

Preprints for the 62nd Grand Lecture Meeting of  
the Iron and Steel Institute of Japan\*

C O N T E N T S

Lect. No.	T i t l e	Lecturer
1	Improved Blast Furnace Operation Based on Sized Raw Materials. ....	<i>Keiji TSUJIHATA, et alii.</i> ...1255
2	Improvement in Ore Sizing and its Effects on Blast Furnace Operation. ....	<i>Toshitaka TORIGOE, et alii.</i> ...1257
3	Effect of Steam Injection into the Blast Furnace. ....	<i>Teiji SHIBUYA, et alii.</i> ...1259
4	Studies on Blast Distribution into Blast Furnace Tuyeres. ....	<i>Kenjiro KANBARA, et alii.</i> ...1261
5	Analysis of Operating Effect on Coke Rate. ....	<i>Motohiko IIZUKA, et alii.</i> ...1263
6	On the Process of Iron Ore Reduction by Bosh Gas. (Fundamental study on fuel injection into blast furnaces—I)	<i>Masaharu KITAJIMA, et alii.</i> ...1264
7	On the Behavior of Injected Gases, Especially Hydrogen. (Fundamental study on fuel injection into blast furnaces—II)	<i>Seiichi KOJIMA, et alii.</i> ...1266
8	Degree of Utilization of Carbon Monoxide and Hydrogen in Reducing Gas. (Fundamental study on fuel injection into blast furnaces—III) .....	<i>Masaharu KITAJIMA, et alii.</i> ...1268
9	On the Theoretical Combustion Temperature in the Tuyere Combustion Zone when H <sub>2</sub> O, O <sub>2</sub> and Fuel are Injected into Blast. ....	<i>Masatoshi SHIMADA, et alii.</i> ...1270
10	Study on the Combustion of Coke on the Tuyere Level in Blast Furnaces. ....	<i>Koretaka KODAMA, et alii.</i> ...1272
11	On the Tap-Temperature in Cupola Melting Operation. ...	<i>Yosikazu KANAMORI, et alius.</i> ...1275
12	Relation between Coke Rate and Variation of Blast Temperature or Si- Content of Pig Iron. ....	<i>Akitoshi SHIGEMI, et alii.</i> ...1277
13	On Desulphurizing of Molten Pig Iron by Injection of CaC <sub>2</sub> and CaCN <sub>2</sub> . ....	<i>Takehiko MASUO, et alii.</i> ...1279
14	On the Desulphurization in a Blast Furnaces. ....	<i>Akira KOBAYASHI, et alii.</i> ...1281
15	Influence of Zn on Cleaning of Blast Furnace Gas. .....	<i>Tadashi NAKAZONO, et alii.</i> ...1283
16	On the Progress of Recent Dwight-Lloyd Sintering Technique. ....	<i>Toshimi YAMANE.</i> ...1285
17	On the Sequence Control System of the Tobata Sintering Plant. —Adoption of contactless relays— .....	<i>Yasuhiro SAWADA, et alii.</i> ...1287
18	Testing Results for D.L. Type Sinter Machine Assessment at Tobata Plant. ....	<i>Yasushi ISHIKAWA, et alii.</i> ...1289
19	Measurements of Flue Dust Quantity in a Blast Furnace Dust Catcher. ....	<i>Shunichi KOMAKI, et alii.</i> ...1291
20	Effect of Various Raw Materials on Iron Ore Sintering. ....	<i>Kazuo MIYAGAWA.</i> ...1293
21	Study of a Suitable Height of the Bed in Sintering Operation. ....	<i>Shizuo Kiriyama, et alii.</i> ...1295
22	Experimental Study on Sintering of Kamaishi Magnetite Concentrate. ....	<i>Takeshi KITAGAWA, et alii.</i> ...1298
23	Application of Anthracite to the Fuel for Sintering Practice. .....	<i>Hiromune MANTO, et alii.</i> ...1300
24	Experiment on Factors of the Self-Fluxing Sinter Prepared from the Kamaishi Magnetite Concentrates. ....	<i>Takashi DOINOCHI, et alii.</i> ...1307

\* To be held on Oct. 17~19, 1961, at Akita University.

