

RESOLUTION
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tive (and perhaps relatively reliable) basis which may provide at least some answers to some questions of interest to photographers and to photogrammetrists. Only future work will reveal whether or not the establishment of this basis was of any real value.

PRESIDENT SANDERS: I am sure that every one of us feels, as I do, a considerable indebtedness to Dr. Pestrecov for the material that he has presented here today. It has truly been educational, and I think it is the type of information that we can use to good advantage. It is the kind of subject that could have been extremely difficult and dry, but Dr. Pestrecov's ability to ring in a little humor at the right time has certainly made it extremely palatable. We thank you Dr. Pestrecov.

You all know that the isolationist theory is a thing of the past in a political sense. In this Society we have never been isolationists in a scientific sense. As a matter of fact, we have in our membership a man who is a real ambassador of scientific good will wherever mapping and surveying are involved. The efficacy of this peripatetic individual is aided by his unusual linguistic ability, of which we have been permitted to take advantage on many occasions.

Our speaker, Dr. Andre Simonpietri, is Special Adviser on Cartographic Matters to the Department of State. He is also traveling Secretary of the Commission on Cartography for the Pan American Institute of Geography and History. In this capacity he has attended three Pan American consultations, one here in Washington, one in Rio de Janeiro, Brazil, and one in Caracas, Venezuela. In each of those he was a person of considerable importance and was depended on greatly. In my attendance at one of them I was extremely proud to see a representative of our Society taking such an active part in such a widespread function.

Dr. Simonpietri was educated here in the United States and in Europe. He is a member of many professional societies outside of the United States, in such countries as Mexico, Peru, Uruguay, Bolivia, Ecuador, and probably others with which I am not familiar. So you see, Dr. Simonpietri is excellently equipped to speak to us today on his subject, The Future of Mapping in the Americas. Dr. Simonpietri.

DR. ANDRE SIMONPIETRI: Thank you, Mr. President.

Ladies and Gentlemen: The title of this talk was suggested by President FitzGerald, the idea being to attempt to fill in with the general idea of mapping in the Americas, since we had heard from Mexico through General Quintanilla and Mr. Vaca and from Canada through Mr. Carroll, and to carry the international phase of it a bit farther than North America, we had a paper from Venezuela and the very interesting talk of Mr. Staub of Switzerland. So, when this was suggested to me, it seemed to me quite a good idea.

I asked him, "What particular phase of mapping. Photogrammetry?"

"No, just mapping in general."

North America has been covered. That leaves Central and South America. I did a bit of mathematical calculation on that, and I figured there were roughly five or six different types of maps and mapping operations that you could talk about—geodetic operations, topographic maps, aeronautical charts, hydrographic charts, and special use maps, geological or soil conservation, whatever you want to call them. There are about five different phases of each of those about which you could talk. That makes twenty-five. There are at least twenty countries involved. That makes five hundred. There are about five agencies in each country interested in this subject. That makes twenty-five hundred. Taking a minute to cover each particular point, we would be here quite a

while. So, it seemed that perhaps the best way to treat this matter would be in rather broad and general terms.

Patterns that are visible might be a very good approach. I should like, then, to mention to you some of the patterns that do appear today to be taking shape. We have covered the mapping part. The future I hope to take up here. I have mentioned the Central and South American part. Perhaps I had better say that I will confine these remarks, then, to the south of Mexico and probably exclusive of the Caribbean area, because I do not know that area as well as I do the others.

The broad picture, if we can use percentages for once, would be that about 10 per cent of the area I am discussing is adequately mapped from the topographic point of view. I do not mean that there are no maps. What, again, is a topographic map? We here normally understand it as a map with contours and a reasonably large scale. There are maps covering all of Latin America; for instance, the magnificent job of the American Geographical Society and the maps which government agencies of this country have produced. I take it that we should exclude those and talk about operations of the countries themselves.

To date, not a complete map of a scale of even 1:500,000 or 1:1,000,000 has been prepared according to modern usage, modern acceptance of the term. Less than 10 per cent has been covered topographically. A larger percentage has been surveyed and not yet mapped. The coasts present a different picture. Most of Central America has been done, but again by outside agencies. In South America itself the southern portion is far better covered both on the east coast and the west coast than the northern part. The process normally has been that of surveying and preparing hydrographic charts of major ports and then subsequently expanding operations to cover the interlocking coastal areas.

