

THE INSURRECTION IN CUBA.

THE struggle between Spain and the disaffected in Cuba has not the character of an ordinary war. There are neither armies nor pitched battles. As in all the revolutions in Central and South America it is a hand-to-hand conflict and depends largely upon the resources of the country and its natural advantages. Ambuscades, marches and counter-marches, which are prolonged almost indefinitely and in which numerous small bands of insurgents called *partidas*, commanded by leaders called *cabecillas*, ravage the country, are sufficient to hold in check a whole corps of an army. These bands, composed of a hundred, often several hundred, men, are made up in large part of negroes or mulattoes, equipped with arms of all kinds and wearing the large hats of the planters, operate principally in the eastern part of the island, in the provinces of Puerto Principe and Santiago de Cuba, where the heavily wooded and mountainous character of the country is specially adapted to the maneuvers and surprises of the guerrillas. Arms and horses are taken from the inhabitants. Fierce and insatiable, they utilize the least accident of ground, and skirmishing without relaxation, thus they torment the Spanish troops, cutting telegraph wires and destroying railroads. They also destroy the storehouses, the coffee and tobacco plantations and the sugar works, which are situated in the center of the plantations. Sugar and tobacco constitute the principal industries in the greater Antilles. One of our engravings represents one of the three establishments at Manzanillo.

The insurgents take advantage of all manner of positions, trees even, especially palm trees, become points of attack, and one of our engravings shows insurgent troops firing on Spanish troops from palm trees.

A *partida* had attacked the village of Cristo, three leagues from Santiago de Cuba on May 6, and dislodged the Spaniards after a fusillade of two hours. The next day three hundred troops of the ninth Peninsular regiment reoccupied the village and on May 8 they made a new attack on the insurgents, who were forced from the village of Caney; the insurgents then destroyed the railroad bridge and part of the railway so that when the train bearing reinforcements of Spanish troops arrived, it was precipitated into a ravine. These troops were massacred after a terrible conflict on the banks of the stream and even in the water.—*L'Illustration*.

In a recent number of *El Quixote*, a Spanish paper published in Madrid, the distinguished Spanish statesman and patriot Senor F. Pi y Margall presents his views on the Cuban movement in very eloquent words.

Senor Margall was one of the presidents of the Spanish republic before Martinez Campos placed Alfonso XII on the throne, thereby again re-establishing a monarchical form of government. He is respected for his honesty and love of justice, and is very influential in the politics of Spain.

The following is a translation:

"We should work to re-establish the principles of justice. No nation has the right to occupy territories populated by other people unless with their consent. If a nation occupies them by force, those conquered can at any time fight them until they drive them from their soil.

"There is no possible limitation. Nothing can limit the right to freedom and independence. Whenever this principle was applied to our life, did we Spaniards understand so? For two centuries we fought against old Rome for our independence. During seven centuries we fought against the Arabs, who in three years had extended from Tarifa to Pirends. The limitation of centuries made no difference. Those of Seville and Granada were as Spanish as ourselves when we drove them away from the territory, as they were Spanish descendants for more than ten generations.

"We did not put down our arms until we drove them from our shores. In Malaga we carried our cruelty to the extreme of taking from them the gold and jewels that might have helped them in their exile. If we acted in that way, is it just that we call bandits those who are now fighting against us for their independence? For the same deeds and for the same cause must we call those bandits who here we call 'heroes'? Heroes are called, all over America and over the world, those who in the first third of the century drove us away from Mexico, Guatemala, Colombia, Ecuador, Chile and Peru.

"Let us be just to those who are now fighting in Cuba. We should have given them long ago the autonomy to which they have an undisputable right. We should have united them to the metropolis by the ties of common interests only, national and international. We would have thus prevented not only the present war, but also that of 1868. How much blood and how much treasure we should have saved by this conduct!

"It was advised by reason, right, our own interests and the consideration of the vast colonial empire we had lost. Unfortunately for countries, more so than for individuals, the force of habit is irresistible. Nothing could persuade us to give up our old policy—a policy so little authorized by our own as well as other people's experiences.

