absolu. En effet, nous avons négligé les carrés des ξ et des η et rien ne prouve qu'en tenant compte de ces carrés, le résultat ne serait pas changé. Mais nous pouvons dire au moins que les ξ et η, s'ils sont originairement très petits, resteront très petits pendant très long-temps. Nous pouvons exprimer ce fait en disant que la solution périodique jouit sinon de la stabilité *séculaire*, du moins de la stabilité *temporaire*." Here the conclusion of § 9 of my present paper is perfectly anticipated, and is expressed in a most interesting manner. M. Poincaré's investigation and mine are as different as two investigations of the same subject could well be, and it is very satisfactory to find perfect agreement in conclusions.

II. "A new Mode of Respiration in the Myriapoda." By F. G. Sinclair (formerly F. G. Heathcote), M.A., Fellow of the Cambridge Philosophical Society. Received August 12, 1891.

(Abstract.)

The Scutigeridæ respire by means of a series of organs arranged in the middle dorsal line at the posterior edge of every dorsal scale except the last.

Each organ consists of a slit bounded by four curved ridges, two at the edges of the slit, and two external to the latter. The slit leads into an air sac. From the sac a number of tubes are given off; these tubes are arranged in two semicircular masses. The ends of the tubes project into the pericardium in such a manner that the ends are bathed in the blood and aërate it just before it is returned into the heart by means of the ostia. In the living animal the blood can be seen through the transparent chitin of the dorsal surface surrounding the ends of the tubes; and in the organ and surrounding tissues cut out of a Scutigera directly it is killed, the blood corpuscles can be seen clustering round the tube ends. If the mass of tubes of a freshly killed specimen are teased out under the microscope in glycerine, they can be seen to be filled with air. The tubes each branch several times. Each tube is lined with chitin, which is a continuation of the chitin of the exo-skeleton. Each tube is also clothed with cells, which are a continuation of the hypodermis. The tubes end in a blunt point of very delicate chitin.

Reasons for supposing these Organs to be Respiratory.

1. There are no other organs which could be supposed to be respiratory in function.

2. The tubes are chitinous, and the chitin grows thin and mem-

branous towards the end, affording a good opportunity for interchange of gases.

3. The tube ends project into the pericardium, so that they are bathed with the blood.

4. The tubes are filled with air.

5. The organ is so placed as to aërate the blood just before it returns to the heart.

6. In Scutigera the dorsal scales do not agree in number with the legs. The organs are arranged on the dorsal scales; that is they are not arranged in correspondence with the mesoblastic or primitive segmentation (see a former paper before this Society, "The Post-Embryonic Development of *Julus terrestris*," 1888). This renders it probable that they are not a primitive development, but a recent modification, agreeing with the fact that all other Myriapods breathe by the more primitive method of tracheæ.

This mode of respiration differs from that in other Myriapods in the following particulars:—

1. The tubes are collected into one definite organ, instead of being distributed about the body.

2. The tubes have no spiral thread.

3. In acting on the blood just before it returns to the heart, so that aërated blood is distributed instead of unaërated.

It resembles the tracheæ of other Myriapods in the following particulars:—

1. In the air sac into which the tubes open.

2. In the cylindrical form of the tubes.

3. In the branching of the tubes.

The organs resemble the tracheal lungs of Spiders—

1. In the large air sac.

2. In the number of tubes opening into an air sac.

3. In the arrangement for bathing the tubes with blood in a blood sinus.

4. In the supply of aërated blood by the heart.

They differ from them in—

1. The form of the tubes, which in Scutigera are cylindrical.

2. In the absence of the membrane which in Spiders surrounds the organ.

I therefore hold that the respiratory organ in Scutigera holds a position intermediate between the tracheæ of Myriapods and the lungs of Spiders. I hold with A. Leuckart ('Zeitsch. für Wiss. Zool.,' vol. 1, p. 246, 1849, "*Ueber den Bau und Bedeutung der sog. Lungen bei den Arachniden*") that the tracheæ have developed into the lungs of Spiders and Scorpions, and I think that the organs in question form a series of which the lowest term is the tracheæ, the next the organ of Scutigera, then the lungs of Spiders, and then of Scorpions.