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PROBLEMI ATTUALI
DI SCIENZA E DI CULTURA

ARDITO DESIO

THE WORK OF THE ITALIANS IN THE SCIENTIFIC
EXPLORATION OF THE KARAKORUM (CENTRAL ASIA)



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Geographical atlases show the Karakorum as a large wrinkle juxtaposed north-west of the larger system of mountainous ranges which are the Himalayas. An 800 km long wrinkle, (therefore a bit shorter than the Alps), going from north-west to south-east and slightly curved, which contains 4 of the 15 mountains over 8000 m, and among these the 2nd highest peak in the world, K² (8611 m), which is only 229 m lower than Everest.

Then, if we take into account that, of the other 45 peaks above 7500 m, 15 can be found in the Karakorum and that the average height of the range is about 5500 m above sea level (the average height of the Alps is estimated at 1300 m), we can get an idea of the altimetric features of our range.

I said that the Karakorum is situated north-west of the Himalayas: this means that while the latter range faces the Indian plain directly, the Karakorum is separated from the Punjab plain by various curtains of mountains that rank over an area of 300 km. So it's easy to understand why the Karakorum climate is different and, on the whole, drier and more rigorous than that of the Himalayas which lie at an average latitude of at least 8 degrees further south.

These short notes alone can give us an idea of the difficulty for the pioneers of reaching the Karakorum range.

Up till a few years ago the only ways of penetrating this remote region were on tracks which were partly covered on trained mountain ponies and partly with porters hired at each stage.

It was a tiring and uncomfortable journey, along rough tracks often only held up by stony walls over jutting rocks smoothed by glaciers, and along paths hardly traced on to slopes prone to landslides, with rickety foot-bridges; or across hanging bridges swinging over gorges through which tumultuous swollen rivers rushed. They were age-old caravan routes that wound along valleys, sometimes narrow and uninhabited and sometimes open and studded with villages scattered among the greenery of laughing oases on morainic terraces spaced out along the rivers, or on wide alluvial fans. Oases created by an ingenious network of running water fed by the glaciers into rustic canals which irrigate small fields of grain (above all barley), vegetable and fruit,

(*) Text of a Lecture held in Rome on June 16th 1976 at the General Solemn Meeting of the National Academy of the «Lincei».

that, together with products got from sheep-farming, are the only source of alimentionation for those poor, but not for this unhappy, populations.

Srinagar, the capital of Kashmir, was once the starting centre for three main caravan routes going north; that is, the western route which reached Gilgit, the chief town of Dardistan, after a 16 days march, the central one, which got to Skardu, on the Indus, chief town of Baltistan, in 15 days, and the eastern one, which got to Leh, chief town of Ladak, in 20 days.

The three towns are spaced out along the Indus valley, and along that of its tributary, the Gilgit, over a distance of 350 km and they represent the starting and supply centres from which you enter the three sectors western central and eastern, of the Karakorum.

Now the journey's much shorter; in an hour's flight from Islamabad, Pakistan's new capital, you can reach the first two villages mentioned; for the third you have to start from Srinagar, the capital of Kashmir controlled by the Indians, as the range's eastern sector is under Indian control. In fact, the armistice line garrisoned by the Indian and Pakistan armies and patrolled by United Nations observers, who make sure they keep the ceasefire, runs between east and west Karakorum.

I mentioned the natural difficulties of entering the Karakorum from the south. I won't dwell upon details of the few routes that cross the range, as the two which really climb it, cross ice-covered passes above 5000 m, while the other a bit more accessible routes go round the range towards the west (Khunjerab Pass, 4700 m) and towards the east (Karakorum Pass, 5575 m). The latter is also the one that inappropriately gave its name to the whole range. I say inappropriately because the toponym Karakorum in Turki means "black stones" ⁽¹⁾, a name that does not suit a range covered with glaciers!

But, this isn't the only case: the natives, who can't have the vision of a great geographic unit like a mountain range, limit themselves to giving names to the places they haunt and, at the most, to some prominent peak visible from their villages. Geographers invented most of the names of large geographic units even when they took them from local toponymy. In this particular case, William Moorcroft gave it its name in far 1820. From its initial, K, the peaks that were gradually measured geodetically by Col. Montgomerie between 1857 and 1859, from a great distance (between 100 and 200 km), got their names. This is the origin of the name used for the second highest peak in the world, K² ⁽²⁾.

(1) Other authors translate the word "black gravel", but it doesn't deal with rounded pebbles, but more or less angular stones like those of the scree.

(2) Other names were given to this peak, like Mt. Vaugh and Mt. Albert (1860), Mt. Montgomery and Mt. Godwin Austen (1866), Mt. Akbar and Mt. Babar (1905-1906), but no one of them was generally accepted. Nevertheless the name Mt. Godwin Austen was more frequently used on the maps, but without a specific reason. If a particular name is to be introduced, I think it ought to be the balti name Chogo-ri, which is a generic name for a big (chogo) mountain (ri or rhi), and was sometimes used also by our porters.

In a territory as remote as the Karakorum, the above-mentioned access difficulty is added to the convergence on its high ridges of four nations' political frontiers (Afghanistan, China, India and Pakistan), which virtually represent insuperable barriers even for those with valid credentials. What's more, a part of those frontiers is still being fought over, or even substituted by armistice lines, as I mentioned above.

The political situation, in comparison with the one the first travellers who penetrated the Karakorum, found, suffered a deep radical change at the time of Pakistan's partition from India (1947) and, above all, after the wars that followed later on between the two countries. Among those who felt the negative effects of this, most were the scholars of those territories who saw their freedom of movement and, therefore, the material possibility of efficient research, reduced year by year.

Among so many difficulties the scientific exploration of the Karakorum progressed, but much slower than elsewhere.

However, when we talk of scientific exploration of the earth's surfaces, we have to understand one another. At first, when a territory was really unknown, even few topographical data gathered by occasional travellers together with information on the climate, inhabitants, fauna, flora and rocks, represented a real contribution to scientific knowledge of the territory itself. But, nowadays, it's difficult to find a fairly extensive area that really can be considered unknown from a geographical point of view.

In general, we can say that scientific exploration progressed at the same speed as the evolution of the local means of transport and/or with the development of lines of communication. Then, today, aerial photographs from high and low altitudes allow us to make maps without having to cross the territory itself, with the advantage that even the most inaccessible spots can be surveyed with every detail by the magic eye of sophisticated photogrammetric cameras. We have to admit that a lot of data which, up to a few years ago, explorers had gathered with great difficulty and dedication are, today, rapidly obtainable through instrumental registration. Pioneers watch this kind of oppression by instrumental automatism on their long, tiring work, carried out on the field with so much zeal, effort and so many risks, with almost a sense of frustration and dejection.

But let's get back to the case we're dealing with, the Karakorum. We can overlook the pionieristic era, when very little really scientific was done, without taking any merits away from the men who opened the roads to geographical exploration. The names of those travellers who penetrated some Karakorum valleys for the first time, are very prestigious; like, for example — among the Italians—Father Ippolito Desideri da Pistoia, in the first half of the 18th century, Marquis Osvaldo Roero di Cortanze between 1853 and 1875, the two brothers, Dukes Lante Grazioli della Rovere in 1878. Their published reports, even though they contained some detailed information about the countries they crossed, and, above all, about the eastern and most accessible part of the Karakorum, all together don't represent anything more

than what journalistic accounts would be nowadays. (Incidentally, Marco Polo passed north of the Karakorum range without touching or even seeing it).

In the meantime, the geodetic and topographic operations of the Survey of India, which settled the region's map-making within rational base lines, an indispensable element for any true progress in territorial research, started in our region.

In the second half of the 19th century the heart of the Karakorum range was penetrated, particularly by English travellers, and, one of them even crossed its central part which is the highest. In 1887, Francis Younghusband reached India from China across the Eastern Mustagh Pass (5422 m) which was completely covered with glaciers.

We'll talk about this again soon, as this way was covered later by an Italian expedition exploring the range's northern slope.

It isn't worth going back over the whole history of the Karakorum's geographical explorations. Among the most famous names, next to that of the English man H. H. Godwin Austen (who was the first to see K² from fairly near), we mustn't forget those of the German Schlagintweit brothers, of the English man, Martin Conway and of the American couple, Workman, who continued their intense exploration activities almost up to First World War and who didn't only have Italian collaborators among the guides (M. Zurbriggen, G. Petigax and C. Savoye), but also as topographers. In particular I'm referring to Dr. Cesare Calciati who was part of the Workman expeditions in 1908 and 1911, carrying out *quick* topographic surveys of the Great Hispar glacier and of some minor glaciers of the Shayok basin (Masherbrum, Gondokhoro and Kabery). Calciati also collected numerous rock samples and some specimens of the flora which gave rise to publications by specialists.

During this time (1909), an Italian expedition led by Duke degli Abruzzi was heading towards the highest and most inaccessible part of the range which rises in the high basin of the Baltoro glacier, with the predominant aim of conquering K², already attempted seven years earlier by a multinational expedition (Eckenstein-Pfannl-Guillarmod). But as on his previous expeditions the Duke was accompanied by a topographer, in this case Commander Federico Negrotto Cambiaso, who used photogrammetric methods for high mountain surveys for the first time, using the Paganini camera which was invented and constructed in Italy.

The expedition doctor, Dr. Filippo De Filippi, took care of the naturalistic collections which were then entrusted to experts for study (Ing. Vittorio Novarese for the rocks and Prof. Romualdo Pirota and Dr. Fabrizio Cortesi for the plants).

