It will be seen from the table and the graph that the optimum pH for the removal of ascorbic acid lies somewhere about 3·9. Further studies on the adsorption behaviour of other insoluble lead salts, are in progress.

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The Advance Monsoon in the West Coast

IN Travancore and Malabar there is usually a period of transition in May from the thunderstorm season of April to the south-west monsoon of June. Whereas the heat storms in April occur irregularly and the rain associated with them falls towards afternoon hours, *i.e.*, just after the period of maximum insolation, there occurs a change in May due to the advent of the monsoon winds resulting in more extensive thunderstorms and heavier rains not always confined to the afternoon hours. This condition may sometimes precede the burst of the regular monsoon by a few weeks or otherwise merge into it quickly without any break. Rarely does the actual monsoon current establish itself without such a transition period which is called the advance monsoon for that reason.

This year's advance monsoon conditions in Travancore area were remarkable for their suddenness and intensity, and also for the distinct break which has set in its wake. The monsoon conditions have yet to begin. But the period 5th to 10th May was one of unusually heavy rain in the coastal and submontane areas of Travancore, accompanied by severe lightning and thunder. Several stations gauged more than 7 inches of rain in 24 hours during this period, the maximum being 10·9 inches at Eraniel (a station in South Travancore) on the 10th May. The disturbed conditions of weather were noted in Trivandrum only after 11 p.m. on the 5th May. The incessant and severe lightning which continued in Trivandrum from about midnight till 1-30 a.m. on that night created general panic. This was accompanied by stormy winds and heavy rain, the wind reaching gale velocity (45–50 miles per hour) for about 5 minutes during the peak of the storm. Several big trees were uprooted and considerable damage caused to the telephone and town electric supply systems. The barograph at the Trivandrum Observatory recorded a rise of 0·07 inch pressure during the height of the storm and the hyetograph recorded 1·5 inches in about 15 minutes. This was evidently the result of the intrusion of moist monsoon winds into the drier tropical air and the consequent instability set up in the atmosphere. One could easily distinguish this type of thunderstorm from the afternoon heat storms of April. Whereas the latter storm would travel from the land area towards the sea, this travelled just the reverse way.

A feature of the advance monsoon of this year that appears noteworthy is that the monsoon current which produced the above instability of the atmosphere and such heavy rains in the coast and submontane areas for nearly 5 days was not strong enough to reach the Western Ghats. Not a single hill-station in the Devicolam High Ranges and other portions of the Ghats facing Travancore recorded any appreciable rainfall during this period. After the 10th May, perfectly clear and hot weather prevails till this day and the regular burst of the south-west monsoon is awaited.

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Microscopic Characters of Some Manganese Minerals, found in the Lateritic Manganese-Ore of Belgaum District, S.W. India

THE manganese ore occurs in the high-level laterite in the Belgaum District. The Dharwar gneiss and schists of Archæan age have been decomposed by weathering, giving rise to

lateritic rocks *in situ*. The manganese ore which is found to be associated with the laterite has been formed by metasomatic process.

On examining the ore by means of an ore-microscope, I have found two minerals—hollandite and romanéchite, which are not yet known to occur in the secondary manganese deposits of India. They are found to be formed side by side with psilomelane and polianite which are the two essential mineral constituents of the ore. I have determined the reflecting power of these minerals by the method of Prof. J. Orcel[1] with different photo-electric cells, sensitive to different wave-lengths.

Psilomelane is the principal constituent of the ore, it is isotropic, the reflecting power of this mineral has been found to be 0·263, for λ 6500Å, using a photoelectric cell of "couche d'arret" type with filter (Wratten No. 29F).

The etch test gave the following results. HCl 1:1 dilute—very rapid attack, H_2SO_4 conc.—blackening of the surface. H_2O_2 100 vol.—violent attack with effervescence.

Polianite occurs in spherolitic form. Fine aggregates associated with certain granular constituents are developed inside the spherolites. It is very strongly anisotropic. The R.P. has been determined by a similar procedure using different filters (Wratten No. 29F, and No. 90) and also by a gas-filled potassium cell sensitive to blue. The standard mineral taken is silicium 99%, whose R.P. is very close to that of these manganese minerals. The following results were obtained:—

Wavelength	R'_g	R'_p	$(R'_g - R'_p)$
4600 Å ..	0·432	0·374	0·058
5700 Å ..	0·385	0·359	0·026
6500 Å ..	0·383	0·348	0·035

The result shows that the R.P. of the mineral varies with the wave-length of light, the higher R.P. being more dispersed. The mineral has got normal dispersion. The results of the etch tests are:—

Positive: HCl 1:1 dilute—after five minutes, blackening of the surface (Diff. between polianite and psilomelane)
HCl conc., H_2SO_4 conc.,
H_2O_2 100 vol., $FeCl_3$ 20%, $SnCl_2$.

Negative: KCN, KOH, $HgCl_2$, and aqua regia.

