FROM THE CHAIRMAN

By all measures (traceable ones that is) the NCSL 66 Conference was an overwhelming success. It was the type of informal conference which not only brought out how different groups had solved a problem but brought out that which is at least as important, how people had not solved a problem and what the attendees were doing to better find solutions in the future.
Second, a great deal of effort by many people was required to put on this type of conference. Each Session Chairman had a more difficult job than such a chairman usually has. In most cases, the sessions were built around committee activities and the efforts of individuals and groups over a period of years.

The ones expending the greatest amount of effort and those most deserving of everyone’s thanks were the Program Chairman (Andy Woodington) and the Local Arrangements Chairman (Reeves Tilley). It required months of intensive planning and coordination. The fact that it went so well is doubly creditable as this was the first complete conference held at Gaithersburg. With little prior experience to fall back on, every item required a basic policy decision. Thanks are also due for Mrs. Wildhack and the other ladies who assisted her in the efforts to arrange and carry out the Ladies Program.

While this was the kind of conference that cannot be completely recaptured on paper, the Proceedings will be available in the near future through the Government Printing Office. Those of you who weren’t able to attend will be able to buy them. They will, of course, go to all attendees automatically.

A resolution requesting designation of a "National Measurement Standards Week" was unanimously endorsed by the Member Delegates at Gaithersburg. If approved by the Congress, this will be a once only chance for each of us to publicize Measurement Standards. Steps are being taken to obtain some National publicity. However, the most effective and valuable publicity will be that arranged locally be each of us. Everyone involved in Measurement Standards should begin planning to take advantage of this with items for company newspapers, local newspapers and any other media of communication you can think of. It would be an ideal time to schedule motivational programs, such as "Zero Defects" awards, group parties, etc. Let me know of any ideas you come up with. I'll try to circulate these for everybody's use.

John R. VandeHouten

On the evening of August 19, 1965 a quiet, down-to-earth fellow rose in front of an attentive NCSL audience and held its attention for forty minutes. He talked lightly and casually of one of the most hazardous of present-day occupations--test pilot. He was a compatible human being with whom you could identify immediately. Two weeks ago he died in a tragically needless accident. JOE WALKER was a man who shall be missed by many. To Mrs. Walker our deepest and sincerest sympathy.
NBS Notes

The Radio Standards Laboratory, NBS/IBS, at Boulder has added a new service for the measurement of effective efficiency of coaxial bolometer mounts at 9 GHz and power level of 10 mW. Units must be fitted with type N connectors and thermistor-type elements of 200-ohm resistance.

The Institute for Basic Standards of NBS has announced a simple precise technique for absolute measurement of reflectance. The calibration procedure, developed by D. G. Goebel, B. F. Caldwell, and H. K. Hammond III, employs an auxiliary sphere coated with a pressed powder for use with a double-beam, integrating-sphere type of spectrophotometer. Further details are available from articles appearing in the Journal of Optical Society of America, May 1966.

The Temperature Section of NBS/IBS has worked out a much improved method of reporting calibration results for copper-constantan thermocouples over the range -190 to +300 C. It has prepared a computer program that not only processes the instrument outputs to obtain the calibration data, but prints out a report in the form of a table with entries at every degree. Introduction of the more complete services has not required an increase in regular calibration fees.

To insure accuracy of measurements of magnetic fields, measuring instruments used in the field often are calibrated at location. In many case the calibration standard is a permanent magnet which in turn must be accurately calibrated in a standards laboratory. NBS/IBS recently adapted a nuclear magnetic resonance (NMR) technique to permant magnet standardization. This technique allows more accurate calibration of permanent magnets having fields in the range of 0.001 to 2 teslas. The calibration procedure is based on the accurate measurement of flux density in the gap of an electromagnet by an NMR magnetometer. This accurately known flux density is then compared with the flux density in the gap of the permanent magnet standard through the use of a suitable transfer instrument. Further details will be available in the September issue of the NBS Technical News Bulletin.
The NBS Institute for Materials Research recently obtained new reliable data on the vapor pressure, heat of sublimation, and entropy of sublimation of rhenium at temperatures between 2350 and 3050 K. These data should be useful in space studies and applications in temperature standardization. Details of the findings are covered in an article by E. R. Plante and R. Szwarc in the NBS Journal of Research-Physical and Chemistry, Volume 70A, pages 175-179.

