REPORT OF ELECTRICAL COMMITTEE

the insurer, and the inspector, is constantly increasing. With these diverse interests the problem of Code making becomes a more involved and a more complex one. So far as the 1940 National Electrical Code is concerned, I am sure there is a general agreement that the interest of every group has been liberally provided for, that advancement in the art has been fully recognized, and that the duties imposed upon the Electrical Committee have been met with a fairness and liberality commensurate with the obligation to safeguard the electrical installation. (Applause.)

MR. SMALL: Mr. President, for the Electrical Field Service Committee, I move the acceptance of this report and the approval of its recommendations.

(The motion was adopted.)

THE PRESIDENT: Now, Mr. Small, will you report for the Electrical Committee?

Report of the Electrical Committee.

ALVAN SMALL, Chairman.

MR. SMALL: In planning the presentation of this report, I have assumed that those who are concerned are supplied with copies of it as distributed by the Association's Executive Office.

Mr. Tousley has competently and sufficiently sold you, I think, the idea of a National Electrical Code and why we have one and why we must continue to have one, and I will not repeat his story or selling message.

Proceeding immediately, therefore, with the Report of the Electrical Committee, one of the many technical committees of the Association, I refer to the Foreword in the preprint and now deliver the statement that is required by our procedure as to the outcome of the letter ballot of the membership of the Electrical Committee on the first-submitted proof copy of the proposed 1940 edition of the Electrical Code.

Reversing the usual statement, I will report that two alternates whose principals have not voted, have cast favorable letter ballots for the approval of this Code by this Association and the American Standards Association. The 47 other members of the voting members of the committee have each filed letter ballots approving this edition of the Code except that two have indicated qualifications or conditions as to their approval, so I can report that out of a total of 49 members eligible to vote, including the chairman, 45 members voted affirmatively, two alternates voted affirmatively, and the two others who voted affirmatively did so subject to conditions which I think my later report will show are amply satisfied.

Proceeding with comment on the preprint as circulated, the first occasion for mention, I believe, appears on Page 8, where under the caption "Purpose and Scope" it is in order to point out that the second paragraph
now mentions railway properties in addition to properties of other utilities where the provisions of the Code do not apply to conditions where the exercise of the utility function is involved.

This proposal for addition of the properties of railways to those previously exempted from the application of the National Electrical Code came to the Electrical Committee through the channels of the American Standards Association. As a result of the recommendation which the Electrical Committee is now making and on the assumption that this Association will approve the statement of "Purpose and Scope" that is now in the preprint, the American Standards Association has of itself approved this statement as a proper one for an American standard recognizing it as the scope of the National Electrical Code. Supplementing this mention of the American Standards Association, which is concerned with this matter because our committee is operating as a Sectional Committee under its procedure, may I report that the American Standards Association has approved the composition and personnel of the Electrical Committee meeting here in December which prepared for your consideration this forthcoming proposed 1940 edition of the National Electrical Code.

Because of this preliminary work, therefore, it is possible to suppose that there will be little or no obstacle to the endorsement of this 1940 edition as an Approved American Standard, when and if it is cleared of the obstacles and barriers that may be met with in our consideration of the report today.

The next item which it seems should be mentioned for the information of the membership is to be found on Page 16, where a new definition is recommended for what is called a "show window." Electrical inspectors regard a show window as a place needing special precautions in the running of flexible cords, etc.

While it has been a condition ever since electrical inspectors were active or incandescent electric lights were available, it has remained a fact for one reason or another that the National Electrical Code has not contained a definition of a Show Window. The new definition is rather broad and I will read it as a matter of interest:

"A show window is any window used or designed to be used for displaying of goods or advertising material whether it is fully or partly enclosed or entirely open at the rear and whether or not it has a platform raised higher than the street floor level."

In the Foreword of this preprint, in reporting for the Electrical Committee, I explained that in going to the membership of the Electrical Committee for a letter ballot action on this material, just as Mr. Tousley has explained, it was necessary to prepare a galley proof from the Stenotype and other notes taken at our December meeting and, in order to meet the time requirement of the Executive Office of the Association, it was not possible to get from the printer a galley proof and subject it to proof-reading and have a second galley run off, so that various typographical errors and other errors sure to appear would be avoided.
There are throughout this printed copy a number of typesetting and minor editorial errors or of changes thought desirable for editorial consistency which I will not mention but, as is promised in the preprint I will mention any changes of substance so as to record action taken by the Electrical Committee last December.

One such change in substance appears on Page 20, Sec. 2005-b., the mention of weatherproof conductors is to be with respect to conductors of all sizes, rather than to larger than No. 6.

Referring now to Page 23, the correspondence which has been exchanged between members of the Electrical Committee and the chairman of the committee on Article 210, has indicated a desirable transposition of text in Paragraph 2105, especially the second sentence. You will notice the paragraph has the caption "Voltage," but this particular sentence discusses circuits. The intent of the Article Committee and the Electrical Committee, I am quite certain, was to specify that in dwellings the voltage at the wire terminals of receptacles or lamp-holders for lamps of the Edison Base type should not exceed 150 volts. The intent was further to permit, on properly laid out circuits, and for convenience outlets supplying appliances of more than 1,650 watts, that voltages up to 220 be found at the wire terminals.

It was further the intent of the Article and the Electrical Committee to recognize even for dwelling occupancies the possible desirable use for decorative purposes, of fluorescent lamps energized at 220 volts, rather than 110.

The Editors are going to assume authority—there is no change in substance—to modify the second sentence to talk of voltages where it was not desired by the Electrical Committee from the point of safety, that it exceed 150 volts at the appliance terminals.

