

his skill and activity largely depends the success of the season. Mahogany-trees do not grow in clumps and clusters, but are scattered promiscuously through the forests, and hidden in a dense growth of underbrush, vines, and creepers. It requires a skilful and experienced woodsman to find them. No one can make any progress in a tropical forest without the aid of a *macheté*, or heavy bush-knife. He has to cut his way step by step. The mahogany is one of the largest and tallest of trees. The hunter seeks the highest ground, climbs to the top of the highest tree, and surveys the surrounding country. His practised eye detects the mahogany by its peculiar foliage. He counts the trees within the scope of his vision, notes directions and distances, then descends and cuts a narrow trail to each tree, which he carefully marks, especially if there is a rival hunter in the vicinity. The axe-men follow the hunter, and after them go the sawyers and hewers.

To fell a mahogany-tree is one day's task for two men. On account of the wide spurs which project from the trunk at its base, scaffolds have to be erected and the tree cut off above the spurs, which leaves a stump from ten to fifteen feet high. While the work of felling and hewing is in progress, other gangs are employed in making roads and bridges, over which the logs are to be hauled to the river. One wide truck pass, as it is called, is made through the centre of the district occupied by the works, and branch roads are opened from the main avenue to each tree.

The trucks employed are clumsy and antiquated contrivances. The wheels are of solid wood, made by sawing off the end of a log and fitting iron boxes in the centre. The oxen which draw these trucks are fed on the leaves and twigs of the bread nut tree, which gives them more strength and power of endurance than any other obtainable food. Mahogany-trees give each from two to five logs ten to eighteen feet long, and from twenty to forty-four inches in diameter after being hewed. The trucking is done in the dry season, and the logs collected on the bank of the river, and made ready for the floods, which occur on the largest rivers in June and July, and on all in October and November. The logs are turned adrift loose, and caught by booms. Indians and Caribs follow the logs down the river to release those which are caught by fallen trees or other obstacles in the river.

The manufacturing process consists in sawing off the log-ends which have been bruised and splintered by rocks in the transit down the river, and in re-lining and re-hewing the logs by skilful workmen, who give them a smooth and even surface. The logs are then measured, rolled back into the water at the mouth of the river, and made into rafts to be taken to the vessel, which is anchored outside the bar. The building of sloops and small schooners for the coasting trade is an important industry in the island. The frames of such vessels are made of mahogany, Santa Maria, and other native woods of well-tested durability, and proof against the ravages of worms, which abound in the waters.

At present the only woods exported from Honduras are mahogany and cedar wood, although the forests abound in other varieties, which Consul Burchard states are quite as useful and ornamental, and which must eventually become known in foreign markets, and open "new and inviting fields for industry and trade."

CANADIAN SOCIETY OF CIVIL ENGINEERS.

THE fifth annual meeting of the Canadian Society of Civil Engineers was held in Montreal on Jan. 15, when Col. Sir Casimir Gzowski, A.D.C., was re-elected president for the third time. In consequence of ill health he was unable to deliver the usual set address, but in a short speech he congratulated the society upon the continued and steady progress which it was making, stating that it already occupied a position which its sister society in the United States had not reached in the first decade of its existence.

The total number on the list now includes 633 members, associates, and students, and many original papers of engineering value have already been printed. It was also announced that the president had endowed a silver medal to be awarded annually for the best paper submitted during the year, provided such paper shall be adjudged of sufficient merit as a contribution to the literature of the profession of civil engineering. The first of these

medals has been awarded to Mr. E. Vautelet for his paper on "Bridge Strains."

During the past year the society has moved from the rooms generously lent by the University of McGill College to more commodious quarters specially fitted up for their accommodation, and centrally located on St. Catherines Street, near the Windsor Hotel.

The principal papers discussed by the society during the past year are the following: "The Screening of Soft Coal," by J. S. McLennan; "The Manufacture of Natural Cement," by M. J. Butler; "Columns," by C. F. Findlay; "Irrigation in British Columbia," by E. Mohun; "The Sault Ste. Marie Bridge," by G. H. Massy; "Generation and Distribution of Electricity for Light and Power," by A. J. Lawson; "Developments in Telegraphy," by D. H. Keeley; "Errors of Levels and Levelling," Parts 1 and 2, by Professor C. H. McLeod.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The editor will be glad to publish any queries consonant with the character of the journal.