"If there is now war in Cuba, it is all our fault. It is our duty to mend our error and stop it. The war of 1868 lasted ten years, and we could only stop it by a treaty. We then allowed the Cubans the rights and liberties enjoyed by Puerto Rico—the treaty by which we will have to end the present war if we are not beaten by Cuba. Let us make it now, when we are the stronger, and when our generosity cannot be construed as weakness. Seventeen years ago we gave them liberty. Let us now give them autonomy. Let us make them now the owners and arbiters of their destinies. Let us allow them to govern themselves politically and economically; and in order that they may be grateful for our generosity, let us help them to their autonomy without any disturbances or bloodshed.

"The feeling of patriotism is invoked against this conduct. Above the feeling of patriotism stands that of humanity, and, above all, the feeling of justice. Cuba is the graveyard of our young men. In these deplorable wars our soldiers die there by the thousands, some on account of the climate and others by the lead and steel of the enemy. The greater part of them go there by force and fight for a cause with which they are not in sympathy.

"Is it even human not to try to find the means of saving the lives of these men? It is irritating to read and hear one day and another that it is necessary to send to Cuba regiments and recruits in order to finish with the rebels and uphold and establish the national sovereignty. In order that their patriotism might not be considered as false, those who think that way should be the first to go with their sons in the advance guard of the army.

"It is easy to stay at home and send others to die, and it is easy, too, not to know anything about the war but by reading descriptions of the battles by our firesides in winter and under the shade of the trees in summer. The national sovereignty! Is it that the nation in order to be sovereign must absorb the life of the groups that make it up? Is it that sovereignty must carry along with it the slavery of the colonies? Its sovereignty limited to the national interests, it must be circumscribed to the life of relations to the colonists.

"National pride is also invoked to continue the war, as if it were dishonorable to a nation to grant what is just. Would the honor of the nation suffer less by continuing the war and losing in the end? Was it more honorable for us to have to ratify in Mexico, by the peace of Cordoba, the plan of Iguala, and to sign in Peru the shameful capitulation of Ayacucho?

"The war will increase our already desperate economic situation. It is only three months since the war was begun, and already it has cost \$7,000,000 in the last budget made up before the war. We had already a deficit of \$6,000,000, and you all know how these deficits are increased upon the final liquidation of the accounts. You can therefore calculate what our deficit will be at the termination of the new financial year if the war continues. F. PI Y MARGALL."

INFLUENCE OF SCIENCE ON MOUNTAINEERING.*

By CLINTON T. DENT, Esq., F.R.C.S., M.R.I.

BETWEEN mountaineering in general and climbing, which is but a special branch of mountaineering, I desire for the purpose of this discourse to draw a clear distinction, but do not wish it to be supposed that my dwelling chiefly on mountaineering implies any depreciation of simple climbing. On the latter it is well nigh impossible to break new ground, save in the geographical sense. The climbers of mountains cannot justly be accused of any exaggerated tendency to reticence as regards their adventures. The technique of climbing is really simple, and considered as a craft, the subject has been fully dealt with. Indeed, the general principles that the climber has to bear in mind have been reduced to rules so few and so simple that many can quote, and a certain proportion can follow them.

I desire chiefly to-night to dwell for a short time on the part that science has played in developing the growth of mountaineering. This has not been adequately recognized. The popularity of mountaineering during the last thirty-five years, the period of greatest activity, has been too much laid to the credit of writers who have regarded and described the Alps as a field for the best of recreations. The more solid work was less before the world. Geologists and botanists, from the first, found in the Alps a magnificent field for pursuing their own branches of work; but in the matter of physical science the work done was speculative, not experimental. Men sought for evidence for or against the deluge, or elaborated vast hypotheses of the earth's formation. They concerned themselves little with attempts to explain the phenomena going on under their eyes, and there was little original investigation. In old books on the Alps, statements, often of the wildest nature, are found copied from one to another without the slightest trace of acknowledgment. Men whose lines of thought led them into the direction of physical research came late into the field, but gradually their work attracted in some quarters the attention due to a new departure. So there arose men who gathered from the amassed knowledge of works of science such facts and observations as might be turned to practical account in mountain exploration. Thus was developed the scientific mountaineer, who, on the mountains, could use his head as well as his limbs. He might or might not be one who made science his prime object when among the mountains. I am far from saying that this is the ordinary type of the mountaineer of to-day, but it must be the type of the mountaineer of the future who wishes to extend his sphere of exploration beyond the restricted field of the mid-European Alps. The pioneers were numerous. Such names as Agassiz, Studer, Rendu, Forbes, Ball, occur at once to the mind; but I must limit myself to-night to two only, De Saussure, during the last century, and Tyndall in recent times.

