

NATIONAL BUREAU OF STANDARDS REPORT

8938

REPORT ON LATIN AMERICA TRAVEL

PART I. U. S. Agency for International Development (AID)--
Colombia Standards Institute Seminar Program,
April 22, 1965 - June 12, 1965.

PART II. Weights and Measures Activities, Colombia and
Venezuela

by

LeRoy L. Wyman
Special Assistant, International Standards
Institute for Applied Technology



U.S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

THE NATIONAL BUREAU OF STANDARDS

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ABSTRACT

PART I of this report details the accomplishments of the Seminar Program of technical assistance given the Colombian Standards Institute (Instituto Colombiano de Normas Tecnicas, ICONTEC) by U. S. Agency for International Development (USAID) - Colombia.

Nine individual seminars were conducted in standardization practices for metals, cement and concrete, modular construction, fertilizers, pesticides, textiles, food, plastics, and hides and leather; these being conducted by technical experts from the National Bureau of Standards and the Department of Agriculture, Agriculture Research Service, U. S. A.

PART II relates the background and activities leading to the establishment of the Weights and Measures demonstration and training center in Bogota, and the writer's visit in Venezuela on the same subject.

ACRONYMS AND ABBREVIATIONS

The use of acronyms is in common and recognized use today, and is of great convenience. However, it does present reader-difficulties to those who do not have a familiarity with the organizations of reference. As a consequence of this, and of certain previous comments on the use of acronyms without detailed explanation, the following list should familiarize the reader with those used in this report.

AID/____	Agency for International Development (AID) Mission Office in the particular country (or Washington)
API	American Petroleum Institute
ALALC (LAFTA)	Latin American Free Trade Association
ALCA	American Leather Chemists Association
ARS	Agriculture Research Service (U. S. Department Agriculture)
ASA	American Standards Association
ASME	American Society Mechanical Engineers
ASTM	American Society for Testing and Materials
CAMACOL	Chamber of Construction of Colombia
COPANT (PASC)	Pan American Standards Commission (PASC)
COVENIN	Venezuela Standards Institute
CU	Consumers Union
D/_____	Department of _____
D/C	Department of Commerce
FOA	Food and Agriculture Organization of United Nations
ICAITI	Instituto Centroamericano de Investigacion y Tecnologia Industrial (Research and Standards Institute for Central American Common Market Countries)
ICONTEC	Instituto Colombiano de Normas Tecnicas (Colombia Standards Institute)
IEC	International Electrotechnical Commission
IIT	Instituto de Investigaciones Tecnologicas
INANTIC	Peruvian Standards Institute
INCOLDA	Instituto Colombiano de Administracion
ISO	International Standards Organization
L. A.	Latin America(n)
NBS	National Bureau of Standards (USA)
NEMA	National Electrical Manufacturers Association
OWM	Office of Weights and Measures, NBS
SPI	Society of the Plastics Industry
W&M	Weights and Measures
WHO	World Health Organization

REPORT ON LATIN AMERICA TRAVEL

1. Preface

1.1 The Standards Programs

The full employment of an adequate program in standards practices and in the adoption and use of measurement standards has long been proven to be essential to the advancement of the science and technology, and to the economy of any nation. Further, none of the lesser-developed nations can hope to achieve greater technological and economic development unless they, too, are active in these areas to the greatest possible extent.

This report, while dealing mainly with the current level of attainment in assisting Colombia via the implementation of standards and their use, carries with it the very significant fact that this is a "first" in which the Agency for International Development (AID) has been actively supporting such an activity. Because of this, and more importantly because of its success, it would seem to be advisable to preface the report with a brief standards orientation which will attempt to show why standards are so essential to developing nations.

1. National Development

In current terminology, we have the "developed," the "lesser developed," and the "under developed" characterization of countries, and, in the broad sense, this is a measure of progress from rags to riches or from the starvation existence to the beautiful two chickens in the lunch pail (or cars in the garage). In any event, what it really means is that nature has provided us with certain raw materials which, through the discoveries of science which are subsequently put to work through an advanced technology, have permitted us to convert these new materials into products which are widely distributed to provide a better life for all the people.

The conversion of the raw materials into the final products is the result of our "know-how" emanating from research, engineering application, and efficient production methods. Furthermore, this "know-how" depends entirely on the full use of mensuration as exemplified in the establishment and use of standards of practice and the adoption and legal application of standards of measurement. The need for these was most eloquently stated by the famous 19th century scientist, Lord Kelvin:

"I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of Science, whatever the matter may be."

Thus, in essence, "to measure is to know;" and thus we "measure" our raw materials and control their conversion through measurements and then we finally evaluate the finished product by test methods, which again fully employ measurements in order to assure that the product is satisfactory.

The distribution of the product involves many factors, but the end-point is the selling of the product to a customer, and the latter's satisfaction with the purchase. This and like transactions constitute the commerce and trade which build the economy of the nation.

1.3 Elements of Trade

The sale and purchase of a product involves three factors which are:

- a. The QUALITY of the product;
- b. The QUANTITY of the product; and
- c. The PRICE of the product.

Of the above three, in the realm of present-day good business practices, the first two of these factors can be considered to be fixed values because they are established by standards of one kind or another. Thus it might be advisable to examine the kinds of standards which are used, and to indicate how and why they are essential to any national development effort.

1.4 Standards of Practice.

The 'quality' of a product is a generalized term denoting that the particular product is satisfactory, i.e., the product meets the established standard for this item because such a standard stipulates the minimum acceptable characteristics of a product for a given application, and that this standard is the result of the voluntary collaboration of both producers and consumers acting in complete freedom on consensus principle to achieve the following: (a) the standard which defines the product, and (b) the test method by which conformity to the standard is ascertained. Furthermore, both of these factors are in terms of measurable characteristics and are consequently completely dependent on the use of measurement standards, as will be subsequently discussed.

"Quality Control" is another popularized term for the very simple fact that if a producer is to make a product which will meet the standard; then he must establish his own standards for (a) the raw materials which he purchases, and he must (b) establish rigid instructions and requirements for each operation which he performs on the raw materials in order to combine these into the final product. The establishment of these standards is essential, and it is the means that are employed to assure conformity to the established procedures that is known as "quality control."

Quite obviously, it is the standard which establishes the quality and these just-described standards are the company standards which are strictly private documents and information, and should always be treated as such.

In addition to these standards, as soon as the producer gets into volume production, and most particularly if he subcontracts for parts and assemblies, he must institute rigid control of measurements in order to insure interchangeability.

As industry expands and there come to be many producers of the same product, these frequently unite in a trade organization in order to promote the welfare of their industry. In so doing they can present a united front, as consumers, to the suppliers of their raw materials; they can consult with their customers to ascertain all consumer requirements and frequently therefrom derive information that will permit them to agree on standardization by means of product-line simplification. For example, the canning industry once had some 200 sizes of cans, and simplified this to 32 sizes* with many savings such as higher production hence lower cost per item; better process supervision per item with same personnel, lower inventories, less warehouse space, etc. Thus, these forms of standardization are recognized as the intercompany, or trade-association level of standards. In the further interest of their industry, one finds that such associations frequently advertise the fact that the products manufactured by their members will always meet or exceed the standards for the product.

Having to deal with many kinds of raw materials, these producers now must coordinate their efforts with the several trade associations formed by the raw materials suppliers--and in which case our product manufacturers become the consumers, thus the tables are turned and we have a complexity of producer-consumer relations. And how is this solved?

The answer lies in the formation of an industry- and consumer-instigated, free and independent standards organization which provides the means for all producers and all consumers to voluntarily collaborate, in a completely democratic manner and on consensus principles, in writing standard specifications for materials and products as well as for the methods by which they are to be tested for compliance to the requirements of the standard specification. This is the inter-trade association-consumer level of standardization which establishes the national standards.

* Quoted from previously published information.

The national economy depends on the international trade between the have and have-not nations and, at this point, we encounter two very significant factors: First, the national standard of one nation may differ from that of another for a given product because of the producer-consumer requirements within each nation; and second, that in measuring both the compliance to standards and the quantity of goods to be purchased, the units of measurement must be defined on an international basis. Thus we find on the one hand the independent, world-wide International Standards Organization (ISO) consisting of 50 or more members which are the national standards organizations of their respective countries. Also, there is the regional international standards organization for Latin America, COPANT, with others in process of formation.

On the other hand, to serve the standards for measurement there is the International Bureau of Weights and Measures at Sevres, France, which has the basic standards of mass, length, and volume which are defined by the International Committee on Weights and Measures, and which serve as the reference standards for the entire world.

Now it must be admitted that obtaining the consensus of both producers and consumers in order to arrive at a standard of practice at the national level is sometimes quite an arduous task; but, once established, it is the national standard.

Idealistically, we can hope for that day when all products are defined by international standards, and this can undoubtedly be accomplished in many areas as evidenced by the fact that ISO has well over 100 committees at work. However, there are three very important elements in international standardization that are not always self-evident:

- (1) The first of these concerns the requirement of the standard itself, inasmuch as this is a compromise on a really big scale. For example, if we go back to the discussion of the initial agreement between a customer and a producer to arrive at a company-level specification, we must become aware of the fact that this agreement amounts to a compromise between what the customer wants (or thinks he can get) and that which the producer is capable of making. At the inter-company level one finds good, bad, and in-different producers and a still wider variety of consumer demands; all requiring compromises, and thus onward to the national level which involves more compromising on a still broader base.

As this base is broadened among countries of varying degrees of technical capability, it is inevitable that the resulting compromise agreements represent a quality level which is

below that of the more capable countries. Furthermore, this situation is aggravated by the fact that the approval of a standard by ISO, for example, is by but a simple majority of votes, whereas the adoption of national standards by the more progressive national standards bodies can only be attained by overwhelming approval.

