Supposing the air rises to one thousand feet, it will there be cooled to 12°; then descending, as it passes over the range, it will at first (*FG*) warm as slowly as it cooled, until all the cloud that it carries is dissolved; the rest of the descent has a faster warming (*GH*), and the ground is reached with a temperature of about 43°, or 8° warmer than when the ascent began.

These figures are not precise, as the diagram is rather hastily constructed from Hertz's plate; but they serve to show how much greater a change is produced by the descent of the upper air than by the evolution of latent heat in a transmontane wind. The approach of the line of summer temperature (*SS'*) to parallelism with the adiabatics also illustrates how much fainter the *foehn* must be in summer than in winter.

The following quotation from Espy's 'Fourth meteorological report' (1857) is of interest in this connection: "It is known that air, in passing over high mountains, . . . is twenty or thirty degrees warmer than the atmosphere is at the same height over plains, because in passing over them it has the latent caloric in it, just evolved by the condensation of the vapor on the windward side." "Air can never come down from a great height without being very dry when it reaches the surface of the earth." "At the time of this hot south wind, there may be a great rain taking place on the other side of a mountain to the south of the observer, sending its hot air over above, and radiating its abnormal heat down, and even bringing some of the hot air down the slope on the north, which would be felt there as an excessively hot, dry air." He also quotes Lepoy's mention of a warm south-west wind at Fort Simpson, east of the Rocky Mountains in British America, and applies the above explanation to it (pp. 146, 147, 151).

W. M. DAVIS.

Cambridge, Jan. 12.

The claimed wheat and rye hybrid.

There is very slight botanical distinction between the wheat and rye genera, and hence we could scarcely select two genera between which we should more readily expect, *a priori*, a success in hybridization. The question, however, is, Has such a hybridization been effected? Mr. Charles Barnard, who scarcely can speak as a botanist, states in the January *Century*, p. 477, that it has taken place. As one who has carefully studied the published claims, and who has also visited the growing plants upon which the result is claimed, I must beg to dissent. Without opportunity for a careful and thorough examination of the various plants produced, I dare not affirm that such a hybridization has not been effected; yet I do dare affirm that the evidence adduced is insufficient to establish the fact, and is sufficient to establish grave doubts.

What are the facts? The flowers of the Armstrong wheat were treated with pollen from rye. A number of variables were produced from the resulting seed, which, without careful botanical investigation, have been pronounced hybrids. These figures were published in the *Rural New-Yorker* of Aug. 30, 1884.

Lindley distinguishes rye from wheat by its narrow glumes, and constantly twin narrow florets with a membranous abortion between them. In the drawings referred to, the glumes in all the figures are drawn broader than in the rye. In four of the figures the spikelets are distinctly those of a common wheat. In the fifth figure — the one called by Mr. Carman "a distinct grain, neither wheat nor rye, and as different from either as wheat is from rye, or rye from wheat" — we must look for the hybrid, if at all. This plant, so far as can be indistinctly made out from the figure, has its spikelet solitary on each notch of the axis, with two nearly equal glumes; and the outer pale of each floret has at the top either a notch or angle on each side of the terminal point or awn, — all the distinguishing characters of the genus Triticum. It has not the narrow glumes nor the constantly twin narrow florets which are peculiar to rye.

What do these figures resemble, if not rye? Judging by comparison of pictures, his No. 335 is close to the Froment de Saumur; his No. 336, to Froment Pictet; his No. 337, to Froment de Naples; his No. 338, to Froment blanc de Flandre; his No. 339, the supposed hybrid, to Froment de Pologne compact, — all, as figured by Heuze, in the form of the head. I do not mean to say by this that they are these varieties, for the material for judgment does not admit of such close comparison; but I refer to these varieties, and those represented by Mr. Carman's figures, as representing like types of head.

We do not question the attempt at a cross. The variability effected is indication of the influence of a foreign pollen. We can explain the appearances, however, by an hypothesis. Under the stimulus of the rye pollen, atavism has resulted, whereby varieties dormant in the Armstrong wheat have made their appearance; and to those unfamiliar with foreign varieties, whose type appears in the progeny, the seedlings produced seem as if novelties, the unfamiliar Blé de Poland being little known in this country.

The whole subject is, however, too interesting a one to allow to pass without comment such statements as the *Century* article contains, and it is to be hoped that at some time a botanist expert in agricultural botany may have opportunity to investigate a series of these specimens.

E. LEWIS STURTEVANT.

Geneva, N.Y., Jan. 6.

Stepniak's 'Russia under the tzars.'

Will you kindly permit a few words of reply from one of your English readers to M. Woeikof's letter on p. 478 of your issue for Nov. 27, 1885?

We in the old country, who are watching with deep interest the struggle for freedom now going on in Russia, do not attach so much importance as your correspondent seems to think we should, to Stepniak's personal share in the conflict: indeed, we do not even care to inquire about it. The important point for us is the accuracy of the facts he has brought forward. If true, they place the Russian government outside the pale of civilization, and deprive it of all right to appeal to civilized Europe against any act in which the wrath and despair of its subjects may find vent. If false, they can easily be disproved. Stepniak has plainly stated names, dates, and sources of information; his book has now been for a year before the public; and he has reiterated his charges through the leading organ of the English press. If the Russian government is maligned, why does it take no steps to disprove his statements?