Now on Page 26, Paragraph No. 2112: The text appearing in the report which you have does not reflect the intention of the Electrical Committee with respect to heavy-duty lampholders. It is clear from the record that it was intended to recognize the text in the preprint in the edition Mr. Tousley has mentioned and considered by the whole Electrical Committee prior to the meeting of December last, so that the text is to read:

"2112. Heavy-Duty Lampholders. Heavy-duty lampholders as referred to in this article shall include lampholders of the mogul type, a lampholder of the medium-base type which is an integral part of a single lighting unit having also a heavy-duty lampholder, and other lampholding devices required for lamps exceeding the maximum rating of the medium-base lamp as provided in section 94201."

A very minor change in substance will be found on Page 27, Paragraph 2135-a., where the word porcelain is to be inserted, limiting the keyless type of socket which is mentioned therein.

Members of the Association present at the meeting in Chicago when the 1939 edition of the National Electrical Code was presented, and members who have given attention to discussions of the Electrical Committee in my reports for previous editions of the Code, will recall a large amount of
attention and consideration being given to the problem of bridging around or tampering with Edison plug fuses, and the proposal that there should be a "fool-proof," "penny-proof" type of fuse.

In preparing for this report, I read the Proceedings for the 1939 meeting and considered the discussion, the remarks and the views voiced by all who took part in it, and refreshed myself as to my own views which seem amply recorded.

I think it important, while not a matter of change in the substance from the printed text that has been distributed, to mention that at the December meeting of the Electrical Committee, the question of a "tamper-proof" fuse was advanced to a very considerable extent.

Those present who are not members of the Electrical Committee may not recognize that the mention in Sections 2451, 2452 and 2453, on Page 49, of the so-called Type S fuse, is a mention of this famous non-tamperable fuse, and I do not intend to be facetious when I say the designation "S" does not refer to the speaker.

I expect that it was intended by the Electrical Committee that the term "Type S" should do two things: One, identify the fuse; second, to memorialize that member of the Electrical Committee who had initiative and guts enough to keep pressing the Electrical Committee to have a tamper-proof fuse specified and required in the National Electrical Code. I refer to Mr. Fred N. M. Squires of the International Association of Electrical Inspectors, and the New York Board of Fire Underwriters. So, if the "S" in Type-S means anything, it means the "Squires" fuse.

There is no change proposed from this printed text—but I should mention that there continues to be the problem, duly recognized by the Electrical Committee, of the interchangeability in fuse holders that are already installed of fuses of different makes of this Type-S type. The Electrical Committee was unable to solve the problem at the meeting and accepted an offer made by a member of the committee who is outstanding in his contributions and services to the Electrical Committee and the National Electrical Code—Mr. O. K. Coleman of the Electric Light and Power Group—to head a special committee, that, if appointed, would tackle the particular problem of interchangeability of different designs of Type-S fuses, and if a solution of the problem was found, recommend it for appearance in the 1940 edition by the interim revision procedure.

The Electrical Committee was very glad to accept this proffer of very special service by Mr. Coleman and a committee was appointed to cooperate with him. He has reported by letter that the Special Committee was not ready yet to report practical or actual results from its deliberations, but indicated there are to be meetings next week and subsequently, perhaps, a definite recommendation as to the solution of this rather bothersome item. So, possibly, before the 1940 edition of the Code can come from the printer's presses, the matter of interchangeability of different makes of Type-S fuses, with fuse holders and adapters of various other makes will be taken care of.
The next item in which a change of substance is noted appears on Page 50, Paragraph 2453-f, the last line should make a cross reference to section 2452.

I desire to comment without discussing details of the article, upon the substantial contribution which was made to the Code and work of the Electrical Committee and sponsorship of the Association by the Article Committee on Article 250—"Grounding"—in submitting for this edition of the Code an entirely re-edited composition of the requirements of the Code with respect to this important feature of electrical safety. In particular, it is appropriate, I think, to mention the substantial service rendered by Chairman Schirmer of the Bell Telephone Laboratories, in having this new arrangement presented for adoption.

There appears in the text of this article, as in the preprint which you have, on Page 54, a need for change in substance—please refer to Section 2543-b., the clause beginning "except those attached to ungrounded portable equipment" should be deleted.

Another change appears on Page 55, where in Section 2545, subparagraph "(b-2)," there is to be a subdivision of that text, making the whole intent clearer to the reader: thus—

"2. Metal frames of electrically heated appliances exempted by Sec. 4237;"

"3. Enclosures for X-ray tubes used in therapy exempted by Sec. 6634."

The next item to be mentioned appears on Page 57.

Possibly 15 years ago, in considering methods to be recognized in the National Electrical Code for avoiding aboveground potentials on exposed non-carrying metal parts of electrical installations, it was suggested that these exposed non-current carrying metal parts be connected to the neutral grounded conductor of interior wiring systems. The proposal was thoroughly discussed and there were advocates as sincere for its recognition as were those for its non-recognition—and it is not for me to say whether it was the conservative element or the liberal element which won.

However, the Code at that time was not changed to recognize the grounded neutral conductor as a grounding electrode. Later, I think in the 1933 edition of the Code—anyway in the 1935 edition—the use of the grounded neutral conductor of an interior wiring system as a means for grounding exposed non-current carrying metal work was recognized indirectly in the Code when by special permission inspection authorities saw fit to allow it, particularly in use with electric ranges.

A special contribution was made this year by a subcommittee on grounding of portable equipment—Mr. W. R. Bullard, a member of the Electrical Committee, chairman. Mr. Bullard presented for the committee an exceptionally well-thought-out and well-planned report which was received and endorsed by the Electrical Committee at the December meeting, as to both intent and substance.
Among the other things that Mr. Bullard personally endorsed, partly as the result of studies of that committee, I expect, and partly as the result of his own experience and observation, was that the text that we now see on Page 56, Paragraph “c” of Section 2556, be re-worded to recognize definitely the grounded conductor of an interior system as a grounding electrode, omitting reference as to special permission.