On request, twenty copies of the number containing his communication will be furnished free to any correspondent.

Rain Formation.

It will probably be readily admitted that one of the most complex problems in meteorology is the explanation of the condensation of vapor into visible drops. Cloud has been formed in a receiver by cooling saturated air very rapidly, but it is doubtful whether actual raindrops have been formed artificially. One of the most serious difficulties encountered in studying the problem has been the fact that our observations have been made mostly several thousand feet below the point of formation of the rain-drop. Observations on mountain tops have shown a great increase in precipitation above that at the base; for example, the rainfall on Mount Washington (6,279 feet) is double that at Portland, Me., though the latter station is on the seacoast. In September, 1880, the precipitation was 15.23 inches and 3.20 inches, and for the year ending June 30, 1880, 97.10 inches and 45.02 inches, at the two stations respectively. An explanation of this apparent anomaly might aid in solving the general problem before us.

It has been held by some that the rocks and earth at the top of the mountain are colder than the air which blows over it, and for this reason there is the greater condensation at the summit; but it has been proved that the rocks on Mount Washington are several degrees warmer than the air, so that this explanation will not hold. Others have thought that warm saturated air, as it is forced up the side of the mountain, is very much cooled by expansion, and this cooling produces the increased precipitation. This does not hold, however, in the case of Mount Washington, because the top rises up like a sharp cone, and the increased rainfall covers an area many times greater than can possibly be affected in this way. I think it will be admitted that a large share of the precipitation on our mountains is formed within a few hundred feet of the top, in a vertical direction. If so, it would seem that we have here a most excellent opportunity for studying this problem.

There have been published recently, by Harvard College, a complete set of the observations made by the Signal Office at Pike's Peak (14,134 feet), from 1874 to June, 1888, and these are now in a most convenient form for study. It has occurred to me that a valuable addition to our knowledge of the conditions under which precipitation occurs might be made by studying the connection, if any existed, between the temperature fluctuations and precipitation at this elevated point. The usual view is, that a column of saturated air in which moisture is forming into drops or snow-flakes is warmer than the air all about at the same level, and for this reason it has a tendency upward. We may put this in another form: if we pass into a column of air in which rain is falling, we shall find the temperature steadily increasing from the circumference to the centre; or, if we take the second interpretation just given for the increased rainfall at the summit of a

mountain, a warm saturated air is continually rushing up the side of the mountain, and the temperature must necessarily rise as long as the rain is formed.

I have projected in curves all the temperature observations at Pike's Peak for the hundred and thirty-six months during which at least .75 of an inch of rain fell. There were thirty-eight months, in all, in each of which less than that amount fell. A very slight diurnal range was eliminated in the manner already indicated many times. Then the precipitation for each eight hours was placed upon the curve of temperature, and the condition of the temperature and precipitation was taken out under three heads,—first with rising, second with stationary, third with falling, temperature. The results for each month are given in the following table:—

Pike's Peak Precipitation and Temperature.

	TEMPERATURE.					
	Rising.		Stationary.		Falling.	
	Total Inches.	Per Cent.	Total Inches.	Per Cent.	Total Inches.	Per Cent.
January.....	3.38	16	4.05	20	13.40	64
February.....	3.22	17	4.92	27	10.27	56
March.....	5.24	17	6.17	20	19.31	63
April.....	13.84	25	16.17	29	26.13	46
May.....	14.68	27	20.11	37	19.98	36
June.....	7.11	27	6.53	25	12.66	48
July.....	17.48	28	16.05	26	28.49	46
August.....	10.38	19	15.32	28	29.19	53
September.....	4.48	20	5.37	24	12.69	56
October.....	4.41	24	4.63	26	9.09	50
November.....	4.29	17	6.88	27	14.34	56
December.....	3.09	17	3.11	17	12.26	66
Year.....	91.60	22	109.31	27	207.81	51

No one can be more surprised than the present writer at this extraordinary result, so contrary to all preconceived theories. We find that on the average more than half the rain occurs with a falling temperature. It seems probable, however, that in general the rain is independent of the temperature. While it might be thought that a falling temperature in a saturated air would tend to produce precipitation, yet such is by no means the fact. There are many cases in which a fall of from ten to fifteen degrees Fahrenheit has occurred in a saturated air without any corresponding rainfall. Whatever may be thought of these facts, there is one point that is certainly made perfectly clear in this discussion, and that is that the temperature in a column of air in which rain is falling is not *higher* than that of the surrounding region.