The true value of De Saussure's work can only be estimated by considering the scientific chaos with regard to glacial phenomena that was widely prevalent before and during his time. It is not long since that avalanches, mountain falls, the bursting of glacial lakes and such like occurrences were considered generally to be the work of fiends or evil spirits. The legends that smiling Alps were converted into snowfalls and glaciers as punishment for man's wickedness were widely credited. Dragons were supposed to haunt the mountains, and were implicitly believed in by men such as Wagner, the naturalist, little more than two hundred years ago. Long after the legendary ages, of which traces enough can still be found in the Alps, and still more plainly in other mountainous countries, the state of physical science as regards mountains and glaciers was in a very primitive condition, owing largely to the terror with which mountains were generally regarded. De Saussure reduced to order by direct observation, by experiment, and by clear and impartial writing much of the confusion. It must be remembered that in the days when he traveled accurate maps were unknown. Thus, in a map of the early eighteenth century, Chamonix is depicted as some sixty miles south of the Mont Maudite, the name by which Mont Blanc was then often known. Strange views indeed are to be found in the old writers, whose desire to be credited with universal knowledge

allowed them little time for accuracy of detail. Crystals were supposed to be formed by the excessive pressure to which ice was subjected. One marvels that mountains do not sink into the earth by their own weight; another believes that they would certainly do so were they not hollow. Lakes well stored with fish were imagined to be present on the top of all high mountains. Besson, who wrote in 1786, was in advance of his time, but it is to be feared that he borrowed largely from De Saussure. He advocates the determining of mountain phenomena by direct observation and experiment. Gruner, in 1760, the year De Saussure first visited Chamonix, published a treatise describing accurately the main features of the results of glacial motion. Still in De Saussure's time the progressive movement of glaciers was questioned. The very foundation of scientific mountain craft lies in knowledge of glacial phenomena and of the results of glacial motion, and De Saussure proved these convincingly enough. Previously, the regular downflow of a glacier was often confounded with the increase or diminution of the mass of ice as a whole. De Saussure independently confirmed and extended Gruner's work. He distinguished clearly between the high snowfalls and the true glacier. He explained, too, the formation of moraines. Theory thenceforth was replaced by direct observation. The principle of the progressive movement of glaciers may now seem obvious enough. Yet for ages the moraines had stretched out their long lines, the dirt bands had traced their curves, the séracs had formed, leant over, toppled and fallen, the crevasses had started, widened and closed up again, but the interpreter had been wanting.

With De Saussure's geological work I have here no concern. Most valuable and interesting are his observations on the effect of high altitudes and diminished pressure on the human frame, for these have a direct import to the modern mountaineer, and to the mountaineering question of the day. De Saussure was the true type of the scientific mountaineer. Yet had it not been for the sensational exploit of the guide Jacques Balmat, in 1786, in ascending Mont Blanc, and had it not been for the wide interest that this feat evoked, De Saussure's work might have remained comparatively unnoticed, and it may be equally true that had it not been for such work as De Saussure's, few might have passed through the door which Jacques Balmat unlocked. Unquestionably the ascent of Mont Blanc marked an epoch. Probably there were quite as many in Balmat's day who would have questioned the possibility of ascending Mont Blanc as there are now who would question that of ascending Mount Everest.