But whilst Stepniak's allegations are confirmed by

the most reliable sources of information at our command, they are only challenged by such bitter personalities and trifling evasions as those indulged in by your correspondent. Writing with evident animus, he can find nothing better to object to Stepniak's crushing indictment against the whole system of government in his country than a quibble as to whether a man who escapes from the prison hospital can be said to escape from prison (your readers will find a detailed account of Prince Peter Kropotkin's escape in Stepniak's 'Underground Russia'); and the obvious truism that polite circles at St. Petersburg profess ignorance of cruelties, their master desires to conceal.

Until some better evidence to the contrary than this is laid before us, we English lovers of liberty must consider the case against Russian despotism as proved; and we shall endeavor — not in hatred, but in love, toward the Russian people — to aid them by every means in our power in their heroic efforts to free themselves and their country. C. M. WILSON.

London, Dec. 27.

Ruminants of the Copper-River region, Alaska.

While on the Copper or Atnah River of Alaska, and its principal tributary the Chitina (*Chitty*, copper; *na*, river), I had occasion to learn something of the species of ruminants inhabiting the region. Of the Cervidae, only two species, as far as I had occasion to learn, exist; viz., the moose, Alces machlis, called by the natives tenáyga; and a form of the caribou, Rangifer tarandus, called by the natives honnâi.

Of the Bovidae, there were two species, one of which, called by the natives tebáy, I had occasion to carefully examine. It nearly resembled Dall's mountain sheep (Ovis canadensis Dalli, Nelson), "found in the mountains of Alaska and southward into British America." My party killed several of these animals, one of which, a ram, had horns twenty inches long and nearly straight. It was killed on a very high point, much above the timber-line, and in its fall was considerably crushed. The horns were similar in structure to those of the big-horn, but had very little curvature. I saw a spoon made from a tebáy's horn, which had a length of twenty-six inches, and measured five inches across the bowl. The natives informed me that some had much larger horns than the one that furnished material for this spoon. This may or may not be true.

The head of the tebáy was much like that of a Southdown ram, the muzzle much less sharp than that of Shaw's Ovis canadensis or Nelson's Ovis canadensis Dalli. The hair, as to kind, was in no respect different from that of the latter animal, but was of a uniform white color, and by no means dirty; in fact, was nearly as white as his surroundings of snow. From the best information obtainable, I would class it as an equal in size to the big-horn, and a relative of Dall's mountain sheep. The ram and one other tebáy were killed on the most northerly tributary of the Chitina, called by us Chitistone (Copper-stone) River, on account of the existence there of copper ore.

The natives informed us that a few miles below the junction of this tributary with the Chitina we could kill small tebáy, and four were obtained. Their heads were left on the mountains, but the body seemed identical with that of the Chitistone River specimens, though very much smaller. Why only small ones should be found at this place, in the latter part of April, I cannot say. The mountains here were not so high as farther to the east and north, where the large ones had been killed. The last tebáy seen or heard of by us were near the source of Copper River, on the divide between it and the Tananá River.

The other species of the family was a white animal whose pelt I frequently saw used in articles of wearing-apparel, and which, from its description, was probably the mountain goat, Mazama montana, found also on the head waters of the Yukon River and its upper tributaries. I saw some of these animals at the junction of the Copper and Chitina rivers, on the west banks of the former, but was unable to obtain them. H. T. ALLEN,

Lieut. 2d cavalry, U.S.A.

Washington, Jan. 2.

The festoon cloud.

In the *Philosophical magazine* for July, 1857, Mr. W. S. Jevons, then assayer at the Sydney branch of the royal mint, had an article on the cirrous form of cloud (vol. xiv. 22–35), and gave therein the best early account that I have met with of a peculiar form of cloud, since commonly called the 'festoon' or 'pocky' cloud. He says these forms are often to be seen on the under surface of dense cirro-stratus clouds, 'especially at the front or tail of a thunder-cloud.' Sometimes these dropping portions of cloud, or 'droplets,' as he calls them, seem to come into contact with dry air, when their well-defined form is destroyed, and a fibrous or fur-like appearance only remains. 'They appear to be truly portions of subsiding cloud.' An accompanying 'imaginary section of a thunder-cloud near Sydney' nicely illustrates their attitude, but not their form.

The earliest valuable figure of the festoon cloud is presented in an article by A. Mitchell, on weather prognostics in Scotland, in the Edinburgh *New philosophical journal* (xviii. 1863, 221), where it is copied from a drawing by the Rev. C. Clouston: it is probably the same figure that is given in a work by the latter author, 'An explanation of the popular weather prognostics of Scotland,' etc. (Edinburgh, 1867); but this I have not seen. The drawing shows the cloud to be distinctly convex downwards, the separate festoons being grouped together somewhat like the adjacent grapes on a bunch; and it is spoken of as a sure sign of stormy weather. Its relative rarity may be estimated from a note by Symons, the veteran English observer, in his *Meteorological magazine* for July, 1868. He first saw it early in the morning of a June day in 1858, just before a violent thunder-storm; then during the succeeding ten years he never saw it, or heard of its being seen, till he came upon the book above mentioned. He said it looked like 'bags of sand,' but does not refer to it as a falling cloud.

Poey, a lifelong student of cloud-forms, sent a brief note to *Nature* (Oct. 19, 1871, p. 489), in which he speaks of this cloud as a new form, and gives a rough figure of it: he considers it very rare, having seen it but twice in his life, both times suspended from the pallio-cirrus of thunder storms, — once in Washington, D.C.; again in Beloit, Wis. This note brought out several others; among them one signed 'J.,' evidently by Jevons, calling attention to his