

Vol. 2

No. 5

1963

March

伝 熱 研 究

News of HTSJ

第 5 号

日 本 伝 熱 研 究 会
Heat Transfer Society of Japan

目 次

論 説

2次元層流熱伝達.....	森 康 夫.....	1
---------------	------------	---

ニ ュ ー ス

§ 1. ヤーロ教授の来日.....	4
§ 2. 機械学会通常総会案内.....	6

会 告

総 会 予 告.....	8
--------------	---

文献リスト.....	9
------------	---

投稿規定.....	48
-----------	----

論	説
---	---

2次元層流熱伝達

森 康 夫

1962年になつてからだと思いますがTrans.A.S.M.EのJournal of Applied Mechanicsに新しい編集方針がのつていました。この雑誌に最近投稿数が多いので新しい制限を設けたものですが目あたらしい事柄につきのようなものがあります。それによりますと容易に考えられまた理解できるような問題を周知の論理的あるいは実験的方法で扱つた論文は採用されないだろうといつております。これに該当するものとして7つの例をあげており、そのうち伝熱に関するものはつぎの2つです。

1. 物性値を一定とする熱伝導および拡散の問題
2. 独創的なあるいは広く応用できる解法を含まない2次元定常層流境界層あるいは熱伝達の問題

これらの制限はさきにものべましたように投稿数の増加にもなつて生じたものであることは明記されております。上記の分野に属するものにも未だ深く研究しなければならない多くの問題があることは明らかで、その研究成果は勿論多くの刊行物で発表できるわけです。

私の心配致しますことはこのような制限が他の刊行物の編集においても次第にあらわれ、その結果2次元層流熱伝達の研究に人々が熱意を失ふことです。我々はこれまでに行つてきた研究、あるいは現に行つていゝる研究から新しい研究の緒を見出すことがよくあります。これはたとえば2次元層流熱伝達のような基礎的問題の研究から新しい3次元熱伝達の重要な研究へのヒントがえられる可能性が充分考えられることを意味します。

一つの例として1923年に寺田寅彦先生が東大の航研報告に発表されている伝熱問題をとり上げてみたいと思います。寺田先生は皆様もご存知のように有名なローマ字学者でもありましたので論文の和文抄録の代りにローマ字の文が冒頭にあり、その論文の題名は Ryūtai no Tairyū ni yotte dekiru syūkitekino Udu no Retu ni Kwansuru Zikken で、欧文題名は Some experiments on Periodic Columnar Forms of Vortices caused by Convection というものです。水平な加熱電板の上に水を流すと、流れ方向に軸をもつ多くの渦を生ずることを細かく観測されたものです。渦がなければ伝熱工学的にいいかえますと平板周りの2次元層流熱伝達というところでは、寺田先生の卓越された観察力により3次元性をつかまえられたわけです。数年前曲面板の境界層に生ずる同じような渦につき Görtler が参照にするまで私も不勉強のためこの報告を知りませんでしたが、Görtlerによると寺田先生の研究がこの種の渦についての唯一の研究であるとのことでした。私の研究室でも最近いくつかの3次元流の熱伝達をしており、その一つとして上記の問題について寺田先生の実験を追試するとともに更に精度のよい実験を行っておりますが、渦の間隔を定めるため境界層に染料を流してとった写真^{*}を図に示してあります。2つの反対の回転方向をもつ渦が対になっており、対の間のすじが写真にみられています。このすじのピッチは壁と流体の温度差と流速によります。

上にのべました例の外にも強制対流層流熱伝達にかぎらず自然対流熱伝達においても、直観的には2次元と考えられる流れでも、熱移動が加わったために詳しく観測すると3次元性をもつ場合がかなりあります。しかしこれらの3次元的な複雑な伝熱問題の研究にはそれらの基礎としての2次元層流熱伝達を完全に理解しその正確な知識を先づ得なければならないことは明らかです。このために今後とも2次元層流熱伝達の研

* 謄写ではよく印刷されませんので、編集の都合上割愛しました。

究をつづける必要があると考えられるわけです。

ニ ュ ー ス

§ 1. ギート教授の来日

カリフォルニア大学(バンクレイ)のWarren H. Giedt 教授は、去る3月11日夫人同伴で来日された。約半年間、東京大学客員教授として滞在し、工学部機械工学科に所属し、学生の教育に参加される。教授は、「基礎伝熱工学」(横堀, 久我両氏訳)の著者であつて、わが国にもよく知られている。以下に教授の略歴を紹介する。

滞日中教授に連絡されたい場合は、東大工機械の植田辰洋教授、または、東大生産技術研究所の橘藤雄教授に連絡されたい。

Professor Warren H. Giedt の略歴

出生: 1920年11月1日

現職: カリフォルニア大学機械工学科(航空専修)教授
University of California, Berkeley 4, California.