- 25 On Sintering Test of Raw Materials for Ferro-Alloys. .... *Tatuo KOYAMA, et alius.* ...1304
- 26 Continuous Determination of Bulk Density Change in Sintering Process by  $\gamma$ -Ray Transmission. (Study on the method for increasing yield and strength of sinter—I) ..... *Masashi MITSUTSUKA, et alii.* ...1307
- 27 Applying Load in Sintering Operation. (Study on the method for increasing yield and strength of sinter.—II) ..... *Yasumasa SAWAMURA, et alii.* ...1308
- 28 Evaluation of Fuel for Sintering by X-Ray Diffraction Analysis. .... *Shōzō WAKAYAMA, et alii.* ...1311
- 29 Strength Tests of Iron Ore Sinter. .... *Shigeji ŌBUCHI, et alii.* ...1313
- 30 Manufacturing of Green Pellets by a Disk-Type Balling Machine. (Study on the manufacture of pellets—I)..... *Hisashi KAWATO, et alii.* ...1315
- 31 Down-Draft Sintering of Pyrite Cinder Pellets with a Movable-Grate Type Furnace. (Study on the manufacture of pellets—II)..... *Gōtarō TADA, et alii.* ...1317
- 32 Sponge Iron Manufacture from Sand Iron and Latelite Ores and Steelmaking by the Sponge Irons. (Practice of Kamijima's process for manufacturing sponge iron—I).... *Hirota KAMIJIMA, et alii.* ...1320
- 33 Activity of Carbon and Oxygen in Molten Iron-Nickel and Iron-Chromium Alloys. .... *Shiro BAN-YA, et alii.* ...1322
- 34 Measurement of the Equilibrium Constant of Reaction of Hydrogen with Oxygen in Liquid Iron. (Study on the deoxidizing limit of special deoxidizers and the form of deoxidation products—I) ..... *Yasuo OMORI, et alius.* ...1324
- 35 On the Activity of Oxygen in Molten Steel. .... *Takeshi KUWANA, et alius.* ...1326
- 36 Effect of Phosphorus on the Activity of Oxygen in Liquid iron. .... *Hideo KOIZUMI, et alius.* ...1329
- 37 Deoxidation and Desulphurization by Addition of Calcium Alloys. .... *Mituo KANDA, et alii.* ...1330
- 38 On the Rate of Complex Deoxidation by Use of Silicon and Manganese. (Kinetic study on deoxidation of steel—I)..... *Nobuo SANO, et alii.* ...1333
- 39 Ferric Oxide Reduction by Mixed Gas of CO and H<sub>2</sub> and the Phenomenon of Carbon Deposition. .... *Jiro HIRAO, et alius.* ...1335
- 40 Reduction of Fine Iron Oxide by Hydrogen AX-and RX-Gas. (On the manufacture of iron powder from iron oxide by gas reduction at low temperature—I)..... *Yōzō TAKEMURA, et alii.* ...1336
- 41 Fluidized-Bed Reduction of Iron Ore. .... *Akimitsu ŌKURA, et alii.* ...1339
- 42 Segregation in Large Rimming Ingots. .... *Akira SAITŌ, et alius.* ...1340
- 43 On the Internal Structure of a Steel Ingots Cast by Pressurized Freezing Process. .... *Keizō ONISHI, et alii.* ...1342
- 44 Some Observations on Inverse-V Segregation in Steel Ingots..... *Shinsaku ONODERA, et alii.* ...1344
- 45 On the Oxygen Converter with Water-Cooling. (Study on a permanent wall-type furnace with compulsory cooling—V)..... *Ryōzō SATŌ, et alius.* ...1346
- 46 On the Oxygen Converter with Water-Cooling. (Study on a permanent wall-type furnace with compulsory cooling—VI) ..... *Ryōzō SATŌ, et alius.* ...1348
- 47 Alternate 2-Unit Operation of 3 Oxygen Converters at Tobata Plant, Yawata Works.... *Shigeaki MORITA.* ...1350
- 48 On the Construction of an Oxygen Converter at Tobata Plant, Yawata Works. .... *Shiro YAMAMOTO, et alii.* ...1353
- 49 On the Pig-Ratio of a L.D. Converter at Kukioka Plant, Yawata Works. .... *Masao TAKEDA, et alius.* ...1355

- 50 Effect of Fluxing Conditions on Dephosphorization.  
