anemone, larkspur, violet, willowherb, scarlet tropæolum, red rhododendron, bilberry, flowering currant, scabious, wild thyme, potato, forget-me-not.

The colouring matter was then withdrawn from these and other petals by macerating them for two days in cold methyl alcohol, the solution was poured off, evaporated to dryness, the residue taken up with warm water, and the solution after filtering tested as follows :—(1) One drop HCl or H^3PO^4, followed by several drops of ammonia ; (2) solution of acetate of lead followed, or not, by acetic acid ; (3) solution of acetate of magnesium. The results are tabulated as follows :—

Name of flower.	Natural colour.	HCl and NH^3.	Acetate of lead.	Acetate of Magnesium.
Pæony	red	deep blue-green	bluish-green	blue-green
Larkspur	blue	green	green	blue
Anemone	red	green	green	—
Violet	violet	nearly blue	green	dark blue
Oriental Poppy ...	scarlet	blue flush	green	green
Campion	pink	blue at neutral point	—	—
Ragged Robin ..	red	blue-green	green (blue, acid)	green (blue, acid)
Garden Rose ...	deep red	blue	bluish-green	green
Dog Rose ...	pink	green	green	green
Pyrus japonica ...	crimson	dark green	bluish-green	—
Clover	red	green	green	green
Vetch	red	blue	blue	—
Vicia sepium ...	red	green	green (blue, acid)	—
Sweet Pea ...	red	blue-green	green (blue, acid)	green
Mallow	red	blue	green (blue, acid)	—
Fuchsia	red	blue	blue-green (blue, acid)	green
Geranium ...	red	blue	red-purple (blue, acid)	red-purple
Flax	crimson	blue	blue	green
Flowering Currant	red	green	green	green
Daisy	red	dark-green	green (blue, acid)	—
Dahlia	deep red	blue	green (blue, acid)	green (blue, acid)
Scabious	blue	green	green (blue, acid)	green
Betony	red	green	green	—
Rhododendron ...	pink	dark green	dark green	deep green
Primula	red	green	green	—
Periwinkle ...	blue	blue-green	green (blue, acid)	—
Foxglove... ...	red	green	green	—
Snapdragon ...	red	green	green	—
Hyacinth... ...	blue	blue flakes	green (blue, acid)	green (blue, acid)
Tulip	red	red-brown	green	deep blue postea
Orchid	red	pure blue	green (blue, acid)	green (violet-blue, acid)

In a few cases the aqueous solution of the pigment, after acidification by HCl, was shaken up with amyl alcohol, and after allowing to separate, the lower acid liquid was withdrawn, and tested with excess of ammonia and of acetate of lead. In this way, rhododendron, red daisy, red tulip, violet, foxglove, *Vicia cracca*, red poppy, gave a brilliant pure blue coloration ; while, on the other hand, flowering currant and woundwort gave greens with ammonia, but blue precipitates with acetate of lead. In order, however, to purify the pigment still more thoroughly, its alcoholic or aqueous solution was shaken up at intervals for two days with well-washed hide-powder, and the latter, after filtering off the liquid, was well washed and extracted with very dilute HCl. The bright red liquid thus obtained was treated successively with the aforementioned reagents. The result was extremely interesting ; for while flowering currant and rhododendron gave greens, red tulip and purple orchis gave blues. In some cases the Wiesner's experiment was repeated, *i.e.* the fresh petals were warmed with dilute HCl, and the acid quite washed out with water, and the now reddened organs placed into solutions of acetate of lead and acetate of zinc, when rhododendron, flowering currant, violet (in some cells), foxglove, *Vicia cracca* (in some cells), became green ; while, on the contrary, *Geranium pratense*, bugle, the rest of the cells of violet, and of *Vicia cracca* became blue. It was evident, therefore, that Wiesner's opinion that anthocyan is invariably blued by alkalis, &c., and never greened, was not confirmed ; inasmuch as at least three petals, when treated in the manner he prescribed, were distinctly greened, the presumption being that all yellow intermixture had been obviated.

The general conclusion which I think must needs be drawn from these my experiments is, that there are different stages in the development of the floral pigment. In the lower stages the natural colour is red, whatever the chromogen may be ; and so far Berzelius was right. In the higher stages, on the other hand, the natural colour of anthocyan is blue, or rather (at least with some chromogens) it becomes capable of forming blue compounds or lakes with alkalis and certain metallic salts. Moreover, as I have laboured to show elsewhere, chromogens exist which, except under very exceptional conditions and circumstances, are incapable of producing a blue pigment ; and these in all stages naturally develop into a red, the brilliancy of which, when contrasted with that of a blue accidentally obtained in an allied species (*e.g.* in flax), unequivocally attests its real, original, and proper character. P. Q. KEEGAN.

The Colour of Flints.

AN examination of the pebbles lying on the beach of the coast of the English Channel shows that while these are principally flints they vary considerably in colour.

The flints derived from the chalk cliffs surrounding this part or the coast, and from which the shingle is generally supposed to be derived, are, so far as my experience goes, invariably black, with a white coating on the exterior.

Only about one-third of the flints on the beaches of such localities as Eastbourne, Hastings, Brighton, Hythe, Folkestone, Dover, &c., or in the large accumulations at Dungeness and at the Chesil Beach are apparently derived from the adjacent chalk cliffs, the remainder being different shades of brown, grey, white and red, the former being the most prevalent. In some cases the outside coating is of a different colour to the interior of the pebble. It follows, then, either that the flints from the chalk undergo some chemical action, either internally or externally, while exposed to the air and salt water of the beach, which changes their colour, or the majority of them must have been derived from inland gravels.

The first theory does not seem feasible, as flints are to be found in raised beaches and other positions, where they have been deposited for long periods, still retaining not only their interior black colour, but also the white coating on the outside.

If these various coloured beach flints are derived from inland gravel beds, they must have been deposited under different conditions from those which now prevail, as there is no action in operation on the south coast which can convey the flints from inland to the sea. The age of some of these shingle beds must, therefore, be much greater than has been generally supposed.

There are isolated pockets of gravel at the top of the chalk cliffs in some places, which fall on to the beach where the cliffs are eroded by the sea ; but these are too few in number to account for immense deposits such as those at Dungeness, Pevensey and Chesil.

Failing to obtain any light on this subject from geologists to whom I have mentioned the matter, and whose opinions vary as to the changes flints undergo, I venture to appeal to NATURE for a solution. W. H. WHEELER.

Boston, Lincs., November 27.

THE PROPOSED CHANGES IN THE MATHEMATICAL TRIPOS.

THE Cambridge Board for Mathematics has presented to the Senate a report on the Mathematical Tripos. This report recommends certain changes in the regulations relating to that Tripos. The following note contains an abstract of the proposals made by the Board :—

The schedule of subjects for Part I. of the Tripos has been reduced by the entire omission of some subjects (calculus of variations, elliptic functions, Bessel's functions, hydrodynamics, sound). Other subjects have been limited in extent (*e.g.* rigid dynamics, electricity, optics, astronomy and others). Care has been taken to specifically exclude parts of some subjects. The arrangement of papers is to be entirely changed and no papers are to be