There are various facets to this picture, to this jewel, if we might call it that. Some countries are very far advanced; others are relatively little advanced. There are various factors that come into this. I was very happy to have the opportunity yesterday to see the picture, "Photo Canada," which, incidentally, was a beautiful job of color photography, giving a very good idea of the problems involved in mapping the vast expanses of the Americas. Canada is probably the largest country. I don't recall my figures exactly. Brazil is second in territorial extent, and the United States is third. There are millions of square miles actually unmapped. The factors coming into play would be the highly diversified terrain from great expanses of level terrain to the toothpick structures of the Andes and the various other mountain ranges throughout the country. When you consider that you have in South America a number of peaks well over 20,000 feet, our own peaks of 14,000 or 16,000 feet seem small compared to them.

The logistics (we might borrow the military term) is again a major problem—reaching the positions that one wishes to occupy, the reconnaissance operations. If we are going to have a decent geodetic net, we have to prepare certain preliminary surveys, reconnaissance surveys. Even those are fantastically hampered by terrain and by transportation. In Brazil, immense country that it is, industrial development has gone in from the coast somewhat like the fingers of your hand. There is no internal connection. The same is true in many others. The entrance is through valleys and up riverways. The interior is mostly unknown.

Equipment is another matter; personnel, to mention another.

The major factor, I would say, would be that of the countries themselves. What is their most pressing necessity? What should they do first? Should they

attempt to prepare highly accurate maps, as they are doing today, at large scales (I mean 10,000, 20,000 and 25,000, and some at 5,000) of these highly important areas and neglect a major knowledge of the rest of the country, or should they drop that strategic area for spot industrial development and attempt to acquire a knowledge of that whole territorial expansion? Or should they try to combine the two? That is one of the major patterns that is coming out today.

Previously they have been confining most of their operations to detailed mapping of spot areas. Now an effort is being made to carry on that type of work and to acquire as rapidly as possible through aerial photography a reconnaissance map, at least, of the whole area.

What is the future? After all, I am supposed to be saying something about the future of mapping in America. All things considered, the future of mapping in the Americas is bright. It really is. It is due to many reasons. There is a general awakening of responsible authority to the real need of maps not only in North America but throughout the world. Dr. Wrather said yesterday that there are more people today who are conscious of the need of maps than ever before. That is very true, not only here but elsewhere. The war had that beneficial result. That awakening process is taking the shape of the creation of new offices, for instance, for surveying and mapping operations where none existed before. We have seen in the last few years, for instance, that Costa Rica had no real mapping organization. It has now set up a Geographic Institute. To mention one or two others, Venezuela set up a Bureau of National Cartography, from whom you received a greeting yesterday, about ten years ago. Colombia's Geographic Military Institute, which also performs cadastral work, was established about ten years ago. Brazil, with its National Council of Geography, started its operations, and it is now set down by law that this is the agency, the National Council of Geography of Brazil, is charged with coordinating the mapping of the country. Again, in the middle thirties Bolivia set up an agency, and Peru's institute, the Army Map Service, has been in existence much longer. It brought in people from other countries prior to the war. The system for triangulation of the country was evolved by the French. They still follow the French methods mostly. Their maps are on the scale of 1:200,000; that is, the national map of the country is designed on that scale.

I could go on and mention other instances where new organizations charged with coordination have been established.

There are other facets to this picture, where there were in existence organizations charged with the mapping of the country as we normally understand mapping—that is, the interior—but with more specific attention to coastal areas. Within the last couple of years two or three countries have drawn up their plans and have set up hydrographic offices. All are now expanding into the air branch, realizing the value of the major subject of the attention of this Society, the aerophotogrammetric answer to their problem.

Training programs have been intensified. I have had the pleasure of seeing North Americans in various countries of Latin America. I have run into Colombians in Chile. I have seen Uruguayans in Mexico. I have seen Argentines in other places. There is a general permutation of scientific knowledge at the present time, of the training of new staffs, basic training at home and then the polishing process in other countries so that they might acquire the experience of others, so that when a difficulty once has arisen and been satisfactorily solved, no time may be wasted on it later by another country because of ignorance of that original solution.