The Electrical Committee did not see fit to go along with Mr. Bullard on this item, however, and the editors in compiling the galley proof of the Code saw fit to make no mention of the special permission requirement that appears in 2556-c, and it has been suggested that to omit mention of special permission in Par. 2559 is, in effect, a change of substance, indicating a modified point of view of the Electrical Committee. Accordingly, the final edition of the Code will contain in Par. 2559 mention of special permission as required by cross reference in subparagraph 2556-c.

Referring to Page 60: Since this report was sent to the printer, there has been an interpretation arrived at by formal procedure of the Electrical Committee, with respect to the intent of Sec. 2591-a. The sense of the interpretation is to be inserted as a note following the table on Page 61 and to read:

“Conduit, pipe, or electrical metallic tubing cannot be used alone as the grounding conductor for a wiring system. See: Par. ‘a’ of Sec. 2591.”

The idea is, that there is no change of substance by the insertion and if the insertion is made, there will be no occasion for inspectors and others to look elsewhere as basis for rulings made in the field.

I have already made mention of Mr. Bullard's contribution to the whole problem of grounding equipment. From the safety to life point of view there remains yet to be solved the problem of how to be sure that exposed non-current carrying metal, on portable devices is not at above-ground potential because of contact with the high side of even a 2-wire grounded circuit.

Many years ago a study was made to see if it was possible to convert all the 2-wire outlets into 3-wire design so that 3-wire plugs and conductors could be used in all portable cords. That was not found feasible, and if not feasible 12 years ago, it is certainly not feasible now.

Mr. Bullard's committee made no definite progress in solving this problem other than to register it as being a definite problem and having inspired the whole Electrical Committee to the study of the problem, with a view to arriving at an answer, somehow, sometime.

On previous occasions, when I have been reporting for the Electrical Committee, it has been suggested that some of the things I have said were without authority of the Electrical Committee, and possibly I was properly criticised on those occasions. I wish it to be understood by the members present, and in the record, that in the following and, perhaps in some of the preceding remarks, I have been making explanations as a personal member of the Association and of the Electrical Committee, without the official sanc-
tion for the statements from the whole membership of the Electrical Committee—so that if what I am now going to advise you concerning is not agreeable to any member of the Electrical Committee present, he will understand that I am merely trying to follow out as chairman of the Electrical Committee the request of the Association—to explain to the non-technical members of the Association who listen and receive and act upon these reports, the purport and intent as the chairman understands it, of some of the recommendations that are made. It would be quite simple, but perhaps more time-consuming, for me to deliver a lecture about the National Code and its provisions, not repeating what Mr. Tousley has said—and then proceed to present a formal report of the Electrical Committee, but it seemed—this year, anyway—that it was appropriate for me to make these informal statements, and I hope they will be so understood and received while going through the formality of presenting the Electrical Committee's Report for your action.

These preliminary remarks are inspired by the many and substantial, important changes that have been made in Article 300, Chapter 3, of this preprint. Mr. Tousley has mentioned them. If I were to have written his report I would have altered the order of his mention of some of the things. As I recall it, in his report he featured thin insulation for conductors as an important change, and so it is; but to my mind possibly a more important and fundamental change is the recognition proposed for this edition of the National Electrical Code of increased temperature to be allowed on the copper from an increased current load on the copper, provided the electric insulation has a capacity or a property to take this high temperature without deterioration.

Ever since we have had rubber insulation, practically, a temperature limit of 50 degrees C., 120 F., has been recognized as one which the rubber could withstand without going to pieces shortly, and all Code installations of electric wiring have assumed the load on copper would be in amount not exposing the rubber to a temperature above that limit.

In the past few years manufacturers of insulated wires and cables have developed new types of rubber insulation. As a result of contributions by Mr. S. J. Rosch of the Anaconda Wire and Cable Co. and of substantial contributions made by others in the rubber insulated cable field, under the auspices of N.E.M.A., with whom Mr. Rosch was affiliated, there was presented during 1939 for attention of the Electrical Committee and others, proposals for recognition in the Code of at least two new grades of rubber insulation that would stand two steps of increased temperature from increased loads on the copper.

So this 1940 edition of the Code proposes three grades of rubber insulation. One can be safely operated at 75 degrees C.; one at 60 degrees C.; and the present recognized Code rubber insulation to be operated at 50 degrees C.

Now 75 degrees C. is hotter than you can hold your hand against and seems very hot for both insulation and conductors. In order to get that
temperature with a given size of copper, you will have to increase the current load on the copper. On a No. 14, for instance, the common size used for ordinary branch lighting circuits, it was thought necessary to limit the current to 15 Amperes in order not to exceed the 50-degree safe temperature of the rubber. With the new insulations the current load can now be run up to 22 Amps., depending on the temperature of the ambient.

In Article 300 and in Chapter 10, or 9 of this Code as now presented, there is substantial recognition of these new ideas as to increased current loads that may be permitted on a given copper size and as to the increased temperatures at which it is safe to operate with the newly recognized rubber compounds.

This new development was assisted by another special committee of the Electrical Committee, which undertook careful study and correlation of the data and findings that had been published by Mr. Rosch and his associates and by N.E.M.A., for the industry. This Association should recognize the contributions not only of these cooperative interests but of this special committee on Temperature Ratings of Insulated Conductors, of the Electrical Committee in making that study.

As Mr. Tousley mentioned, there was also carried on by committees of N.E.M.A., investigations that have resulted in proposed Code regulation of thin insulations among which is one special type to be called Type RHT.