(Study on dephosphorization of a L.D. converter— I )  
..... *Noriyuki TANAKA, et alii.* ...1357
- 51 Variation of Slag (FeO) Content in L.D. Process. .... *Kozo YANO.* ...1360
- 52 Analysis of Iron Loss in L.D. Process. .... *Masaharu ITO, et alii.* ...1362
- 53 Formation of Clinker in Calcining Process. .... *Takeo FURUI.* ...1364
- 54 An Example of Cost Control in a Steelmaking Plant. .... *Masumi AIHARA.* ...1366
- 55 Trends of O. H. Furnace Operation after Blowing-in  
of No. 1 Blast Furnace in Nishijima Works. .... *Haruzō NARISATO, et alii.* ...1368
- 56 On the Use of Dust-Briquets for Open Hearth Furnaces. ... *Hideo MATSUOKA, et alii.* ...1370
- 57 On "Hot-Water Cooling" of the Back Walls of Open  
Hearth Furnaces. .... *Arito OKAZAKI, et alius.* ...1372
- 58 Construction and Operation of an Open Hearth Furnace  
with a Brick Hearth. .... *Tuyoshi KAI, et alii.* ...1373
- 59 On the Mechanism of Disintegration and Corrosion of  
Checker Bricks for Open Hearth Furnaces..... *Kiyoshi SUGITA, et alius.* ...1375
- 60 Research of Combustion Control for Open Hearth Furnaces  
Using Bulk Oxygen. .... *Makoto SAIGUSA, et alius.* ...1377
- 61 Deoxidizing Control of Semi-Killed Steel by Using an  
Oxygen-Meter. .... *Shunichi TANAKA.* ...1379
- 62 Effect of Steelmaking Process on Surface Defects of the  
Seamless Pipe of Low-Carbon Killed Steel. .... *Taiji ARAKI, et alii.* ...1381
- 63 Fundamental Study on Splashes during Top Pouring. .... *Yasuhide TSU, et alii.* ...1382
- 64 Special Features of Vacuum Degassing in a Ladle.  
(Study of vacuum degassing in a ladle— I ) ..... *Kōichi MORI, et alius.* ...1384
- 65 Study on the Combustibility of Coke. .... *Shiro IDA, et alii.* ...1387
- 66 Comparison of Characteristics of Four Kinds of  
Metallurgical Coke Made in U.S.A. .... *Mataichi UTSUNOMIYA, et alii.* ...1389
- 67 On Physical and Chemical Property of Coke-  
Oven Bricks after Long Service. .... *Takasi SIBATA, et alii.* ...1392
- 68 Erosion of the Lining of the Lower Part of the Shaft  
and the Belly Parts in the Blown-Out Blast Furnace.  
(Study of the erosion in blast furnace lining— I ) ..... *Akihiko TANAKA.* ...1396
- 69 Influences of Water Cooling on Erosion of Lining  
of the Lower-Part of the Shaft and the Belly in a Blast  
Furnace. (Study on the erosion in blast furnace lining— II ) ..... *Akihiko TANAKA.* ...1398
- 70 Tracing Inclusions from Nozzle Origin with Non-Radioactive  
Zirconium. (Study of nonmetallic inclusions from  
casting-pit refractories— I ) ..... *Keisuke HIRAGUSHI, et alius.* ...1400
- 71 Some Effects of Induction Stirring in an Arc Furnace.  
..... *Toshihiko OSHIMA, et alii.* ...1402
- 72 On Injection of Lime-Powder with Oxygen Gas in an  
Electric Arc Furnace. .... *Hisao ISHIZUKA, et alii.* ...1403
- 73 On the Behavior of Nitrogen in Molten Steel of Steelmaking  
Process with a Basic Electric Arc Furnace..... *Yoshihiko ABE.* ...1406
- 74 Studies on the Behavior of Nonmetallic Inclusions  
in Molten Steel Made by Basic Electric Furnaces. .... *Sichiro FUKUSIMA.* ...1407
- 75 Sulphur Balance between Slag and Metal in Stainless  
Steel Melting Process. .... *Shigeaki MARUHASHI, et alii.* ...1409
- 76 Some Observations on the Oxygen in Reducing Period  
of a Basic Electric Arc Furnace. .... *Shigeaki MARUHASHI, et alius.* ...1411
- 77 On the Homogeneity of Composition and Structure of Billets.  