(2) Looking at the other side of this coin, the industries in the more advanced countries having national standards which contain more stringent requirements than do the international standards, are sometimes lulled into a false sense of security because their industry unwittingly assumes that their products--meeting or exceeding the national standard--would certainly qualify on the international level. Maybe so--and maybe not, because:

(3) While all of these standards for the product and for the test methods are primarily technical documents, we must face the simple fact that they establish the quality level of items of commerce, and hence become subject to many influences which have been known to affect the writing of some international specifications with the preservation of markets as a primary consideration in the specifications writing. For example, a given U. S. product may have an American Standard which has much more stringent product requirements than does a proposed international standard; so the U. S. producer is not interested and does not participate in the writing of the international specification. Later, he finds that his product does not meet the international specification because metric sizes are mentioned--not English inch/pound measurements. Thus, the U. S. product has been "written-out" of the International standard and much of the world market.

The foregoing factors should be ample evidence of two facts: First, that national standards should be equally--but preferably more--demanding than are any international requirements; and second, that the industry of the country and hence its international trade must be protected by complete collaboration and participation in international standards-writing.

The standards-economy relationship is well expressed at one point in the ISO constitution which states: "The object of the Organization shall be to promote the development of standards in the world with a view of facilitating international exchange of goods and services and to developing mutual cooperation in the sphere of intellectual, scientific, technological, and economic activity."

Perhaps some of this can be further emphasized by the fact that the Latin American Free Trade Association (LAFTA or ALALC) in trying to eliminate the international trade barriers between the Latin American countries on many items of commerce, has adopted the policy that the quality of these items under consideration must be defined by a COPANT standard--and LAFTA has organized a standards committee to collaborate with COPANT to this end. Thus the L. A. countries working within LAFTA must have adequate national standards and must participate in COPANT work to attain Pan American Standards.

It is also of prime importance to note that in two other world areas where free-trade groups are being formed that, having learned from the experiences of existing groups, the initial steps being taken are those in connection with having effective standards organizations in the prospective member countries and effective cooperation among these groups in the interests of common standards in the free-trade area. This will indeed set the pattern for other "developing" areas.

Another form of standards of practice concerns what we call "codes," and to describe these in an overly-simplified manner one might say that where the health, safety, and welfare of the public are concerned, it is necessary to protect these by laws (codes) which are adopted by and enforced by government. These codes differ from standards for materials and products in that the latter define what the item is, while the code states how things are to be done in the interest of the public. Thus in doing so, one can be assured that, for example, in a building code which is established in order to assure safe construction practices, this code will insist that all of the materials and products employed in the construction are "standard."

In a U. N. report of a few years ago, Dr. John Gaillard summarized the advantages of standardization, and I have presumed to paraphrase these, thus the main advantages are:

1. Elimination of the necessity of the repetitive planning of the attainment of a given objective. For example, costs of purchasing by specifications are one-third to one-fourth of the usual "bargaining" procedures.
2. The defining in specific terms and/or measurements of such concepts as "performance" and "quality."
3. The most economic use of human effort, materials and time; thus obtaining the lowest cost of the supply and distribution of goods and services. For example, U. S. industry save \$5 for every \$1 spent in standards efforts.

4. The reduction of the variety of means which are required in order to cover a given range of needs. This is standardization through simplification as previously cited with reference to the tin cans.
5. The promotion of interchangeability of component parts, assemblies, and complete products, thus making possible the use of long-run, highly repetitive manufacturing and also facilitating replacement and repairs--at appreciably lower costs. This, of course, requires full employment of measurement standards.
6. The easier training or re-training of personnel by means of instruction through the use of processing standards, instructions, manuals, etc.
7. The elimination of misunderstanding, confusion, and conflict between individuals and organizations, resulting in their more harmonious and effective cooperation and time-saving.
8. The creation of a rational basis of understanding in contracts, such as between a buyer and a seller.
9. The promotion and assurance of fair dealing in all trade, foreign as well as domestic.

These concepts were well-expressed by a Past-President of ASTM, who commented to the effect that two people, on opposite sides of the world, who had never seen each other nor did they speak a common language, could do business in complete confidence through the use of standards.

1.5 Standards of Measurement

The preceding discussion of standards of practice contained many and repeated instances of measurement; and, if we go back to the first instance of a producer and consumer collaborating to establish the specification for a product and the test method for compliance, through further thought there must come the stark realization that the means of measurement which these two parties use must be identical, and their measuring instruments must be calibrated against the same standard. Thus, as we progress up the hierarchy of standards, these requirements become of even greater necessity. As the consequence of this, it is most obvious that from the company level up through the international level of standards all measurement must be on a common basis. Now, this is from the technical aspect.

When it comes to trade, quantity and price (at a given quality level) are inter-related and subject to bargaining; that is, for a given quantity the prices may be subject to competitive bargaining. However, it is at this point that we fix the quantity in terms of a uniform measurements system, and only price is the variable.

But now there comes into this consideration another element, and whether it is called "consumer interest," or any other name, its essence is honesty in business. Also, because this is in the public interest, it is the obligation of government to assure that the selling element of the populace does not cheat the vast buying element; and this, as with the technical aspects of standardization, can be accomplished only by means of a uniform system of measurement and, in this instance, the enforcement of accuracy in the use of the system--as with a code.

The one and only answer to these many aspects of measurement is that every country must adopt, employ, and insure the proper application of the internationally established standards for mass, volume, and length by passing the necessary laws and establishing the necessary administrative and inspection services attendant thereto in order that the butcher, the baker, and the candle-stick maker are all giving honest weights and measures.

1.6 The Standards Spiral

The discoveries of science lead to new products through technological developments, and these products create new markets and thus enhance the economy. However, there is another aspect to this situation which lies in the simple fact that standards of practice are not permanent; this being due to the fact that as science and technology improve--so do the products thereof, and of necessity, the standards which define these products.

For example, given a new product, it first must pass the company process and product standards, and later a national standard is written. Following this the product encounters compliance testing. During the course of these two testing procedures it is found that a small percentage of the total number of items produced fail to meet the specification requirements, thus research is employed to find out why, because the loss of these rejects is costly to the producer and he must find out and eliminate the causes. Also, curiously enough, another small portion of the total production is far above the requirements--and why should this be? So more research to find this answer in the interests of product improvement and hence better marketability.

When these answers are found, it becomes clear that we have completed the circuit research and development → Product → Product Testing → Standard → Compliance Testing → and from the two testing phases back into R & D. Now, it must be carefully noted that this is not a circle; on the contrary, it is one loop of a spiral because, on completing the circuit, the product now has moved upward in quality. In an advancing technology, this process continues to repeat itself and results in further boosts to the economy of the country.

Having encompassed this briefing of the entire standards picture into but a few pages, it can be more fully appreciated that it is most gratifying to find a "standards consciousness" in Colombia, and that moves are on the way to effectuate standards for the country. Thus it is in this frame of mind that one can understand the reasons for the activities subsequently reported, as well as the reasons why AID is supporting these activities.

PART I. U. S. Agency for International Development (AID)
Colombia Standards Institute Seminar Program,
April 22, 1965 - June 12, 1965.

2. Introduction

During the past 3 years, with assistance from AID/Colombia and NBS personnel, the Colombian Standards Institute, ICONTEC, has been legally established, and has been recognized by the Ministry of Development of Colombia as the official standards-writing body of the country. (See NBS Reports 7793, 8072, 8182, and 8564.)

Organized as a private, independent group, eventually to be supported by Colombian industry, it is the objective of the AID Mission in Colombia to actively support this movement to obtain adequate industry support and effective operation of the Institute by sponsoring a series of seminars which are aimed to (a) familiarize industry executives with the role of, and necessity for, adequate national standards and for effective international standards cooperation, and (b) to work with the standards-writing committees of ICONTEC to assist them to most effective operation.

The entire technical assistance program as outlined in 1963 by Mr. T. Markow, then Industry Officer of USAID/COLOMBIA, and the writer, in agreement with Dr. Javier Henao, Executive Director of ICONTEC, consists of three essential parts (See NBS 8564 for details).

- a. Seminar Program
- b. Standards Library
- c. Training ICONTEC personnel

AID/Colombia requested the assistance of NBS in carrying out this program, with Mr. Wyman coordinating these efforts.

In the disciplines of fertilizers, pesticides, and foods, which are quite outside the scope of NBS activities, Dr. Drostoff (International Administrator) and Dr. Irving (Administrator, Agriculture Research Service) most helpfully provided the excellent services of the Department of Agriculture experts in these fields.

3. Formal Seminar Opening

The original plans for the seminar program had provided for a formal opening session to be held on the first evening. However, due to the fact that so many of the metals people were out of town at a metallurgical convention, the opening formalities were delayed one week.

This session was held in the INCOLDA auditorium and was attended by a specially invited group of industry, university, and government personnel, U. S. Embassy and AID officials, seminar leaders from NBS and Department of Agriculture, and ICONTEC staff, including the following:

Dr. Javier Henao L.	Executive Director, ICONTEC
Mr. James Fowler	Director, US-AID/Colombia
Dr. Roberto Acosta	General Director, Ministry of Public Health, Colombia
Mr. George A. Ellsworth	U. S. Commercial Attaché
Vice Admiral Francisco Munoz	General Manager of Military Industry, Colombian Navy
Mr. L. L. Wyman	National Bureau of Standards, USA

Mr. Fowler opened the program with an account of the interest which the AID Mission had in promoting the technology and industry of Colombia, and hence its economy; this seminar program being only one--but a very important one--of AID activities of assistance.