Among the Italians who accompanied the expedition, we also mustn't forget the unparalleled photographer, Vittorio Sella with his assistant Erminio Botta and the seven guides and porters from Val D'Aosta (Giuseppe and Lorenzo Petigax, Alessio, Enrico and Emilio Brocherel, Alberto Savoie and Ernesto Bareux).

Mario Piacenza's expedition to Nun Kun in 1913 was also of a mixed alpine and scientific nature. However, I'll only mention it fleetingly as that mountain system isn't part of the Karakorum, but of the Kashmir Himalayas which are further south.

Before the First World War, the only real scientific expedition to visit the eastern Karakorum and its bordering areas, was that organised and led by Dr. Filippo De Filippi—who had often accompanied the Duke degli Abruzzi on his expeditions—from 1913–1914. Therefore, I have to spend a bit more time on this expedition than on the others.

The De Filippi expedition had ten members besides its leader (who was also its doctor), of which six left for India with most of the baggage at the end of summer 1913, to winter at Skardu. The others joined them in April the following year. Their names can already tell us something about the expedition: Prof. Alberto Alessio, geodesist and geophysicist; Prof. Giorgio Abetti, geophysicist and Alessio's assistant; Marquis Nello Ginori Venturi, meteorologist; Prof. Giotto Dainelli, geographer and geologist; Prof. Olinto Marinelli, geographer; Major Henry Wood and John Alfred Spranger, topographers; Lieutenant Cesare Antilli, photographer, and Giuseppe Petigax, the alpine guide.

It isn't easy to summarize briefly here all the research done by the De Filippi expedition during its year and a half stay in Asia, research that has been illustrated in 15 volumes published in the following twenty years.

This monumental work, in the Italian language, includes three volumes on geodesy and geophysics, three on geology, three on petrographic and paleontologic descriptions, one on the history of expeditions to this region, one on geographic-physical descriptions, two volumes on anthropogeography and ethnography, one on the plants gathered above 4500 m and on the fishes in the Indus, while the last is an index volume. Numerous collaborators helped in the study of the naturalistic materials collected by the expedition.

Among the results of the geodetic-geophysic research, the connection put into effect for the first time, between the Survey of India's network of gravimetric stations on the pre-Himalayan plain and the Russian Army Geographic Service's network of stations north of the Karakorum, in Pamirs and in Ferghana, is particularly interesting. Among other things, this enabled us to establish the deviations of the vertical and the regional gravimetric anomalies and to establish that the values of gravity are generally in excess in the mountain ranges (of the Himalayas and the Karakorum) and in default in the plains that extend at their feet, besides showing us the greater thickness of the earth's crust under such ranges. To be brief I'll leave off referring to the results of the magnetometric and meteorologic research even though they are interesting.

The geological research allowed us to reconstruct the stratigraphic sequence of the eastern Karakorum with greater precision and details than was previously possible thanks essentially to the work of English geologists of the Geological Survey of India, and to extend this knowledge to unknown areas

towards the east of the Karakorum. The paleogeographic reconstruction and the regional tectonic are also illustrated and extended to Central Karakorum.

If the volumes published by the De Filippi expedition didn't have the renown they merited, above all for the language they were written in and for the exuberant extension of their texts, and if a part of the results, perhaps illustrated with an excessive use of logistic details and of attestations and therefore difficult to interpret, was surpassed by subsequent research, they still represent a milestone in the history of the geophysical, geological and anthropogeographical knowledge of the Karakorum.

After the victorious end to the First World War, in Italy, the political, and even the economical, moment was not favourable to launching a new scientific expedition in the heart of Asia.

Therefore, almost a decade went by before the idea could be realized and the chance came with the celebration of the tenth anniversary of the victory of Vittorio Veneto.

The idea originated in Milan with a small group of mountainclimbing friends, but, then, their real goal was a sports one, that is, to conquer K². I won't go into the various events that preceded the start of the expedition complicated by the future leader's personal problems. I'll only say that while they were setting the bases, and a preliminary journey was being prepared for spring 1928, the newspapers announced that the tenth anniversary of the victory would be celebrated by the flight of the airship « Italia », commanded by Umberto Nobile, to the North Pole.

So, our project passed into second place and was almost cancelled.

During that time, the Duke di Spoleto, the Duke degli Abruzzi's nephew, was called by the Italian Geographic Society, who has assumed the scientific sponsorship of the enterprise, to command the expedition; but after the dramatic end to the Nobile expedition, and with orders from above, he had to fundamentally modify his programme by cancelling the climbing part and reducing his personnel considerably. Modified in this way, the expedition assumed a geographic-naturalistic tendency and took place in the Baltoro glacier region and in the surrounding areas. Among those called to take part in the expedition were, Commander Mario Cugia, to help the Duke in taking geophysical measurements and making topographical surveys; Dr. Lodovico di Caporiacco, a naturalist, to collect specimens of the flora and fauna; myself as geographer and geologist; Col. Dr. Gino Allegri, a doctor, also assigned to taking anthropologic measurements; three alpinists who has been with the previous team (Umberto Balestreri, Giuseppe Chiardola and Vittorio Ponti); a photographer-cinematographer, Massimo Terzano; a radiotelegraphist, Angelo Anfossi and two alpine guides from Courmayeur, Evaristo Croux and Leon Bron.

The expedition left Italy in April 1929 and worked for five months, especially in the Baltoro glacier region, but a small group climbed the eastern Mustagh Pass, which I have already mentioned, and explored the upper Shaksgam Valley, with the glaciers that bar it and that had stopped Major Kenneth Mason's English expedition in 1926. The group also climbed the



- Main watershed
- Main ridge
- Main roads
- Other roads

THE KARAKORUM MOUNTAIN RANGE

Urdok glacier looking for a way to re-enter the upper Baltoro across the Conway saddle and the Duca degli Abruzzi glacier which had been previously explored by the expedition, but because of bad weather they had to give up. Then, it split up into two groups to allow two members, Balestreri and myself, with just enough food to survive, to explore the still unknown part of the Shaksgam Valley, while the other group went back to the base camp.

The scientific work of the 1929 Italian expedition was especially recognized and appreciated in England, while in Italy the official scientific circles almost ignored it, mentioning it as if it had been a tourist trip. Later, there was even someone who denigrated it.

Apart from a few brief preliminary accounts, the expedition's scientific report didn't appear till 1936, because of economic difficulties.

That year, a large volume, which reassumed the geographical and geological results fairly extensively, and in brief appendixes, the data regarding the geodetic, geophysical and anthropological measurements and the zoological and botanical collections, was printed. Unfortunately, only very few copies were published, because, while it was printing the last sixteenmo, the publishing house shut down and nobody heard anything more about all the unfinished copies.

With all that, the expedition's scientific contribution is sufficiently well documented. Apart from the discovery of the Staghar and Singhiè glaciers (so named by the expedition), which barred the Shaksgam Valley, the geologist-geographer who was part of the exploratory group, did the topographic survey (with the "Tavoletta Monticolo") at the scale of 1 : 50.000⁽³⁾, of the upper Shaksgam Valley and its main confluent, of the Sarpo Laggo Valley which up to then had no map representation, as well as of the whole Panmah glacier basin on its southern slope, while the expedition's topographers took care of the photogrammetric survey of the Baltoro basin.

For the first time, relatively detailed geological surveys were done of all the above-mentioned area and were illustrated on single maps in the expedition's official volume accompanied by the illustration of the stratigraphy and of the tectonics. The discovery of fossils of the Paleozoic and Mesozoic eras, not only in the sedimentary zone situated on the range's northern slope, but also in metamorphic rocks in its southern slope, and the petrographic study of numerous rock samples, allowed us to set that whole territory's geology on secure bases for the first time. This study also helped to correct several interpretation errors of previous authors, including more recent ones.

The publication of other volumes dedicated to single scientific fields was planned, but the economic difficulties that—as I said before—had already greatly hindered and delayed publication of the official volume, stopped these works being realised altogether. However, in their place, we still have about fifty notes and reports of varied size and contents, published in the following years and, a part, even recently.

(3) The map was published at the scale 1 : 75.000.

The following year (1930), a member of the De Filippi expedition, Giotto Dainelli, visited the Siachen glacier again and crossed into Rimu with a small expedition (which I had been invited to take part in), which included, as well as its leader, two topographic officers from the Istituto Geografico Militare, Captain Alessandro Latini and Lieutenant Enrico Cecioni and a secretary, E. Kalau von Hofe. Unfortunately, because of a disagreement that arose between the expedition leader and the topographic officers, the map of the Siachen basin, plotted all over again with a Santoni phototheodolite, was never published.

The geological data was included in the De Filippi expedition's volumes.

In the decade preceding the Second World War no other Italian expedition visited the Karakorum. I was well ahead in planning, with the support of the Italian Alpine Club, an alpine-scientific expedition to K², but the sudden start of hostilities put off my carrying out this enterprise.

After the Second World War, the Italian scientific-exploratory activity in the Karakorum range began again rather late because of the country's well-known political and economic difficulties.

I began a first attempt at getting a new expedition going again in 1952 with the financial help of the Italian National Olympic Committee. It was not a scientific expedition, but a sporting one (the ascent of K²), about which it was easier to awaken public opinion in order to raise the necessary funds.