(Study on the continuous casting of steel— VIII ) ..... *Kiyoto USHIJIMA, et alius.* ...1413

- 78 Results of Fused Magnesia Type Refractories for a High Frequency Induction Furnace. (Studies on monolithic lining for large capacity induction furnace— I ) ..... *Yasushige HAYASHI, et alii.* ...1414
- 79 Change of Composition between before and after Consumable Electrode Arc Melting. (Basic study on the consumable electrode arc melting method— I ) ..... *Yoshiro YAGI, et alii.* ...1416
- 80 Study on the Refining Process in Consumable Electrode Arc Melting. (Basic study on the consumable electrode arc melting method— II ) ..... *Yoshiro YAGI, et alii.* ...1419
- 81 On Characteristic of Deterioration and its Countermeasure of the Pt-Wire in the Quick Immersion Thermocouple. .... *Katsukichi NAKAMACHI, et alii.* ...1421
- 82 On the Steel Ingot Moulds Cast from the Blast Furnace Molten Iron. .... *Tomojiro TOTTORI, et alii.* ...1424
- 83 Control of Ingot Moulds in Steel Plants. .... *Yoshihiro MITARASHI, et alii.* ...1426
- 84 Investigation of Topped Crude Oil. .... *Minoru OKA.* ...1428
- 85 Rapid Determination of Slag Basicity. (Centrifugal analysis— I ) ..... *Kiichi SAKANOUÉ, et alius.* ...1429
- 86 On Determination of the Hydrogen in Steelmaking Slag. .... *Shoki SATO.* ...1431
- 87 On the Solidification Rate of Steel Ingots. .... *Yasuhisa ABE, et alii.* ...1433
- 88 Influence of Freezing Conditions on Internal Structure of Ingots. .... *Michimasa SUZUKI, et alii.* ...1435
- 89 Study on the Relation between Types of Shrinkage Pipe by Means of Betatron and Casting Conditions. ... *Kōichirō MIYAUCHI, et alii.* ...1438
- 90 Temperature Computation in the Processes of Solidification and Cooling of Ingots by an Electronic Digital Computer. .... *Kanichiro CHIHARA.* ...1440
- 91 Fundamental Studies on the Gas Evolution during Solidification of Ingots. .... *Toyosuke TANOUÉ.* ...1442
- 92 Study on Lower-Grade Exothermic Compounds including Higher-Grade Exothermics as Triggering Kernel (Feedex 21) (Study on the exothermic hot top— V ) ..... *Tetsuo TAKAHASHI, et alii.* ...1444
- 93 On the Exothermic Hot Top of Small Ingots..... *Sadamitsu IWAMURA, et alii.* ...1446
- 94 Inequalities of Wall Thickness in Tube Expanding Process after Piercing. (Studies on the piercing and expanding processes of seamless steel tubes by the Mannesmann double type piercing mill— I ) ..... *Zenroku BABA.* ...1449
- 95 Relation between Reduction and Rolling Torque vs. Rolling Electric Current of the 2-High Roughing Plate Mill. ... *Shigenari SHIMIZU, et alii.* ...1451
- 96 Gauge Variations of Strips Caused by Rolling Larger Slabs. .... *Takenori HIRAMOTO, et alius.* ...1453
- 97 On the Deformation of Sulfides in High-Sulphur Steels by Working. .... *Kōshi KATŌ.* ...1455
- 98 On the Workability of Steel Tested by Hot-Torsion Method. .... *Fujio MOROZUMI.* ...1457
- 99 Formability Testing of Sheet Steel by the 150 t Hydraulic Press. .... *Masaki IDE, et alii.* ...1459
- 100 Influence of Various Workings on Properties of 9% Ni Steel Plates. (Study on 9% nickel steel for low-temperature service— V )..... *Kiyohiko KIZUKI, et alii.* ...1462
- 101 Effect of the Curvature after Rolling and Straightening on Residual Stress of the Rail. .... *Akinori ITOH, et alii.* ...1464
- 102 Cleaning of Steel Sheets with a Solution Containing Sodium Phosphate. (Measurement of the residual incoating by means of P<sup>32</sup>)... *Etsuro SHUTO, et alii.* ...1467
- 103 On the Erosion of Steel Plates in a Molten Zinc Bath..... *Toshimi YAMANE.* ...1469

- 104 Effect of Aging-Treatment on High-Temperature Strength of High Cr-Ni Austenitic Steels. (Study on high Cr-Ni austenitic steels—IV) ..... *Kenkichi HOSOE, et alii.* ...1471
- 105 On the Precipitation Process during Aging of Gamma-Prime Precipitated Heat-Resisting Alloys. (Systematic studies on gamma-prime precipitated heat-resisting alloys—II) ..... *Shoichi KATOH.* ...1473
