PHYSIOLOGY OF THE IMMERSION.

To reach mayores depths of 100 m.s is something possible for very few people at the moment, and it does not have solely to the capacity of apnea, but to its incredible adaptation to means.

Anyone of us, put under 14 atmospheres of pressure (13 times more of the one than we supported normalnente), we would undergo great amount of the evils: immediate unemployment cardiac, breakage of eardrums, crushing of the torácica box, loss of the conscience, etc.

THE OIDOS.

The membrane of the timpano is very weak, reason why the pressure differential between external means and internal gases can affect to him (making convex it) until the breakage. For that reason, each two or three meters of immersion it is necessary to make the maneuver of Valsalva, who consists of covering the nose with the hand and blowing air directing it towards the tubes of Eustaquio, so that the pressure is increased of the air of these internal cavities, equaling it with the external pressure.

This maneuver is actually very fáci1 to make, and it is used by all the one that, with gas cylinders or without them, it has to submerge.

To 100 meters of depth, the external pressure is already so great that it is not possible to be equaled simply " blowing " (carrying out the maneuver of valsava).

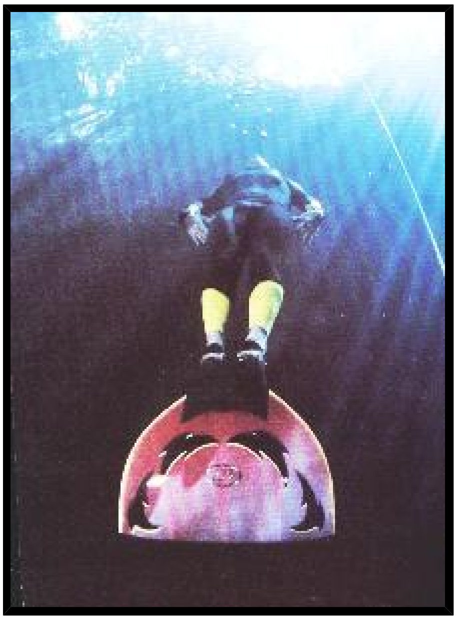
In order to compensate, when arriving at this depth, the apneistas introduce water of sea by the nose so that it arrives at Trompas de Eustaquio, balancing the internal pressure with the hydrostatics. As it is possible to be deduced, this maneuver no longer is within reach of everybody and is necessary to make it with much well-taken care of.

CONCENTRATION AND **VENTILATION,** THE BASES OF **THE APNEA**

An extreme concentration is necessary to reduce to rninimo the consumption of the body,de form that all oxygen concentrates in the brain and the heart, just as happens in other marine mamiferos. The form of more frequent concentration is yoga, together with other Eastern techniques like the body-mind. All united it favors a good ventral, ample and deep ventilation. The hyperventilation is not used, that consists of a series of fast breathings that cause a carbon dioxide reduction that falsea the natural alarm of the body before the necessity to breathe, because also it increases the pulsations and the voltage,y can be dangerous.

LUNGS.

As the pressure increases, the volume of the air contained in the lungs diminishes. To 131 meters of depth, the amount of air is 14 times smaller than in surface. The lungs have limits of elasticity, and if it were surpassed, the torácica cut would be squashed irreversibly.



It is considered that it limits of a lung with capacity for 6,5 liters is in 35 meters. In order to avoid this crushing, the lungs and other hollow cavities literally fill of plasrna, that is not compressed and allows to reach mayores proflindidades. In the ascent, the lungs are due to drain again, which requires certain time and an ascent of somewhat moderate speed. Pipin and Pelizzari tell that in his first slopes to great depth were scared when noticing how 4,5 liters of plasma filled progressively their lungs, but that at the present time takes it like part from the depth and them aid to concentrate itself.

BRAIN.

In the case of the immersion not limits, the very fast ascent does not allow that the organism has the time sufficient to recover a normal physiology, with the consequent return of the blood to the arms and the legs. Therefore, it turns out indispensable to stop before leaving to the surface. In which it concerns to the brain, this it experiences neither reduction of lowered blood nor of irrigation, because it has a self-regulation system that guarantees a neuronal irrigation to him during the course of the apnea. If not outside asi, brain without sanguineous irrigation is always perderian for some of their faculties Un during three or four minutes it considers dead.

To great depth,la nitrogen assimilation on the part of the body due to the pressure which it is put under the air of the lungs causes the borrachera call " of the depths ", really dangerous, since it can cause that the diver forgets from where is and what it must do.

Pipín tells that from the 100 meters it makes mental exercises, like remembering its telephone number,el name of its friends, etc...

HEART

Pipín is able to voluntarily descend the heart rate to 44 pulsations per minute, and when it begins the immersion already has reached lace thirty pulsations per minute. To 133 meters of depth its heart emits a beat every 7 seconds, which supposes a rate of 8 pulsations per minute. The reduction of the heart rate is a natural reflection that can be observed in all the marine mammals when they are sumerjen. About the case of the man, the doctors think that the body cannot accept so low values if the apnea extends at heart. The case of the great apneistas is something different: its so particular physiology allows to support these modifications them without no problem.

THE SÍNCOPE.

Síncope is the main accident of the free diving, and a great amount of victimas is received annually. *** TRANSLATION ENDS HERE ***

El oxigeno y el dióxido de carbono pasan de los pulmones a la sangre o viceversa por difusión , es decir , por la diferencia de presión que hay entre los gases de los pulmones y los de la sangre ,ya que tienden a igualarse .

A una cierta profundidad la presión del aire de los pulmones es muy superior a la normal , por lo que el oxígeno pasa a la sangre aunque sea muy escaso . *Al* comenzar la subida ,la presión va disminuyendo , hasta que se iguala con la presión sanguinea . Nuestro cuerpo de pronto no puede asimilar oxigeno y se produce una pérdida de consciencia .

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