During the one-week delay in this program, decisions had been made to locate the weights and measures demonstration unit in Bogota; thus Mr. Fowler was able to make the official announcement of this important fact at the conclusion of his speech.

Dr. Acosta then spoke of the importance and the need for standards and codes in Colombia, and Mr. Ellsworth emphasized the necessity for standards, particularly as they relate to the establishment of recognized quality levels of the products involved in international trade.

The major address of the evening was presented by Mr. Wyman in a 40 minute lecture on the technical and economic aspects of standards. The presentation emphasized the important roles that standards play in improving the technology and increasing the efficiency of operations, thereby improving quality and also lowering the costs, the effects of which are reflected from the level of "company standards" through to international standards and trade and, hence, the economy of the country.

At Mr. Fowler's request, Mr. Wyman also gave a short discussion of the weights and measures laboratory which had been provided by AID funds, and which would be set up in Bogota, at the National University as an AID/ICONTEC/ National University venture, by NBS experts who would also train National University personnel in order that these facilities would continue these services for the training of weights and measures personnel from other Latin American countries.

The formal session was closed by very appropriate comments from Dr. Henao on the objectives of ICONTEC in promoting standards in Colombia, and on the desire of this organization for full support and participation by Colombian industry. A social hour was then enjoyed by all.

4. Seminar Personnel

The technical experts who conducted the several seminars are all well-recognized for technical accomplishments in their respective fields, and are also well-versed and many of them long-experienced in standards efforts in their respective fields. In fact, four of these have had experience in Latin American standards activities in connection with the Pan American Standards Commission and its seminars.

The Seminar Leaders were:

	<u>Subject</u>
Dr. J. R. Adams (Research Chemist, ARS, Dept. Agriculture)	Fertilizers
Mrs. Ruth Busbey (Asst. to the Chief, Pesticide Chemical Research Branch, ARS, Dept. Agriculture)	Pesticides
Dr. B. E. Foster (Chief, Inorganic Bldg Mat'ls., Building Research Division, NBS)	Cement, Concrete
Dr. F. P. Griffiths (Chemist-in-Charge, Fruit and Vegetable Products Lab, ARS, Dept. Agriculture)	Food
Dr. J. R. Kanagy (Consultant on Leather, NBS)	Hides and Leather

Dr. G. M. Kline (Consultant on Plastics, NBS)	Plastics
Mr. C. T. Mahaffey (Building Research Division, NBS)	Modular Construction
Dr. H. F. Schiefer (Consultant on Textiles, NBS)	Textiles
Mr. L. L. Wyman (Special Asst.-International Standards, NBS)	Ferrous and Non-Ferrous Metals

5. Seminar Program

Due to a number of uncontrollable factors it was necessary to formulate the seminar schedule rather hastily and also make it subject to the availability of the personnel from the USA, many of whom already had a number of prior commitments. This necessitated a certain amount of doubling-up of schedules, with sometimes several seminars running at the same time. However, adjustments were finally made, arriving at the following schedule:

Metals Seminars	Apr 26 - May 7, 1965
Cement and Concrete	Apr 26 - May 7, 1965
Modular Construction	Apr 26 - May 7, 1965
Fertilizers	May 3 - May 14, 1965
Pesticides	May 3 - May 14, 1965
Textiles	May 10 - May 21, 1965 (Medellin)
Food	May 17 - May 28, 1965
Plastics	May 31 - June 11, 1965
Hides and Leather	May 31 - June 11, 1965

6. Seminar Facilities

The major tasks of making all of the arrangements for this series of seminars were the responsibility of ICONTEC, and much credit is due Dr. Henao and his staff for the excellent manner in which this new venture was carried out.

Through the courtesy of INCOLDA, the Colombian Institute of Administration (business) and its Director, Sr. Simon Gonzalez, and with the cooperation of Mr. George Fitch, Industry Officer, AID/COL, the excellent facilities of INCOLDA were made available. The "opening session" was held in the auditorium, and the seminar sessions were held in a special conference room which was especially equipped for such meetings, including individual radios for reception of simul-translation.

INCOLDA made available two most competent ladies for the translation services, and had even gone to the extent of pretraining them by attendance at ICONTEC committee meetings so that they could become familiar with the technical jargon in the several disciplines.

Additionally, a most comely and efficient public relations aide was provided for general assistance and as an interpreter.

The work-sessions with the committees of ICONTEC were held in the committee rooms at ICONTEC headquarters. Such were the arrangements in Bogota. However, for the textile seminar which was held in Medellin in order to be near the center of this industry, INCOLDA again played host and provided the same kind of services as those so well rendered in Bogota.

7. Technical Seminars

7.1 Seminar Operation

The general plan of the seminar program was to devote two weeks to each subject, the morning sessions being devoted to discussions with representatives of business management of the broad aspects of standards from both the technical and economic aspects, while the afternoon sessions were devoted to work with ICONTEC technical committees in actual standards-writing. In most instances, this work program was supplemented by plant visitations.

In order to assure adequate coverage of the most important factors in standards practices, the first day or two of the seminar sessions took the form of topical lectures on standards using a broad program outline such as the following but interpreted in terms of the particular subject industry:

OUTLINE FOR STANDARDS INDOCTRINATION

Standard Defined

A standard specification stipulates the minimum acceptable characteristics of a product for a given application.

Why Standards

Technical

Design

Production

Quality → Quality Control

Purchasing

Communication

Voluntary Standardization

Permits freedom, not government control.

Consensus principle.

Balanced participation in product specs $P \leq C + G + I$

Restraint-of-Trade (US vs. Johns Manville (ASTM))

Brit. Stds Inst. exempt by law

Kinds of Standards

1. Standards of Measurement (Weights & Measures)
Effect of Law, Enforcement.
2. Standards of Practice
 - (a) Materials specifications
 - (b) Test methods
 - (c) Codes - Effect of Law and Enforcement
 - (d) Commodity Standards
 - (e) Consumer "standards"

Levels of Standards of Practice

1. Company standards
2. Inter-company (Trade assn) stds.
3. Inter-Assn. Stds = National Stds. = ICONTEC
4. International Stds
 - (a) Regional -- COPANT
 - (b) Universal -- ISO (IEC)

Who Writes Standards

1. Societies, Associations, Institutes, etc.
 - (a) Private - voluntary
 - (b) Quasi-governmental
 - (c) Government Agency

May vary from "voluntary" (NBS Commodity Stds)
to "mandatory" (Stds from COVENIN, Gov't. Stds
organization in Venezuela -- also others)
2. Voluntary Standards Organizations
MUCH PREFERABLE.
Freedom in Standards
Full consensus
No governmental pressure and/or compulsion, etc.

Standards and Codes

Standards usually define "what"

*Codes usually define "how"

*Something must be **done**, and usually requires standard materials.
A form of standard, requiring government enforcement** in the
welfare of the public.

** Note: In the US many standards are written into codes which
are enforced by local, county, state or federal govern-
ments. In Latin America this is not usually the case;
thus some standards must include the "code-aspects" so
that the entire package can be adopted and enforced by
the federal government.

Organization for Standards

Voluntary, "Three-Body" organization (ASTM, ASA, etc.)

1. Board of Directors
Governs the organization under the constitution and by-laws.
2. Standards Board
(Admin. Comm. on Stds in ASTM)
Gives final approval of proposed stds (from working comm.) If arrived at in accordance with const., by-laws, and regulations.
3. Working committees.
Sub-committees
Task Groups

Origin of Standards

Requests from companies, trade assoc., industry groups, gov'ts., etc. To:

- (a) The standards institute
- (b) Chairman of Working Committee
- (c) Chairman of sub-committee
- (d) From discussions in meetings of (b) or (c)

Effects of Standards

1. Measurement - basis of science and technology
2. Standards, put measurements to products
 - (a) Simplification
 - (b) Unification
 - (c) a and b enhance productivity -- economy
 - (d) Establishes quality level
guarantee by producer
assured quality to consumer
3. Simplified design and engineering
4. Facilitate communications
5. Reduce purchasing costs
6. Economic Aspects
 - (a) Standards define "quality" in the market
 - (b) Promote national and international acceptance
7. Management Responsibility Towards Standards Support and Participate for Technical and Economic Benefits.

7.2 Standards Situation

Being new in the standards field, ICONTEC has the opportunity of benefiting from all previous standard experience but it does have the tremendous obligation of catching up to other countries with respect to the standards which are needed to foster the development of its internal technology and economy, as well as to enhance its national economy by full participation in the writing of Latin American standards through its cooperation in COPANT.

The situation is a healthy one for ICONTEC in the sense that, eventually, the national standards of the individual L. A. countries must be compatible with COPANT standards. As a consequence, in those areas where COPANT standards have been written or are in-process, the ICONTEC committees can begin their work by patterning the proposed Colombian standards on the COPANT work. Similarly, many elements of Colombian industry are operating on well-recognized standards derived from other countries, thus these standards can also serve as the basis for Colombian standards.

7.3 Metals Seminar -- L. L. Wyman

Both the ferrous and non-ferrous metals organizations in Colombia were holding meetings in Cartagena during most of the first week of the seminar series, thus it was not until the second week that the metals seminar began -- and had to do its work double-time.

7.3.1 ICONTEC Metals Subcommittees

ICONTEC already has the following metals subcommittees organized, and these are currently developing standards in their particular categories:

<u>Subcommittee</u>	<u>Subject</u>
C 2.1	Physical & Mechanical Tests
2.2	Chemical Tests
3.1	Flat Products (steel)
3.2	Tubular Products & Fittings (steel)
3.3	Wire and Wire Products
3.4	Bars and Shapes

These subcommittees of ICONTEC consist of 6-12 members each, and one may note that these memberships--though small--do have good representation from industry, government, universities, and engineering societies.

