

rain is caused. This condition of forest land has been remarked on by aeronauts, who find that a balloon is invariably affected, and drops when passing over forests.

The advantages claimed for forests with regard to water supply are that the trees act as regulators of the rainfall; that the average quantity of rain falling on land covered with forests is greater than in the open ground to the extent of about one-sixth; that it holds up the water for a time and discharges it later on when water is most required in river basins, the rain being held back by the leaves of the trees and coming to the ground more gradually; the rain that falls on the surface is also taken up by the layer of dead leaves on the ground, which permits of a gradual percolation to the subsoil. Observations show that in summer the ground of the forest is damper than that of the adjacent cleared land, and snow remains for a much longer period in forest land before melting than in cleared land.

On the other hand, it has been contended by some of those who have made a study of silviculture that forests do not increase the quantity of water flowing to the springs and rivers, but reduce it. The numerous striking facts quoted do not bear out this contention, which is mainly based on the fact that the substratum water stands at a lower level on forest land than in the adjacent cleared ground. This fact is generally admitted to be the case at one period of the year. As the result of many years' observations, it has been found that the maximum level of underground water is reached in May, that the water accumulates in the ground from August to January; and that the rivers are supplied by this reserve, and were it not for this accumulation many brooks and river feeders would cease to flow in summer.

Several very striking examples are given by the authors of the papers as to the deleterious effect of cutting down forests, especially in hilly districts. In the commune of La Bruguière, the forests on the slopes of the Black Mountain were cut down; the consequence of this removal of the trees was that a brook which ran at the foot, and the water from which was used for driving some fulling mills, became so dried up in summer as no longer to be of any use, while in winter the sudden floods caused very great damage in the valley. The forests were re-planted, and as the trees grew up the water coming to the brook was so regulated as to serve its former useful purpose in driving the mills, and the torrents in winter were moderated. Several other examples of a similar character are given.

In Switzerland, amongst other examples is quoted one that occurred in the canton of Berne, where, owing to the re-planting of the mountain-side with fir trees, the water again appeared at a spring which had ceased to flow. After a period the trees were cut down and the land converted into pasturage, since when the spring has almost disappeared, only opening out at occasional intervals.

In the Kazan district of Russia, once celebrated for its forests of oaks and linden, which are now nearly all cut down, there were formerly seventy water-mills constantly at work. Less than half now can be worked, and even they only run half time, and are idle in summer for want of water; while in winter the little rivers that worked these mills are converted into impetuous torrents, breaking up the mill dams and doing other damage. These abandoned water-mills stand out as a striking proof of the consequences of the destruction of forests.

In Sardinia, where the surface consists of plutonic rocks covered with a thin layer of earth, all the

streams have a rapid slope. The woods, which occupied in 1870 an area of more than $2\frac{1}{2}$ million acres, or about 43 per cent. of the whole surface of the island, now are reduced to about one-sixteenth of this area. Since the removal of the trees the floods in the rivers rise with a rapidity and flow with a velocity never known before, and a great number of bridges have been destroyed by the floods. The beds of the channels have been raised in some places above the surface of the land, owing to the detritus brought down in floods.

In Wisconsin, U.S.A., the settlers cut down the forests and converted the land into tillage and pasture. During a period of about seventy years nearly the whole of the forest land was thus cleared, with the result that, as the forest disappeared, the water in the river became lower; finally thirty miles of the channel entirely dried up, and many water-mills that were formerly worked by the stream are now deserted and useless, owing to the want of water to run them.

In Sicily, owing to the cutting down of the forests on a vast scale in the province of Messina, the bed of the river has been raised by the stones and earth carried down by the torrents so as to stop all drainage from the land, and great damage has been done by the floods. Several other examples are given to the same effect where forests have been cleared in the same district, and these are compared with other streams where the forests still exist and their condition remains unaltered. In the former case, landslides from the mountains have become very frequent.

VARIATION OF GLACIERS.¹

THIS interesting report of the Commission internationale des Glaciers shows that these ice-streams still continue to diminish in those parts of the world which it has been possible to examine. In the Swiss Alps, of ninety glaciers observed, not one shows an advance, which fully confirms the general results of the last seven years, and indicates that any slight variation is now at an end; the same is true of the Italian Alps, though some of them give signs of increase in their upper parts. In the French Alps (Pelvoux district), the Glacier Noir has steadily decreased since 1860; the Glacier Blanc, after decreasing from 1865 to 1886, advanced from about 1889 to 1896, but is now again retreating. It is noteworthy that the average elevation of the supply basin of the former is from 2500 to 2800 metres, and of the latter from 3000 to 3300 metres. In the Savoy Alps the shrinkage continues, some small glaciers having disappeared. The same is true in the Pyrenees.

In Norway both snowfall and temperature were rather variable in 1904, but the glaciers, with a few exceptions, have retreated; and in Greenland the Jakobshavn Glacier has shrunk, sometimes rather considerably. In the Caucasus (central) the glaciers continue to retreat; less is known of the eastern district, but the same apparently is true of it. During the past year M. Fedtchenko visited more than 110 glaciers in the Pamir, and has stated that all appeared to be diminishing. The same is true, with a few exceptions, of the north-western part of the United States, as well as of the mountain region of western Canada. In Africa, though the rainfall had been unusually heavy in the Kilimanjaro district, the amount of snow in the crater of Kibo had not, according to

¹ "Les Variations périodiques des Glaciers." Dixième Rapport, 1904. Rédigé par H. F. Reid et E. Muret (Extrait des Archives des Sciences physiques et naturelles, t. xx., juillet et août.) Pp. 34. (Genève: Georg et Cie, 1905.)