De Saussure's observations on the law of the decrease of temperature in the atmosphere according to altitude are of the utmost value to mountaineers. The influence of cold as affecting the possibility of making higher ascents is a factor now recognized as of the first importance. For many years after De Saussure, little more was accomplished in mountaineering than repetitions of ascents of Mont Blanc.

Modern mountaineering dates its birth in the decade 1850-60. It was in 1856 that Tyndall first visited the Alps, ascending Mont Blanc the following year. Just as De Saussure's work was emphasized and supplemented by Balmat's achievement, so Tyndall's researches came opportunely during the active revival of mountaineering when the conquest of the great Alpine peaks was proceeding apace. Though Tyndall, like De Saussure, went originally to the Alps from purely scientific motives, he at once fell under the fascination and became an enthusiastic and a highly skilled mountaineer, which De Saussure never really aimed at. To very few will it ever be given to combine so happily the qualities of man of science and mountaineer which were so conspicuously shown in Tyndall, but to many it may be possible to work on the same admirable lines.

With the views which excited controversy at the time they were divulged, such as theories of glacial motion, and the viscous or non-viscous qualities of ice, I have now fortunately no concern. It need only be said, looking at the views that now obtain on this last question, that it is hard to perceive any ground for fundamental difference of opinion. The divergence of views really turned largely on the exact definition of a word. One feels almost inclined to echo John Hunter's well known condemnation of definitions. On one point there can be but little doubt; Tyndall's views fitted in admirably with practical mountaineering. He rendered clear and precise the interpretation of so many glacial phenomena that he almost made what is known as snowcraft—the most intricate, and the most valuable branch of mountaineering, for it is on excellence in snowcraft that the future of mountain exploration chiefly depends.

But the great influence he had on mountaineering was through his brilliant writings and lectures. Owing largely to these the glacial world began to attract the general interest which before had been confined to the few who had frequented and climbed the high Alps. This result was due to his admirable experimental methods and to the brilliancy with which he expounded his views, and it was in this theater mainly that the exposition was made. I may throw on the screen a slide, a view of the Weisshorn by Mr. Donkin, which almost epitomizes the lectures on "Ice, Water, Vapor and Air." Imagine that from the water in the foreground rises the vapor in solution. The warm air as it rises expands. The expansion produces cooling; as a result of the cooling the vapor is condensed and the cloud is formed.

Once formed, the band of cloud may remain stationary and of uniform size for a long time, constantly forming afresh on one surface, and as constantly diminishing on the other. Or the cloud may increase in volume. Following it then further in imagination till it becomes a rain cloud, the view shows the light fresh snow which has fallen on the higher flanks of the mountains. The snow sinks as the crystals part with their contained air, and so the mass by its own weight is pressed into firm snow, then into névé, then again into pure ice, which melts and flows away as a river. The circle is complete and the whole life history of a glacier is shown in this one view—not the less notable in that it is the presentment of the mountain on which Tyndall's greatest climbing feat was accomplished in 1861.

Time forbids any endeavor to repeat the more striking of the experiments shown to illustrate these pro-

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cesses, but I may bring before your notice once again the simple experiment first made by Faraday in 1850 to illustrate regelation. This simple observation on the properties of regelation was applied by Tyndall to the interpretation of many glacial phenomena. He showed that as the glacier passed through any narrow channel or was torn and fissured as it swept over the slopes or formed an ice fall that the ice was subject to crushing, and he demonstrated that pressure alone was sufficient to account for the complete remoulding of the mass, the closing of the crevasses, and the re-establishment of the purity of the ice. Unless snow possess these properties, all travel on the snow fields would be impossible.

