The respiratory organs are covered by a tolerably thick membrane, which is contracted between each of them, and prolonged in front and behind in the form of a wide vessel receiving the venous blood. Each pulmonary sac is alternately raised or depressed by a double or triple ligament, which rises perpendicularly and is attached to the pericardium. When a portion of the heart is exposed, it is seen that its pulsations act upon the contractile ligaments, causing a pressure of the pulmonary sacs, which forces the blood to rise in the pneumocardiac vessels. This movement is aided by muscular pillars attached to the upper and lower walls of the abdomen.

From all these facts we must conclude, that in the pulmonary Arachnida the venous blood circulates for a great portion of its course in distinctly circumscribed canals ; that it passes into the abdominal cavity as into a vast sinus, so as to penetrate thence into the respiratory organs, whence it rises into the heart by means of a particular mechanism. These facts lead us naturally to the conclusion that analogous arrangements should be sought for in Crustacea and Insects.—*Comptes Rendus*, June 20, 1853, p. 1079.

### THE TIBETAN BADGER OF HODGSON.

Mr. Hodgson having sent to the India House a specimen with its skull of his *Taxidea leucurus* (Journ. Asiatic Soc. Bengal, xvi. 763. 1847), I have compared the skull with that of the various Badgers in the Museum collection. I find all the Old-World Badgers (*Meles*) have a moderate-sized triangular flesh tooth, and a very large four-sided oblong tuberculous grinder in the upper jaw, which is rather longer than broad, and the skull is rounded behind. The nose of the Tibetan Badger or Tumpha, *Meles leucurus*, is rather more tapering and more compressed than that of the European Badger (*Meles Taxus*), which it most resembles. The Japanese Badger (*Meles anakuma*) differs from both in having a much shorter skull and a short, rather broad nose.

The American Badgers (*Taxidæ*, Waterhouse) have a very large triangular flesh tooth, and an equally triangular tubercular grinder in the upper jaw not exceeding the flesh tooth in size. The skull is also much broader, more depressed and truncated behind. Of this genus I only know a single species, *T. Labradoria*.—J. E. Gray.

### *Note on the Germination of the Spores of the* Uredines. By L. R. Tulasne.

Some years since I made known* the origin and structure of the organs known as the spores of these plants. I then showed that these bodies, like the pollen grains of phanerogamous vegetables, are furnished with a variable number of pores through which tubular filaments afterwards pass, analogous, at least in appearance, with those which are the first result of the germination of the spore of a Fungus.

I have since indicated† the *Æcidiolum exanthematum*, Ung., as a

* Ann. des Sci. Nat. 3rd série, t. vii.

† Comptes Rendus, xxxii. March 31, 1851.

peculiar organ of the Uredines, and that its frequency amongst their sori or fertile groups, its relations of position, and its early appearance authorise us in comparing it with the spermogonia of other Fungi, so that the sexuality of the Uredines was not less probable than that of the other families of the same order.

Fresh investigations have shown me that the germ-filaments of the spores do not all continue in the state of simplicity and continuity in which I formerly saw them, and that perhaps they may constitute the rudiments of the *mycelium*.

Thus having sown perfectly ripe spores of *Æcidium Euphorbiæ sylvestris*, DeC., their germ-filaments became less elongated than in my previous experiments, made at a different time of the year, and instead of remaining continuous, they divided by means of transverse septa into four or six cells of unequal size; then these cells, and especially the superior ones, each produced a short lateral appendage (*spicule*), which soon bore an obovate and slightly oblique utricle. These utricles were the last vegetative effort of these spores; they became free and then continue a separate existence, which was indicated by the production of very slender filaments. After the isolation of these bodies, the spore and the tube from which they were formed become exhausted and destroyed, so that this tube or filament represents a sort of *promycelium*, an intermediate vegetation between the primary spore and the utricles, which are either secondary spores, or perhaps the only true spores, and the real producers of the true *mycelium*.

The same facts may be observed in the *Pucciniæ*, the bilocular fruits of which can commence vegetation without quitting the plant which has supported them. In *Puccinia graminis*, Pers., I have seen the tubes arising from these fruits acquire two or three times their length, divide into cells like the germ-filaments of the preceding *Æcidium*, and like these give rise lastly to nearly reniform spores which soon germinated.

The vegetation of the fruit of *Phragmidium incrassatum*, Link., does not differ from that of the *Pucciniæ*. The spores produced are more globular than those of the above-mentioned Fungi.

The *Podisomata* (*P. juniperi communis*, Fr., and *P. fuscum*, Cord.) are Uredines by their parasitic existence and their mode of fructification, whilst in their general appearance and consistence they resemble the *Tremellæ*. Their bilocular fruits (*sporidia*, auct.) can emit as many as eight tubes from their middle; these are crossed and superposed two and two, clothe the Fungus as with a sort of velvet, and each produce several obovate *spores*, an immense abundance of which may be collected as readily as of those of the *Agarici* or *Tremellæ*.