7.3.2 Metals Seminar Registrants

Dr. Abel Morales	Bavaria S. A.
Dr. Gustavo Tobar	Bavaria S. A.
Dr. José Manuel Jiménez	Bavaria S. A.
Dr. Hernando López Chaparro	Socio Personal
Dr. Edwin Arens	Talleres Metálicos Andina TAMETAL
Dr. Eduardo Rincón Trejos	Compania Nacional de Cables NALCABLES
Dr. Emiliano Olivar	Inst. de Investigaciones Tecnológicas
Dr. Raman Stechauner	Industria Metalurgica del Pacifico Ltda.
Dr. Jaime Rudas	Comite Administrativo de Normas
Dr. Felipe Samper	" " " "
Dr. Ernesto Umana	" " " "
Dr. Juan Herkrath	" " " "

Dr. Fernando Martínez	Restrepo & Uribe Ltda
Dr. Humberto Gallego	Acerías Paz del Río S. A.
Dr. Arturo Rangel	" " " "
Sr. H. Westervel	Philips - Incope
Sr. Alvaro Sepúlveda	" "
Sr. Luis G. Sarmiento	" "
Sr. Ambrosio Ferro	" "
Dr. Allan Buckle	Laboratorio Ensayo de Materiales
Dr. José Rafael Ramírez	Joserrago
Dr. Jaime Ruíz Gómez	Industria Militar
Dr. Pedro Barrera	" "
Mayor Luis F. Calixto Correal	" "
Dr. Ricardo Rueda	Universidad de los Andes
Dr. Joaquín Ruiseco	Fabricato
Dr. Hernando Villamizar	Fedemetal
Habib Ferrer	Ferrotécnica

7.3.3 Morning Seminar Sessions

The first two mornings of the metals seminar were devoted to a coverage of the general outline for standards indoctrination with question/answer periods. Some of the questions included:

Where do standards originate?
What is the full meaning of "voluntary standardization?"
What is the "consensus principle?" How is it attained?
What relationship between ICONTEC, COPANT, ISO, ASA, and NBS?
What affects do International Stds have on national stds?
What is the relative quality level of each?
How to handle problem of English and metric measurements?
How to have adequate inspection and compliance testing?

One of the major chores of these sessions was to explain the many sources of standards in the U. S., and how these are supposed to feed into ASA and become internationally known as "American Standards."

While the foregoing may indicate a wide range of interests among the participants, the percentage of these actually raising the questions was small. Thus, in order to broaden the participation by the attendees, the next three sessions were devoted to (a) individual problems, and (b) analyses of ASTM specifications. In the first of these, the writer advised those in attendance that each would be called upon to describe his standards activities and problems. And here is where the seminar "took off"; particularly because some of the problems were quite pointed! In any event, audience participation was certainly achieved--and a number of problems ironed out, such as:

Some producers and suppliers avoid using standards.

How to prevent the dumping of inferior materials, much of it from abroad?

How to get standards for replacement parts and materials for these parts?

What do we do for inspection?

What do we do for compliance testing?

How do we handle low-quality materials that have some areas of use?

What are the relative costs and gains of standardization?

How do codes relate to standards?

In a number of instances the problems were of a specific nature having to do with a particular materials, and, having brought along five of the very recently issued volumes of ASTM metals standards, frequent reference was made to these. In fact, this activity resulted in about half of the time of the last three days being devoted to the detailed study of specifications for particular materials which were called for by the seminar participants.

The interests of the seminar group in the ASTM specifications was not of the specific technical nature, but rather of the broader aspects of what and why the specification covered certain items. For example, particular attention was devoted to the Basis of Purchase section now included in many of the more recent ASTM specifications, particularly wherein the inclusion of end use in this section automatically gives forceful meaning to "workmanship" and "finish" clauses.

Long experience in ASTM committees and chairmanships, together with extensive experience in COPANT activities and steel seminars as well as U. S. National Committee and ISO working group experience were put to good advantage in answering the many questions as to the inter-relations of these organizations and where ICONTEC fits into the picture.

Also of concern was the affect that standards already established by these organizations would have on the standards that must be written by Colombia. This was particularly significant because in writing new standards, ICONTEC must constantly keep mindful of compatability with other standards. In fact, there are more than a few instances wherein the national standards of a particular country have--for a specific industry--gained world-wide recognition and use. As a consequence of this, other national standards, and even the international standards, must be more than compatable: They must be identical or they will not be used. Standards for the petroleum industry, by ASTM with the full collaboration of API and ASME are examples of this.

7.3.4 ICONTEC Committee Meetings

During the course of the metals seminar, three of the steel product committees were scheduled for meetings, so several of the afternoons were spent with these groups in discussing their current activities, problems, and plans.

7.3.4.1 Flat Products Sub-Committee C3.1

This group has a very extensive program of the order of 20 specifications that are now sorely needed.

A few of them are in areas which are covered by COPANT documents, and in other instances it is their plan to accept ASA, ASTM, and other recognized standards as the basis for the ICONTEC standard.

Thus far, this group has been working as a committee-of-the-whole, and progress has been painfully slow. As the consequence, I discussed in detail with them the concept of Task Group assignments in order that the effort could be divided up and speeded up.

Another problem that confronts the committee is that of handling materials which do not meet the quality level of existing specification, but which are nevertheless useful. Thus, the "need" and "use" having been adequately demonstrated, specification coverage is warranted, and, because the product is of "local" nature, it would seem preferable to write a separate specification rather than to include this material as an added grade to an existing material specification having broad application.

The discussion of this lower quality product quite naturally raised the question of the "dumping" of substandard materials, mostly of foreign origin. The answer to this, of course, is to have adequate standards established, and to educate the buyers to purchase by specification and adequately inspect each shipment.

The admixture of sheet steel thicknesses sized by "gage" in inch-fractions, with the sheet lengths and widths cut to metric measurements is a problem which is current throughout L. A. In this, the subcommittee will do well to follow the lead set up by the COPANT seminar of 1962 at which the writer was International Standards delegate.

There are several areas such as electrical (silicon) sheet steel, ten-plate, etc., wherein Colombia is completely a non-producer. However, ICONTEC should have good standards for these materials in order to protect Colombian industry against the intrusion of inferior products.

It so happened that the testing committee was scheduled to meet at the same time as the flat products groups, so it was decided that these committees should meet together with me.

For the particular benefit of the testing subcommittee, I called attention to the recent experiences of U. S. delegates in the ISO working groups on steel and on copper with respect to tensile testing, grain-size, and hardness testing in that these committees were going in different directions and that this would lead to a chaotic situation. This is particularly true because ISO does not have an effective testing committee to coordinate such efforts for the whole organization.

ASTM coordinates such efforts in its "E" or "methods" committees which work in full collaboration with the product committees that need the test methods.

Unless something is done about the present situation, COPANT, too, can easily fall into this same error--thus ICONTEC should so organize its test-method groups so as to be on a society-wide basis.

7.3.4.2 Tubular Products and Fittings Subcommittee C3.2

This group has been engaged in adapting for ICONTEC use a number of the COPANT proposals, which were developed during the past two years. However, there have been some polemic discussions concerning the manner in which one of these electrical conduit proposals was treated in order to cover both English and metric sizes.

To Ing. Enrique Lozano V. and the writer, both of us having been delegates at the last COPANT "pipe and tube" seminar, this was Santiago all over again. After our having explained the how and why of solving the problem on an international basis, the situation appeared to have been resolved.

Because Colombia has a big stake in the petroleum industry, coupled with the fact that materials pertaining to this industry are not only rigidly specified--mostly by ASTM in collaboration with API and ASME--but are recognized and used world-wide, it is essential that this subcommittee must make certain that any ICONTEC specification which they write for these materials must duplicate every requirement of the ones now in use. If they are not identical in requirements, then industry cannot and will not use them. The significant reason here is that human safety is involved and these materials are "code items."

Having been the U. S. delegate to the 1963 and 1964 COPANT seminars on tubular steel products, I found that many of the experiences gained at those meetings were most helpful in pointing out to this subcommittee the best policies to follow in order that the specifications which they write will be compatible and useful.

7.3.4.3 Wire and Wire Products Subcommittee C3.3

Inasmuch as the Testing Committee was having a meeting at the same time as C3.3, it was decided to make this a joint affair.

The wire subcommittee was in the process of adapting the national standard from another country for ICONTEC use, and had progressed to the point where they were about to include in their proposal some data on coiling and reeling diameters which they had obtained from a foreign trade association.

The reference specifications carried a requirement for the "cast" of the product, that is, the departure from straightness of a given length of wire which has been unreel~~ed~~ed or un-coiled and placed freely on the floor. This requirement was to be used in the proposal on which the subcommittee was working. However, they had not been warned that too small a diameter of coiling or reeling could seriously affect the cast of the wire.

As a basic concept, one can give instructions as to how something can be done; or, alternatively, state that the job is to be done in such manner as to attain a stated result. In the former, the instructor assumes the responsibility; in the latter the "producer" carries the onus. Thus it should be obvious that one cannot do both things, and this principle was about to be overlooked in trying to specify both the reeling and the ~~cast~~ cast.

Actually, much of the data shown in the usual trade publications are served up for consumer information and convenience, and in this instance certainly does not constitute an item of specification. In fact, many people run afoul of just these kinds of situations; thus it delineates an area where much education is needed--and was given to the subcommittee at this meeting.

