followed through proved to be the margin of a polygon. The polygons thus identified were of enormous size averaging 80 to 90 feet in diameter. An uninformed person walking upon the playa would never suspect their presence; the only physical mark upon the surface is a broad faint depression more or less straight and trench-like, averaging 3 feet wide and perhaps an inch or more deep in the middle. Each side of a polygon is a line of fracture and fill which could not be recognized from the air were it not for a concentration of vegetation along these faint grooves. Here, either because of better-growing conditions or the more abundant lodgment of seeds, the plants *Suaeda fruticosa* Forsk., with fleshy leaves of a purplish color, and *Atriplex acanthocarpa* (Torr.) Wat., having fuzzy white leaves and bur-like fruits, are concentrated in greater numbers than upon the areas of the polygons and thus form the black borders which are so effective in outlining the polygons. Both plants are bushy and grow about a foot high. This geologic feature might have remained unnoticed were it not for the striking pattern made by the plants as seen from the air.

The year 1934 was one of extreme but brief drought in southern New Mexico. Inquiry disclosed that at least one resident of Animas Valley had remembered seeing that year open fractures on the parched playa. His recollection was that the openings were narrow but may have been two or three feet deep. They were subsequently filled by collapse and inwash of surface material.

The pattern is probably old, and the ground undoubtedly has suffered repeated opening and filling with every severe drought. But why these polygons have formed on such a grand scale is a point of interest which will be enlarged upon at a more propitious time.

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U. S. GEOLOGICAL SURVEY

POLLEN RECORD OF CANADIAN SPRUCE AND FIR FROM TEXAS BOG

A PRELIMINARY pollen analysis of the deep peat deposit (22 feet) in Patschke Bog, Lee County, Texas, gave very significant records on former ranges of boreal conifers and Castanea in North America.

Patschke Bog is an old lake, perhaps of the meander type, now filled completely with peat, which rests on fine reddish sand. The peat is extremely black and consists chiefly of finely divided wood fragments. The preliminary pollen study indicates a history of the vegetation showing the following changes in composition: Spruce-pine-oak-grasses, to oak-grasses, to grasses, to alder, to chestnut-alder, to chestnut-oak-grasses, to oak-grasses. The most significant discovery is a record of upward to 5 per cent. of Canadian spruce and fir pollen in the lower five foot-levels. Castanea attained a pollen representation of 33 per cent. at the 8-foot level, and 30 per cent. at the 6-foot level.

This pollen record shows former distribution of Castanea to have been at least one hundred miles westward of the present range limits, and of spruce and fir approximately 800 miles southward of Bacon's swamp, Indiana, the present southernmost profile showing the former range of these genera.

It seems probable that the hypothetical lake in Texas was occasioned by the blocking of a tributary to Yegua Creek. Abundant seep springs now feed the bog with water from under the adjacent hill slope.

The Patschke Bog is located in the Carrizo formation, the lowest member of the Claiborne group, near the middle of the Eocene system. The mineral content consists of about nine tenths medium-grained sands and one tenth sandy clay. Strata of impervious bluish-grey sandy shale occur at intervals, and, where erosion has exposed them, these result in seep lines of generally quite constant function, even during intense drought periods of several years' duration.

The topography is rolling, and the region is covered by a forest of which the dominants are post-oak, blackjack-oak and Buckley's hickory.

The bog itself was originally covered by a dense growth of *Ilex vomitoria* Ait., *Myrica cerifera* L., and *Quercus nigra* L., with *Erianthus saccharoides* Michx., Panicum spp., *Andropogon glomeratus* (Walt.) BSP., many species of sedges, *Osmunda cinnamomea* L., *O. regalis* L., *Anchistea virginica* (L.) Presl., Lycopodium sp., *Sphagnum subsecundum* Nees., *Rhexia mariana* L., *Pogonia ophioglossoides* (L.) Ker. as representative of the herbaceous flora. *Nyssa sylvatica* Marsh and *Ilex opaca* Ait. reach their southwestern limits along the margins; while the only collection of *Marchanlia polymorpha* L. on record for Texas was made from a burned area in the vicinity.

