meristems are not all characterized by a low oxygen consumption. The polarity of shoot apices was not altered by being orientated away from the vertical position. Indeed, the evidence suggests that the shoot apex controls the geotropic response of the subjacent tissues.

Plants grown from excised apices developed normal though small vascular systems, that is, in circumstances in which the influence of the older vascular tissues had been eliminated. Such development demonstrates the independent, self-determining nature of the apical meristem.

Small segments of the tissues subjacent to the apical region grew best in aqueous medium to which unautoclaved coconut milk had been added. Those of *Lupinus* produced spherical masses that usually grew by cambium-like zones considerably beneath the original cut surfaces. Internally, this cambium produced parenchyma and very short tracheal elements; externally, it produced parenchyma and some cells that were apparently sieve-tube elements. In contrast, the subjacent tissues of *Tropæolum* had various regions of superficial cells that underwent rapid mitoses. The end result was an irregular mass of parenchymatous cells that only infrequently contained groups of tracheal elements. In neither plant did the callus give rise to roots or buds. The original polarity of these subjacent regions was not retained in culture.

The results obtained suggest that there is a decreasing capacity for growth and development on proceeding basipetally along the shoot. The indications thus are that not all living plant cells are possessed of unlimited capacity for development, full meristematic potentiality being restricted to a few tissues only. The shoot apex possesses the greatest capacity for development of the entire plant; tissues subjacent to the shoot apex possess this capacity to a limited extent only. This interpretation is contrasted with other suggestions in the literature that theoretically every living plant cell is capable of producing any cell organisation characteristic of the species.

ASTRONOMICAL TELESCOPES

PROF. H. H. PLASKETT delivered his presidential address on February 8, 1946, to the Royal Astronomical Society, taking "Astronomical Telescopes" as his subject; the address has now been published (*Mon. Not. Roy. Astro. Soc.*, **106**, 1, 80). There has been a tendency for some time to belittle the observational work that can be carried out at observatories in Britain, and some have even expressed the view that in the interests of efficiency the university observatories should be closed down. Others, while not quite so extreme in their attitude towards British climatic conditions, have suggested that if money for new telescopes should become available in Britain, these telescopes should be erected in some more or less remote part of the Commonwealth where better observing conditions prevail. Prof. Plaskett believes that these views are fundamentally wrong, and submits an alternative view under a number of headings; a brief outline of his proposals follows.

Most branches of astronomical research show the necessity for a large telescope in Britain, and Prof. Plaskett selects the physical interpretation of stellar spectra as an example. Although we cannot ignore the contributions made by astronomers and physicists in other countries, the interpretation of stellar spectra was primarily a British achievement; but the research was seriously handicapped because of the lack of a large reflector. It was impossible to apply the theory of Fowler and Milne to the determination of the temperature and pressure in the atmospheres of individual stars since large reflectors, which alone can supply high-dispersion stellar spectra, were not available. As a result, the next step was taken by Russell and Adams in 1928 at the Mount Wilson Observatory with the stellar spectra obtained at the coudé focus of the 100-in. telescope. Theoretical work both at South Kensington and at Mount Wilson was carried out in the closest collaboration with observers at the place where observational and experimental material was available, and it is pointed out that if university observatories are moved from Britain to more suitable climates, the theorists will ultimately follow them. For this reason it seems inevitable that the disappearance of British university observatories as centres of observational astronomy would imply the disappearance of astronomy and related branches of science. Prof. Plaskett pleads for the establishment of at least one large telescope in Britain, and after examining various kinds of telescopes, concludes that the most suitable would be an instrument of the Schmidt type with a mirror of 74-in. aperture, suitable for both direct photography and slit-spectroscopy. The estimated cost with a number of accessories would be less than £100,000. (Reference may be inserted here to the announcement by the president of the Royal Society at the opening of the Newton tercentenary celebrations that the Government has agreed to the construction of a 100-in. reflector. See *Nature*, July 20, p. 90.)

A suitable site for such a telescope should be obtained in a place remote from any of the universities provided with their own observatories, and, as an ideal arrangement, the astronomical activity of the university and private observatories would be centralized about this telescope. While undergraduate instruction would still be continued at the various universities, graduate instruction would be carried out primarily at this "Central University Observatory". Such centralization would permit of a department for the study of applied optics which would have as its primary function the theoretical study of various forms of optical instruments. In addition, it would permit of a modern laboratory for spectroscopic research—a most important branch in connexion with future developments in astrophysics. Various suggestions are made with regard to the board of management and other matters which are merely questions of detail—easily settled once the principle of a central university observatory is admitted.

Objections on the grounds of the unsuitability of the British climate are considered, and Prof. Plaskett shows that these are very much overdone. The fact that Herschel, Lord Rosse and Common did such excellent work with large instruments suggests that seeing conditions in the British Isles are at least comparable with those prevailing in other places where large instruments are used. The infrequency of clear nights is also advanced as an argument against large telescopes; but, as Prof. Plaskett points out, the less frequent the opportunities for observation, the more efficient must be the instrument and its mounting to take advantage of these fleeting opportunities. Indeed, the very rarity of suitable nights demands the best possible instrument.