In several Uredines which I have studied, such as *Uredo Rosæ*, Pers., *U. suaveolens*, Pers., *Æcidium Tussilaginis*, Pers., *Æ. crassum*, Pers., and some others, the tubular filaments which arise from the fruits are capable of more or less ramification, so as to resemble the true *mycelium* of Fungi still more closely.

As regards the spermogonia of the Uredines, I will add that they are organs the structure of which varies extremely little. They all eject, in the form of viscous drops or short cirrhi, an orange substance which is very aromatic, and consists of very thin, ovoid corpuscles (*spermatia*). It is to these alone that the agreeable odour of the *Uredo suaveolens* and many other Uredines is due. The spermatia are produced at the apices of filiform basidia.

The *Ustilagines*, which are very nearly allied to the Uredines, present certain peculiarities in the vegetation of their reproductive bodies. The oblong cell, which is produced from the spores of *Ustilago antherarum*, Tul., becoming soon detached to live independently*, must apparently be compared to the secondary spores of *Æcidium*, *Puccinia*, and other Uredines above described. In *Ustilago receptaculorum*, Fr., utricles, doubtless analogous with these secondary spores, are produced on an imperfectly developed *promycelium*, composed only of a few cells, but which resembles that of *Æcidium Euphorbiæ sylvestris*.—*Comptes Rendus*, June 20, 1853, p. 1093.

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## METEOROLOGICAL OBSERVATIONS FOR JULY 1853.

*Chiswick.*—July 1. Showery. 2. Cloudy. 3. Cloudy and fine. 4. Very fine. 5. Overcast: fine: clear. 6. Overcast and fine. 7. Uniform haze: sultry: much lightning, with thunder and rain at night. 8. Cloudy: lightning at night. 9. Rain: cloudy. 10. Cloudy: clear. 11. Densely overcast: cloudy and fine. 12. Very fine. 13. Very fine: slight haze: very heavy rain at night. 14. Constant rain. 15. Heavy showers. 16. Showery. 17. Cloudy and fine: very clear. 18. Heavy showers. 19. Showery: clear. 20. Uniform haze: very fine. 21. Rain: cloudy. 22. Overcast: slight rain. 23. Very fine. 24. Cloudy. 25. Very fine: rain at night. 26. Cloudy. 27. Cloudy and fine: thunder, lightning and very heavy rain at night. 28. Rain: cloudy: showery. 29. Fine: rain. 30. Fine: boisterous: clear at night. 31. Clear: cloudy: overcast.

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|---|---|
| Mean temperature of the month | 61°·99 |
| Mean temperature of July 1852 | 67 ·61 |
| Mean temperature of July for the last twenty-seven years | 63 ·22 |
| Average amount of rain in July | 2·29 inches. |

*Boston.*—July 1. Fine: rain P.M. 2. Fine. 3. Cloudy. 4. Cloudy. 5. Cloudy: rain P.M. 6—8. Cloudy. 9. Cloudy: rain, thunder and lightning A.M. 10. Cloudy. 11. Cloudy: rain A.M. 12, 13. Fine. 14. Rain: rain A.M. and P.M. 15. Cloudy. 16, 17. Cloudy: rain A.M. 18. Cloudy: rain A.M. and P.M. 19. Cloudy. 20. Cloudy: rain A.M. and P.M. 21. Cloudy. 22. Fine. 23. Cloudy. 24, 25. Fine. 26. Rain: rain A.M. and P.M. 27. Cloudy. 28. Cloudy: rain A.M. 29. Fine. 30. Cloudy: rain A.M. 31. Cloudy: rain P.M.

*Sandwick Manse, Orkney.*—July 1. Bright A.M.: drops P.M. 2. Showers A.M.: fair P.M. 3. Rain A.M.: fair P.M. 4, 5. Cloudy A.M.: rain P.M. 6. Bright A.M.: cloudy P.M. 7. Drops A.M.: cloudy P.M. 8. Bright A.M.: cloudy P.M. 9. Clear A.M.: cloudy P.M. 10, 11. Bright A.M.: cloudy P.M. 12. Bright A.M.: clear P.M. 13. Clear A.M.: cloudy P.M. 14. Clear A.M.: rain P.M. 15. Showers A.M.: cloudy P.M. 16—18. Bright A.M.: clear P.M. 19. Bright, fine A.M.: clear P.M. 20. Rain A.M. and P.M. 21. Damp A.M. and P.M. 22. Damp A.M.: clear P.M. 23. Clear, fine A.M.: cloudy P.M. 24. Rain A.M.: clear P.M. 25. Bright A.M.: clear P.M. 26. Showers A.M.: damp P.M. 27. Showers A.M. and P.M. 28. Fine A.M.: clear P.M. 29. Drizzle A.M.: clear P.M. 30. Bright A.M.: fair P.M. 31. Bright A.M.: fine P.M.

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|---|---|
| Mean temperature of July for twenty-six previous years | 54°·93 |
| Mean temperature of July 1852 | 61 ·36 |
| Mean temperature of this month | 58 ·15 |
| Average quantity of rain in July for seven previous years | 2·69 inches. |

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* Ann. des Sci. Nat. 3rd série, t. vii.