Even if the goal was an alpinistic one, I had, however, arranged for a group of scientists to take part in the expedition with a well-defined programme to carry out and almost complete logistic autonomy from the climbing group. The difficult negotiations with the Pakistan Government lasted the whole of the following year, during an attempt by an American alpinistic expedition, led by Dr. Charles Houston, to climb K².

In summer 1953, I went on a reconnaissance of the Karakorum financed by the National Research Council, visiting, at the Pakistan Government's request, the Stak valley, where the Khutiah glacier, in the last three months, had advanced 12 km, invading the main valley and threatening the higher villages.

From there, with a companion (Riccardo Cassin) I crossed into the adjoining Turmik valley to do a geological survey and collect rock samples, and then went on into the Basha and Braldu valleys towards the Baltoro glacier and the foot of K², in order to study the possible ways of climbing it. I carried out geological surveys and perfected the ones begun in 1929 along this itinerary too, using the maps we plotted then. This journey helped me, among other things, to get permission for the K² expedition; permission that was being contended by five other countries.

1954 was the year the scientific-alpinistic expedition to the Karakorum—as is well-known—conquered K², the second highest peak in the world. I won't talk to you about that undertaking, which is known to many people, but about the scientific research combined to it, especially as I was severely criticised, both in Italy and abroad, for such a combination, which would have

caused—according to my many critics—the failure of both undertakings. I was, then, at my thirteenth scientific-exploratory expedition and I felt pretty sure of what I was doing. You will judge whether the scientific programme achieved the results I had set myself.

First, I have to mention the colleagues who collaborated in the research with me. Prof. Paolo Graziosi, from Firenze University, was in charge of doing anthropological research on the local populations and pre-historic surveys in the inhabited zone of the north-western Karakorum. Prof. Antonio Marussi, from Trieste University, took the geophysical measurements and Prof. Bruno Zanettin, from Padova University, did the geopetrographic investigation. Captain Francesco Lombardi of the Istituto Geografico Militare was assigned to topographic surveys with the Pakistani assistant. Badshajan. I, myself, beside the heavy duty of the leadership took care of the geological survey and the meteorological observations with one of the mountain climbers while, the anthropological measurements on Hunza and Balti porters, which had been entrusted to the expedition doctor, were not done.

I can't go into too many details about the scientific results, which would need an excessively long exposition; even more so as the 1954 expedition was followed by five other, purely scientific, but easier and shorter, ones, which were meant to complete and extend the research done during the 1929, 1953 and 1954 expeditions.

It embarrasses me somewhat to talk to you about these last expeditions, as I was both organiser and leader. But, at the time of the Second World War, I directed and organized all the Italian scientific expeditions that explored the Karakorum range, and, of the foreign ones, only a few did scientific surveys as well.

Therefore, I will say that, in 1955, I went back to the Karakorum with two Italian collaborators. Prof. Paolo Graziosi and Prof. Antonio Marussi, and was accompanied by Dr. M. N. Khan, Director of the Pakistan Geological Survey. The expedition went as far as Gilgit from the Chitral territory along different routes, carrying out anthropological and ethnographic research among the Kafiri, taking gravimetric and magnetometric measurements and doing geological research and studies in the whole of that vaste territory which includes the western extremity of the Karakorum and a part of the Eastern Hindu Kush range.

In the following expedition, in 1961 I again had as collaborators, Prof. Marussi for the geophysical part and Drs. Ercole Martina and Giorgio Pasquare for the geological part. It was supposed to take place on the northern slope of the Karakorum and of the Eastern Hindu Kush—namely in Wakhan, the corridor that separates Pakistan from Russian Pamirs and that belongs to Afghanistan—but as, at the last minute, we didn't get permission to enter Wakhan, it mainly took place in Badakhshan and in some bordering areas. I would like to add that it was a provident drawback, as Badakhshan proved to be the key-zone for interpreting the structural relationship between Pamirs

and Hindu Kush, and for explaining the stratigraphy and tectonic of an area characterized, among other things, by an exceptional seismicity.

The following year, 1962, with two geological assistants, Dr. E. Martina and Dr. G. Galimberti, and thanks to a special permit from the Pakistan President, I was able to ascend the whole Hunza valley again, as I had only partly covered it in 1954, and reach the Chinese border, finding the solution to still unsolved geological problems regarding the structure of Central Karakorum.

The 1971 expedition took place along the new road being built, which follows the middle Indus valley and which was almost completely unknown geologically, and I was accompanied by an assistant geologist, Dr. Giuseppe Orombelli.

On that occasion, I was able to establish for the first time, exactly where the huge ice-tongue of the great glacier, that occupied the Indus valley in the Quaternary, came to a stop; a position that all the previous authors assumed to be somewhere else; and to clarify other geological problems that were still up for discussion.

That year, I wanted to see the Khutiah glacier again, but various kinds of difficulties stopped me. It was only two years later that I managed to carry out an excursion into that remote valley with a hunza student and to complete other research on the ancient glaciers of the Indus basin.

The last expedition was that of 1975, which was organized and directed by my colleague Marussi for its geophysical (geoseismic) part, and by myself for its geological one. It was financed, as were my previous expeditions, by the National Research Council. The data and materials we collected are still being worked on, so I don't think I ought to dwell on the results with you at this moment.

I can only remind you that, the geological and geophysical research was intended to complete the study of the structural connection between the Indian ledge and the Eurasian continent, with the intervening orogens of the Kashmir Himalayas, of the Karakorum and of Pamirs, using not only surface geological and geophysical surveys, which, as I have already said, have been done for years, but also a deep seismic sounding between the Punjab plain and northern Pamir, in collaboration with a Pakistani team, and a Russian team, this one for the area north of the Karakorum.

The documentation of the scientific results of my eight previous expeditions to the Karakorum are illustrated in seven volumes, part of a collection that should include twelve volumes, published from 1964 to 1975. Therefore, there are another five left to publish, one of which is ready for print and another two are being prepared. Those already published are: one on Geophysics (by A. Marussi), three on Geology by A. Desio and B. Zanettin, with the collaboration of E. Martina and G. Pasquarè, another two on Paleontology and, finally, one on Prehistory and Anthropology by P. Graziosi. One of the latter volumes includes Zoology and Botany. The volumes have been compiled by many experts and are written in English in order to make the results of our

research known to a scientific circle which is undoubtedly vaster and, I would say, even more interested in the problems of Central Asia than the Italian one.

This was a very important decision, which I pondered over for a long time, and was counseled by experience, as I have already mentioned, since I knew it would complicate and delay the volumes' editing and printing and even noticeably increase their cost.

I said that, up to now, seven volumes have been published; but, to these, we have to add more than a hundred, mainly geological, minor writings, both in Italian and other languages (of which 50 written by me).

I have reached the end of my presentation, with which I intended to illustrate very concisely, as I had to in so little time, the development of the scientific research carried out by the Italians in one of the Earth's highest regions in the century that is now coming to an end. It's a story full of emotional and sometimes dramatic episodes, among people very different from us, simple or better still primitive, but fundamentally good people in whom we managed to inspire feelings of fondness which caused most willing collaboration, even in the most difficult moments, when life itself was in danger.

I'll never forget the meeting I had, in spring 1954, with three porters from the small team who had accompanied me on that adventurous reconnaissance trip to the other side of the Karakorum, in Chinese Sinkian, with just enough food to survive and a pretty difficult pass, of over 5000 m, which separated us from our companions, to cross, 25 years before. For three days and three nights they waited for me to pass on the caravan route of Shigar Valley and when they saw me, they ran towards me with tears in their eyes, offering me the fruits of their land and trying to kiss my hands in sign of affection and respect for their leader, who they had carried over the more difficult fords on their shoulders, but who they had followed faithfully over the hardest routes, along glaciers full of dangers, across tangled masses of crevasses, or up steep slopes threatened by avalanches.

This spiritual communion between me, an European scientist, and my humble Asian porters is, in the field of human experiences, one of the greatest satisfactions I got during my journeys, and an important success factor on my expeditions among the fascinating Karakorum mountains.

BIBLIOGRAPHY

- ABETTI G. & ALESSIO (1929) - *Geofisica, Gravità e Magnetismo*. In: Relaz. Scient. Spedizione De Filippi, etc., I, vol. 2: pp. 1-222, 38 pls. Zanichelli, Bologna.
- ABETTI, ALESSIO, VENTURI GINORI & WOOD (1929) - *Astronomia geodetica, geodesia e topografia*. In: Relaz. Scient. Spedizione De Filippi, etc., I, vol. 1: pp. 1-418, 55 pls. Zanichelli, Bologna.
- ALESSANDRI & VENTURI GINORI (1931) - *Meteorologia, Geofisica, Aerologia e Pireliometria*. In.: Relaz. Scient. Spedizione De Filippi, etc., I, vol. 3, pp. 1-570, Zanichelli, Bologna.
- ALOISI P. (1933) - *Le rocce*. In: Relaz. Scient. Spedizione De Filippi, etc., II, vol. 7. Zanichelli, Bologna.

