Correspondence.

Growth of the Eucalyptus.

To the Editor of the SCIENTIFIC AMERICAN:

In connection with that portion of the article published in the SCIENTIFIC AMERICAN of March 2 relating to the growth of eucalyptus trees in California, I will add for the benefit of your readers that one of my neighbors recently chopped down a eucalyptus tree which he had planted nineteen years ago.

The tree yielded four cords of stove wood and the measurements were as follows:

Height, 63 feet; circumference at base, 12¼ feet; circumference just below the first limb, eight feet from the ground, 8¾ feet. ERNEST ROBERTSON.

New Jerusalem, Cal., April 8, 1895.

A Curiosity in Violin Playing.

To the Editor of the SCIENTIFIC AMERICAN:

I have a violin which has very loose strings when tuned to concert pitch. By a peculiar manipulation of the bow I am able to produce in a clear tone the second D below the treble staff, which is a full fifth lower than the natural open tone of the string, and by fingering play the scale from that point up. It is done by a heavy slow bow about three-fourths inch from the bridge, and can be done on any good slack-stringed instrument, but not on one on which the strings are very tight to procure the pitch. Can you give me an explanation of the character of vibrations brought into play in this case? I understand the philosophy of what is termed harmonics, but they are always of a higher pitch than the natural tones. The tone is not a squeak nor a grating noise, but a good tone nearly as pure as can be made on any other part of the instrument, and the instrument is a good one.

Buchanan, Mich. J. G. HOLMES.

Sun Spots and Aurora.

To the Editor of the SCIENTIFIC AMERICAN:

The reports of observations of the aurora that have been secured the past winter for the purpose of comparison with those of Lieut. Peary in North Greenland have shown a decrease in the number and brightness of displays, as compared with previous years since 1892, when there was a large increase following the years of minimum, which reached its height in 1889 and 1890. As is the rule, the present decrease is simultaneous with a diminution of the activities which produce spots on the sun. In some respects, a period of such declining activity is favorable for gaining an insight into the behavior of the phenomena in question, such outbreaks as occur, both of sun spots and auroras, being more isolated, so that any relations existing between them may be more readily distinguished. Thus, during the past winter, there have been but few auroras that have been widely seen, and the most prominent among these plainly conform to the periodicity at intervals closely approximating twenty-seven and one-quarter days, dates as follows: October 27, November 23, December 20, January 17, February 14, and March 14. All these displays were seen more or less widely, both in America and Europe; those in November, February and March being strongest, and the one in December being the weakest, thus conforming to what has been found to be a general rule in regard to relative brightness in the different months named. At each of the dates named traces of auroral action were noted, more or less, for two or three days, but the strongest manifestations were, as a rule, confined to a single day at the beginning of the outbreak. Preceding the return in March, notices were sent by the writer to a large number of observers suggesting the desirability of special observations from the 14th to the 16th of that month. The result was to secure much information that might otherwise have been lost. The aurora in this case had the peculiarity, as seen in many localities, of consisting of isolated streamers without an arch or diffuse luminosity of any sort. It was widely seen in Europe as well as this country, but in the reports thus far at hand is not described as specially brilliant, except in those from northern Canada. As is the rule, it was accompanied by disturbances of terrestrial magnetism, which were quite strong as compared with the conditions existing generally in the present year of declining activity. At the Toronto Magnetic Observatory much disturbance of the declination magnets was registered, the others remaining comparatively quiet. There was some disturbance of the longer circuits of the telegraph lines by earth currents in isolated localities on the North American continent. The chief disturbance from earth currents, however, seems to have been on the Atlantic cables on March 14 and on the evening of March 15.

As regards the solar conditions attendant upon this aurora and its predecessors at the regular interval named, it will be noted that the period of recurrence corresponds closely to the time of a synodic rotation of the sun, as determined from the average rate of motion of the spots, which do not remain fixed upon the sun's surface, but have motions of their own.