1940~43 カリフォルニア大学機械工学科に学ぶ(B.S)

1943~47 アメリカ合衆国空軍, この間, 空軍熱力学助教授を2年間兼ねる。

1945~50 カリフォルニア大学機械工学科(Ph.D)

1947~50 カリフォルニア大学機械工学科講師

1950 バブコック・ウイルコック会社技師

1950~ カリフォルニア大学機械工学科助教授, 准教授を経て現在航空専修教授。伝熱および熱力学の講義と主として伝熱関係の研究を行う。

著書: "Principles of Engineering Heat Transfer"
D. Van Nostrand, 1957

上記の教科書は日本訳され, 広く利用されている。

「基礎伝熱工学」 訳: 横堀准, 久我修両氏, 丸善 1960

伝熱関係の主な研究

1. "Investigation of Variation of Point Unit Heat Transfer Coefficient around a Cylinder Normal to an Air Stream" Trans. ASME., Vol. 71, p.375, 1949
2. "A Study of Local Heat Transfer and Skin Friction on a Circular Cylinder in the Critical Flow Region" Ph. D. Thesis. University of California, Berkeley, 1950
3. "Effect of Turbulent Level of Incident Air Stream on Local Heat Transfer and Skin Friction on a Cylinder" J. Aeronautical Sciences, Vol. 18, No.11, p.725, 1951
4. "The Use of a Zehnder-Mach Interferometer for the Study of Heat Transfer from a Cylinder" Proc. Instrument Soc. America Vol. 7, 1952
5. "The Determination of Transient Temperatures and Heat Transfer at a Gas-Metal Interface applied to a 40mm Gun Barrel" Jet Propulsion, Vol. 25, p.158, 1955
6. "Heat Transfer to, and Temperature Distribution in, a Metal Cutting Tool"(共著) Trans. ASME., Vol. 78 p.1507, 1956.
7. "An Oxyacetylene Flame Apparatus for Surface Ablation Studies — Distribution of Heat Transfer and Initial Ablation Test"(共著) U.C. IER Report, HE-150-171, 1959
8. "Heat Transfer, Recovery Factor and Pressure Distributions around a Circular Cylinder normal

to a Supersonic Rarefied Air Stream"(共著) J.
Aero-Space Sciences, Vol. 27, No.10, p.721, 1960

9. "Boiling Mercury Heat Transfer"(共著), ASME, J. of
Heat Transfer, Vol.82, Series C, No 4, p.387, 1960

§ 2. 機械学会第40期通常総会は来る4月1日~5日にわたって開催
されるが、講演会は1~3日の間、東京電機大学で開かれる。伝熱関
係の講演予定は次の通りである。

1. 純機械的除湿法 Moisless について

正 *尾 園 鉄次郎 天野特殊機械
ク 榎 場 平 一 ク
皆 川 健 一 ク

2. 気液混合物の垂直管内上昇流について(第1報)

正 植 田 辰 洋 東大工
ク *小 林 倬 他 飯野海運

3. 気液混合物の垂直管内上昇流について(第2報)

正 植 田 辰 洋 東大工

4. 核沸騰における気泡の成長と崩壊について

正 西 川 兼 康 九大工
ク *楠 田 久 男 九大工教養
ク 山 崎 健 一 九大工

5. 遷移沸騰の研究(第1報)

正 西 川 兼 康 九大工
ク 長谷川 修 ク
准 *岩 淵 俊 彦 ク
ク 宮 原 由 幸 ク

6. 超臨界圧におけるボイリングもどき現象について

正 *西 川 兼 康 九大工
ク 宮 部 喜代二 ク
准 伊 藤 猛 宏 ク

7. 発熱する円管における内外面の温度差の計算
正 長谷川 修 九大工
8. 管内熱伝達に及ぼす遠心力のえいきよう
正 福井 資夫 東芝中研
ク *坂本 守義 ク
9. 輻射対流フインの温度分布と効率
(第2報フイン環の場合)
正 岡本 芳三 原研
10. 各種流体中における微粒子の強制対流熱伝達
正 *坪内 為雄 東北大速研
ク 増田 英俊 ク
11. 熱伝達の解析にかんする一考察
准 伊藤 猛宏 九大工

