completely as possible without resorting to saw and axe. One of the most successful land-clearers we have found claimed that fires were burning every day of the year on his place.

We have noticed in passing over burns that where one log crosses another, or where two logs have lain together, the fire has done wonderful execution, and sometimes a comparatively small stick lying across a large log has been the cause of burning the log in two. And, again, since beginning these investigations of land-clearing methods, we have frequently noticed that some of the stumps are burned out completely, roots and all, by the ordinary "good burn," and since logs do not burn in spots or roots burn underground by chance, a study of the cause producing these effects will result in a better understanding and utilization of these potent factors when we try to duplicate them. The burning of a log at the point of contact with another is largely due to radiated heat. The heat generated by the burning wood of each is radiated to the other, by transmitting the energy produced by its burning to the other, thus driving out the elements not favourable to combustion, which are usually there in the form of water. This radiated action is in direct proportion to the distance between the burning portions. Those who have measured this force have laid down the rule that radiated heat diminishes in intensity by the square of the distance radiated. Thus: let heat radiated 1 inch be represented by 1, then that radiated 2 inches would be diminished by the square of the distance radiated (two), which would be 4, or diminished to 1-4. By the time we have reached 12 inches the intensity is diminished to 1-144 or the square of 12. This explains why logs burn when together and go out as soon as separated. This power is also an important factor in burning out stumps.

By the use of a good cover over the fires that follows the fires up closely at all times, we get the full force of this radiated heat on to the roots below the ground, and this proper covering conserves all this heat.

Another equally important factor working in harmony with this is that of artificial draughts or currents of air which bring to the burning material the necessary oxygen, and another fixed law may be here observed—namely, heated air expands, and in doing so moves upward, the colder air rushing in to fill the vacuum formed brings the oxygen necessary for the chemical process of combustion which we call burning. The stumps that burned out by themselves were naturally in condition to be well fired, and because of the material being especially favourable for burning, or of the close contact of some radiating body, they were burned out below the surface until the vacuum was formed by the heated air rising and cold air rushed in with its store of oxygen and facilitated the burning. A natural air-current was set in motion.

If we look into the holes where the burning is in progress, we will see that the fire is advancing most rapidly at the bottom, because that is where the incoming current of cold air with its undiminished supply of oxygen first comes in contact with the burning root. This burning of the under portion first still more facilitates the further burning. The portions of charcoal and ashes dropping to the bottom, thus partially covering the ground and acting as a non-conductor of heat, also reflect that heat back again to the burning portion. There is a law of radiation that operates here which should be understood—namely, if heat strikes a reflecting surface perpendicularly it is reflected back perpendicularly, but if it approaches the reflecting surface at an angle it glances off at an equal angle on the other side. This principle is also an important factor in covering over our fires artificially, to which we will refer again later.