- ARCANGELI A. (1934) — *Isopodi terrestri raccolti nel Caracorum dalla spedizione di S. A. R. il Duca di Spoleto*, «Ann. Reg. Ist. Sup. Agrario di Milano», vol. 1, pp. 1-23, Parma.
- BALDI P. (1976) — *Magnetism of Karakorum and Surrounding Regions*, Accad. Naz. Lincei: Geotectonics of the Kashmir Himalaya-Karakorum-Hindu Kush-Pamir Orogenic Belts, 1974, pp. 139-142, Roma.
- BALIANI A. (1934) — *Materiali zoologici raccolti dalla spedizione italiana nel Caracorum (1929 VII). Coleoptera, Carabidae, Amara*, «Atti del Museo Civico St. Nat. di Trieste», 12, pp. 101-106, Trieste.
- BEAUX (DE) O. (1935) — *Spedizione Italiana al Caracorum comandata da S. A. R. il Duca di Spoleto (1929). Mammiferi*. «Atti Soc. Ligustica Sc. Lett. di Genova», 14, pp. 61-84, Genova.
- BERIZZI QUARTO DI PALO A. (1970) — *Upper Cretaceous Molluscs and Brachiopods from Badakhshan*. Desio's Italian Expeditions to the Karakorum and Hindu Kush, Scient. Reports, IV, vol. 2, pp. 77-118. Brill, Leiden.
- BERIZZI QUARTO DI PALO A. (1970) — *Paleogene Pelecypods from Kataghan and Badakhshan*. Desio's Italian Expeditions to the Karakorum and Hindu Kush, Scient. Reports, IV, vol. 2, pp. 161-240. Brill, Leiden.
- BIASUTTI R. (1916) — *Balti e Ladachi*. «Riv. di Antropol.», 20, Mem. 4, pp. 3-9, Roma.
- BIASUTTI E. (1933) — *Osservazioni antropologiche eseguite da G. Dainelli su Cashmiri, Ladachi e Nubresi (1930)*. Relaz. Scient. Spedizione De Filippi etc., II, vol. 11, pp. 191-251, Zanichelli, Bologna.
- BIASUTTI R. (1936) — *I caratteri antropologici dei Balti*. Appendix to: La Spedizione Geografica Italiana al Karakorum, 1929, pp. XLIV-XLVI. Arti Grafiche Bertarelli, Milano.
- BORELLI L. (1930) — *Osservazioni di fisiologia d'alta montagna*. «Boll. Club Alpino Italiano», 42, (75), Torino 1925. Idem In: Spedizione Mario Piacenza. Himalaya Kashmiriano. Appendici scientifiche pp. 121-172. Rizzoli, Milano 1930.
- CALCIATI C. (1910) — *Les fronts des Glaciers de Yengutsa et d'Hispar*, «La Géographie», 22, pp. 241-246, Paris.
- CALCIATI C. (1914) — *Esplorazione delle valli Kondus e Hushee nel Caracorum sud-orientale*, «Boll. Soc. Geogr. Ital.», 51 (9), pp. 995-1014; (10), pp. 1076-1093, Roma.
- CALCIATI C. (1923) — *Il più grande ghiacciaio della terra. Il Siascen nel Caracorum*, «Emporium», 58, pp. 105-115, Milano.
- CALCIATI C. (1928) — *Il Karakorum secondo le ultime esplorazioni con speciale riguardo al contributo degli italiani*. Istituto Geografico Militare, Firenze.
- CALCIATI C. (1930) — *Al Karakorum. Diario di due esplorazioni*. Bemporad, Firenze.
- CALCIATI C. (1930) — *Osservazioni di Geografia*. In: Spedizione Mario Piacenza, Himalaya Cashmiriano, Appendici scientifiche pp. 3-79. Rizzoli, Milano.
- CALCIATI C. & KONCZA M. (1910) — *The Basin of the Hispar Glacier*. In: Workman W. H., The Call of the Snowy Hispar, Appendix I, pp. 245-282. Constable, London.
- CALCIATI C. & KONCZA M. (1910) — *L'expédition Bullok-Workman 1908 dans l'Himalaya*, «Bull. Soc. Fribourg. Sc. Nat.», 17, Fribourg.
- CAPORIACCO (DI) L. (1933) — *Pesci raccolti durante la spedizione italiana al Karakorum (1929)*, «Monitore Ital. Zool.», 44, pp. 339-344. Firenze.
- CAPORIACCO (DI) L. (1934) — *Aracnidi dell'Himalaya e del Karakorum raccolti dalla Missione Italiana al Karakorum (1929)*, «Mem. Soc. Entomol. Ital.», 13, pp. 113-263, Genova.
- CAPORIACCO (DI) L. (1936) — *Notizie preliminari sui risultati zoologici della spedizione*. Appendix to: La Spedizione Geografica Italiana al Karakorum 1929. Arti Grafiche Bertarelli, Milano.
- CASNEDEI R. (1976) — *Geological reconnaissance in the Yasin Valley (NW Pakistan)*. «Rend. Accad. Naz. Lincei», ser. VIII, 59, pp. 792-799, Roma.
- CIRY R. & AMIOT M. (1965) — *Sur quelques Foraminifères Permians d'Asie Centrale*. Desio's Italian Expeditions to the Karakorum and Hindu Kush, Scient. Reports, IV, vol. 1, pp. 127-133. Brill, Leiden.

- CITA M. B. & PREMOLI SILVA I. (1975) - *Micropaleontological notes on some Cretaceous-Focene sections North-Eastern Afghanistan*. Desio's Italian Expeditions to the Karakorum and Hindu Kush, Scient. Reports, III, vol. 3, Palaeontological Appendix, pp. 457-494. Brill, Leiden.
- COMUCCI P. (1933) - *Rocce del bacino del ghiacciaio Siacen*, Relaz. Scient. Spedizione De Filippi, etc., II, vol. XI, pp. 3-48. Zanichelli, Bologna.
- COMUCCI P., (1935) - *Scisti di Dasso nel Baltistan*, « Rend. R. Accad. Naz. Lincei », ser. VI, 21, pp. 284-287, Roma.
- COMUCCI P. (1936) - *Relazione sommaria sulle rocce raccolte dalla spedizione*. Appendix to: La Spedizione Geografica Italiana al Karakorum, 1929. pp. XXXIII-XXXVIII. Arti Grafiche Bertarelli, Milano.
- COMUCCI P. (1938) - *Le rocce raccolte dalla Spedizione Geografica Italiana al Karakorum (1929)*. « Mem. R. Accad. Naz. Lincei », ser. IV, 7 (3), Roma.
- CUGIA M. (1936) - *Determinazioni astronomiche di posizione*. Appendix to: La Spedizione Geografica Italiana al Karakorum, 1929, pp. III-XXIV. Arti Grafiche Bertarelli, Milano.
- CUGIA M. (1936) - *Determinazioni di magnetismo terrestre*. Appendix to: La Spedizione Geografica Italiana al Karakorum, 1929, pp. VIII-XXIII. Arti Grafiche Bertarelli, Milano.
- DAINELLI G. (1914) - *Intorno alla morfologia himalayana. Appunti critici ed osservazioni preliminari*. « Riv. Geogr. Ital. », 21, pp. 189 & 355, Firenze.
- DAINELLI G. (1921) - *Sul Glaciale del Caracorùm e dell'Himàlaya del Cashmir*. Atti 8° Congresso Geogr. Ital., vol. 2, pp. 12-19, Firenze.
- DAINELLI G. (1922) - *A proposito della trascrizione dei nomi geografici della regione del Caracorùm*. « Riv. Geogr. Ital. », 29, pp. 162-167, Firenze.
- DAINELLI G. (1922-34) - Relaz. scient. Spedizione De Filippi etc., II, vol. 1, *Storia dell'esplorazione (1934)*; vol. II, *La serie dei terreni (1934)*; vol. III, *Studi sul Glaciale (1922)*; vol. IV, *Le condizioni fisiche attuali (1928)*; vol. VIII *Le condizioni delle genti (1924)*. Zanichelli, Bologna.
- DAINELLI G. (1924) - *Paesi e Genti del Caracorùm. Vita di carovana nel Tibet Occidentale*. 2 voll. Pampaloni, Firenze.
- DAINELLI G. (1924) - *Il limite delle nevi nel bacino superiore dell'Indo (Caracorùm e Himàlaya occidentale)*. Recueil de travaux offert à M. Y. Cvijic par ses amis et collaborateurs à l'occasion des ses trente-cinq ans de travail scientifique. Belgrade.
- DAINELLI G. (1930-1931) - *Il mio viaggio nel Tibet occidentale*, « Boll. R. Soc. Geogr. Ital. », ser. 6, 7, pp. 865-882, 8, pp. 30-40, Roma.
- DAINELLI G. (1932) - *A Journey to the Glaciers of the Eastern Karakoram*, « Geogr. Journ. », 79, pp. 257-274, London.
- DAINELLI G. (1932) - *Italia-Pass in the Eastern Karakoram*, « Geogr. Review », 22, pp. 392-402.
- DAINELLI G. (1932) - *Il mio viaggio nel Tibet occidentale*. Mondadori, Milano.
- DAINELLI G. (1933) - *La mia spedizione al ghiacciaio Siacen nel Caracorùm orientale*, « Boll. Comit. Glaciol. Ital. », 13, pp. 39-57, Torino.
- DAINELLI G. & BIASUTTI R. (1925) - *I tipi umani*. In: Relaz. scient. Spedizione De Filippi, etc., II, vol. 9. Zanichelli, Bologna.
- DAINELLI G. & MARINELLI O. (1914) - *Remo o Rimu*, « Riv. Geogr. Ital. », 21, Firenze.
- DAINELLI G. & MARINELLI O. (1915) - *Relazione preliminare sui lavori scientifici della spedizione De Filippi al Caracorùm (1913-14)*, « Riv. Geogr. Ital. », 22, p. 236, Firenze.
- DAINELLI G. & MARINELLI O. (1915) - *Cenni speciali intorno alle ricerche di Geologia e Geografia. Relazione preliminare sui lavori scientifici della Spedizione De Filippi al Caracorùm (1913-14)*. « Riv. Geogr. Ital. », 22, Firenze.
- DAINELLI G. & MARINELLI O. (1917) - *Osservazioni sui ghiacciai sbarranti l'alta valle dello Shaiok (Caracorùm)*, « Riv. Geogr. Ital. », 24, pp. 81-223, 307, Firenze.
- DE FILIPPI F. (1911) - *The Expedition of H.R.H. the Duke of the Abruzzi to the Karakorum Himalayas*, « Geogr. Journ. », 37, pp. 19-30, London.
- DE FILIPPI F. (1912) - *La spedizione di S.A.R. il Principe Luigi Amedeo di Savoia Duca degli Abruzzi nel Karakorum e nell'Himalaya occidentale (1909)*. Zanichelli, Bologna.

