

the animal's body. The same vessels which penetrate between the plates or leaves of these organs, and which cover them with blood when they are cut transversely, also send out numerous branches to the exterior surface of the air-bladder. I found in a hundred parts of the air of the swimming-bladder four of oxygen and ninety-six of nitrogen. The medullary substance of the brain displays but a feeble analogy with the albuminous and gelatinous matter of the electric organs. But these two substances have in common the great quantity of arterial blood which they receive, and which is deoxidated in them. We may again remark, on this occasion, that an extreme activity in the functions of the brain causes the blood to flow more abundantly towards the head, as the energy of the movement of the muscles accelerates the deoxidation of the arterial blood. What a contrast between the multitude and the diameter of the blood-vessels of the gymnotus, and the small space occupied by its muscular system! This contrast reminds the observer, that three functions of animal life, which appear in other respects sufficiently distinct,—the functions of the brain, those of the electrical organ, and those of the muscles, all require the afflux and concurrence of arterial or oxygenated blood.

It would be temerity to expose ourselves to the first shocks of a very large and strongly irritated gymnotus. If by chance a stroke be received before the fish is wounded or wearied by long pursuit, the pain and numbness are so violent that it is impossible to describe the nature of the feeling they excite. I do not remember having ever received from the discharge of a large Leyden jar, a more dreadful shock than that which I experienced by imprudently placing both my feet on a gymnotus just taken out of the water. I was affected during the rest of the day with a violent pain in the knees, and in almost every joint. To be aware of the difference that exists between the sensation produced by the Voltaic battery and an electric fish, the latter should be touched when they are in a state of extreme weakness. The gymnoti and the torpedos then cause a twitching of the muscles, which is propagated from the part that rests on the electric organs, as far as the elbow. We seem to feel, at every stroke, an internal vibration, which lasts two or three seconds, and is followed by a painful numbness. Accord-