Advanced equipment is going to help a lot. The picture of that particular phase of it is extremely interesting throughout the Americas today. Most of the phototheodolites, most of the restitution cameras, and most of the plotting equipment is European. During the war no replacement parts were available. So, much of this equipment, usable in itself, because of the lack of one particular essential part could not be used at all. Someone mentioned to me yesterday that in one of the countries to the south some of the multiplex projectors were sitting idle because they could get no more projection bulbs, a simple thing. In Ecuador I ran into the question of proof presses actually being used for maps. They had quite an investment in paper, they had the presses, and the maps were ready. The printing plates were ready, but they had no ink. They lacked a special kind of ink, and so just sat there.

Advanced, newer equipment is gradually being acquired by these countries. They are thirsty for it and need it very badly. Enlarged budgets are being placed at the disposition of the mapping services of many of the countries.

Therefore, getting back again to the broad patterns which are visible, I would say that they resolve themselves into three. One is that there is a general tendency toward higher standards of accuracy. In Colombia, in conversation with the chief of the department there (of course, it always depends upon the terrain), he told me that they really found that it cost very little more to acquire first degree accuracy in their operations than second degree. Therefore, they were gradually transferring their operations to these new requirements. There is definitely an advance throughout the various phases of planning long-range programs. Argentina has recently instituted a program of several million dollars covering a specific period of time. Brazil is doing the same. I mention the countries occasionally because when you make a statement about long-range planning, you are usually supposed to back it up with an example.

There is a general appreciation of the value of coordinating the various services within a country. You can always consider that the Army is interested in mapping and is doing mapping, as are the Navy, the Air Forces, the Ministry of Public Works, of Communications, the Department of the Interior, of Agriculture, to mention the major ones. You have others—the Post Office Department, the statistical setups, and so forth. Usually there are a half dozen in each country. In this country we have tried on an average of at least every five years to attempt some sort of coordination. I know that there have been roughly twenty different plans that have gotten perhaps as far as the President and perhaps not quite that far at various times. We realize the value of coordinating these operations, and we are not the only ones who appreciate that.

There is also the difficulty which we find almost unfailingly mentioned when anyone talks about operations in Latin America, the instability of governments. On that particular point we might mention that we have a few uncertainties here with forty-eight states and forty-nine governors today. There is this effort at coordination of planning throughout Latin America, coordination of the services, and the correlation of activities with neighboring countries. There are various phases of surveying operations which must necessarily be international in scope. You can't run a triangulation net right up to a border and bump to a dead stop, because it doesn't make sense. If you coordinate your program with the chap who happens to touch you to the north, south, east or west, you can tie together your nets, and the result is going to be far better in accuracy. It is going to be a better basis for the extensive mapping operation in which you are to engage.

There is also an increased usage recently in, shall we say, the auxiliary sci-

ences. We do not necessarily need permanent tidal stations to determine the level, no, but there is advantage in having them, checking for maritime commerce afterwards. Magnetic surveys are being undertaken by a number of countries today. The Carnegie Institute of Washington went down to South America about 1918 or 1920, I believe, and established a number of stations which in the two decades that followed were not reoccupied. Plans are now being made to reoccupy those stations, to establish units to determine the magnetic values which are necessary for high precision results.

Pattern number one, then, is a tendency toward a higher standard of accuracy throughout.

I would say that pattern number two—which I mentioned a while ago, but it bears repetition—is that of not deciding whether you shall have large scale maps of spot areas in the country and insufficient coverage of the rest of the country amounting to almost a complete lack of knowledge, but in carrying out your program of large scale mapping of strategic importance and economic areas and simultaneously carrying out the other. It means much larger budgets. They realize that. They are doing everything they can, requesting and soliciting and getting international support, pointing to examples in other countries, which is always a good method.

The third pattern I would say would be that of international cooperation. We have had here various examples of that, cooperation not only of governments but of societies. The proceedings, *PHOTOGRAMMETRIC ENGINEERING*, your publication, have helped a lot. It is not necessary that international cooperation take the form of government to government or necessarily agency to agency. It can be individual to individual, society to society, society to government. There are many phases.

