to develop a very good catalytic asymmetric oxidation of unfunctionalized alkenes to diol. Using $K_3Fe(CN)_6$ – K_2CO_3 as source of oxygen-transferring agent in *t*-BuOH-H_2O system at 0–5°C, most of the olefins undergo dihydroxylation with high selectivity[17]. Generally used chiral ligands are $DHQD_2$-PHAL or DHQ_2-PHAL and potassium osmate as the catalyst. Several of these ligands were developed based on the understanding of the mechanism of asymmetric dihydroxylation reaction.

Consequences and applications

Some of the applications of the Nobel Laureates' pioneering work have already been discussed. It is especially important to emphasize the great significance that their discoveries and improvements have for industry. Industrial synthesis of new drugs is of major importance, but we may also mention the production of agro-chemicals, including pheromones, flavours, fragrances and sweetening agents. This year's Nobel Prize in Chemistry shows that the step from basic research to industrial application can sometimes be a short one.

All around the world many research groups are busy developing other catalytic asymmetric syntheses that have been inspired by the Nobel Laureates' discoveries. Their developments have provided academic research with many important tools, thereby contributing to more rapid advances in research – not only in chemistry but also in materials science, biology and medicine. Their work gives access to new molecules needed to investigate hitherto unexplained and undiscovered phenomena in the molecular world.

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FROM THE ARCHIVES

CURRENT SCIENCE

Vol. V] OCTOBER 1936 [NO. 4

Indian museums

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Central Museum, Nagpur

Most provinces in India have their museums but it is regrettable how very few of these museums have developed a provincial aspect, which should be the foremost thought in their system of development.

Recently there has been a tendency to develop archaeology only in these museums to the detriment of other branches and sections. Archaeological museums are certainly the easiest to curate whilst biological ones are the most difficult. As archaeologists or numismatists are frequently in charge of such institutions, it is natural that natural history and other sections will suffer, although the latter are more popular with the general public… .

Nowadays most colleges teach biology but even an elementary display of zoological types are non-existent in most provincial museums. I once met a post-graduate student in zoology, who said his thesis had been on the moths of Lahore, yet this same student when shown a Uranid moth, pronounced it to be a butterfly!!

The complaint in most museums is lack of funds and mismanagement by those at the head through want of proper technical knowledge on the subject of museums. Sometimes a few persons who perhaps are uninterested and have never visited a museum are appointed to select a curator and of course the man with the highest degree amongst the applicants is selected, although he may be quite unsuited for the post. The result is that valuable collections already accumulated are lost or rejected before he gets initiated or learns his work.

Then again a person cannot be an expert in all the branches of a museum and it becomes necessary to have assistants for certain sections; this prevents neglect in sections in which the head of the museum is not much interested. A geologist for instance will hardly take an interest in ethnology or an archaeologist in zoology and vice versa. It is here that the services, if available, of honorary workers, who are experts and keen on the subject, should be enlisted. Perhaps it would be better policy for one man to curate a certain section in two or more museums.

Another point which needs development in local museums are libraries, laboratories and research collections, which should be available to the public. There might also be an Inspector-General of Museums whose duty it would be to go round giving advice and suggestions.

Visits of the staff to other museums should be encouraged, as it may be useful in suggesting new ideas, and it should be open even to junior members of the staff as well as to directors and curators. Museum publications should be encouraged even if they do not profit the museum.

Lastly the man appointed to a museum should be an enthusiast and keen on this subject, and the keener he is the more the museum will improve unless his energies are damped by those above him or by financial stringency.

SCIENTIFIC CORRESPONDENCE

Use of mint essential oil as an agrichemical: Control of N-loss in crop fields by using mint essential oil-coated urea as fertilizer

Indian agriculture aims at competitive production of higher level of food grains, vegetables and fruits and industrial raw materials from the existing arable land, through innovative research and development applications. The land holdings with Indian farmers are small, not amenable to the mechanized agricultural practices responsible for high crop yields, such as obtained in North America, Europe and Australia. Productivity of Indian agriculture per unit area and time is largely dependent on provision of fertilizers and irrigation in ample measure for the adequate expression of genetic potential of improved varieties of food grain, horticultural and industrial crops.

Fertilizers are one of the costly inputs in the agriculture of the developing countries. Agricultural production in these areas could be improved, if fertilizers could be used in larger quantities. Urea is the widely used nitrogenous fertilizer. Indian agriculture presently consumes over 10 million tonnes of urea. However, it appears that benefits from such large levels of urea fertilizer use in Indian agriculture can be expanded by increasing the effectiveness of fertilization. Average estimates indicate that the recovery of applied urea by summer season *kharif* crops in India is 30 to 50% and it can be $\leq$ 20% in lowland rice crops[1]. In the soil, the applied urea is hydrolysed by the enzyme urease of rhizosphere microbes to ammonium (NH_4) and nitrate (NO_3), which are prone to losses through volatilization, and denitrification and leaching, respectively. Arrest of N-loss in the crop fields can help increase N utilization/beneficiation per unit area. This, if achieved, will provide several advantages: decrease the cost of agricultural production and increase profits to farmers, expand the use of urea in optimal amounts over larger cultivated area and contain N-pollution that results from inefficient use of urea[2].

Control of urea transformation reactions that occur in soil for better utilization of its N by crops has been an active R&D area. Several classes of compounds, including phosphorodiamidates and triamidates, sulphahydryl reagents, hydroquinones, catechol, *p*-benzoquinones, dihydric phenols and aminocresols have been found to restrict hydrolysis of urea in soil. Ammonium polyphosphate and phosphoric, boric and nitric acid have been found to reduce volatilization of ammonia generated from urea[3]. Urea–thiourea mixtures placed in either bands or pellets have been used to retard the transformation of urea in the soil[4]. Rapid nitrification or oxidation of ammonium to nitrate in soil catalysed by microbes has been found to be inhibited by nitrapyrin (2-chloro-6-trichloro methyl pyridine), BHC, sodium azide, sodium chlorate, dicyandiamide (DCD), thiourea, AM (2-amino-4-chloro, 6-methyl pyridine), ATC (4 amino-1,2,4-triazole), N-serve and certain other compounds[4–6]. Besides, certain natural products like Karanjin from Karanj tree (*Pongamia glabra*), tea waste tannins, neem tree (*Azadirachta indica*) oil cake have also been found to retard hydrolysis of urea and nitrification to various degrees[7]. However, the high costs of these materials and/or large-scale unavailability have constrained the commercial use of urea treated with such protectants of N-loss.

There are a number of challenges to be met by Indian agriculture, in the post-green revolution era. In the case of most of the food grain crops, the yields per unit area have stabilized at a lower level than those obtained in the developed countries. Since the cost of cropping has gone up, the farmers are demanding higher than international prices for their produce. Full-scale application of World Trade Organization (WTO) regime may permit large-scale imports of commodities produced abroad, at comparatively lower prices. These kinds of development are expected to negatively affect the interest of local farmers in the cropping of food grains and jeopardize national food security. Thus one of the major concerns of Indian R&D effort in the area of agriculture must be to develop technologies whose deployment will allow high levels of income to farmers, while sustaining their interest in food grain crops.

In recent years, in the Indo-Gangetic plains, considered as the bread-basket