When below the freezing point regelation does not take place. This fact, with regard to the highest ascents where the cold may be extreme, is of obvious significance. Under conditions of extreme cold, and where the snow contains little air, it will often be powdery, as was found on the first ascent of Chimborazo. This condition is rare in the Alps. In the latter, indeed, the worst conditions of snow seldom in the summer months turn back the mountaineer, but in higher regions, where time is of the first consequence, it would be of the greatest moment to judge beforehand in what condition the snow is likely to be found. The compass bearings with regard to the sun of the slopes up which the track lies, the prevailing winds and their temperature, the radiation from rocks in the neighborhood and such like factors must be taken into account. With regard to the formation of crevasses Tyndall did much work, though it was limited rather to the lower portion of the glacier and extended little above the ice falls. He showed most clearly the method of formation of crevasses, longitudinal, transverse and oblique. Many years previously Besson had said, "the ice of a glacier flows like a torrent following fluid laws," probably not appreciating the full truth of his own remark. Tyndall by careful measurement showed the situation of the point of maximum motion and demonstrated that when a glacier curved, the point of maximum motion lay nearer the convex border of the glacier. Thus in a glacier whose course is serpentine, the lines of maximum rate of motion crossed the central line at each curve. From this a practical point in mountaineering can be deduced. In descending an unknown glacier, it is generally best when the ice cannot be quitteed to keep on the side of the smaller curve of the glacier when the marginal crevasses will be less numerous on this border. I can recall an occasion in the Caucasus when inattention to this point led to our being benighted on the glacier.

On the so-called dirt bands, first noticed by Prof. Forbes in 1842, Tyndall made many observations. It is matter for regret that a feature of glaciers so beautiful as these great curving stripes should have received so unpoetic a name. Tyndall clearly demonstrated their formation in the ice falls. To the mountaineer much that is practical may be gathered from their presence. Thus the existence of dirt bands shows conclusively that there must be an ice fall at some part of the glacier, and that there must be rocks in the neighborhood capable of yielding the grit of which the dirt bands are composed. Several glaciers may coalesce and form the main stream. Thus the Mer de Glace has three tributaries; on one, the Glacier du Géant, the dirt bands are strongly marked, on another, corresponding to the Glacier de Talèfre, they are but faintly indicated, while the third, the central stream, has no dirt bands at all. These several streams can be distinguished one from another, to the very extremity of the Mer de Glace, by the medial moraines. It is certain then that on two of the glaciers higher up will be found ice falls, and that the third, the central, will lead by more or less gentle declivities to the snow basins that feed it. Suppose the Mer de Glace were an unexplored field visited for the first time, such an observation might obviously be of the highest value in determining the route to be taken.

If it be true that with more accurate knowledge of glacial phenomena mountaineering skill has improved, and mountaineering possibilities extended, it would naturally be expected that the progress would be more shown in the class of amateurs, as they are termed, than in that of the professional guide. Such I think, and I have the authority of some first rate guides of long experience to back me, is the case. Much has been said on the comparative skill of guides and travelers. The truth probably is that the best guide of to-day is fully as good a man as the best guide of any other period, while the general standard of mountaineering proficiency among travelers has greatly improved, though there will probably be not a few laureates temporis acti to question such a conclusion. Mountaineering has, however, developed in such a way that no comparison is possible now between the traveler and guide, and none is needed. For the more difficult work that yet remains to be done, the qualities that the guide shows best are absolutely essential to achieve the best possible success; and so also are the qualities that the traveler has in a great measure developed. The traveler and guide can each supplement the qualities of the other, and they who are interested in the progress of mountaineering ought to be as much concerned with encouraging the development of guiding skill as of advancing their own. In one other respect science may possibly do much for the future of mountaineering by throwing light on the problems that still environ the question of the effect of high altitudes and diminished atmospheric pressure on man. Here the mountaineer comes in direct touch with the physiologist. The evidence gathered so far has come from three sources. Some from laboratory work, some from experience on the mountain side, and a certain amount from those who have made balloon ascents. So far, it must be allowed, the laboratory work has not been fruitful in practical results; but the question as recently revived is really still young. In the very few minutes that remain I may be able very briefly to sketch how the matter now stands, and indicate what progress has been made as to its practical solution.