Another development, recognized in the proposed Code, is the product of research in rubber substitutes—a better sounding word is "synthetic" rubbers, not rubbers at all; and it has become the practice in the Code circles to call them "synthetics." This development for electric insulation is a "thermo-plastic," a substance containing no rubber whatever, that can be applied to electric conductors much as rubber insulation has heretofore been applied, and within the limits of general performance of thermo-plastics, as to high and low temperatures, takes care of all the requirements of an insulated electric conductor very nicely.

This new Code is to recognize the use in a limited way of this synthetic or Type "SN" insulation and also a new rubber insulation called Type "RU" which is another of the things of which Mr. Tousley spoke, requiring so much attention of the committee and the editor in compiling this report.

This next new development in insulation is one with which many of you already have had contact. It is the use of so-called latex in rubber manufacture. A method of applying rubber latex to electric conductors to accomplish insulation has been in practical application in the field for more than ten years.

I now mention a change not of substance but included in one of the conditional letter ballot endorsements of this proposed Code. The word LATEX is a dictionary word, it has a perfectly definite meaning applying to the product with which it has been used in these Code tables. However, there are two other words spelled a little differently but pronounced almost the same, that are registered trade names.
The Electrical Committee thought at the December meeting that perhaps it would be inappropriate to have mention of a word too closely resembling these registered trade names in the description of this material, so where you see on Page 68, under the first column the word LATEX and elsewhere throughout the Code where the word LATEX is being used to describe a particular type of insulation, Type RU is to be substituted for LATEX, and LATEX deleted.

While discussing changes in the text as presented in the report on Article 300, refer to Page 68 at the bottom of the page, Par. "a," third line, the expression "maximum operating" with respect to temperature, is to be deleted, and we will say, instead, "room" temperature.

Now, Mr. President, continuing my personal lecture as to what is in this Code, and referring further to thin insulations: I should like to have the membership know what it is going to be asked to vote on shortly.

There has been reported and discussed and considered and not much done about it until recently, a very serious obstacle to the modernization of the wiring of existing buildings, because the capacity of the existing conduits has been all used up. Someone did not make a mistake in the first place, but it seems now as though somebody did, in not using a conduit twice as big as that first employed and now existing.

There has been in the National Electrical Code since almost the year One—in other words since the first edition of the Code—a table restricting the number of conductors that could be pulled into a raceway of given size. At various times the values in that table have been the subject of controversies within the Electrical Committee. Some of these controversies were waged and disappeared before my contact with the Electrical Committee in 1909. Since 1909, anyway, there has been a table generally known as Table 2, that limited the number of insulated conductors of a given nominal size that could be pulled into a conduit of a given, nominal size. It is because of natural conditions, of observance of economic laws that in wiring, for instance, this building, if it was determined you wanted to pull a certain number of conductors to the control board, here, to the end of the room, say, that the owner be not asked to invest for poundage of steel or use a box bigger than necessary, as specified by the Code, to have contained those wires. It would, in other words, have been a waste to have left too much room in that pipe. There is a place where economics prevail, but in a great many buildings, particularly on the store or street level floors, existing conduits or raceways for wires are all filled up and when you have conditions of modern degree of illumination, with an increase of several hundred per cent of lumens, on a given lighting system, you have a problem requiring more copper and more wires. The expense of ripping out plaster and existing conduits, putting in new fixtures, pulling in new wires, etc., has in many cases proven prohibitive.

While this problem was being felt and was the cause of pain to many, there developed a cause for multiplication of the pain, the new fluorescent
lamp, the popularity of which has increased by leaps and bounds, and the desirability of which appears to be a fixture.

Probably the limitations of Table 2 (1939 Code, for example) were based upon the mechanical forces to which a conductor was subject while being pulled in. Certainly, if you started in with a No. 12 conductor, it wouldn't be desirable to pull it through say 100 feet with 17 bends, to draw the copper down to be a No. 18—there is nothing to be gained there. And that is the basic reason for some of the dimensions that are found in Table 2. Too much mechanical force must not be applied to the conductors while they are being pulled in.

Another reason was to provide for added room for another conductor to be pulled through later when and if needed. I am making this statement on personal responsibility.

Taking ordinary copper sizes, such as used for branch circuits, it has been common for years to suppose if the rubber insulation was less than 3/64 in. thick, the building was going to burn up—whereas the facts are, the limitation of 3/64 in. for rubber thickness was a practical one back in the factory where the soft rubber was being handled and applied to conductors. Whether it was the strip machine or the tubing machine, it was difficult to be sure that a definite value of insulation was left, if you did not start with ample margin of rubber thickness. However, for smaller coppers, 18 and 16 copper, it has been permitted for signal circuits and lighting circuits and elevator circuits, and permitted for the wiring of elaborate and simple-wired fixtures that rubber insulations as thin as 1/64 in. be used—and in the 35 years with rubber insulated conductors, there has been no occasion to challenge the sufficiency of 1/64 or 2/64 in. as compared with the thicker insulation with respect to ordinary voltages ordinarily found in the house wiring of buildings for ordinary heat, light and power, the wiring that is done under the regulations of the Code. So there was a place from which to start to conceive that no serious giving up of factors of safety or no serious additions in a potential fire hazard or hazard of injured persons would result if insulations less than 3/64 in. were used.

These two problems met on the same crossroads, one day, and out of this meeting there grew an idea which was favorably considered by the Electrical Committee, that for the 1940 edition of the National Electrical Code there should be recognized for the rewiring of existing conduits or rather raceways, a conductor with a thinner insulation than that which had been previously recognized for wiring, anywhere between the convenience outlet and the next feeder back. Now, the National Electrical Code does not say so, but I say so, on my own authority, without authority of the committee, that the proposals in the 1940 edition of the Code to recognize the use of thinner insulations in existing raceways is a form of trial installation. I think if it works during the time before the 1943 edition is considered it is going to be a standard method of wiring recognized in all kinds of raceways. It is certainly going to be safe to pull an insulation in a nice new job,
safer than through an old job that may be cluttered up with rust and dirt, etc. So I am making the prediction that the recognized use of thinner insulated conductors in existing raceways is a trial installation, and that if it meets success in a large scale, the next edition of the Code will recognize it without limitations. One evidence of this is the proposal in this edition to recognize the general use of the RHT insulation for possibly 75-degree temperature and only 1/32 in. thick.

