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Palynology - An elementary idea

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Palynology is the study of pollen in both living and fossil forms. The term was suggested by English Palaeobotanists Hyde and Williams in 1944. Pollen, the pretty powdery substance produced by flowers in the anthers has a white, yellow or blue hue. It is found everywhere - in the air we breath, in water we drink, in food we eat, and in the soil we walk on.

Pollen-grains are formed in the male reproductive part of flower - the anther. Pollen varies greatly in viability, after being shed from the anther. Pollen viability is greatly affected by temperature and humidity. Grass pollens are very short lived and remains viable for few minutes to few hours. On the other hand, pollen in some species remain viable for several years if stored properly.

Prof. P.K. K. Nair, the father of Indian Palynology, was the most reknowned palynologist of 20th Century. He played a pivotal role in the spread of palynological science in India and contributed in the areas of palynotaxonomy, aeropalynology , palaeopalynology, pharmacopalynology and forensic palynology.

Palynological studies have helped with geological aspects of oil and natural gas exploration. Pollens are resistant against decomposition, and are found embedded within sedimentary rocks. Most sedimentary rock sequences have characteristic polynological assemblage. Proper identification of indicative polymorphs could lead to discovery of oil and gas deposits. As pollen have the tendency of being dragged along with migrating petroleum through porous rocks, they are good indicators of the presence of Petroleum.

Microscopic pollen and spores are removed from sedimentary rocks and are examined to determine the history of every thing from climate change to the impact of man on the environment. Much of the history of human uses of plants has been discovered through

palynology. It has been possible to determine drought and humid periods in the history of agriculture. Pollen is preserved in lake and bog sediments that accumulate each year. This preservation results in a sequence of pollen assemblage representing the succession of past vegetation.

Palynomorphs recovered from the gut or intestinal tract of early humans, and those associated with artifacts such as pots, tools and cultural objects found at their grave sites have been used to understand the diets and hunting practices of these early people.

The defining principle for forensics is that every contact leaves the traces. Trace evidence may be clothing fibre, finger print, or DNA from blood and hair. In recent years there has been an addition to the list of forensic tools - the pollen. Among the world's forensic scientists, there is a small group of experts who use pollen and spores to link object and people to crime scenes. They are called Forensic palynologists.

Pollen is very small in size and hence criminals do not realize that they have taken it with them. Further, the cell wall of pollen is very durable and this make the pollen to survive for millions of years. There are thousands of flowering and coniferous plants that produce pollen and as such there is a lot of diversity among the 'Finger-prints' left by pollen. In some cases in wales, pollen from a walnut tree that has been cut down 80 years prior to the case, linked suspects to the scene of crime where the tree has once stood.

In a case in Austria, a murder suspect could be linked to the crime by analysis of the mud still attached to the sole of his boot recovered from his room. An examination of mud by a palynologist showed that in addition to modern spruce, willow and alder pollen, it contained millions of years old hicory pollen. Based on the pollen evidence, the site of the crime where he had killed and buried the victim could be pinpointed. When confronted with the identity of the location, the shocked dependent confessed his crime.

Thus, forensic palynology has the capacity of providing or disproving alibis ; connecting suspects to source of their crime. Thus pollen can provide new clues to solve the case.

A survey of atmospheric pollen and spore production finds its application in medicine and in forestry, etc.

In the study of allergies, palynology is used to discover geographical distribution and seasonal production of pollen, which can help sufferers of allergies, such as hay fever. Pollen of many weeds and grasses, and even some trees contain allergens which cause hay fever. Parthenium, an introduced weed that occurs along road sides and waste places is perhaps the worst allergic weeds in India.

The occurrence of pollen in the air is also closely linked with the seed production in forest trees.

The study of pollen in honey, with the purpose of identifying the source plant used by bees in the production of honey. This is
important to honey producers because honey produced by the pollen and nectar from certain plants demand a higher price in the market. On the other hand, some plants may produce pollen and nectar that contain toxins which are harmful for human health.
Pollen types found in honey may identify these toxic sources and honey thus produced can be kept out of the market.

Bee pollen, the food of young bee, is about 40% protein and is considered me of the nature's most nourishing foods. It contains nearly all nutrients - enzymes, vitamins, amino acids, hormones and trace elements needed by the body for cell growth. Bee pollen is being used for medicinal purposes from ancient times. It has long been prescribed for its healing properties by the ancient traditional health practioners. It is considered as energy and nutritive tonic in Chinese medicine. Bee pollen contain an antibiotic factor effective against certain bacteria.

It is reported to normalize cholesterol and triglyceride levels in the blood. It also shows immune strengthening properties. It is also considered as a remedy for hay fever and allergies. It works as elixir, if taken regularly.

It also help in skin rejuvenator as it contains a high concentration of nucleic acids - RNA and DNA.

Pollen is also known for its ability to improve skin health and rejuvenate the skin. Nutrients found in the pollen help nourish and protect your skin. Potent antibiotics present in pollen can act to reverse the affects of normal aging exerts on skin, correcting darkness, wrinkles and blemishes. Pollen is thus used in many
cosmetic preparations such as antiwrinkle supplements, miracle cream, skin oil, etc.

It is the study of pollen found on the body or in the gut of insects. It is useful for determining their feeding and migratory habits, particularly of economically important insects as the boll weevil or tarwigs.

Besides above mentioned areas, the use of pollen in the production of alloyed steel is also being studied.