- 106 Effect of Tempering Temperature on the Creep Rupture Strength of a Cr-Mo-V Steel for Steam Turbine Shafts. (Studies on the high-temperature strength of a Cr-Mo-V steel for steam turbine shafts—I) ..... *Yukoh KUMADA, et alii.* ...1475
- 107 On the High Temperature Strength of Turbine Casing Materials. .... *Takeshi SUZUKI, et alii.* ...1477
- 108 Creep-Rupture Characteristics of 16-13-Mo Austenitic Stainless Steel. .... *Takashi ABE, et alii.* ...1479
- 109 Study on High-Carbon High-Vanadium Cobalt-Type High Speed Steels. .... *Tamotsu HIURA, et alii.* ...1481
- 110 On the Properties of a New Heat-Resisting Steel "TAF"..... *Tsuneo KUNOU, et alii.* ...1483
- 111 Effect of Ti and Al on 15 Cr-20Ni Austenitic Heat-Resisting Steels. (Studies on austenitic heat-resisting steels—IV)... *Toshihiko SASAKURA, et alius.* ...1485
- 112 Fatigue Properties of Austenitic Stainless Steels. .... *Susumu TAKEMURA, et alii.* ...1587
- 113 Study on Properties of 17Cr-1Ni Cast Steel. .... *Teruyuki KISHIE, et alii.* ...1488
- 114 On the Nitrogen-Addition Alloys for Nitrogen-Bearing Stainless Steel. .... *Koichi OKU, et alii.* ...1490
- 115 A Study on Grain Growth Characteristics in 18Cr-8Ni-Ti Steel. (With reference to the change of heating temperatures and cold-drawing ratios) ..... *Hirofumi HAMADA, et alius.* ...1492
- 116 On the Hardening Conditions for 17-7 PH Stainless Steel.... *Masaaki OHMURA, et alii.* ...1494
- 117 Effect of Composition and Structural Conditions on Properties of Cr-Ni Stainless Steels. (Effect of Mn and Al additions) ..... *Yasuo OTOGURO, et alius.* ...1496
- 118 Effect of Composition and Structural Conditions on Corrosion Resistance of Cr-Ni Stainless Steels. (Effect of Ni and Mo additions) ..... *Yasuo OTOGURO, et alius.* ...1498
- 119 Effect of Combined Additions of Mo, Si and Cu on Mechanical Properties and Corrosion Resistance of 30Ni-20Cr Stainless Steels. (Studies on 30Ni-20Cr stainless steels—II) ..... *Shigehiro INOUE.* ...1500
- 120 Rapid Determination of the Carbon in Pure Iron. .... *Kenzo OKAMOTO, et alii.* ...1502
- 121 Quantovac Analysis of Iron and Steel. (Pig Iron) ..... *Yutaka MANABE, et alius.* ...1503
- 122 Spectrographic Determination of Small Amount of Boron in a Heat-Resisting Alloy. .... *Takeji KOIZUMI, et alius.* ...1505
- 123 Determination of the Arsenic in Iron Ores Based on Thermo-Decomposition. .... *Takami MIZUNO, et alius.* ...1507
- 124 Gas Chromatographic Analysis of Blast Furnace Gas and Annealing Atmosphere. (Applications of gas chromatography to iron and steel works—I)..... *Yoshiaki MIURA, et alius.* ...1509
- 125 Effect of Columbium on the Crystal Grain Size of Steel. .... *Kiichi NARITA, et alii.* ...1512
- 126 Austenite Grain Size and Morphology of Aluminum Nitride. (Study of aluminum nitride in steel—VI) ..... *Shigeo HASEBE.* ...1514
- 127 Identification of Nonmetallic Inclusions by X-Ray Microanalyzer. (Study on nonmetallic inclusions in steels—IV)..... *Iku UCHIYAMA.* ...1516
- 128 Effect of Nonmetallic Inclusions on the Ultrasonic Test Figure of Steel Plates. .... *Suehiro HIYOSHI, et alii.* ...1518
- 129 Study on Nonmetallic Inclusions in the Rimmed Steel Ingot by the Slime Method. (Study on nonmetallic inclusions in steel by the slime method—I) ..... *Yukiyoshi ITOH, et alii.* ...1520

- 130 Determination of the Sulfides in High-Sulphur Steels. .... *Kōshi KATŌ, et alius.* ...1522
- 131 Influence of Sulphide Inclusions in S-Segregated Zone  
on Fractured Surface of the Torsion Test Piece. .... *Sōichi IZUMI, et alii.* ...1524
- 132 Effect of Titanium Deoxidation on Surface Defects  
of Aluminum Killed Mild Steel Plates. .... *Yoshiie FUKUDA, et alii.* ...1527
- 133 On Deoxidation of Steel by Titanium. .... *Junichi IMAI, et alii.* ...1528
- 134 Effect of Addition of Ti and B on Mn-Si, Mn-Si-Cr and  
Mn-Si-Mo Steel.  