Romanéchite.—Very fine needles of this mineral are found to be formed in the veinules produced in psilomelane. The R.P. determined by the same cell for λ 6500Å is

$$R'_g = 0{\cdot}290 \quad R'_p = 0{\cdot}261.$$

The results of etch tests are:—

Negative: HCl dilute 1: 1, HCl conc., $FeCl_3$ 20%, H_2O_2 100 vol.

Positive: $SnCl_2$ saturated, H_2SO_4 conc., $H_2SO_4 + H_2O_2$.

Hollandite is found to be crystallized side by side with romanéchite. It occurs in grains often associated with polianite, and psilomelane. Its R.P. is inferior to that of polianite. Using the same method the reflecting power has been found to be:—

$$R'_g = 0{\cdot}329, \; R'_p = 0{\cdot}305.$$

The results of the etch tests are:—

Negative: HCl 1:1, HCl conc., HNO_3, KOH, KCN, $FeCl_3$ 20%.

Positive: H_2SO_4 conc., (slight attack), $SnCl_2$ saturated, H_2O_2 100 vol., $H_2SO_4 + H_2O_2$.

It is quite possible that these two minerals—romanéchite and hollandite—have been formed out of psilomelane, some of which has been dissolved and enriched afterwards by the addition of iron and barium. An excess of iron leads to the crystallization of hollandite, while its deficiency is responsible for the formation of romanéchite. Hollandite is a mineral which is known to be formed in the meso-zone of metamorphism; the microscopic study of this ore shows that it can also occur in the superficial sedimentary zone, in the lateritic rocks. It is evident from this study that romanéchite and hollandite are two distinctly different species. The reflecting power of hollandite is much greater than that of romanéchite. This fact can be further substantiated by the chemical composition, the etch test, and the

structural characters which are different in these two minerals.

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[1] Orcel, J., "Sur l'emploi de la pile photoélectrique pour la mesure du pouvoir réflecteur des minéraux opaques," *C. R. Acad. Sciences*, 1927, t. **185**, 1055–57; 1928, t. **187**, 1141–43.

Orcel, J., "La mesure du pouvoir reflecteur des minéraux opaques à l'aide de la cellule photoélectrique et ses applications," *Bull. Soc. Fr. de Minéralogie*, 1930, t. **53**, 301–49.

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Lethality of Gametes Conditioned by Exchange of Segments between Partially Homologous Chromosomes in a *Nicotiana* Species Hybrid

IN studying the percentage of viable pollen in the species hybrid *N. glauca* × *N. Langsdorffii*, I found that their percentage corresponds approximately to the percentage of dyad and monad microspores formed in the hybrid as a result of non-occurrence of the first or of both meiotic divisions.[1] Studying the viability of the pollen in the species hybrid *Nicotiana Raimondii* ($n = 12$) × *N. tabacum* var. *Tyk-kulak* ($n = 24$) in connection with the dyad formation and the chromosome conjucation during the meiosis, quite different results were obtained. This hybrid, growing in the green-house, usually formed at the end of April (1939) 3–6 bivalents. Pollen-mother cells with 2 bivalents and with more than 6 were rarely found (ca. 6%). At the same time, in about 12–15% of the PMC dyad microspores were found. They usually resulted from non-occurrence of the first meiotic division (*i.e.*, restitution nuclei). When the flowers opened and the anthers dehisced no viable pollen were found. This indicates that both kinds of pollen grains: (1) those having reduced nuclei, as well as (2) those having non-reduced nuclei (dyads) with the total chromatine material from *N. Raimondii* and *N. tabacum* (36 chromosomes), were lethal. The lethality of the first kind of pollen originating from reduced microspores has been usually interpreted in assuming irregular distribution of the hereditary material during the meiosis and formation of tetrad microspore nuclei with incomplete and unbalanced genoms. The pollen originating from dyad microspores have two complete genoms, the whole *Raimondii* genom and the whole *tabacum* genom, nevertheless they were lethal. Non-viability of these pollen-grains is not due to loss of some chromosome fragments as a result of crossing over in inverted region or regions, because one chromatine bridge was very rarely observed (in 0·3% of the pollen-mother cells), during the meiosis. The most probable cause for their lethality is the exchange of segments between partially homologous chromosomes which takes place in each pollen-mother cell between 3–6 partially homologous chromosome pairs (bivalents) following chiasma formation. The reliability of this assumption is supported by the behaviour of the same hybrid plants during the autumn (1938) when their meiosis proceeded at a lower temperature. At this condition the hybrid usually formed 0–4 bivalents, and had in about 18% of the pollen-mother cells (PMC) dyad microspores; ca. 5% of the PMC having asyndesis (no bivalents). They formed then about 0·4% viable pollen grains. These pollen grains probably developed from PMC with asyndesis, in which the first meiosis has failed, thus producing dyad microspores and further pollen with whole chromosome sets and unchanged chromosomes of the parental species *N. Raimondii* and *N. tabacum*. It should be mentioned here that these two species are not closely related. They belong to two different sections —the former to *Rustica* section and the latter to *Tabacum* section.

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[1] Kostoff, D., *Journ. Genetics*, 1938, **37**, 120–209.