H. A. Bowman and R. M. Schoonover (NBS/IBS) have improved precision hydrostatic weight comparisons by one to two orders of magnitude. First announced in the NBS Journal of Research Vol 69C (July-September 1965), the improved technique employs a Cartesian Diver for precisely comparing the densities of extremely small specimens.

Six permittivity standards have been made available by the NBS Office of Standard Reference Materials through the cooperative efforts of NBS, the National Physical Laboratory (England), and the National Research Council of Canada. The original work was described in the IEEE Transactions on Instrumentation and Measurement in December 1964.

On March 3, 1966 the nation's two key measurement standards (meter bar and kilogram weight) were removed from the custodial vault at NBS-Washington and moved to the new resting place at Gaithersburg, Maryland. Secretary of Commerce J. T. Connor participated in the ceremonies, marking the 65th anniversary of the founding of the Bureau.

A familiar face was missing from the NCSL 66 meetings. Warren C. Stickler of the Radio Standards Laboratory at Boulder, died April 15 following a heart attack. Warren was at the Bureau from 1952 and was well known to visitors. A former national director of the Precision Measurements Association, he helped form the Central Colorado Section of PMS. His aid was always made evident at each of the NCSL meetings held at Boulder. The Precision Measurements Association is establishing a memorial Warren C. Stickler Fund at George Washington University and those wishing to contribute should contact John Williams, 977 Victor Street, Aurora, Colorado.
The national electrical standards were officially established at the new Gaithersburg (Md.) laboratories of the National Bureau of Standards (U. S. Department of Commerce) on Thursday, May 12, 1966. On that day the standards were carefully transported to Gaithersburg under police escort from the old Washington (D. C.) laboratories of the Bureau.

From these basic electrical standards—for the volt, ohm, farad, and watt—NBS has derived other standards for all electrical quantities in use today. Thus the accuracy and reliability of all electrical equipment, devices, and meters used in this country depend upon the accuracy of these standards. An error of a fraction of a percent in the determination of the ohm, for example, could cause errors of millions of dollars in the electric bills paid by industry and private householders.

The electrical standards are of fundamental importance to the communications, defense, aerospace, and most other industries. The production of an aircraft, a radio transmitter, or a space vehicle requires thousands of individual components whose electrical characteristics must be carefully controlled for successful operation. Without precise standards for the electrical quantities such control would be impossible.

The transfer of the electrical standards took place on the fourth and last day of the third national conference of the National Conference of Standards Laboratories (NCSL), which met at the NBS Gaithersburg laboratories. This Conference and its continuing committees bring together representatives from military, commercial, and university laboratories, to promote cooperative action on common problems of management and operation of measurement standards and calibration laboratories. Participating in the ceremonies at Gaithersburg were Dr. Robert D. Huntoon, Director of the NBS Institute for Basic Standards; Dr. Chester H. Page, Chief of the NBS Electrochemistry Section; John R. Van De Houten of Aerojet-General Corporation, Chairman of NCSL; and Charles E. White of Avco Missile Systems Division, Chairman of the National Academy of Science's NBS Advisory Committee on Calibration and Measurement Services.

The standards that were transferred included a group of very constant standard cells, from which the volt is obtained as an average value; standard resistances that provide the ohm; standard capacitors for the farad; and a standard wattmeter.

The most difficult part of the operation was the transfer of the delicate standard cells. These cells are sensitive to light, electric current, shock, and vibration, and are especially sensitive to temperature. A temperature change of a tenth of a
degree would change a cell's electromotive force by about 5 microvolts. Normally, the cells are kept in a constant temperature oil bath. Tipping a cell more than 45° or inadvertent contact of the terminals of a cell with each other permanently destroys the cell.

