the magnetism of the earth; which we all know to be the cause of the compass needle pointing to the north. This is only a rough way of speaking. It does *not* point to the north, but very considerably to the west of north, and that, not always alike. Three centuries ago it pointed nearly as much east as now west of north. From year to year the change is very perceptible; and, what is more, at every hour of the day there is a small but perfectly distinct movement to and fro, eastward and westward, of its average direction. But besides this, the compass needle is subject to irregular, sudden, and capricious variations—jerking, as it were, aside, and oscillating backwards and forwards without any visible cause of disturbance. And, what is still more strange; these disturbances and jerks sometimes go on for many hours and even days, and often at the same instants of time, over very large regions of the globe; and in some remarkable instances, over the whole earth—the same jerks and jumps occurring at the same moments of time (allowance made for the difference of longitude). These occurrences are called magnetic storms, and they invariably accompany great displays of the Aurora; and are very much more frequent when the sun is most spotted, and rarely or never witnessed in the years of few spots.

(37.) The last four years* have been remarkable for spots, and there occurred on the 1st September 1859, an appearance on the sun which may be considered an epoch, if not in the sun's history, at least in our know-

* This lecture was delivered about the end of 1861.