This correspondence of the times of recurrence of the aurora to the rotation period of the sun as viewed from the earth, which is advancing in its orbit in the same direction in which the sun is turning on its axis, shows that the solar impulse which originates the aurora must proceed from some particular meridian relative to the position of the earth; otherwise there could be no periodicity at the twenty-seven and one-quarter day or any other uniform interval. It will be observed that we are able to affirm positively that the effect proceeds from some particular solar meridian, whether we are able to identify that meridian or not. As a matter of fact, at each return of the aurora which has been mentioned, the portion of the sun exactly at the eastern limit appearing by rotation was the seat of very persistent spot groups. Observation in numerous other cases, as well as that under consideration, has shown that, no matter what there may be or may not be elsewhere upon the sun, there is always a portion specially frequented by spots and faculæ at the eastern limb appearing by rotation whenever there is an aurora and magnetic storm. This is the one thing that stands out prominently in the arrangement of these two sets of phenomena in their natural order, based upon the twenty-seven and one-quarter day period. If there is any error in the length of this period, it must be so small as not to obscure, within several years, the relation which has been described by producing discrepancy between tables of auroras showing their recurrence at the twenty-seven and one-quarter day interval, and the similar table of sun spots, showing their returns to the meridian at the eastern limb at the same interval.

The identification of the particular part of the sun concerned in any individual outbreak, or series of outbreaks, of the aurora is the proper starting point for the study of the mode of operation of the forces concerned. Indeed, there can be no assured progress whatever without such identification. It is the one clew that is required for the elucidation of details that could not otherwise be understood at all.

It is not proposed at the present writing to enter into these details, although some of them are beginning to be understood.

Lyons, N. Y. M. A. VEEDER.

Wood World Waifiets.

Native woods used in building in Sierra Leone, Africa, are oak, whismore, brimstone, teak, mahogany (two varieties), rosewood (fine quality) and black walnut. These are durable woods that will withstand insects and weather.

"Knock-me-back" is a Honduras tree 25 feet high. Each leaf ends in a sharp thorn, which suggests the name to the natives who brush against them.

Among Honduras trees is the "Santa Maria," or Calophyllum calaba, suitable for shingles and buildings. It grows 80 feet high and 24 inches through. It is hard. The seeds yield oil for lamps.

The principal native woods of South Africa are: Yellow-wood (two kinds), black and white ironwood, stinkwood, olyreuhout (olive), assagai, white pear, kerschout (candlewood), white alder and others. None of these woods grow in sufficient quantities to cut any figure in lumber problems, except the following: Yellow-wood, which somewhat resembles poplar, though it is harder and has a cross grain, and stinkwood, which is more like American walnut and has many colors and shades when polished.

Wild cinnamon grows 30 feet high and 16 to 18 inches in diameter.

Argentine Republic woods are distinguished for their pronounced colors. The algarrobo is white, red, gray, black and violet. The quebracho is deep red and pure white. The cedar is bright red. The cibil is white, red and black. The gayaibi is white, gray and black. The laurel is white, black and yellow. The tipa is white, red and yellow. The palo amarilla is bright yellow, and so is the palo moro. The viraro is dark brown. The calden is bright red. The tatanè is golden yellow. The pacara is dark red. The molle is black brown. The lapacho is green, gray and black. The guayabo is deep red, veined with black and yellow. The palo ribera is dark cinnamon, with red veins. The guayacan is jet black and almost indestructible. Some of these woods are hard enough to resist the keenest tools and to withstand fire in a remarkable degree.

European nations recognize the value of forests. The Austro-Hungarian government does not sell any part of its forests, but buys more each year. In some parts of the country, as in the eastern region of the Carpathians, woods are found of several thousand acres in extent, consisting for the most part of red beech. This is used for firewood, carriages, staves, agricultural implements and in the manufacture of bent wood. There are few fires, and they seldom permanently damage the woods. There are large, resinous forests in Transylvania, but they are not very accessible; and there are some in the district of Marmaros, in the northeast part of the country. In France there is little primeval forest. Woodlands of heavy growth sell at $60 to $100 per acre. Labor is very cheap. The percentage of forest land to the whole area is very small. The demand for wood products is very large and such as to secure a heavy price for forest products of any variety. Even faggots sell by the bunch, kindling wood sells by the pound, and lumber is scarce and high. In Germany, Austria-Hungary and England similar conditions prevail, to a greater or less degree of intensity. Government regulations for forestry management have been adopted in most of these countries. They have but small areas of primeval forests. The forests of central Europe look like the public parks of America, with very few trees to the acre, mostly full-grown specimens, with very little underbrush, and with a degree of uniformity which bespeaks careful artificial management.—American Wood Worker.