It is probable that some will think there is a contradiction between the results here presented and those given several times before, especially in this journal for Sept. 5, 1890, but I think this is only a seeming contradiction. While the great bulk of the rain in the eastern part of the country occurs with a rising temperature at the earth's surface, yet I have shown, that, during the passage of storms and high areas, the temperature in the upper air changes several hours earlier than at the earth (in the case of Mount Washington five to ten hours earlier); so that there may easily be a falling temperature where the rain is formed. Several months of observations at Mount Washington have shown practically the same result as at Pike's Peak.

For several years I have contended that there is absolutely no proof of an ascending current in the centre of our storms, or even where rain is falling. It seems as though the present discussion must be regarded as a culminating point, and a perfectly satisfactory disproof of such ascending current.

H. A. HAZEN.

Washington, Jan. 26.

BOOK-REVIEWS.

Socialism New and Old. By WILLIAM GRAHAM. (International Scientific Series.) New York, Appleton. 12°.

THIS is an interesting work. It is written in a more attractive style than that of most economic treatises, and bears the marks of study and thought as well as of a philanthropic spirit. It opens with a statement of what socialism is, its various forms being recognized and defined, with special attention to what is now the leading form of it, that known as collectivism, or nationalism, according to which the State is to be the owner of all the instruments of production, while private property in other things is to remain undisturbed. The author then sketches the history of socialism with special reference to the evolution of the contemporary forms of it, and showing the various contributions of Rousseau, St. Simon, Marx, and others to the doctrine as it is to-day. He then goes into an elaborate discussion and criticism of the proposed socialistic or collectivist state, pointing out the respects in which it would be sure to fail, as well as others in which its success would be very doubtful. The main objection he makes, and one that he rightly deems insurmountable, is the impossibility of determining the relative rates of wages of the different classes of workers in the socialistic state. He has no difficulty in showing that equality of payment would be impracticable, since the more skilful workmen and the abler managers could not be induced to put forth their best efforts except for relatively higher pay; while, on the other hand, there is no possible way to determine how much higher the pay ought in justice to be. Other objections, such as the impossibility of applying the collectivist scheme to foreign trade, the lack of personal liberty under a socialistic regime, and the difficulty of providing for intellectual workers, are also emphasized; and the conclusion is that the attempt to introduce the system "would bring chaos, and 'confusion worse confounded,' until human nature rose in revolt against the impossible thing."

But while Mr. Graham is no collectivist, he maintains that the condition of the laboring classes can be bettered, and ought to be bettered, and that the State ought to do it; yet he seems at a loss with regard to the means. He has some chapters on "practicable socialism," in which he advocates several measures of a more or less socialistic character, such as State loans to co-operative societies, allotments of land to laborers, and purchase of city lands by the municipalities, all more or less objectionable, and, as it seems to us, promising but little real benefit to the poor. Mr. Graham, in short, is more successful as a critic of socialism than as a constructive social reformer; the most useful suggestion he makes being that of giving all classes the means of getting a good education in order to equalize opportunities,—a suggestion, however that is not new. In his last chapter he discusses the supposed present tendency toward socialism, expressing the opinion that such tendency is overrated, and that counter tendencies are at work which will nullify the socialistic movement. Altogether, Mr. Graham has given us a useful discussion, and one that deserves to be read by all who are interested in the subject.

AMONG THE PUBLISHERS.

HENRY HOLT & Co. have just ready "Told After Supper," a series of brief burlesque ghost-stories by Jerome K. Jerome. Although represented as told in good faith by their narrators, the reader is sometimes let into a hint of realistic explanation which gives the touch of good-natured satire characteristic of the author.

—Benjamin R. Tucker, Boston, has just ready "Church and State," a new volume of essays on social problems, by Count Leo Tolstoi, translated directly from Tolstoi's manuscript. It was written several years ago, but has thus far been kept in manuscript.

—Roberts Brothers will publish Feb. 10 the following: "Petrarch, his Life and Works," by May Alden Ward (author of a similar work on Dante), a clear and well-written sketch, in which the subject is considered as the precursor of the Renaissance, and as one of the great triumvirate that created the Italian language and inaugurated its literature; and a volume entitled "Power through