- DE FILIPPI F. (1912) – *Karakoram and the Western Himalaya 1909. An Account of the Expedition of H.R.H. Prince L.A., of Savoy, Duke of the Abruzzi*. Constable, London.
- DE FILIPPI F. (1915). – *Relazione preliminare sui lavori scientifici della Spedizione De Filippi al Caracoròm, 1913-1914: cenni generali*, « Riv. Geogr. Ital. », 22, pp. 225-000, Firenze.
- DE FILIPPI F. (1915) – *Spedizione scientifica Italiana in India ed in Asia Centrale negli anni 1913-1914*. « Boll. R. Soc. Geogr. Ital. », 52, pp. 109-114, Roma.
- DE FILIPPI F. (1915) – *Expedition to the Karakorum and Central Asia, 1913-14*, « Geogr. Journ. », 46, pp. 85-105, London.
- DE FILIPPI F. (1924) – *Storia della spedizione scientifica italiana nell'Himàlaya, Caracoròm e Turchestàn cinese (1913-14), con capitoli aggiuntivi di Giotto Dainelli e J. A. Spranger*. Zanichelli, Bologna.
- DE FILIPPI F. (1929) – *Valle Shaksgam e Catene Aghil*, « Boll. R. Soc. Geogr. Ital. », ser. VI, 6, pp. 485-90, Roma.
- DE FILIPPI F. (1932) – *An Account of Tibet. The Travels of Ippolito Desideri of Pistoia, 1712-1727*. Routledge, London.
- DELLA BEFFA G. (1930) – *Insetti del Kashmir raccolti dal Dott. Cesare Calciati nella Spedizione Mario Piacenza (1913)*. In: Spedizione Mario Piacenza. Himalaya Cashmiriano. Appendici scientifiche, pp. 173-187, Rizzoli Milano.
- DESIO A. (1930) – *Geological work of the Italian Expedition to the Karakoram, 1929* « Geogr. Journ. », 75 (5), pp. 402-411, London.
- DESIO A. (1930) – *Itinerari percorsi durante la Spedizione Geografica Italiana nel Karakorum 1929. Appunti geologici e geografici*, « Boll. R. Soc. Geogr. Ital. », ser. VI, 7, pp. 163-181 and 277-300, Roma.
- DESIO A. (1940) – *Il Baltoro*, « Le Alpi », 59, pp. 477-478, Roma.
- DESIO A. (1953) – *Sull'eccezionale avanzamento di un ghiacciaio himalayano*, « Rend. Accad. Naz. Lincei », ser. VIII, 15, pp. 253-255, Roma.
- DESIO A. (1953) – *La triade dei colossi: Everest (8840 m), K² (8611 m), Kanchenjunga (8585 m)*, « Riv. Mensile del Club Alpino Italiano », 1-2, pp. 3-8, Bologna.
- DESIO A. (1954) – *An exceptional glacier advance in the Karakoram-Ladak region*, « Journ. of Glaciology », 2, pp. 383-385, Cambridge.
- DESIO A. (1954) – *La mia ricognizione al Karakorum del 1953*. « La Ricerca Scientifica », year 24, pp. 243-262, Roma.
- DESIO A. (1954-1957) – *La conquista del K²*. (Italian editions in 1954, 1955, 1956, 1957). Garzanti, Milano. *The Conquest of K²*, 2 English editions, 1 edition in German, French, Spanish, Swedish, Hungarian, Russian, 2 editions in Japanese.
- DESIO A. (1955) – *Le ricerche scientifiche della Spedizione Italiana al Karakorum, K²-1954*. « Accad. Naz. Lincei », Quaderno, 34, Roma.
- DESIO A. (1955) – *The ascent of K²*, « Geogr. Journ. », 121, Pt. III, pp. 261-273, London.
- DESIO A. (1958) – *Il Cretaceo fra il Karakorum e l'Hindu Kush (Asia Centrale)*. XX Congresso Geol. Intern., Mexico 1956, Secc. VII, pp. 345-354, Mexico.
- DESIO A. (1959) – *Cretaceous Beds between Karakoram and Hindu Kush Ranges (Central Asia)*, « Riv. Ital. Paleont. », 65, pp. 221-229, Milano.
- DESIO A. (1960) – *Sull'estensione dei plutoni granitici nel Karakorum e nell'Hindu Kush (Asia Centrale)* « Rend. Accad. Naz. Lincei », ser. VIII, 28, pp. 783-786, Roma.
- DESIO A. (1961) – *Resti glaciali quaternari nelle valli Panjkora, Chitral e Swat (Pakistan Nord-Occidentale)*, « Boll. Comit. Glaciol. Ital. », ser. 2, n. 9 (1959-1960), Pt. I, pp. 3-10, Torino.
- DESIO A. (1962) – *Travel in the Karakorum Range*, « The Tourist World », 2 (8), pp. 29-31 e 48-49, Karachi.
- DESIO A. (1963) – *Appunti geologici preliminari sui bacini dei ghiacciai Biafo e Hispar (Karakorum-Himalaya)*, « Boll. Soc. Geol. Ital. », 81 (1962), pp. 69-84, Roma.
- DESIO A. (1963) – *Travels in the Karakorum*. « Pakistan Quarterly », 11 (3), pp. 14-21, Karachi.
- DESIO A. (1963) – *Notizie preliminari sulla Spedizione Desio al Karakorum 1962*. « La Ricerca Scientifica », 3, pp. 485-488, Roma.

- DESIO A. (1963) – *Qualche osservazione sopra un recente studio geologico sul Karakorum (Asia Centrale)*. « Rend. Accad. Naz. Lincei », ser. VIII, 34, pp. 358–363, Roma.
- DESIO A. (1963) – *Review of the geologic « Formations » of the Western Karakorum (Central Asia)*, « Riv. Ital. Paleont. », 69, pp. 475–501, Milano.
- DESIO A. (1963) – *I rapporti tettonici fra il Badakhshan ed il Pamir (Asia Centrale)*, « Giornale di Geologia », ser. II, 31, pp. 163–170, Bologna.
- DESIO A. (1964) – *Geological Tentative Map of the Western Karakorum. 1:500.000*. Institute of Geology, University of Milan. Milano.
- DESIO A. (1964) – *Sulla presenza del Cretaceo fossilifero nel vallone del Burji-la, presso Skardu. (Baltistan, Asia Centrale)*. « Rend. Accad. Naz. Lincei », ser. VIII, 37, pp. 360–363, Roma.
- DESIO A. (1964) – *Tectonic relationship between Karakorum, Pamir and Hindu Kush (Central Asia)*. Report of 22nd Session Intern. Geol. Congr., India 1964, Part XI, pp. 197–213, New Delhi.
- DESIO A. (1965) – *Sulla struttura tettonica dell'Asia Centrale*, « Rend. Accad. Naz. Lincei », ser. VIII, 38, pp. 780–786, Roma.
- DESIO A. (1965) – *On the tectonic connection between Pamirs and Hindukush*. In: « D. N. Wadia Commemorative Volume », pp. 716–721, Mining e Metallurgical Inst. of India, Calcutta.
- DESIO A. (1966) – *The Devonian sequence in Mastuj Valley (Chitral, N-W Pakistan)*, « Riv. Ital. Paleont. », 72, pp. 293–320, Milano.
- DESIO A. (1974) – *Karakorum Mountains*. In: Mesozoic–Cenozoic Orogenic Belts. Data for Orogenic Studies by A. M. Spencer, Pubb. No. 4, of the Geol. Society, pp. 225–266, London.
- DESIO A., (1974) – *Geological Reconnaissance in the Middle Indus Valley between Chilas and Besham Qila (Pakistan)*, « Boll. Soc. Geol. Ital. », 9, pp. 345–369, Roma.
- DESIO A. (1975) – *Some Geological Notes and Problems on the Chitral Valley (North–West Pakistan)*, « Rend. Accad. Naz. Lincei », ser. VIII, 58, pp. 611–617, Roma.
- DESIO A. (1975) – *Una visita al Ghiacciaio Kuthiah nel Karakorum Centrale (Pakistan)*, « Boll. Comit. Glaciol. Ital. », 22 (1974), pp. 39–44. Torino.
- DESIO A. (1976) – *Introductory Report on the Geotectonics of the Kashmir Himalaya–Karakorum–Hindu Kush–Pamir Orogenic Belts*. « Accad. Naz. Lincei »: Intern. Coll. on the Geotectonics of the Kashmir Himalaya – Karakorum – Pamir – Hindu Kush Orogenic Belts, 1974, pp. 9–13, Roma
- DESIO A. (1976) – *Some Geotectonic Problems of the Kashmir Himalaya–Karakorum–Hindu Kush and Pamir Area*. « Accad. Naz. Lincei »; Intern. Coll. on the Geotectonics of the Kashmir Himalaya etc. 1974, pp. 115–129, Roma.
- DESIO A. & CITA M. M. (1955) – *Nuovi ritrovamenti di calcari fossiliferi del Paleozoico superiore nel bacino del Baltoro (Himalaya–Karakorum)*. « Rend. Accad. Naz. Lincei », ser. VIII, 17, pp. 587–598, Roma,
- DESIO A. & GIOBBI MANCINI E. (1974) – *On the Geology of the Southern Slope of the Masherbrum Peak and the Upper Hushe Valley (Karakorum, Central Asia)*, « Mem. Accad. Naz. Lincei », ser. VIII, 12, sez. II, pp. 79–100, Roma.
- DESIO A., GUI P. & PASQUARÈ G. (1968) – *Notes on the Geology of Wakhan (North–East Afghanistan)*. « Mem. Accad. Naz. Lincei », ser. VIII, 9 (2), sez. 11, pp. 37–52, Roma.
- DESIO A. & FANTINI N. (1960) – *Sulla presenza del Giurassico fossilifero in Valle Shaksgam (Karakorum–Himalaya)*, « Rend. Accad. Naz. Lincei », ser. VIII, 28, pp. 301–303, Roma.
- DESIO A. & LONGINELLI A. (1961) – *Sull'età dei graniti del Baltoro (Karakorum–Himalaya)*, « Rend. Accad. Naz. Lincei », ser. VIII, 30, pp. 437–448, Roma.
- DESIO A & MARTINA E. (1972) – *Geology of the Upper Hunza Valley, Karakorum, West Pakistan*, « Boll. Soc. Geol. Ital. », 91, pp. 283–314, Roma.