尚、講演会のあと、「実際の熱伝導問題におけるアナロジー」というテーマで、懇談会が開かれる。

会	告
---	---

1. 第9回編集委員会

昭和38年3月15日 午後3時～5時

内田委員長，原，国井各委員出席

- a. 「伝熱研究」第5号掲載内容につき打合
- b. 次期編集委員長候補につき相談

2. 第5回幹事会

昭和38年3月19日 午後2時30分～5時

- a. 次期総会の開催要項を次のようにきめた。
 - 4月3日 午後2時から
 - 東京大学生産技術研究所(予定)で開催
 - カリフォルニア大学のギート教授の講演を予定
- b. 学術会議，燃焼伝熱研究連絡委員会について報告
- c. ニュース「伝熱研究」の分売を希望する向きがふえたが，その場合，当分の間会員は一冊150円，非会員は一冊300円とすることにした。

文 献 リ ス ト

§ 1 ТЕПЛО-И МАССОПЕРЕНО (Heat and Mass Transfer)

(甲藤好郎 編)

この論文には1961年6月5日から9日までの間、ミンスク市で行われた熱及び物質交換に関する第1回全ソ連邦会議の「各種材料，熱運搬体の熱物理特性とその決定方法」の部門の会議で通読された論文が掲載されている。それらは熱物理特性，熱交換係数，拡散，密度の決定方法及び熱物理的研究用にあらかじめ定められた器具の記述にあてられている。以下はその目次である。

ТОМ I

А. Ф. Бегункова, Г. Н. Дульнев, Е. С. Платунов. Приборы для теплофизических измерений, разработанные в ЛИТМО	3
А. Ф. Чудновский, Б. М. Могилевский. Использование термоэлектрического эффекта в полупроводниках для определения их теплопроводности	11
И. С. Лискер. Измерение коэффициента теплопроводности полупроводников в нестационарном режиме	20
Ян. Земанек. Некоторые исследовательские работы, выполненные в ГИИТ в области измерения температур и теплофизических свойств	34
М. В. Кулаков. Задачи теплопроводности с источником тепла	42
А. Б. Вержинская. Метод источника постоянной мощности	57
И. И. Морачевский, Б. В. Спектор, В. И. Рязанцев. Метод и прибор для определения теплофизических характеристик материалов без взятия пробы	61
В. С. Волькенштейн. Скоростной метод измерения теплофизических характеристик материалов	65
Г. Н. Третьяченко, Л. В. Кравчук. Методика определения теплофизических характеристик материалов при высоких температурах	70
Ю. А. Кириченко. Определение теплофизических характеристик методом радиальных температурных волн	77
Н. И. Гамаюнов. Новый метод комплексного определения коэффициентов тепло- и массопереноса и критерия фазового превращения	86
В. С. Гуменюк, В. Е. Иванов, В. В. Лебедев. Определение теплопроводности металлов при температурах выше 1000° С.	94
П. Г. Алексеев. Метод комплексного определения теплофизических характеристик полимеров в зависимости от параметров внешней среды — температуры и давления	102
Х. И. Амирханов, А. П. Адамов, Л. Н. Левина. Теплопроводность углекислоты вдоль пограничной кривой, включая область критического состояния	107
Б. Н. Колбасов. Исследование теплообмена и теплофизических свойств двуокиси углерода в сверхкритической области	109
Р. Е. Кржижановский. Некоторые закономерности в поведении теплопроводности металлов и сплавов	115
Б. П. Пашаев. Измерение теплопроводности некоторых металлов и сплавов при плавлении	126
В. А. Календерьян, Р. А. Бахтиозин, З. Р. Горбис. Теплофизические и иные характеристики частиц искусственного графита	131
Е. В. Кудрявцев, К. Н. Чакалев, О. И. Лулева. Эталонирование теплового потока	140
Е. А. Митькина. Определение теплоемкости с помощью электронного калориметра	146
Н. Д. Косов, О. В. Ривин. О новом типе калориметра для определения тепловых констант	152
В. А. Гришин. Тепловые измерения методом текущей тепловой компенсации	160
И. Я. Залкинд. Измеритель тепловых потоков с поверхностей	166