The movement of these fragile cells was as carefully engineered as though they were a cargo of explosives. For the trip, the cells were housed in a special box designed to minimize temperature change, shock and vibration. Inside the darkened box the cells were fixed upright with all cell terminals safely apart from each other. Bureau scientists carefully carried the box to the station wagon that brought the cells from Washington to Gaithersburg. A police escort accompanied the station wagon to insure safe transit of the standards.

NCSL Notes

At a meeting of the NCSL Board of Directors at New York on March 20, timed to coincide with the International IEEE Conference, the following notes were made:

1. It was agreed to invite Liaison Delegates to sit in on Board meetings in the future, as observers.

2. The NCSL fiscal year is established as July 1 to June 30.

3. An ad hoc committee was to be established to study military specifications, with the hope to unravel some of the confusion associated with "traceability" and "calibration ratio".

4. The number of Delegates as of March 20 was 115.

5. Don DeLauer reported 16739 procedures in the NCSL Calibration Procedure Library, of which approximately 9000 had been obtained from industry. Presently there are 51 member-laboratories participating. Requests for procedures to the Library totaled 3442 to date, of which approximately 1300 were filled. If an average figure of $375/procedure was considered as applicable the requests filled, if applicable to the needs of the subscribers, represented a saving of $487,500.

In an effort to help Bill Holmes in his work on compiling recommended practices, Chairman VandeHouten announced that a definite format for preparation of recommendations and establishment of an approval system would be ready for the NCSL 66 meetings. Supplementing these, was a direct appeal to committee chairmen to begin thinking of supplying tangible inputs to Bill. Of partic-
ular importance should be work by all NCSL committees to compile state-of-the-art practices affecting the particular committee functions. To help readers to appreciate what Bill's work is, the following is the approved function of the "Recommended Practices Committee".

To develop a consensus within NCSL on desirable practices, either in management or technical operations, and to prepare drafts of NCSL Recommended Practices for publication.

The need for a second Vice-Chairman for NCSL was brought out with the expectation that concrete action would take place in the near future. Another need—that of a permanent address for NCSL was again brought out, with the expectation that the new headquarters for NBS might be so designated.

A meeting of the Delegates Assembly was held at Gaithersburg on May 11 at which time, the following items of interest were developed:

1. It was agreed that agencies from outside the boundaries of the United States, present at the International Unification Session on May 10, be invited to appoint Liaison Delegates to NCSL to assure continuity of the cordial relationship and exchange of information which was so clearly in evidence at the session.

2. Balloting for officers in 1966 would be by mail.

3. NBS to be officially requested to supply a repository and correspondence station at Gaithersburg for a more nature and efficient NCSL operation.

4. It was announced that the Board of Directors had approved establishment of a second Vice-President and that the Bylaws would be revised to provide for the addition.

5. The idea of having the President (or Congress) proclaim September 12-18, 1966 as NATIONAL MEASUREMENTS STANDARDS WEEK was enthusiastically received by the Delegates. Note—later correspondence disclosed that Congressman George P. Little (California), Chairman of the House Science and Astronautics Committee was considered to be the focus of any requests. The week considered, was supposed to have been the week during which the new NBS facilities were to be dedicated in toto. However, changes in schedules of government officials have forced
postponement of ceremonies from September to November. Meanwhile persons interested in the idea expressed by such a proclamation are urged to write Congressman Little expressing their interest in measurements standards, and their feeling that more emphasis should be placed upon the national need for more accuracy in measurements.

6. Ed Quane suggested that NCSL contact the major television networks, with the thought that a documentary film presentation, in conjunction with the proclaimed week for national measurements, would have audience appeal.

7. Ray Bailey brought up the need to consider another method for supporting the Calibration Procedures Library because of the rapid depletion of funding assigned the project by Air Force.

The Electronic Industries Association announced the appointment of J. A. Caffiaux as NCSL Liaison Delegate.

W. Bostwick and P. Long are cooperating to bring about a revision of the NCSL Standards Laboratory Directory. Be alert for the preliminary questionnaire which is in the mail now.