Quince Culture.

Prof. L. H. Bailey, of the Cornell University, has recently issued, in Bulletin 80, one of the most complete accounts of quince culture that we have met with for some time. T. C. Maxwell & Brother, of Geneva, N. Y., have a tract of about thirty acres, which is used expressly for growing this fruit for commercial purposes. Professor Bailey states that though the quince will grow on light soil, it will do best on heavy land, provided it be well drained. On account of the shallow roots, which are always near the surface, it is found best to keep the soil continually stirred about the trees. A heavy manuring is judicious.

The Maxwell orchard is fertilized chiefly with stable manure. Two-thirds of the annual growth of the trees are cut away each winter; the branches left for fruit bearing are shortened in. About three hundred trees occupy an acre, which gives them an area of 10 by 15 feet each. A bushel of fruit to a tree is considered a fair crop. The Maxwells sort their quinces, before marketing, into three grades—the best grades are shipped in grape baskets of about a peck each, or in kegs holding a bushel, while the second grade is shipped in barrels or half barrels. They bring about two to two and a half dollars a barrel. The third grade, or "culls," are not very profitable. The Orange, the Champion, the Meech, and the Rea are the principal varieties cultivated in the State of New York.

The leaf blight and the fruit spot are the chief enemies of quince culture. The brown spot on the leaf is caused by one of the species of microscopic fungus named Entomosporium maculatum. When attacked by this fungus, the leaves fall early, in which case, as with the pear and other fruits, the product is inferior in size and quality. In a perfectly healthy tree of any variety of fruit the leaves should remain on until their natural period of falling, in the autumn.

Spraying with the various copper solutions recommended is found to be a complete remedy against the attack of this or any other fungus. The quince borer would be very troublesome if not kept away from the plant; but no good cultivator now is annoyed by this insect, as care and watchfulness prevent them from operating.

Formaldehyde in Photo Gelatine.

The discovery that formaldehyde (H.COH) renders gelatine insoluble in water is likely to be of much value in photography. Gelatine, both in solution and in the dry condition, is rendered insoluble by formic aldehyde, and the jelly after treatment becomes non-fusible. When a very small proportion of formaldehyde is mixed with a warm solution of gelatine the whole sets on cooling, but can be remelted. If, however, the jelly is spread out and allowed to dry, the gelatine becomes perfectly insoluble in water, forming a flexible film, which can be used for photographic negative purposes. In both the wet and dry collodion processes, chrome gelatine is used to insure the adhesion of the collodion to the glass plate, the sensitized collodion emulsion being poured on to the thin layer of chrome gelatine previously applied. Instead of chrome gelatine, formaldehyde gelatine can be used, although whether there is any advantage in it remains to be seen. The applications of formaldehyde gelatine are patented (A. Zimmerman, London. From the Chemische Fabrik auf Actien, vorm. E. Schering, Berlin, Germany. Eng. Pat. 2,036, January 30, 1894), and a process for making sensitive films is described in the specification.

A Noble Gift to Lick Observatory.

Edward Crossley, the English philanthropist and member of Parliament, has given his great three-foot reflecting telescope to Lick Observatory, on condition that it be named the Crossley reflector, and that the cost of transporting it from Halifax, England, be borne by Americans. As Mr. Crossley gives the dome and all the apparatus, it will cost $5,000 to move it.

There is a place at Lick Observatory for the big glass, as James Lick's will provided for both a refractor and a reflector, but the money provided could buy only one. With the Crossley reflector superb photographs have been taken even in the humid English atmosphere, so that much better work ought to be done in the dry air of Mount Hamilton.