On looking over some of the current efforts of the subcommittee, it was apparent that extensive use was being made of "by previous agreement" clauses. These are the "open-end" agreements which are now studiously avoided in ASTM--because they are trouble-makers and usually lead to a degrading of a specification. I explained these dangers to the group and suggested that they adopt a policy against these agreements.

8. Visitto Acerias Paz de Rio, Belencito

One of the first things I learned after my arrival at Bogota was that I had been invited and arrangements had been made for me to visit "Paz de Rio". So on April 28, with Mr. Fitch, AID/BOG, who had arranged the transportation, we motored to Belencito with Dr. Humberto Gallego, who was my escort for the two-day visit.

Colombia's only producer, the Paz de Rio steel mill, is located about 170 miles northwest of Bogota at an elevation of 8400 ft.

The plant consists essentially of a 20 ft. diameter blast-furnace that turns out some 650 tons per day of iron to feed the three 20-ton Thomas (basic Bessemer) furnaces and the one 20-ton electric furnace for the production of special steels.

The product line, as shown for 1963, consisted of:

24,000 tons of rails and large shapes
65,000 tons of rounds and small shapes (this includes concrete reinforcing bars)
36,000 tons wire products
25,000 tons Black plate
25,000 tons galvanized sheet
<u>175,000 tons</u>

The 1965 objective is aimed at achieving a 220,000 ton/year rate.

The iron ore is mined and prepared at the Paz de Rio site some 22 miles away; the coal is also mined in this area, and laundered at Paz de Rio. These prepared ingredients are then transported to Belencito by company-owned railroad.

Although some coke is purchased from small near-by producers, the principal source is the battery of 43 15-ton ovens at Belencito which not only produces most of the coke for the blast furnace but also gives cause for the sizeable coke by-product plant.

The limestone sources are near Belencito, and one can hear the conveyors 24 hours a day bringing this material down the mountain-side and into the plant-side where it and the necessary dolomite are calcined.

Both ingot break-down and rolling capabilities are presently rather restrictive; the latter being accomplished by two rather old too-high mills. Thus, while the flat products constitute a sizeable portion of the total production, reinforcing bars and the large wire production make these items of major import. In fact, there were nine machines making barbed wire for fencing.

Steel consumption in Colombia has been projected to an annual rate of 570,000 tons by 1970, and Paz de Rio has set 600,000 tons/year as its capacity by that time. In the works now is an ore-sinter plant at Paz de Rio, enlarged breakdown capacity to 5 ton ingots, new ingot-soaking pits, a strip mill, enlarged wire mill, another blast furnace and additional coking facilities.

Several new Davey-United Engineering mills are due for operation by early 1967, thus there will be improved production of both hot and cold plates. An electrolytic tin-plate mill is also on the way.

Paz de Rio is presently handicapped by having a high-phosphorus ore--which is reflected in the final product. Additionally, the annealing furnaces are oil-fired, thus adding sulphur pick-up difficulties.

At the comfortable employees club, Dr. Short joined us over an excellent dinner, and explained many factors concerning the growth of the steel mill. He also commented on the fact that employment of the more recent steel-making developments such as the oxygen processes in basic oxygen furnaces and continuous casting were under advisement by management.

The rehabilitation and enlargement of the laboratory facilities were essential in order to have better control of plant processes and product. In this, Dr. Short wanted me to meet with Mr. Fletcher and laboratory staff to discuss new instrumentation for the chemical laboratory and how to get the metallographic facilities effectively operating.

In meeting with Mr. Fletcher and laboratory staff, I was told that the plant laboratories were currently undergoing a refurbishing; there is a fine research and development laboratory that has produced excellent results; the analytical chemistry laboratory is quite effective; the mechanical testing^a laboratory is well equipped with up-to-date equipment; and there is/quite good metallographic set-up.

As to the latter, the instrumentation is there, but activity has been at an extremely low level the past few years. Thus, one of the reasons for my visit was to confer with the laboratory and quality control personnel on the ways and means of getting the metallographic work up to the necessary level of operation. Unfortunately, there is a lack of experience on which to build, and, while there is an extensive plant library, there is but little pertaining to metallography.

I made a number of suggestions as to operation, and pointed out a number of sources from which study material could be obtained.

The analytical chemical group has been studying the instrumentation for rapid analysis and, in discussions with local agents for such equipment, seem to have arrived at some preferences. However, on closer questioning I found that there was more than a bit of indecision as to just what products they wanted to analyze--and what elements and in what amounts. Because of this, I offered the

suggestion that, with due consideration to the rather sizeable capital investment involved, it might be better to send one of their men to visit the U. S. and see these instruments in steel-mill use and discuss instrumentation with NBS experts.

Financially, this company has operated profitably since mid-1957; the curve rising sharply the past 2 years. In 1955 the invested capital was about 1-1/4% by government, about 76% Banco de la Republica, and the balance being private investment. Last year, this distribution was still 1-1/4% by government but the bank was down to 17-1/4% and private investment had the balance, 81-1/2%.

Inasmuch as modular construction was the subject of one of the seminars, a most pleasant surprise was the employee housing at Belencito. Using a few different modular designs and alternating bricks for blocks with different painting decors, these units were devoid of the "row-house" appearance; in fact, they were most attractive.

9. Other Seminars

9.1 Cement and Concrete Seminar - B. E. Foster

ICONTEC has an active Committee on Cement (C4.1) which has initiated the work in obtaining Colombian standards for that product. Thus far the major effort has been concerned with specifications and test methods for cement.

Since many individuals in the construction industry were concerned with both concrete and with modular construction, the seminar portions of these programs were divided between Dr. Foster and Mr. Mahaffey, each for a 2-hour period in the general discussions at INCOLDA. Having been active in the ASTM committees on cement, and also in ISO and COPANT, Dr. Foster was able to present the effects of standards on the cement industry and evaluate these in relation to such standards for Colombia.

The work with the ICONTEC cement committee was primarily devoted to orientation with the work now going on in COPANT with respect to proposals on the chemistry of cement and for "round-robin" inter-country comparison of the several existing methods of cement testing so as to arrive at the best procedure for COPANT adoption.

ICONTEC committee C4.2 is concerned with the specifications of "stony aggregate" materials and has representatives from the CAMACOL, engineering groups, and several universities.

Inasmuch as cement and cement-aggregates are but the basic ingredients of concrete, it was deemed necessary that ICONTEC should have a working committee covering this end product. As a consequence, a call was issued to all interested parties and the organization meeting was held for this new committee of ICONTEC.

Dr. Foster also spent a half-day session with the Engineering Faculty members of the University in a question/answer program on the technical aspects of cement and concrete.

9.2 Modular Construction Seminar - C. T. Mahaffey

Mr. Mahaffey discussed Standards and Codes, a suggested Building Code System, and Modular Construction Principles and Practices in the morning seminar sessions.

Lacking any uniformity in the sizes of bricks, cement blocks, and prefabricated windows and doors, the building construction industry in Colombia (as in most of Latin America) is confronted with the complexities and expense of cut-and-try means of construction. This is a severe handicap, particularly affecting the low-cost housing developments under the Instituto de Credito Territorial; there being some 12,000 units involved.

In the AID-sponsored Kennedy City development, a new scheme of "self-help" for construction is being used to keep down the cost of construction. Some 1000 units are scheduled to be built following the modular single design that has but four sizes of new related blocks based on a 10 cm size (4 inch in U.S.). Also, modular sizes have been adopted for window frames, concrete floor joists, door lintels, and circular-stair treads--all made of precast reinforced concrete. The major problem in this area is the supply of these new sizes because present supply consists of many sizes from small producers. The solution may lie in placing very large orders by the housing developers so as to warrant changeover to the new modular sizes.

Another problem with this modular construction is that many architects feel that such methods are so restrictive that only "row-houses" can be designed. Consequently, there is need for promotional activity in this area.

In working with the ICONTEC building committees, the greatest interest was in the area of building codes, and after detailed discussions it was the consensus that a national code similar to the New York State Code, with code interpretation and materials evaluation within ICONTEC framework would probably be the most satisfactory solution for Colombia. A special meeting was held with the Chamber of Construction, CAMACOL, with a lively question and answer session on the subject.

Mr. Mahaffey made several inspection trips to the housing developments in Bogota, and visited the University of Valle, located at

Cali, about 150 miles west of Bogota. This University has an excellent reputation for its work in the building field, attributable mostly to its School of Architecture and Institute of Construction. While there, Mr. Mahaffey lectured to the faculty and students, and also spoke at a special meeting of area building materials manufacturers, stressing modular construction and building codes.

9.3 Fertilizer Seminar - J. R. Adams

With other seminars using the INCOLDA facilities each morning, the Fertilizer and Pesticide Seminars were held there in the afternoons. Also, because so many of the participants were active in both fields in Colombia, these seminar meetings were held as joint sessions with Mrs. Busbey and Dr. Adams sharing the leadership.

In the sessions on fertilizers there was keen interest in every phase of U. S. manufacturing procedures and the sampling procedures and analytical methods in use. As to the latter, the standard reference in Colombia is the U. S. publication "Official Methods of Analysis of Official Agricultural Chemists." Much of the discussion was directed toward the rules and regulations governing the distribution and sale of fertilizers and for quality control. This discussion is most timely for the simple reason that the industry is well regulated in the U. S., whereas there are no regulations in Colombia, as yet.

This particular problem is of much concern to ICONTEC Committee C7.1, and this group can be of great service to the country by fostering good regulations. Standard nomenclature for fertilizers is another problem facing the ICONTEC committee.