Now I may have imposed on the membership in telling it, but that is what has happened in the revision of Article 300 and of the tables of Chapter 9 and Chapter 10.

I now proceed to report other changes in substance from the printed text.

Page 79, I mention in passing that Article 326 of the 1939 edition of the Code is to be deleted and wooden mouldings as raceways pass out of the Code picture.

Referring to Article 336, Page 82, it is appropriate to report that for the 1935, 1937 and 1939 editions of the Code there were proposals to recognize uninsulated, grounded neutral conductors in wiring systems, generally. Some of the members will recall, I expect, that the Electrical Committee recommended a so-called trial installation of an uninsulated, grounded neutral conductor wiring method, and that the Association endorsed such a trial installation program. To whatever extent the field has demanded of it and the electrical authorities have acquiesced, that program has been pursued, and is still in effect.

A proposal made to the Electrical Committee and seriously discussed at the December meeting was that Article 336 be amended to give recognition within the covers of the Code to the type of non-metallic sheathed cable which has an uninsulated conductor supposed to be the grounded conductor of a wiring job. That proposal did not receive the necessary endorsement of the Electrical Committee membership and was lost. However, the trial installation status of material involved and of grounded uninsulated wire systems continues.

One of the details of the methods of the Electrical Committee operation is the consideration of what are called fact-finding reports. There was a proposal considered for the 1939 Code that rigid conduits having baked enamel coatings be no longer recognized.

After discussion, that proposal was not acted on, on the understanding the Rigid Conduit Manufacturers Association would have a research conducted which could be reviewed by the Electrical Committee on the basis of which and on other data, the committee could determine what to do with the matter. That program was pursued—the fact-finding report was promulgated in due time, and presumably on the basis of its data Sec. 3462 on Page 86 and Sec. 3463, Page 87, have new texts that limit the places of use where conduits with baked enamel finishes may be used.

I am going to mention this in passing: (Page 88, Sec. 3488) the Article Committee reported a recommendation that there be an addition made to this section that would permit fine threads under certain conditions. The recom-
mendation of the Article Committee was opposed on the floor, and it was finally determined that no action would be taken. Accordingly, this text, Sec. 3488, is that of the 1939 edition. Since the Electrical Committee meeting, resort has been had to the interim revision program, which was fully explained to the membership years ago, and a letter ballot is now under way with respect to a proposal that this text of Sec. 3488 be amended by adding "except when fittings approved for the purpose are used." The letter balloting is not completed and I cannot say what the outcome of it will be.

Referring to Page 93, Sec. 3565, in the second line, the word "headers" is going to be changed to "header access units"—a minor change in the substance.

It is an unusual circumstance, I think—there has already been an interpretation delivered by the Electrical Committee, according to the formal procedure described in the back pages of this document, with respect to some of the provisions of Article 380, Page 104, Section 3814: There have been several questions asked and answered as to the application of these two paragraphs, "a" and "b." It is not necessary to take the time of the meeting to report concerning those, except to say that one of the questions was "Does paragraph 'b' refer to fluorescent lamps?"—and the answer to the inquiry was in the affirmative.

There is a typographical error which, if corrected, means a change in substance on Page 112, Sec. 4137-a, "Type R" rubber modified to read "Types R, RP and RH rubber-covered wires—3/64 inch insulation; Type RHT rubber-covered wire—2/64 inch insulation—solid or stranded."

Mr. President, I would prefer to make the mistake of reporting changes in substance although minor, than to seem to ignore one—because what I think is minor might be of importance to someone in the meeting. Through some confusion in reading the Stenotype report of the meeting, the text for Section 4248, Page 118, does not record the action taken by the Electrical Committee, which was to have the section read:

"4248: Automatic Flatirons. It is recommended that electrically-heated smoothing irons be equipped with an approved temperature-limiting device."

I would like to report for the information of the members that in view of a recommendation of the committee on Article 430, Page 133—and as a result of some proposals that were made by Mr. Frank Thornton, Jr., and others, the Electrical Committee agreed that there should be set up a new technical subcommittee, according to its procedure, which is going to give consideration to the problem of Code recognition, rules, etc., covering the installation and operation of motors and motor-driven machines in the machine tool industry. The machine tool industry trade organization is very much interested and concerned in this matter and has promised its cooperation, and there is a strong possibility, I expect, that a future edition of the Code will cover the matter.

It is appropriate here to report, that another special committee of the Electrical Committee gave study to the problem of transformer vaults, par-
particularly those for network transformers. Some of the data considered by that committee appeared in the Quarterly, last year. It is a matter of great satisfaction to me and I think to many members of the Electrical Committee that this problem regarding which much concern has been expressed, was studied by this thoroughly competent committee. No new Code rules were proposed in the committee's report, which nevertheless was a very worthwhile contribution.

I should report to the meeting, Mr. President, that there has been received from the Jefferson Electric Company, in accordance with the Association's procedure, and with respect to the purpose of the preprint, a comment or protest with respect to the provisions on Pages 172 and 173, of Sections 6011, 6012, and 6013. These three sections and related ones, including 6014 and 6015, are intended to recognize existing practices of gas tube display or decorative lighting when inside building. All are familiar with the use of gas-tube display and sign lighting outdoors, and those of you who are still able to stay out after dark will recall, no doubt, that in some of the night clubs which you visit, there are all sorts of decorative lighting involving Zeon and colored Neon lamps, etc., which operate on pretty much the same technical principles and methods as do the outside gas tube sign lights. So this section under the caption “Inside Lighting,” at the bottom of Page 172, is provided for inspector use and provides for transformers building up to 15,000 volts between the conductors with current flows up to 60 milliampere, and recognizing these installations inside of buildings.