MISCELLANEOUS

An Associated Press report dated June 15 revealed the answer to a mystery which has haunted your editor for a long time--why are there two watch pockets in men's vests? The answer is that watches were originally so inaccurate that you had to carry a miniature sun dial also. Researchers maintain that today's wrist watches are more accurate than a sun dial. To which our reply is "Perhaps--when the sun is shining".

The recent special 5-day courses at George Washington University June 6-10 and 13-17 were once again a huge success, both from an attendance standpoint and from audience reaction.

A recent communication from Bob Simberg informs us that Julie Research Laboratories will again present their one-day Standards Laboratory Teacher Training Program on November 16, 1966.
Do your friends laugh when you sit down to discuss calibration policy? If this has been your unhappy experience, grieve no more. No longer need you sit in a corner, silently counting your thumbs. Now, with only a few hours practice in the privacy of your own home, you, too, can talk about calibration with the total unintelligibility of an expert.

Lashed to a fever of creativeness by a recent experience poking mild fun at calibration gobbledygook, Mr. Uhoodi has produced what he calls a buzzphase generator.

This, he guarantees (Mr. Uhoodi is no mean gobbledygookist himself), will give to any utterance on calibration "that proper ring of decisive, progressive, knowledgeable authority".

The buzzphase generator consists of three columns of words and phrases, numbered one to ten. These are:

| 1  | Integrated                      | 1  | Management              | 1  | Options   |
| 2  | Total                          | 2  | Organizational          | 2  | Flexibility |
| 3  | Systematized                   | 3  | Monitored               | 3  | Capability |
| 4  | Parallel                       | 4  | Reciprocal              | 4  | Mobility   |
| 5  | Functional                     | 5  | Digital                 | 5  | Programming |
| 6  | Responsive                     | 6  | Logistical              | 6  | Concept    |
| 7  | Optimal                        | 7  | Transitional            | 7  | Time-phase |
| 8  | Synchronized                   | 8  | Incremental             | 8  | Projection |
| 9  | Balanced                       | 9  | Third-generation        | 9  | Hardware   |
| 10 | Compatible                     | 10 | Policy                  | 10 | Contingencies |

There, now. The conversation turns to policy and an opening occurs for you. You have one or two ideas--come now; everybody has one or two ideas about policy, even in the Defense Department--but you do not know how to express them so as to impress your hearers with your grasp of the subject.

What you do, then, is to think of any three-digit number, related the digits to the words in the three columns, and unostentatiously drop the product into your first sentence. Take 369, for example--systemitized logistical hardware.

Everybody who knows anything about calibration knows that an ample supply of logistical hardware is one of the prime needs of the day. Obviously, if logistical hardware is to be of any use at all, it must be systematized.

So there you are: "It seems to me if I may say so, that the Headquarters Department in its current posture is not giving enough attention to systematized logistical hardware". After that, you can say anything; you are a certified expert.
513? Functional management capability. Is anyone against functional management capability in our Headquarters Department—Communists excepted, of course? 951? Balanced digital options. It may not mean much, but, by George, it has a ring to it, hasn't it?

Now, get in there and blind them with footwork at the next meeting.

It's astonishing all the information you get in this proposal for a lousy cause.

(Courtesy of our Canadian friends)

The recently-organized Boston Section of Precision Measurements Association has been quite active lately. Meetings were held April 12 - "Derivation of Electrical Units from Fundamental Standards; May 10 - "RMS, Average and Peak Measurements; Present State of the Art; June 14 - "AF Calibration System" and "The 33k Calibration Procedures". Bylaws are in a near-completion stage. Present officers are J. C. Thompson-President, W. A. Perkins, Jr.-Vice President, R. W. McGowan-Secretary, J. Ware-Director.

The Physical and Mechanical Measurement Instrumentation Division of the Instrument Society of America has been actively recruiting membership lately. They are actively soliciting papers for the ISA meetings in New York October 24-27. Director of PHYMMID is T. M. Mathison, Boeing Co. P.O. Box 797, Renton, Washington 98055.

