sent 900 tons of machinery to Nome in one shipment last season and will construct a large pumping plant this year.

Day labor, as well as those employed in the trades, had a most prosperous season in the past year. The average wages paid for labor was \$5 per day and board. Some mining operators were compelled on account of lack of labor to pay as high as \$6 per day and board. It may seem strange that more laboring men do not flock to such a place; but every man who has served in this capacity will concur in the statement that every man is expected to earn the wages he is paid—that the laborer is well worth his wages.

Two new districts have recently attracted attention. They are known as the Tannan and the Copper River districts. They are deep in the very heart of the territory. Discoveries made last summer have developed so satisfactorily that this new find bids fair to gather round it a very substantial mining community. Valdez, a town on Cook's Inlet, the point from which all the miners start for this new discovery, is the gateway of a tremendous expanse of practically unexplored or unprospected country.

The need of some practical method of transportation is keenly felt. Last season the price of freighting to these new camps was \$1 per pound. This problem can be solved by the building of a railroad. A survey has been made from Valdez to Eagle City, on the Yukon, traversing the heart of this district; but as yet no steps have been taken for building the railroad. The prospects indicate that there is a vast amount of wealth in minerals and unnumbered acres of agricultural and grazing land in this district awaiting development. This season one thousand head of cattle will be driven to these grassy plateaus and slaughtered in the fall of the year. Another party contemplates bringing a similar number of sheep for the same purpose.

Along the coast of Alaska, especially in Cook's Inlet, men have prospected for oil for the past three years. During October last a gusher was struck seventy miles south of Valdez. All the adjacent land was taken up and recorded and companies formed for the further exploiting of the field. Since then large quantities of supplies and machinery have been forwarded to this point, and it is expected that further developments will reveal the existence of a considerable oil field. The surface prospects are decidedly encouraging. The gusher referred to, which is the pioneer in Alaska, was struck at a depth of three hundred feet, and the oil proved of an exceptional quality.

The annual spring stampede from the Pacific coast cities to Alaska is in progress. It is expected that at least 10,000 men will go into the new mining camps, 200 miles inland, while many others will be attracted to the new oil fields.

Since the development of the resources of the Pacific coast the value of its fish has proven to be one of its richest heritages, and to-day Alaska can claim a paramount position in that respect. Last year over \$8,000,000 worth of salmon was shipped from its ports. It might be well to state that Mr. Seward paid \$7,200,000 for these Russian possessions. Salmon canneries are now located on almost every stream of any importance from Mary's Island, the most southern point of the

territory, to the Arctic Ocean, and this year's output will far exceed that of the past year.

These canneries encroach upon the inalienable rights of the natives, sometimes depriving them of their livelihood. This is a serious matter and will soon resolve itself into a difficult problem.

#### SCIENCE NOTES.

In a note entitled "The Ear a Manometer," M. Pierre Bounier sets forth a new theory of hearing, to wit, that the liquid of the interior ear moves as a whole, so that audition is a hydrodynamic, not an acoustic, phenomenon. The ear is not a resonator, but a registering manometer, in which variations of pressure are alone recorded. He points out that the nerve of the labyrinth is thus brought under the common law of the apparatus of sensation.

Mdme. Curie, having obtained about a decigramme of pure radium chloride by fractional crystallization of radiferous barium chloride, has endeavored to determine the atomic weight of radium. The results of her experiments show that the atomic weight is 225 (taking Cl = 35.4 and Ag = 107.8), with a probable uncertainty of not more than one unit, radium being considered a bivalent element. The chemical properties of the element include it in the alkaline-earthly series, in which it constitutes the higher homologue of barium. In accordance with its atomic weight it should be placed below barium in Mendeleeff's table, and on the same line as thorium and uranium. Pure anhydrous radium chloride is stated to be spontaneously luminous.

The largest factory of chemicals in the world is said to be the aniline and soda establishment of Baden, in Ludwigshafen-on-the-Rhine. The works employ 148 scientific chemists, 75 technical engineers, 305 clerks, and more than 6,000 workmen. There are 421 buildings for factory purposes and 548 dwellings for laborers and 91 for officials. One hundred and two boilers furnish steam for 253 engines with 12,160 horse power. Gas is extensively used as fuel. Five large steam hoists on the banks of the river are used for loading and unloading. The works own a vessel, with a capacity of 600 metric tons, for the transportation of sulphuric acid. A network of railways, having a total length of 27 miles, connects with the state railroad system. Three hundred and eighty-seven cars are owned by the factory.

As a result of the numerous micro-chemical experiments with calcium metaphosphate, A. L. Herrera in *Memorias de la Sociedad Científica "Antonio Alzate,"* Mexico, propounds the theory that natural protoplasm is composed of this salt, impregnated with various substances absorbed or secreted under special osmotic and electrolytic conditions. Transparent vacuolated bodies of homogeneous structure, and of the consistency of natural protoplasm, have been observed, which have very striking analogies with protozoa in general, changing shape, swelling, dividing, and, on treatment with salt-solution, forming a plasmodium. Prof. Herrera shows several micro-photographs of the artificial protoplasm which he has prepared, and which consists solely of calcium metaphosphate, in actual movement in salt solution.

We have heard so much of what is poetically termed the "teeming millions" of China, that the official census recently published by the Imperial Treasury Department of China is of no little interest, since it furnishes a method of determining just how many "teeming millions" there are. It appears that the Celestial Empire contains 426,000,000 inhabitants, and that China proper—the eighteen provinces—contains 407,000,000. The table is given in the *Mouvement Géographique* of Brussels, to which readers are referred for details. The number of inhabitants per square kilometer varies from 201, in Ho-Nan, to 32, in Kan-Sou, and is, on the average, 103 in the eighteen provinces. In Mongolia, the number is 0.7; in Manchuria, 9; in Yibet, 5, and in Turkestan, 0.8. For comparison we may recall that Germany has 105 inhabitants per square kilometer; Belgium, 220; and the United Kingdom, 130.

The agricultural authorities at Barbadoes have been carrying out investigations to ascertain the effect produced by falls of volcanic dust on insect pests and other parasites of the field. The first examination was made after the fall on October 16 last to study the results. Taken on the whole, the dust appeared to have exercised but little effect, most of the insects having hidden themselves during the actual fall. Observations on the following day showed that the greater number of insects had escaped unharmed. Two-winged flies suffered severely, there being a notable absence of them after the dust. "Cow bees," "wild bees," and other hymenoptera suffered in the same way. Other groups practically escaped, so that the dust had little, if any, effect on the pests. The destruction of two-winged flies, "cow bees," etc., is not regarded as beneficial, as many of these serve to keep caterpillars and other pests in check.