The first recommendation or criticism of the Jefferson Electric Company has to do with Par. 6011 where it proposes that a limit of 7,000 volts on the high-tension side of the transformer be specified. I understand that the Article Committee to which this matter was referred, does not support the recommendation. Another item, in Sec. 6013, had some support from the Article Committee. Let me see if I can tell it to you.

Refer to the second sentence, “If the spring contact type of receptacle is used, it shall be so designed that, even with the tube removed, the live spring will be recessed a distance equal to three times the diameter of the receptacle opening”—this manufacturer doesn’t challenge the desirability of that safeguarding, where we have 15,000 volts, etc., except that it does not provide for recognition of a distance less than 3 in., when the other precautions in the paragraph are satisfied. The intent is to prevent access to high-voltage by persons relamping, and it is presumed the access is prevented with this clearance. But there is automatic means of cutting off the voltage from these receptacles, and it is not recognized, if that means is provided, that a smaller receptacle clearance is adequate. I am merely reporting this; I have no authority to propose any change of the committee recommendation—but the procedure provides for these protests, and it is my obligation only to report them as received.

A very minor change in substance on Page 178, Par. 6111-c: after the parentheses “(type V)” insert “or asbestos varnished cambric (types AVA and AVB)”... etc.
I think I should call attention of the meeting as Mr. Tousley has done, to Article 620, Page 183, Sec. 6206—the use of electrical metallic tubing is now recognized in elevator wiring work.

Article 660, "X-Ray and High Frequency Equipment," Page 191—two minor changes of substance—Sec. 6613, in the last line, it says, "except when closed by the operator"; it should be, "except when held closed by the operator."

In Sec. 6616, third line, second word, is printed "these"; it should be "each."

I think we should call it to the attention of the membership that in Chapter 7, as a result of studies made by the Committee on Emergency Lighting and others, there have been some modifications or changes in Sec. 7011. This particular paragraph and perhaps all provisions of the section will be of interest to other committees of the Association, especially that on Safety to Life.

Similarly I would like to comment on the services of the Committee on Article 800, Mr. Swan, chairman, on the substantial editorial revision, arrangement and additions as to technical content in Chapter 8, which is indicated by the description of the "Scope" of the article in Sec. 8001. There are no changes in substance proposed in this.

It was necessary to make a slight change in the wording of Section 92403, Page 218, so that paragraph will read:

"92403. Marking. Fuses shall be plainly marked with the amperereating and the name or trademark of the maker, and the voltage for which the fuse is designed shall be provided on a paper label which shall be navy blue for 250-volt fuses rated at 15 amperes or less, green for 250-volt fuses rated at more than 15 amperes, and red for 600-volt fuses."

Now, Mr. Tousley told you of the very substantial studies and contributions that he has made to the various tables that appear in this Chapter 9. I am inclined to the view that a few of them will not finally appear as printed in this copy. The original copy proposed that there be a whole set of tables (Page 224) with respect to asbestos insulated products. Those tables are all coming out and the appropriate values will appear in the table on Page 222. There are a number of such items, and I believe it is in order to make general mention of them without trying to report all the details for the record or to the membership. Both Mr. Tousley and I have copies of these changes, and those who are technically concerned will probably wish to ask about them after the meeting, and be satisfied to do so.

For example, it is going to be necessary to make a number of editorial changes in column headings of the table, Page 235, merely to save by condensing into one table a lot of data that could be given otherwise if there was enough room in the Code to do it.

During my story about the Code, I mentioned increased values of current to be permitted on the copper of a given size, according to the kind of rubber insulation that is to be used; the members only have to look at the
values, Page 236, to see how they run all the way across the scale, according to the heat resistant characteristics and properties of the kind of insulation used.

There is a typographical error in the values in the footnote No. 1, at the bottom of Page 236, in the mention of 3 and 5 amperes as limits of current on 18 and 16 copper—those values should be 5 and 7.

So we come to Table 4, on Page 238. I have no changes to propose for this table. It is the one I made mention of some time ago as limiting the number of conductors of a given size that may be pulled into a conduit or other raceway of a given size.

Mr. Tousley was correct in his report as Electrical Field Engineer in saying the committee had a meeting sitting through from Monday to Friday night, which found it necessary to leave a lot of this material for editorial attention. I doubt if anybody has any criticism of Mr. Tousley's editorial work in this connection.

Attention is called to Table No. 11 on Page 242. This applies when Table No. 4 is not applied. It operates on the basis of saying that the number of wires to be permitted in a conduit of a certain size shall be limited so that the conduit shall not be filled up to more than a given per cent of its internal area.

Whatever condition justifies applying table 11 instead of table 4, there is a certain amount of, what should I say—of unrest or dissatisfaction with the limitations of Table 11.—Refer, for example, to the third group in the table for rewiring existing raceways with thin insulated conductors. If it is safe to rewire with thin insulation up to 60 per cent of the cross-sectional area of the conduit, wouldn't it be that much safer to pull in conductors with greater thickness of insulation? What other safeguarding is accomplished, as long as the per cent area of fill is not exceeded? This is not a matter that is as yet in shape to be reported on officially. I can only say there has recently been received an application for an interpretation as to the intent of the Electrical Committee in the matter, what will be the finding of that interpretation and whether or not the finding can appear in the Code as printed or, must continue alone as an entirely separate item for attention of enforcing authorities, remains to be determined.