(Study on high-strength structural steel—II) ..... *Hideo TAN, et alii.* ...1530
- 135 Effects of V, W, Mo, or Cr on the Resistance to Temper  
Softening of Steels. (Effects of special elements on  
the resistance to tempering of steels—I) ..... *Hiroshi ISHIZUKA, et alius.* ...1532
- 136 Effect of Mn and Ni in Case-Hardening Steel on  
Gas-Carburizing of Steels. .... *Toshimi SASAKI.* ...1534
- 137 Relation between as-Slack-Quenched Heterogeneous Structure  
and Mechanical Properties of Spring Steel. .... *Michira UCHIYAMA, et alii.* ...1535
- 138 Hardness and Impact Value of Hot-Working Tool Steels at  
Elevated Temperature.  
(Study of hot-working tool steels—I) ..... *Kiyoshi HORI, et alius.* ...1538
- 139 Effect of Chemical Composition and Hardness on Abrasion  
Loss of Steel against Soil and Sand.  
(Studies of abrasion-resisting steel—I) ..... *Kunio YAMADA, et alii.* ...1540
- 140 Fatigue Strength of Deformed Bars. .... *Sinichi WATANABE, et alius.* ...1542
- 141 Effect of Vacuum Melting and Annealing for Spheroidization  
Applied to Cold-Forming Wires. .... *Kinji YOKOYAMA, et alii.* ...1544
- 142 Studies on Relation between Thermal Absorption and  
Heat Treatment of the Material for Turbine Rotors.  
(Studies on type A deflection revealed during  
heat indication tests of turbines—I) ..... *Hiroshi YOSHIDA, et alius.* ...1546
- 143 Studies on the Surface Reflectability of Steam Turbine Rotors  
and Type A Deflection. (Studies on type A deflection  
revealed during heat indication tests of turbines—II) ..... *Ei KANAZAWA, et alii.* ...1548
- 144 On the Cause of the D-Type Deflection of a Turbine  
Shaft during Heat-Indication Test. .... *Makoto AIZAWA, et alii.* ...1549
- 145 On a Method to Obtain Crack-Arresting Transition Temperature. .... *Saburo ABE.* ...1551
- 146 Low-Temperature Brittleness of Pure Iron.  
(Studies of load-time relations under Charpy  
impact test—VII) ..... *Masanobu OHMORI et alii.* ...1554
- 147 Impact Tensile Properties of a Mild Steel at Low-Temperature.  
(Measurement of the tensile properties of steels  
with a high-speed impact testing machine—IV) ..... *Tadahisa NAKAMURA, et alii.* ...1556
- 148 Study on Corrosion of Gray Cast Iron by Fused Alkali.  
(Studies on the alkali-resisting cast iron—I) ..... *Motosuke KIMURA, et alius.* ...1557
- 149 Study on Corrosion of Inoculated, Ductile and Low-Alloy Cast  
Iron by Fused Alkali. (Studies on the alkali-resisting  
cast iron—I) ..... *Motosuke KIMURA, et alius.* ...1558
- 150 Study on Corrosion of Cast Iron under Various Casting  
Conditions by Fused Alkali (Studies on the alkali-  
resisting cast iron—III) ..... *Motosuke KIMURA, et alius.* ...1561
- 151 Machinability of the Lead Carbon Steels.  
(Study on leaded free-cutting steels—IX) ..... *Teturo ITO.* ...1563
- 152 Study on Nodular Graphite Steel Rolls. .... *Yoshiaki MASUKO, et alius.* ...1564
- 153 Observation of Grain Growth of Low-Carbon Steel  
Sheets with a Hot-Stage Microscope. .... *Takenobu KOGA, et alii.* ...1567
- 154 Effect of Annealing Processes on Properties of  
Extremely Low-Carbon Steel Sheets. .... *Morihiko YAZU, et alii.* ...1568
- 155 On the Slide-Capped Steel. .... *Hidetaro NEMOTO, et alius.* ...1570
- 156 Mechanical Properties and Metallurgical Observation  
of Welded Rails. .... *Masaaki MURAKAMI, et alii.* ...1572