Dr. Uhlig, increased since 1901. Thus the report indicates that the retreat of glaciers, which began about forty-five years ago, still continues, having overpowered the slight rally which has been occasionally perceptible during the last decade. T. G. B.

THE REVOLUTION OF THE CORPUSCLE.¹

Air: "The Interfering Parrot." (Geisha.)

A corpuscle once did oscillate so quickly to and fro,
He always raised disturbances wherever he did go.
He struggled hard for freedom against a powerful foe—

An atom—who would not let him go.
The æther trembled at his agitations
In a manner so familiar that I only need to say,
In accordance with Clerk Maxwell's six equations
It tickled people's optics far away.

You can feel the way it's done,
You may trace them as they run—
 dy by dy less $d\beta$ by dz is equal $K.dX/dt$.

While the curl of (X,Y,Z) is the minus d/dt of the vector (a,b,c).

Some professional agitators only holler till they're hoarse,

But this plucky little corpuscle pursued another course,
And finally resorted to electromotive force,
Resorted to electromotive force.
The medium quaked in dread anticipation,
It feared that its equations might be somewhat too abstruse,

And not admit of finite integration
In case the little corpuscle got loose.

For there was a lot of gas
Through which he had to pass,
And in case he was too rash,
There was sure to be a smash,
Resulting in a flash.

Then dy by dy less $d\beta$ by dz would equal $K.dX/dt$.

While the curl of (X,Y,Z) would be minus d/dt of the vector (a,b,c).

The corpuscle radiated until he had conceived
A plan by which his freedom might be easily achieved,
I'll not go into details for I might not be believed,
Indeed I'm sure I should not be believed.

However, there was one decisive action,
The atom and the corpuscle each made a single charge,

But the atom could not hold him in subjection
Though something like a thousand times as large.

The corpuscle won the day
And in freedom went away
And became a kathode ray.
But his life was rather gay,
And he went at such a rate,
That he ran against a plate;
When the æther saw his fate
Its pulse did palpitate,

And dy by dy less $d\beta$ by dz was equal $K.dX/dt$.

While the curl of (X,Y,Z) was the minus d/dt of the vector (a,b,c).

¹ Composed by Mr. A. A. Robb and sung at the annual dinner of the research students of the Cavendish Laboratory, Cambridge, on December 6, 1905.

NOTES.

DR. N. L. BRITTON, director of the New York Botanical Garden, has been elected president of the New York Academy of Sciences.

DURING the meeting of the French Association for the Advancement of Science, to be held at Lyons next August, it is proposed, if the suggestion arouses sufficient interest, to arrange an exhibition of urban hygiene.

THE Brussels correspondent of the *Daily Telegraph* states that at the last meeting of the Academy of Science it was announced that Dr. Jacobs had conclusively proved cancer to have a bacterial origin. This is not the first time that similar positive statements have been made which subsequent research has proved to be fallacious, and all such reports must be received with the greatest reserve.

THE Morrison lectures of the Royal College of Surgeons, Edinburgh, have this year been delivered by Dr. Ford Robertson on the pathology of general paralysis of the insane. The main theme of Dr. Robertson's lectures is that general paralysis is an infective or germ disease caused by certain diphtheroid bacilli, which can be isolated from the blood and cerebro-spinal fluid of the patient, and the toxins of which by their action on the central nervous system induce the paralysis and other symptoms.

THE Milroy lectures of the Royal College of Physicians of London will be delivered by Dr. W. H. Hamer on March 1, 6, and 8, the subject being "Epidemic Disease in England: the Evidence of Variability and of Persistency of Type." The Goulstonian lectures will be delivered by Dr. H. Batty Shaw, on the subject of "Auto-intoxication," on March 13, 15, and 20; the Lumleian lectures by Dr. Ferrier, the subject being "On Tabes Dorsalis," on March 22, 27, and 29; and the Oliver-Sharpey lectures by Dr. E. J. Spriggs on April 3 and 5, the subject being "The Bearing of Metabolism Experiments upon the Treatment of some Diseases." Prof. W. Osler will deliver the Harveian oration on St. Luke's Day, October 18, and Dr. S. J. Sharkey the Bradshaw lecture in November.

THE annual general meeting of the Iron and Steel Institute will be held on Thursday and Friday, May 10-11. The council will shortly proceed to award Carnegie research scholarships, and candidates must apply before February 28. The awards will be announced at the general meeting. In place of the ordinary autumn meeting, a joint meeting of the American Institute of Mining Engineers and of the Iron and Steel Institute will be held in London on July 23-29. The Lord Mayor of London has consented to act as chairman of the London reception committee, and will give a conversazione at the Mansion House on the evening of July 24. The annual dinner will be held at the Hotel Cecil on Friday, July 27. A programme of the visits and excursions to be made during the meeting will be issued when the arrangements are sufficiently matured.

THE death is announced, at the age of eighty-three, of M. Jules Despecher, who for more than half a century played a prominent part in organising and arranging submarine cable services.

THE commission for the methods of examining and methylating alcohol, appointed by the French Government, has decided to offer the following prizes for open competition, irrespective of the nationality of the competitors:— (1) a prize of 20,000 francs for a method of methylating alcohol, which shall be preferable to that now in vogue in France, and which at the same time shall prevent any