- DESIO A., MARTINA E. & GALIMBERTI R. (1963) – *Notizie geologiche preliminari sull'Alta Valle di Hunza (Karakorum-Himalaya)*, « Rend. Accad. Naz. Lincei », ser. VII, 34, pp. 115–117, Roma.
- DESIO A., MARTINA E. & PASQUARÈ G. (1975) – *Geology of Central Badakhshan (North-East Afghanistan) and Surrounding Countries*. Desio's Ital. Expeditions to the Karakorum and Hindu Kush, Scient. Reports, III, vol. 3, pp. 1–628, 59 figg., 29 pls., 1 geol. map. 1 : 150.000. Brill, Leiden.
- DESIO A. & MARUSSI A. (1960) – *On the geotectonics of the granites in the Karakoram and Hindu Kush Ranges (Central Asia)*. Report of the XXI session Intern. Geol. Congress, pt. II, sect. 2, pp. 156–162, Copenhagen.
- DESIO A., MARUSSI A. & CAPUTO M., (1961) – *Glaciological Research of the Italian Karakorum Expedition 1953–1955*. Publ. n. 54 of the IASH, Snow and Ice Commission, pp. 224–232.
- DESIO A. & OROMBELLI G. (1971) – *Notizie preliminari sulla presenza di un grande ghiacciaio vallivo nella media valle dell'Indo (Pakistan) durante il Pleistocene*, « Rend. Accad. Naz. Lincei », ser. VIII, 51, pp. 387–392, Roma.
- DESIO A. & SAVOIA AOSTA A. (1936) – *La Spedizione Geografica Italiana nel Karakoram. Storia del viaggio e risultati geografici*. Pp. 1–620, 254 figg., 39 pls., 4 maps. Arti Grafiche Bertarelli, Milano.
- DESIO A., TONGIORGI E. & FERRARA G. (1964) – *On the Geological age of some granites of the Karakorum, Hindu Kush and Badakhshan (Central Asia)*. Report of 22 session Intern. Geol. Congr. India, 1964, Part. XI, pp. 479–496, New Delhi.
- DESIO A. TONGIORGI, E. & FERRARA G., (1964) – *Notizie preliminari sull'età geologica di alcune rocce granitoidi del Karakorum, Hindu Kush e Badakhshan (Asia Centrale)*. « Rend. Accad. Naz. Lincei », ser. VIII, 36, pp. 776–783, Roma.
- DESIO A. & ZANETTIN B. (1956) – *Sulla costituzione geologica del Karakorum Occidentale (Himalaya)*. Congr. Geol. Intern., XX Sesión – Mexico 1956, Seccion XV, 11 pp., Mexico.
- DESIO A. & ZANETTIN B. (1957) – *Sur la constitution géologique du K² (8611 m) dans la chaîne du Karakorum (Himalaya)*, « Bull. Soc. Géol. France », sér. 6, 6, pp. 829–837, Paris.
- DESIO A. & ZANETTIN B. (1957) – *Notizie geologico-petrografiche preliminari sul bacino del ghiacciaio Baltoro*, « La Ricerca Scientifica », 27 (3), pp. 657–673, Roma.
- DESIO A. & ZANETTIN B. (1970) – *Geology of the Baltoro Basin*. Desio's Ital. Expeditions to the Karakorum and Hindu Kush, Scient. Reports, III, vol. 2, 309 pp., 74 figg. 43 pls., 2 geol. maps. Brill. Leiden.
- EBBLIN C. (1976) – *Tectonic lineaments in Karakorum, Pamir and Hindu Kush from ERTS Imageries*. « Rend. Accad. Naz. Lincei », ser. VII, 60, pp. 245–253, Roma,
- EBBLIN C. (1976) – *Structural Geology of the Thule Area, Baltistan, Karakorum, Central Asia*. « Rend. Accad. Naz. Lincei », ser. VIII, vol. 60, pp. 663–671, Roma.
- FANTINI SESTINI N. (1965) – *Permian Fossils of the Upper Hunza Valley*. Desio's Expeditions to the Karakorum and Hindu Kush, Scient. Reports, III, vol. 1, pp. 135–148 Brill, Leiden.
- FANTINI SESTINI N. (1965) – *Permian Fossils of the Shaksgam Valley*. Desio's Ital. Expeditions to the Karakorum and Hindu Kush, Scient. Reports, III, vol. 1, pp. 149–227. Brill, Leiden.
- FENAROLI A. C. (1929) – *La spedizione italiana nel Caracorum. Presentazione di una raccolta di piante himalayane*, « Milano », 4, pp. 226–230, Milano.
- FIORI G. (1957) – *Una nuova specie di *Seminolus Muls. et Rey* del Karakorum*. « Atti del Museo Civico di St. Nat. di Trieste », 21 (2), Trieste.
- FORCELLA F. (1975) – *Description of the specimens of metamorphic and plutonic rocks from Central Badakhshan*. Desio's Italian Expeditions to the Karakorum and Hindu Kush, Scient. Reports, III, vol. 3, Petrographic Appendix, pp. 521–582. Brill, Leiden.
- FORCELLA F. (1975) – *Description of the specimens of metamorphic and plutonic rocks from Wakhan*. Desio's Italian Expeditions to the Karakorum and Hindu Kush, Scient. Reports, III, vol. 3, Petrographic Appendix, pp. 596–609, Brill, Leiden.