First, as to the contribution of the mountaineer. On this diagram are indicated certain ascents, selected chiefly because in their description special reference has been made to the effect of high altitude on the travelers. The subject has for long received occasional attention. Sometimes in the early accounts surprise is expressed at the absence of effects which

have for centuries been noticed and commented on. Thus Deluc on Mont Buet (10,200 ft.) seemed quite astonished that he did not suffer from mountain sickness. On Mont Blanc, De Saussure was considerably affected and gave an admirable description of the symptoms. De Saussure thought it improbable that scientific observations such as he wished to carry out could ever be properly made at so great a height—and now there is an observatory on the top, and a railway station, as I understand, is in contemplation. In the numerous accounts dealing with Mont Blanc published in the early part of this century, the effect of the rarefied air is almost uniformly mentioned. Often, it may be suspected, this was because the writer thought it proper to allude to the subject rather than because he really suffered from mountain sickness. Within the last few years the expedition has several times been made from Chamonix to the top of Mont Blanc and back to Chamonix within twenty-four hours; once I believe in about eighteen hours. The vertical height to be ascended is over 12,000 ft. In the ascent of Elbruz (Caucasus) one party experienced no discomfort at all, another party was affected. Of the more recent experiences in the Andes and Karakoram I need hardly remind you. Perhaps the Karakoram expedition shows the greatest height reached, though not much above the Schlagintweit expedition. A very curious point is brought out by the chart, viz., that heights far exceeding Mont Blanc had been reached long before the ascent of that mountain drew attention to the question. Thus the Karakoram Pass, about the height of Elbruz, has been known for centuries as a well established trade route, and another pass (the Changlung) of over 19,000 ft., has long been known. Indeed, Western people were still speculating on the possibility of ascending to any higher elevation than that of Mont Blanc, while centuries before in the East men had reached points nearly 4,000 ft. higher. Assuming that the highest point of the earth's crust is about 30,000 ft., this other diagram shows in another form how much has been accomplished by mountaineers, and, it may be added, how little apparently remains to be done. The question of the ascent of the highest point indicated (Kabru) on the diagram is doubted by many good authorities. There is no doubt about the height of the mountain which has been triangulated, but the question is whether the travelers did not mistake the peak they actually ascended. Whether the party actually did so or not, seeing that there is conflict of opinion, must remain uncertain. But the Karakoram experience, the latest, tends to show that it was certainly not physically impossible.

Experiments in the laboratory have been conducted with apparatus on a large scale similar to that which I show you here in miniature. By means of this apparatus the atmospheric pressure can be reduced to any degree required, and the pressure can be, by an ingenious contrivance, maintained absolutely constant for any desired length of time.