A real appreciation of the value of this cooperation and the possibilities of it is becoming very prevalent today. There was a peculiar psychology, if I may use that word, not only here but in the other American countries. France was always looked to as the great cultural center, and other countries of Europe were regarded as those of great scientific advancement. You had the peculiar picture of lines radiating from separate nations in Latin America or in the Americas to specific spots in Europe. The lines always radiated out. They never seemed to cross each other. Peru did not well understand the problems of Brazil, although one might profit from the knowledge and the experience of the other. Argentina was always interested, yes, but not to any great extent did it understand the needs of the Central American countries. I do not mean in this use of names to imply a lack of understanding. I merely wish to point to a historical fact, that these lines seem to radiate to a common point from various starting points, but that there was no intercommunication, no interconnection among them.

Again, the future in Latin America is bright because of the new techniques that have been evolved during the war, the possibility of doing in ten years, shall we say, a job which normally by the classic method would take over a century. Some of these are techniques which were followed during the war, such as the linking of continents and outlying islands. We have carried that through considerably farther in the last few years, in even the last few months, I believe, off Florida and the outlying islands.

The electronic methods will solve many problems. Research is now under way to refine the accuracy of these methods. Perhaps therein lies the answer to occupying almost inaccessible positions, to your logistics problem.

Trimetrogon photography, widely used, has many beneficial results. It will

give an excellent reconnaissance map of the country in a very short period of time with very little ground control, relatively speaking. It will give photographs capable of many other uses. We have also learned during the war that you really do not need quite so many picture points, quite so much ground control, for certain types of photogrammetric operations as was previously assumed.

There are other simplifications, smaller and more compact radios and time perceptions, two-way radios for communication between parties and bases. We saw yesterday the method of two or three different types of planes with two or three different types of terrain and different types of surveying operations.

I seem to come back to the geodetic phase. What is the picture there? It is unusual. We have the North American datum originally linked to Mexico and Canada. Mexico joined it and tied into it some years ago. There is an excellent base measured by Sidney Birdseye in the northern part of Honduras at a point practically contiguous with the boundaries of Salvador and Guatemala, which can be used in the extension of that. Other bases are being studied throughout Central America. There are no specific data as yet established for South America. Many countries are working on provisional data. That matter is definitely under study. I might say that with the North America datum extending from the southern part of Mexico through Alaska, at the present time you have there the longest triangulation net in the world. No other continent, not even Europe with its so-called great advances, has a triangulation net or datum of such extent as that.

Within the last two years Brazil has launched a campaign to extend a triangulation net up through the center of the country along a 50 degree arc from the southernmost part of the country up into Venezuela. Its length is practically 3000 miles. Argentina has been working northward also along the 62nd parallel, then switching over to the 64th. Brazil tells me that it will be finished in about three years all the way up to the north. Argentina is proceeding very rapidly, indeed. You have fine nets of triangulation in Peru, Ecuador, Colombia, and Venezuela. They are not tied together, but this is planned. The paper from Venezuela yesterday spoke of the plan of Venezuela to tie in with Colombia. Colombia is planning to tie in with Ecuador, and Ecuador at the present moment is tying in with Peru. It would take very little for Peru to tie in with Chile. Argentina has already tied in with Uruguay.

The picture has changed enormously within the last five years. A South American mapping official estimated the other day that more has been done since 1940 in mapping in the Americas than in the previous forty years. I do not think it was at all an exaggeration.

An international organization can help a lot in the present continental program, because that is really what it is. The Commission on Cartography of the Pan American Institute of Geography and History is the only official governmental agency existing in the field. Its program has been to hold annual meetings or as close to annual meetings as possible, so that the broad phases of continental planning may be discussed in their various developmental stages and so that the country where a meeting is being held may have added stimulus to its mapping program. Three of those meetings have been held, as mentioned by President Sanders—Washington, Rio de Janeiro, and Caracas. The fourth is scheduled for Buenos Aires the latter part of this year. At the last meeting at Caracas, if one might gauge the interest of the nations, there was practically rivalry between several countries as to who was to receive the next consultation, which is again evidence of the awakening.

This Commission has also specific committees made up of technicians not selected from the point of view of geographic representation, but of personal excellence. There are committees on geology, topographic maps and aerophotogrammetry, aeronautical charts, hydrographic charts, and special use maps.