- FOSSA MANCINI E. (1928) - *Foraminifere del calcare grigio di Sciusciul (Lago Pangkong)*. Relaz. Scient. Spedizione De Filippi, etc., II, vol. 6, pp. 187-223. Zanichelli, Bologna.
- FOSSA MANCINI E. (1928) - *Fossili eocenici del Ladak*. Relaz. Scient. Spedizione De Filippi, etc., II, vol. 6, pp. 225-331, Zanichelli: Bologna.
- GAETANI M., (1967) - *Northern and Eastern Iran, Northern Afghanistan and Northern Pakistan*. Intern. Symposium on the Devonian System, Calgary. Vol. 1, pp. 519-528. Calgary.
- GHIGLIONE P. (1946) - *Himalaya: Karakorum*. Ist. Geogr. De Agostini, Novara.
- GIUFFRIDA RUGGERI V. (1918) - *A proposito di alcuni risultati antropologici della spedizione De Filippi al Caracoram*. « Rend. R. Accad. delle Sc. Fis. e Matem. di Napoli », 24, ser. 3, pp. 19-23, Napoli.
- GORTANI M. (1920) - *Permocarbonifero e Permiano nella catena del Caracoram*. « Rend. R. Accad. Lincei », ser. II, 29, pp. 53-55, Roma.
- GORTANI M. (1921) - *L'Ordoviciano nel Caracoram orientale*. « Rend. R. Accad. Lincei », ser. V, 30, pp. 183-185, Roma.
- GORTANI M. (1928) - *Fossili ordoviciani del Caracoram*. Relaz. Scient. Spedizione De Filippi, etc., II, vol. 5, pp. 3-97, Zanichelli, Bologna.
- GORTANI M. & MERLA G. (1934) - *I fossili del Paleozoico*. Relaz. Scient. Spedizione De Filippi, etc., II, vol. 5 Zanichelli, Bologna.
- GRAZIOLI LANTE DELLA ROVERE G. (1881) - *Brevi ricordi di un viaggio nelle montagne del Kashmir*. « Boll. del Club Alpino Italiano », 15, pp. 227-250, Torino.
- GRAZIOSI P. (1961) - *The wooden statue of Dezalik, a Kalash divinity, Chitral, Pakistan*. « Man », pp. 149-152.
- GRAZIOSI P. (1964) - *Prehistoric Research in Northwestern Punjab*. Desio's Ital. Expeditions to the Karakorum and Hindu Kush, Scient. Reports, V, vol. 1, pp. 6-52, 95 pl. Brill, Leiden.
- GRAZIOSI P. (1964) - *Anthropological Research in Chitral*. Desio's Ital. Expeditions to the Karakorum and Hindu Kush, Scient. Reports, V, vol. 1, pp. 55-249, 57 pl. Brill, Leiden.
- GRIDELLI E. (1934) - *Materiali zoologici raccolti dalla Spedizione Italiana al Karakorum (1929)*. *Coleoptera, Staphilinide*. « Atti Museo Civico St. Nat. di Trieste », 12, pp. 69-85, Trieste.
- GRIDELLI E. (1934) - *Materiali zoologici raccolti dalla Spedizione Italiana al Karakorum (1929)*. *Coleoptera-Terebronidae*, « Atti Museo Civico St. Nat. di Trieste », 12, pp. 86-88, Trieste.
- GRIDELLI E. e MÜLLER G. (1965) - *Results of the study of the Entomological collection of the Karakorum and Hindu Kush*. Desio's Expeditions to the Karakorum and Hindu Kush, Scient. Reports, III, vol. 1, pp. 279-327. Brill, Leiden.
- MARUSSI A. (1955) - *L'Esplorazione Geofisica del Karakorum*. « L'Universo », 25 (1), pp. 1-12, Firenze.
- MARUSSI A. (1964) - *Geophysics of the Karakorum*. Desio's Italian Expeditions to the Karakorum and Hindu Kush, Scient. Reports, II, vol. 1. Brill, Leiden.
- MARUSSI A. (1976) - *Introductory Report on Geophysics*. « Accad. Naz. Lincei »: Intern. Coll. on the Geotectonics of the Kashmir Himalaya etc. 1974, pp. 15-25, Roma.
- MARUSSI A. (1976) - *Gravity in the Karakorum*. « Accad. Naz. Lincei »: Intern. Coll. on the Geotectonics of the Kashmir Himalaya etc., 1974, pp. 131-137, Roma.
- MASI L. (1933) - *Diagnosi di una nuova Hemimeria dell'Himalaya*, « Ann. Museo St. Nat. Genova », 56, pp. 000, Genova.
- MERLA G. (1931) - *Fossili antracolitici del Caracoram*. Relaz. Scient. Spediz. De Filippi, etc., II, vol. 5, pp. 101-319, Zanichelli, Bologna.
- MERLA G. (1934) - *Fossili triassici delle Depsang*, Relaz. Scient. Spediz. De Filippi, etc., II, vol. 9, pp. 51-124. Zanichelli, Bologna.
- MERLA G. (1935) - *Osservazioni preliminari sul Permiano della Valle Shaksgam (Karakorum)*, « Boll. Soc. Geol. Ital. », 54, pp. 153-159, Roma.
- MERLA G. (1936) - *Prime osservazioni su alcuni fossili permici raccolti dalla spedizione*. Appendix to: La Spedizione Geografica Italiana al Karakoram (1929), pp. XXIX-XLIII. Arti Grafiche Bertarelli, Milano.

- MOLTONI E. (1933) - *Elenco degli uccelli raccolti dalla spedizione italiana al Karakorum 1929, Comandata da S. A. R. il Duca di Spoleto*, « Atti Soc. Ital. Sc. Nat. », 72, pp. 209-18, Milano.
- NEGRI G. (1930) - *Sulle raccolte briologiche eseguite dal Dott. L. Borelli durante la Spedizione Piacenza nel Kashmir maggio-settembre 1913*. In: Spedizione Mario Piacenza. Himalaya Cashmiriano, Appendici scientifiche, pp. 195-200, Rizzoli, Milano.
- NEGRI G. (1933) - *La vegetazione dell'oasi glaciale di Terani Scer (Caracorum)*. Relaz. Scient. Spedizione De Filippi etc. II, vol. 11, pp. 179-190, Zanichelli, Bologna.
- NOVARESE V. (1912) - *I risultati scientifici della Spedizione di S.A.R. il Principe Luigi Amedeo di Savoia nel Karakoram*, « Boll. Soc. Geogr. Ital. », ser. V, 1, pp. 355-365, Roma.
- OMODEI D. (1912) - *Relazione sulle osservazioni meteorologiche fatte dalla spedizione di S.A.R. il Duca degli Abruzzi nel Karakorum ed Imalaia Occidentale e calcoli altimetrici*. In: F. De Filippi, La spedizione di S.A.R. il Principe Luigi Amedeo di Savoia, etc., Bologna.
- PAGANINI P. (1912) - *Rilievi fotogrammetrici nella regione del Karakoram, eseguiti dalla spedizione di S.A.R. il Duca degli Abruzzi*, « Boll. Soc. Geogr. Ital. », ser. V, 1, (8), pp. 819-840; (9) pp. 947-965, Roma.
- PAMPANINI R. (1915) - *Nuove piante del Karakorum*. « Boll. Soc. Botan. Ital. », 4-6, pp. 28-33, Firenze.
- PAMPANINI R. (1916) - *L'ignorato contributo di un italiano alle conoscenze floristiche dell'Himalaya occidentale e del Karakorum*, « Nuovo Giorn. Botan. Ital. », n.s., 23, pp. 34-50, Firenze.
- PAMPANINI R. (1916) - *Ancora a proposito dell'ignorato contributo di un Italiano alle conoscenze floristiche dell'Himalaja occ. e del Karakorum*. « Bull. Soc. Botan. Ital. », 4, p. 65, Firenze.
- PAMPANINI R. (1926) - *Contributo alla conoscenza della Flora del Caracorum (Asia Centrale)*, « Bull. Soc. Botan. Ital. », 1, pp. 36-40, Firenze.
- PAMPANINI R. (1928) - *Un altro contributo alla conoscenza della flora del Karakorum (Asia Centrale)*. « Nuovo Giorn. Botan. Ital. », n.s. 35, pp. 540-545, Firenze.
- PAMPANINI R. (1933) - *Aggiunte alla flora del Caracorum*. Relaz. Scient. Sped. De Filippi etc., II, vol. 11, pp. 143-172, Zanichelli, Bologna.
- PAMPANINI R. & VINCIGUERRA (1930) - *Raccolte di piante e di animali*. Relaz. Scient. Spediz. De Filippi etc., II, vol. 10. Zanichelli, Bologna.
- PARONA C. F. (1917) - *Faune cretache del Caracorum e degli altipiani tibetani*. « Rend. R. Accad. Lincei », ser. II, 26, pp. 53-57, Roma.
- PARONA C. F., (1928) - *Faunette triassiche del Caracorum e degli altipiani tibetani*. Relazioni Scient. Spediz. De Filippi etc., II, vol. 6, pp. 3-39, Zanichelli, Bologna.
- PARONA C. F., (1928), *Faune cretache del Caracorum e degli altipiani tibetani*. Relazioni Scientifiche Spedizione De Filippi, etc., II, vol. 6, pp. 113-147, Zanichelli, Bologna.
- PARONA C. F. (1932) - *Appunti su fossili raccolti sul Caracorum durante le esplorazioni F. De Filippi (1913-14) e Giotto Dainelli (1930)*, « Atti della R. Accad. delle Sc. di Torino », 3, pp. 179-193, Torino.
- PARONA C. F., (1933) - *Alcuni fossili raccolti al Caracorum da G. Dainelli*. Relazioni Scient. Spediz. De Filippi, etc., II, vol. 11, pp. 127-140. Zanichelli, Bologna.
- PETRINI G. (1936) - *Cenni illustrativi sulla compilazione della Carta Topografica al 75.000 della spedizione*. Appendix to: La Spedizione Geografica Italiana al Karakoram, 1929, pp. XXV-XXXII. Arti Grafiche Bertarelli, Milano.
- PIACENZA M. (1930) - *Himalaya Cashmiriano*. Rizzoli, Milano.
- PREMOLI SILVA I. (1965) - *Permian Foraminifera from the upper Hunza Valley*. Desio's Italian Expeditions to the Karakorum and Hindu Kush, Scient. Reports, IV, vol. 1, pp. 89-125, Brill, Leiden.
- PREMOLI SILVA I. (1970) - *Cretaceous-Eocene Microfaunas of Western Badakhshan and Katakhan (North-Eastern Afghanistan)*. Desio's Italian Expeditions to the Karakorum and Hindu Kush, Scient. Reports, IV, vol. 2, pp. 110-160, Brill, Leiden.
- ROCCATI A. (1909) - *Sopra alcune rocce e sabbie del bacino del ghiacciaio Hispar (Himalaya Nord-occidentale)*. « Riv. di Miner. e Cristall. Ital. », 39, pp. 33-46, Padova.