Industry representatives were anxious to have Dr. Adams visit some of the fertilizer plants and to discuss standards and regulations. Those which he visited included the Caja de Credito Agrario, a mixing plant in Bogota; the Industria Colombiana de Fertilizantes, S. A. in Barrancabermeja; and Albonas Colombianos in Cartagena; both of the latter being manufacturing plants. Because of activities in fertilizer analysis, Dr. Adams visited IIT and discussed this work with Dr. Young, Director, and his staff.

9.4 Pesticide Seminar - Ruth L. Busbey

As previously mentioned (9.3) Mrs. Busbey and Dr. Adams alternated as leaders of the combined pesticide-fertilizer seminar sessions held at INCOLDA.

Particular interest in matters concerning the regulations pertaining to pesticides was shown--especially because a proposed control

decree, in which the ICONTEC committee played a major role in drafting, was expected to be issued for one of the Departments (States), Meta, and serve as the basis for national control. Mrs. Busbey discussed various control measures effective in the U. S., both federal and state, and had copies of many of these regulatory measures for the ICONTEC Library.

The Pesticide Committee (C7.2) of ICONTEC holds Technical Secretariat for Pesticides for COPANT, and has prepared one COPANT proposal on Definitions, Classification, and Nomenclature which has been circulated to member countries for comment. Mrs. Busbey was able to discuss this document in detail, since ASA had requested D/Agriculture comments on the proposal and these had come to Mrs. Busbey via these channels.

Due to the fact that the use of pesticides has a direct bearing on health, the standards, codes, regulations, etc., are the concern of many organizations such as the Food and Agriculture Organization of the U.N. (FAO), and the World Health Organization (WHO).

Methods of Analysis were of prime concern, and Mrs. Busbey met with this ICONTEC committee to discuss details. She also visited IIT to discuss these matters with Dr. Young and his staff. She advised them that analytical reference standards are available in the U. S.

Additional visits were made to Productos Fitosanitarios de Colombia, S. A. (PROFICOL) and Instituto Colombiano Agropecuario (ICA) at which Mrs. Busbey discussed technical and regulatory measures.

9.5 Textiles Seminar - H. F. Schiefer

The textiles industry in Colombia is growing rapidly and has need for standardization. Although there had been some organization among producers, no specifications had been discussed as yet. ICONTEC was now taking the initial step in this activity also. Through the combined efforts of AID, ICONTEC, INCOLDA, and personal contacts by Dr. Schiefer, a meeting of textile people was called in Medellin with that chapter of INCOLDA acting as host.

ICONTEC staff opened the session, and then Dr. Schiefer discussed textile standardization activities in other L. A. countries, COPANT, ISO, and in the U. S. The attendees were most interested and decided to form a textile committee of ICONTEC. As a measure of interest, there were 14 attendees representing 10 companies when the sessions convened, but when the sessions adjourned, 10 more members representing five additional interests had been added.

Under Dr. Schiefer's guidance, Committee C15 on Textiles was formed with 4 subcommittees including C15.1, Fibers; C15.2, Yarns; C15.3, Fabrics; and 15.4, Color Fastness. Some 40 COPANT and ISO documents were reviewed by the new committee.

Attendance by accredited delegates at the ISO/TC 38, Textiles meeting in London, June 1965, and the next COPANT Textiles Seminar (Sept-Oct, Lima) was discussed.

The attainment of a new ICONTEC committee having excellent industry support and highly competent personnel, represented an achievement far beyond the hopes of the seminar sponsors.

9.6 Food Seminar - F. P. Griffiths

At present there are some sanitary codes, food regulations, and powers of inspection established in Colombia and administered by the National Institute of Health. However, due to shortage of funds and competent inspectors, efforts thus far have been limited to the analysis of drugs, quality of milk and water, and a few items of food adulteration.

During the sessions, all phases of food standards and regulations were discussed by Dr. Griffiths, and several important factors were brought forth which may serve as guides for ICONTEC C10, Foods, activities. Effort needs to be expanded in establishing adequate quality standards for the raw materials for canning. For example, at present no standard as to color and ripeness of fresh tomatoes is followed so that the producers of tomato juice and catsup need to add color dye to the product to obtain uniformity of appearance to the customer. Provisions must also be made to train competent food inspectors for both industry and government.

The two largest canning companies in Colombia are US-descended, both being very active in canners organizations and standards in the U.S.

Food processing is one of the prime activities of IIT, but it has yet to attain adequate levels of operation because of lack of facilities to complete its pilot plant. However, the Institute was a natural collaborator in seminar activities.

To demonstrate the nature of one kind of self-regulation by U. S. canners trade organizations, Dr. Griffiths and IIT collaborated in a "cutting;" that is, to have an independent agency obtain several cans of goods of different producers of a particular material from stores and warehouses, to identify each can by code-mark when removing the label, advising each producer of only his code mark; then opening

the cans for examination as to color, consistency, flavor, taste, defects, etc. In addition, other items such as drained-weight, texture, etc., may be evaluated.

The main point of the demonstration was that the canned goods producers in Colombia might best combine efforts and form trade groups which, in collaboration with ICONTEC, could arrive at voluntary standardization instead of waiting for the government to take rigid action through its health agency.

Colombia has excellent potential for developing a canning industry that could have a large export volume. Tropical fruits for salad, avocado puree, papaya puree and chunks, mangoes, lulo or naranjilla juice, pineapple, cashew nuts could be considered for canned or frozen production along with frozen fish products. Dr. Griffiths had a special meeting with AID, IIT, UN and ICONTEC personnel on the subject.

There is a need for development of adequate shipping containers for fresh fruit and vegetables because much damage is encountered by raw materials at present, this again lowering the quality of canned goods.

Standards for juices and jams are currently under discussion in COPANT, and a FAO/WHO meeting scheduled for Europe this summer will be of interest to Colombia food standardization activities.

9.6.1 Alcoholic Beverages

Although alcoholic beverages was not a subject matter in this seminar series, attention should be called to the fact that last year ICONTEC did assume the task of being host to the first COPANT standards seminar on this subject. That seminar was highly successful, having delegates from many L. A. countries whose combined efforts resulted in a series of test method proposals for alcoholic beverages. A second seminar on these products is contemplated for the coming year's activities.

9.7 Plastics Seminar - G. M. Kline

The plastics industry in Colombia is growing rapidly and, in addition, two new resin plants are being constructed by U. S. interests. The industry has an active trade association, Acoplasticos, which has 70 member companies.

IIT is in the process of establishing a plastics laboratory to serve industry; it being expected that a UN expert on plastics will devote about a year as an advisor to IIT in the installation of the laboratory and organization of the work program.

ICONTEC does not have a plastics committee, thus a major objective of the seminar was to obtain a consensus from industry concerning formation of such a committee.

During the first week of this seminar, Dr. Kline outlined standards activities in plastics in the U. S., purpose and organization with full collaboration of SPI and ASTM at the national level, and ISO, IEC, etc. at the international level. The current activities of the 600 member ASTM Committee D-20 on Plastics were detailed through ASTM and ASA to ISO/TC61. Forty ISO standards have already been published with another 50 in process by committees.

ICONTEC should consider a plastics committee in the immediate future which would probably be the first in L. A. This action could provide the necessary impetus to initiate plastics work in COPANT. Discussions at special meetings with Acroplastics personnel and with IIT staff resulted in favor of initiating standards work in ICONTEC.

Acroplastics arranged for Dr. Kline to visit nine of their member-companies to observe operations and discuss standards.

The plastics industry in Colombia is currently operating under difficulties because of the imports situation. This has caused the industry to resort to use of reground scrap and also to alter compounding formulations in order to use materials made in Colombia, both of these factors resulting in lower quality products.

Recommendations were made that ICONTEC proceed with organization of a plastics committee which would start with subcommittees on Nomenclature, Specimen Preparation and Conditioning, Testing Methods, and Specifications. It would also be advantageous to have the assistance of a qualified expert in organizing this committee and getting it started on a good program.

9.8 Hides and Leather Seminar - J. R. Kanagy*

Since there was no ICONTEC committee identified with hides and leather, Dr. Kanagy spent the first few sessions of the seminar in describing the standards activities in the U. S. by the collaboration between ALCA-ASTM, The Dept/Agriculture, Dept/Commerce, and Federal specifications writing. Particular emphasis was given to such activities in Latin America whereby COPANT already has seven standards submitted for approval. Copies of the Spanish translations of these standards were made available for study.

* Ref. NBS Report 8903

Quality control and its relationship to standards was an important item of seminar discussions. This is more essential because of ALALC (LAFTA) attitude requiring standards for the determination of quality in trade among the Latin American countries.

As a result of the seminar and meetings, a 3-man committee was appointed to work with ICONTEC to form a Hides and Leather Committee.

10. Standards Library

The second phase of AID assistance to ICONTEC consists of building up an adequate library of national and international standards.

It was agreed that U. S. reference standards would include specifications of ASTM, ASA, SAE, ACI, API, NEMA, Dept Commerce Commodity and SPRs, and U. S. Federal (GSA). International standards would include ISO and IEC recommendations. AID/Bogota will make funds available for NBS to order these documents for shipment to Bogota.

11. Training Trip - Javier Henao L.

As the third phase of the AID assistance program for ICONTEC, a series of visits by Dr. Henao in the U. S. was suggested and arrangements were made for Dr. Henao to attend the Annual Meeting of ASTM as well as visits to ASTM HQ, ASA HQ, NEMA, NBS, Department of State, and CU.

At the ASTM meeting week, Dr. Henao got first-hand insight as to how voluntary standardization on the consensus principle is working in the U. S. He participated in meetings of committees on carbon and alloy steels, steel tubing, stainless steels, materials testing, and cement.