The resolutions of the various conferences have been widely circulated. At each succeeding meeting the various governments are requested to present a report covering their mapping operations from the last meeting to the one then being held, to give statements concerning their future programs, and a statement concerning the action taken on previously adopted resolutions. It is not a case of general resolutions being passed and then forgotten, but there is constantly a checking process to see what is done, whether this resolution covered the need, whether it should be altered if it has not had the desired effect.

Another phase of the Commission's activities has been the preparation of technical training films in technicolor. There has been one prepared giving an introduction to cartographic operations in the United States, another on geodesy and the most recent has been Reconnaissance Mapping by Trimetrogon Photography, a complete picture of the various phases of that rather extensive operation. A copy of that film is at the present moment in Brazil. General Zarrate, the Chief of the Army Map Service of Mexico, has requested another copy, and it is being turned over to General Quintanilla today for him to take back with him.

I said at the outset that the future of mapping in the Americas is bright. You must always make some qualifications and express certain reservations. There are many problems that have not been solved. The need for equipment is paramount. The need for trained personnel is perhaps next. The plans are there, the ideas are there, the will to do it is there. There are certain physical limitations at the present time which we hope within the next couple of years will be changed.

There is also another factor which must be considered, that of economy. All nations after a war seem to become economy-minded. Let us hope in this case that they will realize that good maps, a better knowledge of their country, of the possibilities of the country, of its natural resources, will be the best kind of economy, a realization that good mapping is the best possible economy; in short, that instead of cutting back on their mapping operations, they will find it the best possible economy to extend them further. I thank you very much.

PRESIDENT SANDERS: Thank you, Dr. Simonpietri. I would like to make a few comments on the talk which Dr. Simonpietri has just given us.

It was a very interesting talk, but beyond that it was very valuable. He has told us how there has come not exactly an awakening in South America, but a resurgence of interest, let us say, in mapping by photogrammetric means and mapping by all means. He has also told us that they are thirsting for equipment and for services. That causes me to go back to the retiring address of our President, Mr. FitzGerald, in which he made a plea that we not oversell photogrammetry. The situation is ideal for exploitation of these people to the south of us, which we must be exceedingly careful not to do. All of us concerned with equipment must remember that these people in all cases do not send their best photogrammetrists to this country to inquire after services and equipment. The personnel situation in the South American countries is such that the qualified engineers are usually so important back home that only on rare occasions do they get here. Usually the survey of materiel is conducted by one of their lieutenants, who might not be quite so cognizant of all the information on mapping and photogrammetry as the chief himself. Consequently, as we show him bright

and shining new equipment, because of this thirst which the drought of the last five years has created, the tendency is for him to say, "That will solve all our problems." We must avoid that.

Our duty, the Society's duty, is to see to it that they get what they need and no more, so that they get services and equipment that fit in with their budgets on a long-range plan. Dr. Simonpietri is contributing to that type of selling of American mapping and photogrammetry, but he is only one man and can not get everywhere, although he seems to get most places. It is the job of every one of us in this Society to remember that we have an obligation to this whole hemisphere to see to it that the best type of selling of our photogrammetry is done so that mapping throughout the Americas will really progress.

This is the time schedule for the afternoon. The first paper at one-thirty, the second paper at approximately two-fifteen, the third paper at three o'clock, and anticipated adjournment at three-thirty. I encourage you to return on time. Please try to be back at one-thirty so that we may start promptly. Thank you.

NEWS NOTE

Wallace & Tiernan Products Inc., Belleville, N. J., announce a pocket size filter plant called the MINI-FILTER. Sportsmen, travelers, construction crews, survey parties and others away from approved water supplies can be sure of safe drinking water wherever they go. The device assures protection from water-borne diseases such as typhoid and dysentery—the germs of which are often present even though the water sources look clean.

Originally developed during the war for the Armed Services, the MINI-FILTER was used successfully all over the world. It includes a hand pump and filter together with a purifying kit (AQUA-TABS), all in a pocket size unit weighing less than five pounds. The principal of operation is the same as that used by municipal filter plants. It eliminates taking chances on water quality or boiling drinking water to be safe.