This whole Chapter 9, Mr. President, could be discussed without wasting time to the same length that I have discussed the previous chapters of the Code, I think, but I am going to relax a bit, now, and refer to Table 13:

Three or four years ago, I think it was the 1935 edition of the Code, electrical inspectors began to say, "We would like to have some help in the Code in the application of Table 2" (Table 4, in this 1940 edition)—"we don't know how big a rubber-covered wire of the given copper size has to be." It's like saying how big is a person's hand—because he is so old, what size glove is he going to take?, etc. Tables like these on Pages 242 and 243 were intended to be informative. They were not regular rules, only information such as might be found in manufacturers' catalogues. Nowadays
almost everybody thinks of Table 13 and the following tables as binding and authoritative, instead of only informative although it is now claimed, and I think, correctly, that the dimensions are in excess of modern practice. Hence I am of a view that it would not be a change in intent or substance if Mr. Tousley exercised a certain amount of editorial discretion modifying the values of the approximate square areas and the approximate external diameter for the various conductor sizes.

The data in Table 14, at the top of Page 243, is to be amended by striking out reference to stranded conductor wires. There is a note to be added to Table 15 to read:

"Note. Type RU insulation recognized in sizes Nos. 14, 12 and 10. No. 14 to No. 8, solid conductors, No. 6 and larger, stranded. Type SN conductors without outer covering and Type RU conductors with an outer covering have the same overall diameters."

Mr. Tousley has worked out some other condensation of table data on Pages 244 and 245, all with no intent to change the substance.

A very satisfactory amendment has been made of the headings of the table on Page 246, after consultation with the chairman of the committee on Article 430.

There are several other small changes that are to be made; one affecting the substance, or perhaps it will be thought so, appears on Page 254: In the table the first mention of single-phase repulsion-start motors is to be deleted so there is just one mention of single-phase motors in the table.

Finally I should report at our December meeting there was some discussion as to the procedure of the Electrical Committee, and of methods in doing its own business delegated to it by the Association, and by the American Standards Association, it was agreed that a special committee should be appointed to study our rules of procedure and make a report respecting them to the next meeting, for action.

Mr. Bell, the Chairman of the Board of Directors, in the report which he made to the Association last night, stated for the directors that this method of presenting the Electrical Committee's Report and the proposed 1940 edition of the Code, was a more regular one, and one to be preferred, over the method previously followed where we did not have a copy like this for the members' consideration; I wonder if that is so. However, I took note of the mention last night that the preparation of this copy cost the Association $1,000 and that is a lot of money, no matter who you are.

I am wondering whether any member of the Association or any member of the Electrical Committee present, feels that with this report of changes in substance there remains still a necessity or a justification for asking the Association to spend another $1,000 to have another proof of this text prepared, and particularly for the consideration of the Electrical Committee and for another letter ballot. My own interpretation of the letter balloting which I reported on when I first came to the platform, is that the committee as a whole is satisfied with the handling of this report, and was satisfied in advance with the presentation of the report which I have made.
With due consideration, therefore, of the problems of the treasurer of the Association, with ample knowledge of the faithfulness of Mr. Tousley in the studies he has made in compiling this text, and in the small amount of further studies that are necessary in the tabular matter in Chapter 9, I make this motion, feeling that I have full authority of the Electrical Committee for so doing:

The motion is, that this Association accept this report of the Electrical Committee, that it approve for publication a 1940 edition of the National Electrical Code, which shall be this preprint, amended as I have reported with respect to items and substance affecting the substance, and amended as may be further necessary upon consideration of editorial and non-substance-amending details.

If that action is approved by the Association, I will further move that the Association report this 1940 edition of the Code to the American Standards Association for approval as an American standard and that it then certify it to the publisher, the National Board of Fire Underwriters for the usual distribution.

THE PRESIDENT: I understand you make that all as one motion.

(The motion was seconded.)

THE PRESIDENT: Is there any discussion on Mr. Small's motion?

DR. M. G. LLOYD (National Bureau of Standards): As a member of the Electrical Committee, I think I can assure Mr. Small that I and most of the rest of us are very well satisfied with the way the set-up of the Code has been prepared and the way it is being handled. There are a few details, though, that I would like to bring up at this time, in accordance with Mr. Small's statement that there will still need to be some adjustments made and I sincerely hope that can be accomplished without spending $1,000 for another set of proofs.

Some weeks ago Mr. Small informed the Committee that our Board of Directors and the National Board of Fire Underwriters had both decided that a change in the sub-title of the Code was desired, and would be made. It seems rather unfortunate that that matter could not have been brought before the meeting of the Electrical Committee and an opportunity given to that committee to consider such a change—because some members of the Electrical Committee, especially those who legally enforce the Code, consider that something vital is involved in such a change.

The title page of the Code now reads: "National Electrical Code—Regulations of the National Board of Fire Underwriters" etc., and I understand there is objection on the part of the National Board to the use of that word "Regulations" with the connotation that they are regulations of the National Board of Fire Underwriters, because the National Board states that it does not enforce these rules, and consequently, on their part, they are not regulations.
We all recognize, however, that they are regulations when adopted and used by other people, whether they are local inspection departments of insurance underwriters or municipal or state officials who may have legally adopted the Code. Consequently, there is some apprehension on the part of that group that such a change in the title will be understood to involve a real change in the status of the Code, and I do not understand that there is any such motive or desire, either on the part of the National Board or of this Association.

It therefore seems to some of us that the objective of the National Board of Fire Underwriters could be achieved in some other way and I might say that there is now pending a letter ballot before the Electrical Committee to see what the consensus of that committee is with respect to what I might call a "compromise" wording for that title page.