This apparatus has been devised for other purposes, but essentially it could serve like M. Bert's "pneumatic cabinet." You may judge, and judge rightly, that the conditions produced in a man who shuts himself up for a time in such an apparatus and lowers the pressure are different from those on the mountaineer. At least M. Bert's pneumatic cabinet has proved the existence of other factors in the problem. M. Paul Bert, experimenting on himself, sustained a diminished pressure equal to 32,528 feet for a short time—a lower pressure than that of Mount Everest. From many experiments he was led to the conclusion that deficiency of oxygen was the main cause of the symptoms—like those of mountain sickness—experienced. He set down the limit of life as arriving when the air contains but 7 per cent. of oxygen, the normal amount being 20 per cent. He was therefore led to infer that by supplying oxygen the evil effects of diminished pressure could be warded off. To carry a sufficient supply of oxygen on the mountain side would be physically impossible. Mr. Whymper's experiences disprove M. Bert's theory, and Bert's views received a further shock in the fatal balloon in which MM. Crocé, Spinelli and Sivel lost their lives, dying from asphyxia at a height of about 28,000 feet, although they had a supply of oxygen with them. M. Bert's researches have attracted much attention, but the work of Geppert and Frankel, published in 1883, really carried the question as regards laboratory work a good deal further. And here I hope I may be pardoned if I turn only for a moment to some physiological details. Geppert and Frankel found that life could be sustained, without supplying oxygen, at a far lower pressure, viz., that of 180 mm. of mercury, equivalent to a height of 36,400 feet. Yet more, they pointed out clearly that three distinct stages could be observed—that of difficulty of breathing, paralysis, and lastly, unconsciousness or coma. On the first and third much has been written. But it is the second of these three stages—the partial paralysis—which has received far less attention, that affects profoundly the question from the mountaineer's point of view. Geppert and Frankel's results seem absolutely trustworthy. They bear out, too, even allowing for possible error in observation, the experience of those who have ascended in balloons. Life unquestionably can be maintained at far greater elevation (i. e. at a much lower pressure) than that of the highest mountain. In the pneumatic cabinet, two most important factors do not come into play. No exertion is required beyond that of breathing, and there is no lowering of temperature. In high balloon ascents again no exertion is required of the lower limbs. The same effects that are shown under diminished pressure are also shown at greatly increased pressure. The circulation in the portion of the spinal cord or marrow immediately concerned with the innervation of the lower limbs becomes greatly disturbed. The partial loss of power in the lower limbs is brought about in this wise. The blood collects and stagnates at this portion. It has been stated, but incorrectly, that the reverse condition is produced. The temperature of all the extremities is greatly lowered, not only by the surrounding cold, but by change in the nerve centers themselves. The importance of this disturbance to the mountaineer who seeks to attain the greatest elevation on foot is obvious. Yet this, the most significant feature of the problem from the climber's point of view, seems to have attracted little attention. The actual effect of this partial paralysis must be to render each step which involves the raising of the weight of the body doubly or trebly as laborious as it would be at the pressure to which the individual is naturally accustomed. It is certain, however, that the effects can be completely recovered from, and this partial loss of power is, as far as can be judged from what is at present known, though a formidable obstacle and one not generally recognized, not insuperable. Possibly medical means may be discovered to combat the condition. Oxygen as a remedy has failed; other remedies may be found. Certain drugs recently introduced produce effects not unlike those which result from diminished pressure—a significant fact. One curious effect of diminished atmospheric pressure has been noted, and has been held to compensate for the diminution in the amounts of oxygen, a diminution that, as Professor Roy has suggested, must be increased on the mountain side when there is any melting of snow, inasmuch as water will absorb oxygen more readily than nitrogen from the air. If any stay is made at an elevation of some 13,000 feet, as Viaillet has shown, there is an enormous increase in the number of the red blood corpuscles, that is to say, an enormous increase in the area of the surface concerned with the absorption of oxygen. At the sea level the ratio of the body surface to the blood surface is as 1 to 2,560; while at a pressure corresponding to 13,000 feet the blood corpuscles so increase in number as the ratio of the body surface to that of the corpuscles has altered to 1 to 4,293. Putting the matter in another way, the actual corpuscle surface at sea level = 3,840 square meters; at 13,000 (after 11 days) = 6,144 square meters. But though the increase of the corpuscles may begin at once, the multiplication is a slow process. The maximum is perhaps reached in three to four days.

FUNERAL OF PROF. HUXLEY.

In accordance with his own wish, the late Prof. Huxley was buried at the Marylebone Cemetery, Finchley. The coffin came up from Eastbourne in the morning, and the numerous mourners assembled at the cemetery to meet it. Wreaths from members of the family, and from friends and fellow workers of the great naturalist whose loss we mourn, covered the coffin. The Royal College of Science, with which Huxley was connected so many years, sent a large wreath, and there were also wreaths from Lady Hooker, Mrs. Tyndall, the members of the staff at the Royal Gardens, Kew, Mr. Herbert Spencer, Sir Henry Thompson, Sir Henry Roscoe, Messrs. Macmillan, and the editor of Nature, among others.

The funeral service was performed by the Rev. J. Llewelyn Davies, an old friend of Prof. Huxley's, now rector of Kirby Lonsdale, but formerly vicar of Marylebone, where he was for a long time Huxley's neighbor.

The family was represented by Mrs. Huxley, the two sons, Mr. Leonard Huxley and Mr. Henry Huxley, and three daughters, the Hon. Mrs. Collier, Mrs. Waller, and Mrs. Eckersley (the remaining daughter, Mrs. Roller, is in Switzerland with her husband, who is ill), Mrs. Heath (a niece), and two sons-in-law, the Hon. John Collier and Mr. F. W. Waller.