After his return to Bogota, Dr. Henao made a series of proposals for the improved operation of ICONTEC, such as to be closely parallel to what he had learned of ASTM during his visits. He submitted these to the writer for comments and changes, and he has recently advised that these suggestions to revise regulations and procedures have been approved by the ICONTEC Board of Directors. This should greatly facilitate the operation of ICONTEC and its committees, and reflect some of the benefits resulting from Dr. Henao's visit to the USA.

12. Summary

During this series of nine seminar sessions, each of the seminar leaders devoted approximately half of his time in discussing the broad aspects of voluntary standardization on the consensus principle, as well as both the technical and economic significance of these standards in assisting development of Colombia. These were the primary considerations of the management personnel constituting the major portion of the seminar attendees.

Another large segment of effort by the seminar leaders was devoted to actual participation in the meetings of ICONTEC committees wherein they could add the latest developments in specification procedures and drafting.

As the direct result of the seminar meetings, new committees were formed, or at least initiated, in the areas of Concrete, Textiles, Plastics, and Hides and Leather.

Just how successful these seminars have been is something which is impossible to evaluate at present. In fact, only time can tell what increased support ICONTEC gets from industry and how much industry is helped by enlarged and more competent operation of the ICONTEC committees now organized; or the assistance given other industries by the new committees.

Good standards, codes, etc., from ICONTEC, as well as its effective international standards participation, will be the measure of these seminars.

Keeping in mind the fact that the participation in these seminars by U. S. experts has much of a voluntary element involved, this means, in essence, that they must believe in this effort, because to do so they must spend many hours in preparation, and spend many more hours in "catching up" after their return. Evaluated in terms of their post facto feelings of accomplishment, their unanimous opinion would rate these seminars as extremely worthwhile.

13. Recommendations

This seminar series was conducted despite a number of handicaps such as late starting, conflicts with other meetings, availability of personnel, etc.; thus some of the areas where deficiencies appeared were, under the circumstances, quite unavoidable. Because of this, the following recommendations should be considered in this light:

1. The technical assistance program for FY 66 should be continued as originally planned and reported in NBS 8564B--included here for ready reference:

"Budget Proposals for Assistance to
Instituto Colombiano de Normas Tecnicas (ICONTEC)

Fiscal Year 65

a. Procurement of Standards Reference Library

Standards from American Stds Assn	\$ 1,350
Standards from ASTM	250
Standards from Society Automotive Engrs	500
Federal, Military, Commercial, Food and Drug Adm., Specs. of U. S. Government in collaboration with -	600
Selected specifications from such as American Waterworks Assn., American Petroleum Inst., American Concrete Inst., Society of Plastics Ind., Inter- national Standards Organization, etc.	<u>1,800</u>
Total	\$ 4,500

- b. Technical assistance** by U. S. Experts,
Technical experts from National Bureau
of Standards or other U.S. Gov't Agencies,
in specialized fields such as Iron and
Steel, Non-ferrous Metals, Cement, Concrete
and Building Materials, Agricultural Chemistry,
Textiles, Plastics, etc. These experts in
estimated 6 categories to spend, on re-
quest, an estimated total of eight 3-week
trips to Bogota. \$ 7,000*

*Note: This is predicated on present policy
that NBS and other agencies will "loan" these
experts, including salaries, but that travel
costs and per diem will be paid by AID (or other).

- c. Visit of ICONTEC Engineer to U.S. for orienta-
tion and standards training, including National
Metals Stds. committee meeting and ASTM meetings.
Visits to ASTM Hq and ASA Hq, Consumers Research
(NY), NBS (Washington, D. C.)
Estimated 6 weeks (1 wk Mexico, 5 wks U.S.) \$ 1,500
- d. Instrumentation (Facilities) for Standards
reproduction \$ 2,000
- Total FY 65 \$15,000

Fiscal Year 66

a. As per item a, above (FY 65)	\$ 3,000
b. As per item b, above	7,000
c. As per item c, above for <u>2</u> trainees	3,000
d. As per item d, above	<u>2,000</u>
Total	\$15,000
e. Instrumentation and Equipment for Testing Materials for compliance with standards (I.I.T. - Testing Institute)	<u>\$10,000</u>
Total FY 66	\$25,000

In discussions with AID officials, it was agreed that the above would be a "phase-out" program with decreased assistance for each of the succeeding 3 years, then ending. By increased effort in missionary work on business executives, ICONTEC should then be self-supporting.

AID money for travel can only be used for international travel, thus for any side-trips within Colombia in connection with ICONTEC, assistance would have to come from other sources.

It is intended that AID will arrange finances so that the purchase of standards, packing, shipping, etc., as well as trip expense for NBS personnel will be chargeable in Washington." (End of Reference)

** It may be noted that, under Item b of the original proposal, the technical program which was actually scheduled and carried out was that which was agreed upon by AID and ICONTEC as being MOST BENEFICIAL FOR THIS YEAR--the subject of this report. For this next year, a similar seminar program should IMMEDIATELY be agreed upon and initiated in order to avoid many of the difficulties encountered this year.

As to the new program, it is recommended that ICONTEC, in formulating this suggested list of seminar topics for AID approval, give primary consideration to the following:

1. Seminars for the newly-formed ICONTEC committees;
Concrete, Modular Construction, Textiles, Plastics, etc.
2. Both ferrous and non-ferrous metals, due to increased national and international need.
3. The inclusion of Weights and Measures training as part of the seminar program.

2. AID itself, and through its contacts, should actively support the new ICONTEC committees on concrete, textiles, plastics, and hides and leather.
3. In collaboration with ICONTEC, set up a publicity campaign to not only create general awareness of standardization and its benefits, but to particularly publicize such events as these seminars.

13.1. Future seminar activities:

1. The seminar leaders should (a) be provided, at least two (2) months prior to seminar date, with copies of the agenda of pertinent ICONTEC committees, and (b) copies of standards proposals in process together with any questions on these.
2. Leaders should be advised as to specific technical information and data that may be needed.
3. Leaders should be provided with lists of questions which will probably arise. Seminar registrants should be requested to send in questions in advance of meetings.
4. Leaders should be advised of any laws, codes, decrees, etc., affecting standards in their discipline, as well as current activity under these regulations.
5. Any lecture engagements for the seminar leaders should be firmly pre-arranged and the leader so advised as to time, place, organization, subject. etc.

13.2 Recognizing the industry strength of the camaras, ICONTEC should make special effort to collaborate with them--and probably gain more support by doing so.

13.3 Through its joint committee with Government Ministries, ICONTEC must strive for closer cooperation in:

- (a) Building Codes
- (b) Food Laws, etc.
- (c) Fertilizer and Pesticide Control
- (d) Weights and Measures Laws

By working directly with the ICONTEC committees, the seminar leaders could bring to the members the beneficial experiences of many years of standards participation, at both the national and international levels.

Materials specifications are no longer mere technical documents, they are now the mark of the quality of goods in the world's market, and, unless most carefully supervised, can easily become subject to commercial pressures.

"COMMERCE AMONG NATIONS SHOULD BE FAIR AND EQUITABLE" - Franklin*

14. Acknowledgments

Primary recognition should be given the personnel (past and present) of AID/Bogota for having the foresight and ability to sponsor standards activities in Colombia as a significant contribution to the technical and economic advancement of that country.

The cooperation between AID/Bogota and ICONTEC in carrying out these NBS-ICONTEC planned seminars marks a new era in technical assistance.

INCOLDA cannot be praised too highly for granting the use of its excellent meeting facilities in Bogota and Medellin--and certainly we from the U. S. Have very particular acknowledgments for the excellent assistance rendered by the senora in simul-translation and general assistance.

One-third of this seminar series was conducted by members of the Department of Agriculture staff who were "loaned" to the program through the good offices of Dr. Drostoff, Chief, International Relations and Dr. George W. Irving, Administrator, Agriculture Research Service. We are most grateful for this excellent cooperation.

* This quotation is carved above the "Secretary's Entrance" to the Department of Commerce Building, Washington, D. C.

PART II. Weights and Measures Activities, Colombia
and Venezuela

15. Introduction

Somewhat over three years ago it was decided that one of the essential assistance programs for Latin America was the establishment and use of an effective Weights and Measures System in each of the Latin American countries. The use of such a system is not only essential to the technological and economic development within the country, but it is a necessity in international trade relations.

Although most of these countries had been signatories to the metric convention for several scores of years but few have made even initial attempts to establish such systems; only Mexico having thus far carried such a program through to completion. Thus, to initiate this program, through arrangements between OTS, D/Commerce and AID/Washington the latter granted an appropriation and requested the NBS to prepare a set of standards for mass, length, and volume for use in Latin America to demonstrate the operation of such standards and to exemplify a weights and measures system.

The Office of Weights and Measures of NBS proceeded to obtain these standards and, in doing so, they not only re-designed the shape of the mass standards in order to make them more usable but they had the Metallurgy Division of NBS develop a very special kind of stainless alloy that had the same mass as the previously used brass-- and which could withstand an appreciable amount of handling without damage. Furthermore, there would be no deterioration of this material with time. With the completion of the fabrication of these standards, both time and funds had been exhausted with still no decision as to the best manner in which to carry on such a demonstration in Latin America. Also, there was yet the problem of financing the calibration of the standards as well as the costs of demonstration.