- ROCCATI A. (1910) — *Études sommaire du matériel lithologique rapporté par M. le Dr. Calciati du bassin du Glacier d'Hispar*. « Bull. Soc. Fribourg, Sc. Natur. », 17, Fribourg.
- ROCCATI A. (1910) — *Étude Sommaire sur le Matériel Lithologique (Roches et Sables) Rapporté par le Dr. C. Calciati du Bassin du Glacier d'Hispar (Himalaya N. W.)*. In: Workman W. H. and F. B., *The Call of the Snowy Hispar*, ecc. Appendix II, pp. 283-285. Constable, London.
- ROCCATI A. (1914) — *Sulle rocce di Karakorum Sud Orientale*. « Boll. R. Soc. Geogr. Ital. », 51, pp. 1086-1903, Roma.
- ROCCATI A. (1915). — *Studio litologico e mineralogico del materiale raccolto dal conte Dott. Cesare Calciati nelle spedizioni al Karakoram Sud-Orientale durante l'estate del 1911*. « Boll. Soc. Geogr. Ital. », 34, pp. 2-78, Roma.
- ROCCATI A. (1930) — *Studio litologico e mineralogico del materiale riportato dalla Spedizione M. Piacenza nell'Himalaia Cashmiriano* In: M. Piacenza: *Himalaia Cashmiriano*, Appendici scientifiche, pp. 81-116. Rizzoli, Milano.
- ROERO DI CORTANZE O. (1881) — *Ricordi dei viaggi al Kashmir, Piccolo e Medio Tibet e Turchestan in varie escursioni fatte dal 1853 al 1875*. vol. 1-2-3, Torino.
- ROSSI RONCHETTI C. (1965) — *Rudiste e Nerinee del Cretaceo di Yasin (Pakistan Nord-Occidentale)*. Desio's Italian Expedition to the Karakorum and Hindu Kush, Scient. Reports, III, vol. 1, pp. 229-272, Brill, Leiden.
- ROSSI RONCHETTI C., (1967) — *Mollusks from the Upper Cretaceous at Burji-la (Baltistan, Central Asia)*, « Riv. Ital. Paleont. », 73, pp. 811-832, Milano.
- ROSSI RONCHETTI C. (1970) — *New Contribution to the Knowledge of the Jurassic Fauna of Karkar (Afghanistan)*. Desio's Italian Expeditions to the Karakorum and Hindu Kush, Scient. Reports, IV, vol. 2, pp. 43-74, Brill, Leiden.
- ROSSI RONCHETTI C. (1975) — *Megafossils of some localities of North-Eastern Afghanistan*. Desio's Italian Expeditions to the Karakorum and Hindu Kush, Scient. Reports, IV, vol. 1, Palaeontological Appendix, pp. 509-520. Brill, Leiden.
- SARTENAER P. (1965) — *Rhynconelloidea de Shogran et Kuragh (Chitral)*. Desio's Italian Expeditions to the Karakorum and Hindu Kush, Scient. Reports, IV, vol. 1, pp. 55-56, Brill, Leiden.
- SALFI M. (1934) — *Ortotteri raccolti dalla Spedizione di S.A.R. il Duca di Spoleto al Karakorum (1929)*, « Annuario del Museo Zool. R. Univ. Napoli », n.s., 6, (11), Napoli.
- SAVOIA AOSTA, AIMONE DUCA DI SPOLETO, (1930) — *Spedizione nel Caracorum*, « Boll. R. Soc. Geogr. Ital. », ser. VI, 7, pp. 3-20, Roma.
- SAVOIA AOSTA, AIMONE DUCA DI SPOLETO (1930) — *The Italian Expedition to the Karakoram in 1929*, « Geogr. Journ. », 75, pp. 385-401, London.
- SAVOIA LUIGI AMEDEO DUCA DEGLI ABRUZZI (1910) — *Esplorazione ai Monti del Caracorum*, « Boll. R. Soc. Geogr. Ital. », ser. IV, 47, pp. 435-469, Roma.
- SCHOUPPE (VON) A. (1965) — *Die Mittel- bis Oberdevonische Karallenfauna von Kuragh (Chitral)*. Desio's Italian Expedition to the Karakorum and Hindu Kush, Scient. Reports, IV, vol. 1, pp. 14-53, Brill, Leiden.
- SCHOUPPE (VON) A. (1970) — *Lower Carboniferous Corals from Badakhshan (North-East Afghanistan)*. Desio's Italian Expedition to Karakorum and Hindu Kush, Scient. Reports, IV, vol. 2, pp. 3-22, Brill, Leiden.
- SILVESTRI A. (1934) — *De Petris, saxis et foxilibus paleozoici superioris a missione italica geografica in Caracorum inventis*. Scientiarum Nuncius Radiophonicus, n. 30, 28 Mart. 1934, Città del Vaticano.
- SILVESTRI A. (1934) — *Rocce e fossili del Paleozoico superiore raccolti dalla Spedizione Geografica Italiana nel Caracorum (1929): P. I, Le Rocce*. « Mem. Pont. Accad. Novi Lincei », ser. III, 1, pp. 33-48, Città del Vaticano.
- SILVESTRI A. (1935) — *Rocce e fossili del Paleozoico superiore raccolti dalla Spedizione Italiana Geografica nel Karakorum (1929), P. II, I fossili*. « Mem. Pont. Accad. Novi Lincei », ser. III, 2, pp. 79-117, Città del Vaticano.

- SPADEA RODA P. (1975) - *Description of the specimens of metamorphic and plutonic rocks from the Lake Shiwā area*. Desio's Italian Expeditions to the Karakorum and Hindu Kush, Scient. Reports, III, vol. 3, Petrographic Appendix, pp. 582-596, Brill, Leiden.
- STEFANINI G., (1917) - *Echinidi mesozoici del Caracorum raccolti dalla Spedizione Italiana nell'Asia Centrale (1913-1914)*. « Rend. R. Accad. Lincei », ser. II, 26, pp. 49-50, Roma.
- STEFANINI G. (1917) - *Su l'esistenza di depositi cenomaniani e di altri livelli mesozoici nel Caracorum (Asia Centrale)*. « Rend. R. Accad. Lincei », ser. II, 26, pp. 190-195, Roma.
- STEFANINI G. (1928) - *Molluschi e Brachiopodi calloviani del Caracorum*. In: Relaz. Scient. Spedizione De Filippi etc., II, vol. 6, pp. 41-100, Zanichelli, Bologna.
- STEFANINI G. (1928) - *Echinidi mesozoici del Caracorum*, Relaz. Scient. Spedizione De Filippi etc., II, vol. 6, pp. 149-186, Zanichelli, Bologna.
- TURATI E. (1934) - *Lepidotteri della Spedizione di S.A.R. il Duca di Spoleto al Caracorum*, « Atti Soc. Ital. Sc. Nat. », 72, pp. 191-208, Milano.
- VANDERCAMMEN A. (1965) - *Les Spiriferidae de Shogran et Kuragh (Chitral)*. Desio's Expeditions to the Karakorum and Hindu Kush, Scient. Reports, IV, vol. 1 pp. 67-75. Brill, Leiden.
- VINASSA DE REGNY P. (1932) - *Hydrozoen und Korallen aus der Ob. Trias des Karakorum*. Wissensch. Ergebn. der Dr. Trinkler'schen Zentralasien Exped., vol. II, pp. 192-196. Reimer, Berlin.
- VITERBO C. & ZANETTIN B. (1959) - *Caratteri petrografici e chimismo della massa gnessica granitoide affiorante fra Skoyo e Valle Tormik (Karakorum occidentale)*. « Rend. Soc. Mineral. Ital. », 15, pp. 283-309, Pavia.
- VITERBO C. & ZANETTIN B. (1959) - *I filoni lamprofirici dell'Alto Baltoro (Karakorum)*. « Mem. Accad. Patavina di Sc. Lett. Arti », 71 (1958-59), pp. 3-39, Padova.
- WILLIAMS L. H. G., (1965) - *List of Spermatophyta collected by Professor Ardito Desio in the Karakorum 1953 and 1954*. Desio's Italian Expeditions to the Karakorum and Hindu Kush, Scient. Reports, III, vol. 1, pp. 331-343. Brill, Leiden.
- ZANETTIN B., (1956) - *Notizie petrografiche sul territorio compreso fra i gruppi dell'Haramosh e del Koser Gunge (versante settentrionale dell'Indo Balti)*. « La Ricerca Scientifica », 26 (11), pp. 3394-3404. Firenze.
- ZANETTIN B., (1957) - *Motivi petrografici essenziali osservati nella regione centrale del Karakorum*. « Rend. Soc. Mineral. Ital. », 13, pp. 397-411, Pavia.
- ZANETTIN B. (1964) - *Molteplicità di processi nella genesi di masse granitiche terziarie nel Karakorum Centro-Meridionale*. Consiglio Naz. Ricerche, Centro di Studi per la Petrografia e la Geologia, pp. 3-20, Padova.
- ZANETTIN B. (1964) - *Geology and Petrology of Haramosh-Mango Gusor Area*. Desio's Italian Expeditions to the Karakorum and Hindu Kush, Scient. Reports, III, vol. 1, pp. 1-253, 21 pl. Brill, Leiden.
- ZANIN BURI C. (1965) - *A new Permian Epimastopora (Calcareous Alga) from Hunza Valley (Western Karakorum)*. Desio's Italian Expeditions to the Karakorum and Hindu Kush, Scient. Reports, IV, vol. 1, pp. 79-88. Brill, Leiden.
- ZAVATTARI E. (1930) - *Imenotteri*, « Boll. Museo Zool. Anat. Comp. Torino », 24, n. 596 and n. 605, 1909; vol. 27, n. 657, Torino 1912. Idem, in Spedizione Mario Piacenza. Himalaya Kashmiriano, Appendici scientifiche, pp. 188-194, Rizzoli, Milano.

