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On trees in South America

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On the question proposed for discussion to the
Botanical Congress at St. Petersburg
**what trees are best adapted for cultivation
in the South of Russia**

by

Andrew Murray F. L. S.

The subject proposed for consideration here resolves itself, as it appears to me, not so much into what trees may be found to suit the condition of the South of Russia, as what is to be done to alter these conditions so as to produce a climate more suitable to trees generally.

I do not believe that it is possible to find any tree suited to the present conditions of that country, in other words, that will bear being burned up in the summer without a drop of water for months at a time, and burned up by the cold in winter for a similar period: and what makes it more hopeless is that the very conditions which prevent them growing are perpetuated by their absence.

It is not any peculiarity in the soil which is hostile to their growth. — The wide plains covered with tall weeds, which constitute what is properly called the steppes, have a rich thick black soil consisting mainly of humus or vegetable mould combined with a little saltpetre — and as might be ex-

pected this soil is very fertile, especially one kind of it, which is well known under the name of tschernosom and is productive in the highest degree. — So far as regards the soil therefore the steppes are everything that could be desired. If the climate would give the soil the smallest chance, the steppes would grow crops and trees as well as any country on the face of the Earth.

The less fertile plains classed by professor Karl Koch under the name of pampas are also perfectly productive when supplied with water. — Nothing in their soil is opposed to the growth of forest trees.

After the steppes and pampas the only remaining specially distinctive soil is that of the salt deserts — but it is now perfectly well known that by the aid of fresh and running water even the most strongly impregnated salt soils can be made to grow plants as well as any other soil. — It has been done on a considerable scale in the Salt-lake district of Northwest America, and there is no reason to doubt that similar means would produce like results in the South of Russia.

The great difficulty in the way of covering these plains with woods and crops is the want of water, and at present there seems no other source from which to procure water but the rivers which pass thro' the country. — There seems to be no reservoir in the underlying strata from which it could be procured by boring — at least, according to one present information, the chances are against this, altho' it may well be worth while to determine how far this is the case by actual experiment. — In some districts a year or more occasionally passes without a shower of rain refreshing the earth, and very generally not a drop falls in the whole country from the end of May to the middle of September. It rains no doubt in spring and autumn, and snows in winter, but the country is so uniformly level, and what is of more importance the subjacent strata are so uniformly level, never having been dis-

turbed by geological causes, that there are no means by which the water which falls at these seasons can be accumulated and stored up in subterranean reservoirs or fissures — (the existence of springs depending on the inclination of strata and dislocation of beds). — The water is thus simply absorbed of the soil and when the warm season comes is gradually evaporated. — Hence arises of the extreme heat and cold which characterise the district in summer and winter. — No plant which cannot live like bulbs under ground can survive these extremes of temperature. — All leaves and branches and stems are every year cut down. Consequently trees cannot be expected to grow.

There are some countries so situated in relation to neighbouring mountains that it may be doubtful whether rain could ever be attracted to them, as in the dry regions of Thibet, but there is no such physical disability in the South of Russia. With such large masses of water as the Black sea and the Caspian in its immediate vicinity and no great mountains intervening, there is no reason why the regions which are now a waste for some months in the year should not be a garden; — were the ground even partially clothed with timber the whole would be changed. — There is no reservoir of moisture equal to a forest. — It is a sponge which soaks up an enormous quantity of water to render it back in perennial springs and streams. — Moreover forests not only receive rain and retain it when it falls, but they attract it. — I read that already a few trees planted by the engineers employed in the excavation and construction of the Suez Canal near their temporary residences, have had the effect of attracting clouds and that the rare event of rain falling in the land of Egypt has already taken place in their vicinity. To do the same thing in the South of Russia is obviously (as the very question proposed implies) the true means of utilizing, fertilizing and rendering productive the vast steppes in question, and it must be done in the same way. The

starting point must be the locality where water already exists — in other words the banks of the rivers. By planting first in their neighbourhood, and by using the aid of irrigation wherever possible, a gradual advance may be made on the open plain. The process will be long and slow, especially at first, and will require that united action and continuous perseverance which can only be obtained from governmental superintendence. Individuals may deal with works that can be compassed in the lifetime of a man, but governments or companies can alone look for success in works, which may extend over centuries.

One word as to the kinds of trees to be planted. I have a strong conviction that in general no kinds of trees are so well adapted for a country as those, which naturally grow in it or in its neighbourhood already. All therefore that grow naturally in the neighbouring regions would probably grow well in the steppes if supplied with water. The *Pinus silvestris* in fact already grows (no doubt in a dwarf and shrub-like form) but still grows in the steppe region of the middle Don. If under its present disadvantageous circumstances it can subsist at all, it is a great argument that if it were placed in more favourable conditions it would prosper. The *Pinus Pallasiana* of the Crimea would also doubtless do well. I have heard *Pinus Pinaster* (*maritima*) suggested, but neither the soil nor the conditions seem suited to it. The elm, birch, oak, beech, lime and chestnuts would no doubt thrive, — once supply the soil with water and moderate the severity of the climate by the multiplication of trees, and almost any thing will grow. The soil is fertile enough to grow anything, but at the commencement the experiment should be made with the very commonest, hardiest and cheapest species that can be got—that, I imagine, is *Pinus sylvestris*. To attempt to introduce rare species from other countries is obviously premature.

Gaylord Bros.
Makers
Syracuse, N. Y.
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