of river flow there is no manner of doubt. I might refer to my paper, "The Grand River . . . Effect of Deforestation and Swamp Drainage" (Transactions Canadian Society Civil Engineers, 1905).

Recent approximate gaugings indicate the minimum flow of the Grand River to be only about one-quarter of one per cent. of the flood flow above the outlets of two tributaries, which are more steady. This means that one day of flood passes more water than a year's flow at the minimum rate.

Everyone who has given attention to the subject will agree with Professor Fernow that definite investigation must be the first step toward improvement: a full topographical survey, precipitation records, stream gaugings, etc.

There is one further item in Professor Fernow's letter to be commented on. He says: "The floods in large rivers are conditioned by quite different phenomena, rapid snowmelting and continuous rains. Here the value of the retarding quality [of forestation] becomes nugatory." The Grand River can be called a large river only for a very short time in the year, and it is undoubtedly largest when snow melting and rains come together. The normal season's snowfall on the head drainage area is about 110 inches. The past winter was one of unusually heavy snowfall. A large part of the snow remains until spring, and then, in the open fields, melts very quickly with a few warm days, especially with attendant rain. In the woods, however, melting of the snow is much slower, whether with or without rain. Absence of leafage does not nullify this retarding effect, but it is materially greater with continuous leafage, such as of the heavily timbered evergreen swamps, which covered a large part of the area in question, and which were so dense as to be almost impenetrable except in winter on snowshoes. With large continuous areas of forest or wooded swamp the retardation of snow melting is much more effective than with detached small areas.

This retardation Professor Fernow appears to have neglected. It renders the effect of forestation anything but nugatory; on the contrary, the effect is positive and potent. Yours truly,

W. H. Breithaupt.

May 9th, 1908.

## RAILROADING IN WEST AFRICA.

A most amusing and instructive lecture on railroad survey and construction work from Sekundi, on the west coast of Africa, inland to Ashantee, was delivered by Hilder Daw, C.E., before the Montreal Council of the Royal Arcanum on Monday evening, May 11th. The lecture was really a recital of personal experiences while Mr. Daw was serving as a Government Civil Engineer, where you are expected to die, added interest being centered in a large number of lantern slides, kindly loaned for the occasion by Dr. Todd, who went to Africa in connection with Scientific Research, regarding the devastating sleeping sickness. Without exaggerating discomforts and climatic deterrents, Mr. Daw gave the technical men present the torrid aspects of railway pioneering as distinct from the frigid prevailing in Canada-mosquitos being substituted for black flies, "explosive" tinned meats for frozen, diluted mud for drinking water instead of cracked ice, and quarreling, superstitious, often dishonest natives, for the imported Jap, Italian or Hungarian. Clearing party methods through virgin dense underbrush-the right of way and a chain on each side of it, no tumbling being permittedtrack-laying at the rate of a mile a day, the facility and freedom with which engineers nearer the base appropriated supplies, mechanical or for messes, were dealt with by the lecturer greatly to the enjoyment of his audience. Mr. Daw regards the Gold Coast, it's malarias and adversities notwithstanding, as the world's future cotton fields-when swamps are drained, mosquitos exterminated, and missionaries have a common sense religion for Ashantee people, from whom the American, West Indian Negroes were originally sold into slavery, often to very religious, but very thrifty leaders of Church thought.

## SURVEYORS LEAVE FOR THE NORTH.

Eighteen members of the Dominion Government Alaska boundary survey party in charge of J. D. Craig, Ottawa, left for the north to-night by the steamer "Princess May." A. J. Brabazon will this year co-operate with the American survey party south of Juneau.

They will ascend the Stikine River to the scene of their summer's labors. On a tributary of that raging waterway last fall, when on their way out, Mr. Craig's party had a close call on account of their boat striking a submerged log, and being shattered to fragments. All the cameras, survey instruments, as well as the photographic plates, representing a portion of the official records, were lost. Subsequent efforts shortly after the accident, and again during the season of low water in December, to recover these articles proved unsuccessful. As a result the particular work they were engaged at will have to be done over again.

The visitors will shortly be followed by other survey parties, which will outfit and engage assistants here. It is expected that it will take at least three years more to complete the surveys to the Arctic ocean.

## IMPORTANCE OF THE CHEMIST.

In a very interesting paper, entitled "The Chemist and the Community," Mr. Arthur D. Little shows that "few of the industries upon which the prosperity of the country and the comfort and material well-being of its inhabitants depend have not experienced within a generation changes so profound and so far-reaching in their effect as to be fairly described as revolutionary. It is within the truth to say that in the great majority of cases these changes have been initiated or accelerated by chemists. It is unnecessary, even if it were possible, to catalogue the materials for which, at prices permitting their general use, the community is indebted to the chemist. They comprise a large proportion of the things which are regarded as among the necessities of life, without which comfortable, or even decent, living would be impossible. With reference to productive industry generally it may be said that in many instances the chemist is the most effective agent for standardizing materials, controlling the course of processes, and minimizing wastes.

"The chemist has been similarly active in respect of matters pertaining to the public health. One has but to recall the splendid pioneer work in connection with the study of public water supplies in Massachusetts, work which is still regarded everywhere as the standard for other communities. The sanitary engineer cannot work without the chemist, the physician relies upon him for the most potent means for avoiding or arresting disease or alleviating suffering, and domestic economy and science make increasing demands upon the laboratory.

"In no way has the community benefited more than through the 'diffusion of useful knowledge among men,' and few, if any, agencies for the diffusion of such knowledge have worked to better purpose than the Smithsonian Institution, which stands as an enduring monument to the wisdom and public spirit of Smithson, who was a chemist.

"There are, perhaps, as many as ten thousand chemists in the country; the census of 1900 gives 8,847, as contrasted with 125,000 lawyers and 93,000 doctors. In the light of these figures, who shall say that the chemist has not borne his part as should the Happy Warrior in the fight against ignorance, material obstacles, and the phantasms of the mind?"

Excavation is being made for a four storey structure, <sup>110</sup> feet by 75 feet, on the corner of Strachan Avenue and King Street, Toronto, for the Massey-Harris Company. Material, brick, warehouse construction. This is an addition to the company's large array of storehouses for stock.