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A FORGOTTEN FACTOR IN CARDIAC PHYSIOLOGY

As the result of experience in the devising and use of mechanical hearts,[1] quite naturally my attention has been focused on the mechanical properties of the physiological model. One of these has been utterly impossible to duplicate and, as the efficiency of the machine depends largely on this factor, its consideration becomes of prime interest.

[1] O. S. Gibbs, *Jour. of Pharmacol. and Exp. Therap.*, 35: 197, 1930; *ibid.*, 49: 181, 1933.

The function to which I refer is the amazing ability of the heart to handle large, variable streams through markedly angular passages, at vastly different pressures and rates varying from zero to high speed, without provoking therein measurable eddies. Quite an elementary knowledge of engineering teaches us that the onset of eddies in either inlet or outlet ducts is associated with a material drop in efficiency. As the velocities increase, the production of eddies may be so great that finally they themselves may put a top level at which the system may function. Moreover, there are two different ways in which this may occur. On a low pressure induction system, the top rate of the entry stream may be easily and finally limited, while on the high pressure outflow side, the effects may also be similar where limited power is available or, alternatively, markedly increase the energy consumption per unit of flow.

In the living heart, eddies on the very low pressure flow side could very easily cause obstruction leading to acute or chronic venous congestion. On the outflow sides, the development of such eddies would be most importantly connected with a limitation of the total output, both immediately and secondarily, by the onset of unusual cardiac fatigue.

There seems little doubt that this function is associated with at least three factors, namely, the curious arrangements of the muscular bundles; the pattern of the nervous discharge; and the properties of the blood itself. It is also conceivable that the odd lining of the ventricles may have a damping effect on eddy formation. Moreover, it seems highly probable that this function is not entirely located in the heart itself, but is also carried out in the main vessels, especially the arteries where eddies would very greatly increase internal friction.

As eddies are readily discernible by stethoscope or other devices, their onset has many clinical notations. Those that are not occasioned by gross physical damage and tend to be variable in character are called haemic or organic murmurs. That changes in the blood may cause such eddies is known, especially by certain anemias, but it has not been generally recognized that their normal absence is due to a remarkable cardiac function which may itself become disturbed. Consequently, its full significance both in diagnosis and prognosis has been overlooked. Especially might attention be directed to the fact that increase in the loudness of murmurs by reason of increased work is a clear sign that the efficiency of the heart is materially decreased for such higher loading. Eddy formation in the large vessels would not be heard easily, as they are too deeply situated, but, by effectively decreasing the available flow space, they will load the heart with useless counter-friction work. The markedly decreased ability to compensate for loading by some arterio-sclerotics, in the absence of other obvious causes, may be such an example. The importance of eddies in flow systems is very well appreciated in engineering, including electrical, and it seems worth while to recall this neglected factor to students of the circulation, since it has yet to be incorporated in the standard works.

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A CATALOGUE OF INSECTICIDES AND FUNGICIDES

FOR the past year we have been engaged in surveying the literature and cataloguing all materials which have been tested for insecticidal or fungicidal properties. In our opinion such a compilation will be valuable to research workers and students in the fields of agricultural chemistry, economic entomology and plant pathology, particularly since it will insure a minimum of duplication in any search for new materials. Apparently no catalogue of this nature has been prepared up to the present time.

Our search so far has yielded over 500 literature citations, from which approximately 5,000 individual insecticidal and fungicidal materials have been catalogued. It is obvious that the usefulness of such a catalogue will depend upon its completeness. While we have made every effort to cover the literature completely, there are undoubtedly journal articles, bulletins and other less widely circulated publications which have been overlooked.

In this connection, therefore, we are appealing to all workers in the fields mentioned to supply the undersigned with any unpublished data, reprints or literature citations dealing with insecticidal or fungicidal tests on specific materials, so that all such materials may be included in this catalogue. Particularly we would welcome lists of materials tested by industrial research laboratories, even though the results disclosed may be of a negative nature.

Information should include the name of the chemical compound, its formula, the name of the test organism and a general statement of toxicity. In the case of plant products, the scientific name as well as the portion of the plant used for the test should be included.

It is our intention to prepare this catalogue for publication as soon as possible. Because of the size of the undertaking, it may not be available for wide distribution, but each *bona fide* contributor will be assured of a copy. We shall be very grateful for any comments or suggestion.

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