Recent elections in the IEEE Group on Instrumentation and Measurement placed George E. Schafer (NBS-Boulder) as Chairman for a second term, with Francis L. Hermach (NBS-Washington) as Vice-Chairman. Elected to the Administrative Committee which governs the Group were A. F. Dunn of National Research Council-Ottawa, E. W. Houghton of Bell Labs, H. W. Lance of NBS-Boulder, and B. O. Weinschel of Weinschel Engineering-Gaithersburg. IEEE elections in the Boston area resulted in C. E. White moving in as Chairman of the IEEE-Boston Section for 1966-67. R. G. Fulks moved into the position of Chairman of the Boston Chapter of the IEEE Group on Instrumentation and Measurement. Of significant interest in this male-dominated world (?) was the election of Ruth A. King of Bell Labs as Vice-Chairman of the Merrimack Valley Subsection of IEEE—a long overdue recognition of the hard work put in by an exceptional representative of the distaff side.
The 1966 Standards Laboratory Conference held May 9-12 at the new location of the National Bureau of Standards, was considered a highly successful activity both by the registrants and by the program and session chairmen. Conducted at the site of the new government facilities, many special features were available to attendees, and many of the ordinary things could be provided as things that are always desired. The helpful entrance to the Administration Building undoubtedly imparts a deep sense of pride to the Bureau's employees and truly made those who are taxpayers aware of what tax money can provide for national pride.

Too much cannot be said for the prime movers and managers of the Conference. For NCCL, Andy Woodington's job deserved an "excellent" rating and should have given him a justifiable sense of accomplishment when it was all over. Representing NCCL in their work and coordinating efforts applied the difference between success and mediocrity. Putting Tilley and Woodington together as a partnership, we have a pair of people who after four days of frustration and anxiety, could relax on the evening of May 12 and listen to the well-deserved praise of the attendees.

As long as we are thinking in terms of cooperation, hospitality, and cordiality, many thanks are due to Dr. Allan Astin, Dr. Robert Hanson, and William Wildhack for their encouragement and sponsorship of the meetings, particularly when it should be remembered that the Bureau is still in a continuing process of movement from Washington to Gaithersburg. The thoughtfulness of officials in providing a national noteworthy event—the transfer of the nation's electrical standards to the new facility at Gaithersburg—is evidence of the desire on their part to make NCCL 66 a significant event.

In the pages that follow, we are attempting to bring back memories for those who were in attendance at the Conference. For those who missed the event, it is hoped that the pictures, together with the descriptive material which follows, will impart some of the feeling encountered by those present. From John Van de Housten's opening remarks to Bill Holmes' closeout session, many words were spoken, much informative material presented to the audience, quite a few lighter, humorous moments were interspersed, and some serious thoughts were implanted in the minds of the delegates. Active participants were too numerous to be mentioned or presented individually in picture form. In toto. The support given each Session Chairman was noteworthy and speaks well for the future of NCCL. For this, they also deserve praise.

This Conference is now over but the work of NCCL picks up tempo again. In Bill Amey's words—there is work to be done and we all need a rest on the back—a vigorous one applied low done! Also Bill said several other things which deserve repeating here, verbatim:

---NCCL is now of age. It seems to be growing steadily larger, and its professional responsibilities are growing with it. But as it grows, there will be a temptation to take on more and more projects. The question you must face is this: As the membership grows, is it growing with men who wish to contribute to the work, or is it growing with additional members who want to receive something?---

"Work on the part of your dedicated associates brought NCCL to its present state of vital importance in the operations of your work to get standards lab. It took work to maintain the motion against all the drag effects, and it is going to take even more work to affect any acceleration. Self-motivated work is the characteristic of every professional, and it is the only medium through which directories, recommended practices, standards, definitions, etc., come into being---"

"I am taking the liberty here—to ask everyone in the audience who is not now active in some facet of NCCL work "Please raise your Chair and insist that we all work. Otherwise we will find ourselves in the situation of just getting things started, and then nothing more will happen---"

"To date we have been quick to talk about management problems where higher levels of management always seem to be the problem. It's VERY responsibility to understand what we would like them to know. I submit to you, however, the people who do the work know how, and the manager—if he is any good—knows why. As an organization, if we are going to get problems associated with standards laboratories, must face OUR responsibility to find better means of evaluating not only the technological competence of our measurements, but also the utility of them."