At the inception of this program, it was contemplated that this demonstration would take the form of a travelling exhibit which would visit each of the L. A. capitals desiring such a demonstration. However, further consideration of transportation difficulties, costs of display facilities, personnel availability, etc., together with indifferent response to several airgrams to missions in an effort to seek participation and financial support, negated the original demonstration plan. Of particular interest among the replies from the missions was the ICONTEC (Colombian Standards Institute) offer of facilities and personnel (in collaboration with the National University) to locate the W&M Laboratory in space to be provided by the University to be used as a permanent demonstration and training center for the use of all the L. A. countries.

During early 1965, various efforts were made to secure funding for the completion of this work and finally in April of 1965, Mr. T. Markow, AID/Washington was able to advise NBS to proceed with the calibrations of the standards and make plans for the demonstrations which, by this time had been re-evaluated in terms of further information from Colombia as well as comparable invitations from Panama and ICAITI (Guatemala, Institute for Central American Common Market nations).

After evaluating the several possibilities that had been presented, the decision was to the effect that, granted adequate facilities were available and suitable arrangements could be made for competent instructor personnel, it would be to the best advantage of all to accept the Colombian invitation and set up the AID-sponsored Weights and Measures demonstration and training center at the National University, making it available to all Latin American countries.

As further developments at this time, Dr. Patricio Rubianes U., head of the newly formed Weights and Measures Agency, Ministry of Commerce and Banking, Ecuador, visited the Bureau in Washington and when informed of the Bogota plans, advised that Ecuador would certainly avail itself of the Weights and Measures facility, if established in Bogota. Also, the Division of Metrology, Ministry of Development, Venezuela, had expressed official interest in the training center and in having NBS personnel visit the Division. (See 17.1)III). Venezuela was advised by AID/Washington that the writer would be conducting a seminar in Bogota, Colombia, and could be available to stopover in Caracas on his return trip early in May to discuss these matters.

16. Bogota, Colombia

16.1 National University of Bogota

Dr. Henao, Executive Director of ICONTEC, Mr. George Fitch, Industry Officer, AID/Bogota, and Mr. Wyman visited Dr. A. Sandino Pardo, Dean, Faculty of Engineering and his staff at the National University, to inspect the facilities and discuss operation of the proposed Weights and Measures Center at the University.

Review of space for the new Weights and Measures Center included the choice of any one of four 30 x 50 ft laboratories, and one 30 x 30 ft inside laboratory--all in the Engineering Physics Building. This space was compared with a desired lay-out which had been prepared by Mr. Stabler of the NBS Office of Weights and Measures for evaluation of soundness of floors and walls, vibration sources, amenability for air conditioning, water and electrical services, etc. Inspection of

the laboratory space and blueprints of the buildings, the installation of necessary facilities and the construction of balance benches, the length-standard 20-ft bench, balance-room, and the concrete base elements were discussed and found to present no problems.

As to personnel, it was assured that these would all be college level and very competent.

Resulting from the above visit, the plans and recommendations were immediately dispatched to the NBS. After further discussions and correspondence with Mr. Wollin of NBS-Washington, the smaller interior lab space was deemed suitable and the formal acceptance by AID was cabled to AID/Bogota in time for Mr. Powell, Director of AID/Bogota, to make the formal announcement at the opening session of the Seminar Program.

The following week, after receiving more detailed information from Washington, another visit was made to the University. These details were thoroughly discussed and ^{it was} agreed to immediately begin the necessary construction for the laboratory with completion expected by mid-June 1965.

During these conversations, it was also revealed that if this facility were to be placed permanently at the University, they would provide specially designed space in the new building to be erected soon instead of keeping it housed in a rebuilt lab space.

After these visits and the concluding of arrangements, I could but conclude that it is rare in a lifetime that one can be associated with such a gracious, generous, and cooperative group of people as that with which I worked while at the University.

16.2 Ministry Visit

In order to achieve the proper liaison and cooperation between ICONTEC and the GOC, there is a joint committee composed of ICONTEC and Government-ministry representatives that has jurisdiction in this area. Mr. Fitch and I were invited to meet with this group to discuss the Weights and Measures program and suggest necessary actions.

Colombia has a law under which a W&M system can be established but it does not have the specific legislation. I explained the necessity of such enactment and detailed how such a system is organized and how it should operate. Copies of several Weights and Measures Handbooks and a copy of the model law (in Spanish) were supplied for information.

In discussing the W&M demonstration and training, I pointed out that a most important point of the training was that of field inspection, and lacking any laws under which to operate, those engaged in this work might encounter difficulties with shop-keepers, etc. Assurance was given that adequate arrangements would be made to prevent any such difficulties since there would be (as previously agreed upon) prospective government field-inspectors among the trainees.

The consensus of this committee was that full support would be given to the W&M program and that action would be initiated to effectuate the W&M program for the Government.

16.3 Final Arrangements

As of the time of my departure from Bogota in early May, it was planned that the instrumentation and calibrated prototype standards would be shipped by air freight in mid-June to Bogota, to be transported directly to the laboratory space at the University under the immediate supervision of Mr. Stabler, NBS/Washington. Messrs. Stabler and Wollin were scheduled to arrive in Bogota about June 30 to initiate the program, meet with representatives from Colombia, Venezuela, and Ecuador for the training program, and assist in setting up and testing of laboratory instrumentation.

With the completion of the above arrangements, I left Bogota with a planned stopover in Caracas at the invitation of the GOV for a visit to their Metrology Division.

16.4 Current Status

As of this writing, the W&M program in Bogota has been a success; the laboratory and its facilities are excellent; and the training program has been successful. (Refer NBS Report 8970 by Messrs. Wollin and Stabler).

Mr. Wollin stopped over in Panama on this return, at the request of the GOP, to discuss Weights and Measures. That country, too, is interested in initiating such a program (Refer NBS Report 8976 by Mr. Wollin).

In July 1965, Ing. Cabrerizo, Director of INANTIC (Stds Institute of Peru) visited NBS-Washington and indicated his interest in initiating a W&M program in Peru. He noted that he would initiate a formal request for assistance.

17. Visit to Caracas, Venezuela (May 9-12, 1965)

17.1 Background

In the exchange of messages between AID/Washington and the AID Missions in Latin America regarding interest and participation in the Weights and Measures Center, the Ministry of Development, GOV, requested a meeting with an NBS expert on such matters. AID/Washington advised AID/Caracas that Mr. Wyman would be in Bogota and might return via Caracas, if specifically requested, for a survey of facilities and preliminary discussions prior to the visit of a metrology expert from NBS. The request from AID/Caracas was received by AID/Washington and approved for Mr. Wyman's stopoff in Caracas.

17.2 Orientation

Mr. Foster Knight, Industry Officer, AID/Caracas, explained the local situation, particularly with respect to the new weights and measures law in effect in Venezuela, and that the Division of Metrology, Directorate of Commerce, Ministry of Development, was charged with the responsibility of establishing and administering the W&M program for all the country.

Meeting was held with Dr. Ramon de Colubi, Chief, Division of Metrology, and Ing. Gustavo Briceno, his assistant and the one who is expected to be in charge of the W&M program (Legal Metrology). The description of the Metrology Division and its activities by these two gentlemen was most informative since we at NBS were not aware that this very effective and excellent organization had been abuilding during the past 3-1/2 - 4 years.

Of greatest importance at present is the problem of establishing and implementing a weights and measures program for the country; a law to this effect having been passed by the Venezuelan Congress in December 1964; becoming effective about six weeks prior to Mr. Wyman's visit. A brief outline of weights and measures activities in the U. S. was given along with a copy of the "Model Law" (in Spanish) such as was used to establish W&M in Puerto Rico--and with which they were familiar. Copies of other W&M Handbooks were presented as reference material.

Inquiry as to training of personnel in Puerto Rico for W&M administration was discussed but Mr. Wyman was able to inform them that such training would be available about July 1st in the new Weights and Measures Center in Bogota.

17.3 Metrology Division (Venezuela)

This organization was authorized about 7 years ago but only during the past 3-1/2 years has it actually been taking form and building up to the degree of excellence it has presently attained.

The Division has been set up primarily on metrology including mass, volume, and length laboratories. Other activities have had to be included, thus one section is concerned with the calibration of thermometers, another testing gas meters, another checking watt-hour meters, while another is concerned with testing weights, volumens, etc., in packaging.

The Division currently represents an investment of about \$500,000 in equipment and instrumentation including certified prototypes from the International Bureau of Sevres, France.

The ultimate plan is to have the Division divided into three activity groups as follows:

- I. Scientific Metrology
- II. Legal Metrology (Weights and Measures)
- III. Industrial Assistance

Group I may now be considered to be well organized and equipped. However, and possibly affecting Group II, the limiting balance capacity is now 30 kg; hence, it would seem that this might well be increased to somewhat near 1000 kg such as represented by the 2500 lb Russell Balance which is used in the U. S. for W&M work and which will be demonstrated in Bogota.

Group III of the above list represents an area where the Division will need to provide many kinds of measurements services to the developing industrial area until such time as these new industries are financially and technically capable of their own precision measurements requirements. Certainly with the excellent instrumentation, prototype standards, and well-trained personnel at the Division of Metrology, Venezuelan industry does have an outstanding national resource in this group.

Group II will require passage of a weights and measures law such as adopted by the several states in the U. S. and Puerto Rico in addition to training personnel and establishing field stations. The various details of these latter activities in the U. S. were discussed with Drs. de Colubi and Briceno. Equipment for field stations

has been obtained and the current plan is to initially locate these stations in five centrally located areas throughout the country. The field inspectors will operate out of these stations.

The Weights and Measures demonstration and training center to be established in Bogota is most opportune for Venezuela. The Division plans to send two or more trainees to Bogota for instruction in all phases of W&M operation, inspection, etc., then to return to the Division to (1) initiate the training of additional personnel, and (2) initiate field inspection.