No announcements of the funeral were sent out, and the large number of distinguished men who attended, and the various learned societies that sent representatives, did so on their own initiative. The Royal Society was officially represented by Lord Kelvin, Sir John Evans, Prof. Michael Foster, and Sir J. Lister, many of the fellows also being present. The Geological Society was represented by Dr. Henry Woodward, Dr. Blanford, and Prof. Bonney. Dr. Frankland, Mr. Crookes, Dr. Thorpe, and Dr. Gladstone were the representatives of the Chemical Society. The mourners from the Royal College of Science included Prof. Rucker, Prof. Norman Lockyer, C.B., Prof. Tilden, Prof. Judd, C.B., Prof. W. C. Roberts-Austen, C.B., Prof. Howes, Prof. Farmer, Dr. Wynne, Mr. J. W. Rodger, and Mr. Woodward. Major General Sir J. F. D. Donnelly, K.C.B., Major General Festing, Captain Abney, C.B., Mr. T. Armstrong, Mr. F. R. Fowke, and Mr. A. S. Cole represented the Science and Art Department; Sir William Flower, K.C.B., Dr. A. Gunther, Mr. George Murray, Mr. C. E. Fagan, Prof. Jeffrey Bell, and Mr. F. A. Bather, the Natural History Museum; Prof. Armstrong, Prof. S. P. Thompson, Prof. Perry, and Prof. Ayrton, the City and Guilds Institute; Mr. Stanley Boyd, Mr. H. F. Waterhouse, Mr. J. F. Pink, the Charing Cross Hospital Medical School; Mr. J. H. Teall, Mr. F. W. Rudler, and Mr. E. T. Newton, the Geological Survey. In addition to the fellows of the Royal Society not included in the above, there were present Prof. E. Ray Lankester, Dr. Dallinger, Sir Joseph Hooker, K.C.B., General Strachey, Dr. Lauder Brunton, Dr. Selater, Prof. Carey Foster, Prof. G. H. Darwin, Sir James Paget, Dr. Burney Yeo, Prof. H. Marshall Ward, Prof. Seeley, and Mr. F. Darwin. Among the other mourners were Mr. Walter Troughton, representing Mr. Herbert Spencer, who was prevented by illness from being present, Dr. T. K. Rose, Mr. W. Darwin, Mr. A. H. Heath, Mr. S. Hingley, Mr. W. S. Stewart, Major General Sir Richard Pollock and Mr. D. Pollock, Mr. Alma Tadema, Mr. W. E. H. Lecky, Mr. and Mrs. Humphry Ward, Mrs. Tyndall, Mrs. W. K. Clifford, Mr. Henry James, Mr. Mark Judge, Mr. H. Saunders, Dr. Semon, Mr. F. Macmillan, Mr. G. L. Craik, Mr. Clodd, Mr. G. Griffith, Lady Staveley Hill, Mr. Paynter Allen, Mr. John Boyes, Mr. Spencer Walpole, Mr. Wood Smith, Dr. J. Johnson, Mr. James Hulme, Mr. Stanley Edwards, Dr. Glover, Mr. T. B. Windsor, the Rev. D. D. Jeremy, Dr. J. Malecki, Mr. J. Spiller, and Mr. and Mrs. Briton Riviere.

The funeral was at first announced to take place at 3 o'clock, whereas the time fixed upon was 2:30. Owing to a delay in the train, a number of workers in science, from the Midlands and the North of England, did not arrive at the cemetery until the ceremony was over, and thus, to their deep regret, they were deprived of the melancholy satisfaction of being present when the remains of an esteemed master and friend were laid to rest.

The memory of Huxley will always be cherished among men of science, and it is imperative that there should be a permanent memorial of some kind to show the world how great is their regard for him. The memorial should be a truly national one, and not limited to any particular institution. We understand that the Dean of Westminster is willing that a tablet shall be erected in the Abbey, if desired, and this is one of the forms which the memorial might take. Sir Wil-