Bill Amey's message is worth remembering. For those readers who did not attend NCCL 66, be alert to the fact that the transactions of the Conference will be published in the near future under auspices of NCCL. Official announcements will appear in regular publications. Our short message ends at this point. Immediately following are descriptions of the photographs reproduced on the several pages which follow.

NCCL-66

1) Welcoming address to NCCL attendees: new auditorium at NBS-Gaithersburg facility.
2) Chairman John R. Vandenberg opens conference.
3) Dr. Robert B. Hinkley, Director NBS/IBS welcomes attendees.
4) Dr. Allan V. Astin, Director NBS addresses NCCL delegates.
5) R. C. Richardson describes 1965/66 Measurement Comparison audit.
6) J. L. Barnes presents new Navy film "Wary Calibrator." 
7) G. M. Finckh opens panel discussion on statistical procedures.
8) G. M. Finckh opens panel discussion concerning information needs of measurements standards laboratories.
9) J. L. Barnes opens panel discussion on calibration and measurement laboratories.
10) H. E. White presents survey of world-wide efforts to standardize industrial measurements.
11) A. B. Berlin, Canadian Department of National Defence, expands on material for, international standardization report.
12) D. G. Bennett, British Ministry of Technology, reports on recently-established British Calibration Service.
14) A. E. Schmitt presents background of Japanese standardization measures.
15) A. L. Frink expands details of Swedish standardization efforts.
16) M. T. Anglo reports on committee activity—Measurement Standards Laboratory Organization and Management.
17) A. B. Berlin discuss committee work on control of work load.
18) H. E. White discuss panel work on performance requirements of measurement standards laboratories.

OFFICIAL TRANSFER OF ELECTRICAL STANDARDS

Standards are unloaded at new Gaithersburg location after armored trip from old Washington facility.

Careful handling is the order of the day.

Unloading proceeds with care.

Officials take inventory.

Dr. G. Hanson presents cards to Dr. C. Page.

Dr. G. Hanson presents cards to Dr. C. Page.

Ready for transfer to environmentally-controlled oil bath.

Dr. G. Page briefly reviews history of standards.

Audience enjoys the ceremonies.

Amos Shaver/IBS handles delicate units.

and ten attendance units in oil bath.

Whereupon Dr. C. Page, Director of IBS, makes his fellow worker's only hand.

Mr. D. Newman Craig, present at each transfer of NBS standards since 1945, gives his nod of approval.

Participants acknowledge receipt of standard cards, Loek, White, Vandenberg, H. Jenny, B. Hinkley, R. Page, W. Wildhack, W. Hanson.
BEHIND THE SCENES AT NCSL 66

BUSY REGISTRATION DESK AT NBS WITH

HAZEL REID/IBS AT WORK

DELEGATES AND PROBLEMS

BERNADINE DUNFEE VISITS

CHAS WOODINGTON, R. TILLEY/IBS WORRY

P. LONG, W. BOSTWICK DISCUSS NEW NCSL DIRECTORY
APPLICATION FOR MEMBERSHIP
NATIONAL CONFERENCE OF STANDARDS LABORATORIES

Name of Laboratory or Organization

Address

applies for membership in the National Conference of Standards Laboratories and appoints as its Delegate

Name and Title

who will serve until June 30, 1967

Signed: __________________________

Title: ____________________________

Date: ____________________________

The NCSL is a continuing non-profit association whose members are either measurement standards and calibration laboratories, organizations maintaining such activities or other organizations having related interests whether operated under academic, scientific, industrial, commercial or government auspices.

Application for membership is made by completing the above form and submitting it together with the annual dues of fifty dollars ($50.00). Checks should be made payable to the National Conference of Standards Laboratories.

Applications may be mailed to:

Mr. Donald DeLauer, Chief
Det. #2 2802d IG&C Gp
P. O. Box 1525
Vandenberg AFB, California 93437

If an otherwise qualified organization finds it impossible to become a member organization by payment of dues as such, it may be granted member privileges by payment of an equivalent registration fee in advance of the Delegate's Assembly.