The idea is that this title page might read: "National Electrical Code of Rules for Electric Wiring and Equipment", and that the National Board could follow that on the title page with a statement of their own relation to the Code by some such wording as "Adopted as standard for fire prevention by the National Board of Fire Underwriters".

It would seem that that would effect what the National Board has in mind, and yet without changing in an important way the actual title of the document.

I trust that the Board of Directors of the Association will reconsider their action in regard to this matter and try to make an adjustment with the National Board as publishers of the Code on that matter that would, perhaps, meet the desires of all concerned.

Now I presume that it was in connection with that idea of avoiding the use of the word "regulations" that some changes in the text of the Code have been made, which have not been referred to by Mr. Small, and these changes have been made since the galley proof was circulated to the Electrical Committee and their vote taken accepting these texts.

In the introduction we now have: "This Code is intended to be suitable not only for the use of insurance inspectors but also for mandatory application by governmental bodies exercising legal jurisdiction over electrical installations."

I don't know if it is the intent of anybody to change the invitation that is there offered to states and municipalities to adopt the Code as their regulations, yet in the copy of this preprint which is circulated to members of the Association, that wording has been changed by omitting the word "mandatory". It seems to me that such a change, in the first place, should not be made without proper consent of the Electrical Committee, since we are dealing with the text of the document; and also that it does not have a tie-in with any change on the title page; and thirdly it seems it would be a very undesirable change, because I think everybody concerned with this matter does consider this Code suitable for mandatory application by governmental bodies who wish to enforce some kind of electrical regulations.
Now the fact that some changes like that have been made in the text without notice to the Electrical Committee and without even mention here, this morning, in the presentation of the report, makes some of us feel a little bit uneasy about the result of that method of making changes without again referring these items to the Electrical Committee.

I don't know how many more changes of that kind have been made between the circulation of the galley proof to the committee and issue of this report, because I have not had time to proof-read the entire Code; and I don't know that anybody else has; but it seems such changes should not be made without the acceptance of the committee. I don't think it necessary to mention a lot of items regarding changes necessary in the text to conform with the actual action of the Electrical Committee. I personally have filed a number with Mr. Tousley and he has assured me that a number of these would be made. There are two which have not been mentioned, and which I should like to mention here.

1. Either in Article 300 or in the tables in Chapter 9 I think there should be a definite statement of the limitation to application not exceeding 600 volts of some of these new types of wire, and it seems to me that should be stated in paragraph 3005 where the insulations are given authorization for use.

2. In connection with the recognition of this new material used structurally for floors, and which is now recognized as a container for wires, in Sec. 93,561 there should be inserted an item, accepted by the Electrical Committee in its meeting, that the interior finish of such channels for wires should have a smooth finish similar to that required for rigid conduit.

There is one other item I should like to mention which has reference to Mr. Small's report. In connection with Article 336, Mr. Small referred, I believe, to trial installations of wires where the neutral or grounded wire of the circuit does not have individual insulation.

Several years ago, the Electrical Committee recommended that that system be given trial installation, but it attached to that recommendation a number of conditions which should be observed when those trial installations are made. Of the installations which have come to my knowledge, I don't think there is one in a hundred that complies with those requirements or restrictions which the Electrical Committee at that time attached to the recommendation for trial installation; and I think we should all realize what I am afraid most have not, that the so-called "trial installation" made of that type of wiring has not been made according to the recommendations of the Electrical Committee; and they are not trial installations in the sense the Electrical Committee recommended them. I do not think that they should be advertised as being put in "under the recommendations of the Electrical Committee" because they do not conform to the recommendations of the Electrical Committee.
MR. SMALL: Mr. Chairman, if I may make only one statement with respect to Dr. Lloyd's remarks—I do it, not feeling that it is necessary to defend Mr. Tousley or me—but I have had no information of the deletion of the word "mandatory" in the text on Page 9, under "Introduction" and "Scope", and had I known it, I would have mentioned it.

THE PRESIDENT: Are there any further comments? If not, all in favor of Mr. Small's motion will say aye.

(The joint motion made by Mr. Small was adopted.)

THE PRESIDENT: I would like to ask Mr. Pye if he would now care to bring up the question of an amendment to the Standard for Electric Cars and Trolley Buses, which the Committee on Electric Railway Car Houses and Cars is advocating?

Report of Committee on Electric Railway Car Houses and Cars.

H. N. PYE, Chairman.

W. W. WISE, Secretary.

H. H. ADAMS,
American Transit Association.

A. W. BAKER,
American Transit Association.

R. S. BEERS,
National Electrical Manufacturers Association.

S. L. BURGHER,

R. DRISCOLL,
Canadian Underwriters' Association.

W. K. ESTEP,
Middle Department Rating Association.

E. B. FITZGERALD,
American Transit Association.

O. A. FREDERICKSON,
National Electrical Manufacturers Association.

EUGENE F. GALLAGHER,
Ohio Inspection Bureau.

C. W. JOHNSON,
Conference of Special Risk Underwriters.

JOHN LINDALL,
American Transit Association.

JAMES S. MAHAN,
Member at Large.

H. R. MARKEL,
International Association of Electrical Inspectors.

F. MCVITIE,
American Transit Association.

WALTER O. RANDLETT,
American Transit Association.

V. H. TOUSLEY,
N.F.P.A. Electrical Field Engineer.

LUIS L. WILTRANK,
Conference of Special Risk Underwriters.

G. M. WOODS,
National Electrical Manufacturers Association.

Mr. Pye: My committee would like unanimous consent to present a recommendation to change one rule of the Standard to incorporate one provision of the revised National Electrical Code. Our committee has unanimously approved this suggestion, and I therefore ask consent to present this under the rules permitting such procedure.

THE PRESIDENT: Is there any objection? If not, and I hear none, unanimous consent is assumed.