Д. И. Гремилев. Исследование теплообмена методом теплообменника	170
Г. Е. Ожигов. Малонерционный термостолбик для исследований лучистого теплообмена	175
В. Ф. Вышенская, Н. Д. Косов. Исследование температурной зависимости коэффициента диффузии газов	181
И. Е. Суетин. Оптический метод измерения коэффициентов взаимной диффузии газов	188
Ю. Д. Василевская. Коэффициенты диффузии бинарных смесей паров некоторых углеводородов и воздуха	191
А. А. Коныков, В. П. Ионов. Спектральные характеристики некоторых газов при высоких температурах и давлениях	196
Н. Н. Медведев. Температурный гистерезис	205
Р. С. Прасолов. Материалы со сверхнизкой теплопроводностью и расчет теплопроводности и вязкости газов в тонкопористых материалах и при разрежении	213

ТОМ II

Предисловие	3
-----------------------	---

ЧАСТЬ I. ТЕПЛО- И МАССОПЕРЕНОС ПРИ ФАЗОВЫХ ПРЕВРАЩЕНИЯХ

С. Р. де Гроот. О термодинамике необратимого тепло- и массообмена	5
А. В. Лыков. Применение методов термодинамики необратимых процессов к исследованию тепло- и массопереноса в пограничном слое	16
Д. В. Споддинг. Тепло- и массообмен между газообразной и жидкой фазами в бинарной смеси	26
С. С. Кутателадзе. Теплообмен при кипении	44
В. П. Скрипов. Кризис кипения и термодинамическая устойчивость жидкости	60
М. В. Буйков, С. С. Духин. Диффузионная и тепловая релаксация испаряющейся капли	65
Г. Т. Сергеев. Исследование процесса переноса тепла и вещества при испарении жидкости в вынужденный поток газа	75
В. М. Боришанский. Критические нагрузки при кипении и термодинамическое подобие	80
Э. Л. Миропольский, М. Е. Шницман. Критические тепловые потоки при кипении воды в каналах	87
И. Л. Мостинский. Применение закона соответственных состояний к расчету теплообмена при кипении жидкости	94
П. И. Позарин. Обобщение данных по кризису кипения при течении в трубах воды, недогретой до температуры насыщения	100
Б. А. Зенкевич, О. В. Ремизов, В. И. Субботин. О влиянии геометрии канала на критические тепловые нагрузки при вынужденном течении воды	106
В. И. Толубинский. Скорость роста паровых пузырей при кипении жидкостей	112
И. Г. Стюшин. Новые результаты исследования теплообмена при кипении в трубах	114
Л. Н. Григорьев. Исследование теплообмена при кипении двухкомпонентных смесей	120
В. М. Боришанский, П. А. Масличенко, Б. С. Фокин. Некоторые данные о механизме пленочного кипения в большом объеме жидкости	128
И. Р. Кричевский, Н. Е. Хазанова, Л. Р. Линишиц. Диффузия в газах вблизи критической точки равновесия жидкость — пар	132
И. Р. Кричевский, Н. Е. Хазанова, Л. С. Лесневская. Диффузия в газах при высоких давлениях	136
П. Г. Романков. Общие кинетические закономерности массопереноса в системах твердое тело — газ, твердое тело — жидкость	142
Н. У. Ризаев. Исследование процесса массообмена в системах твердое тело — жидкость	148
В. В. Кафаров. Анализ процессов массопередачи на основе представления о межфазной турбулентности	152
Иржи Шнеллер. Вопросы в области тепло- и массообмена, решаемые в Государственном исследовательском институте теплотехники (Чехословакия)	161
И. Т. Эльперин. Интенсификация теплообмена между газом и поверхностью твердого тела при помощи промежуточного жидкого теплоносителя	181
И. Т. Эльперин. Исследование процессов обмена во встречных струях	190
Р. З. Алимов. Тепло- и массообмен в трубах при вихревом движении двухфазного потока	198
В. С. Жуковский, К. И. Резникова. Тепло- и массообмен в воздухоохладителях со спирально-ребристыми трубками	206

П. А. Новиков. Влияние скорости движения тела на тепло- и массообмен в вакууме	215
Л. Е. Михайлов. Исследование кризиса теплообмена при вынужденном движении этилового спирта в канале кольцевого сечения	222
Дискуссия	228

ЧАСТЬ II. ТЕПЛО- И МАССОПЕРЕНОС ПРИ ХИМИЧЕСКИХ ПРЕВРАЩЕНИЯХ

Б. В. Канторович. К вопросу о смешении газов, движущихся внутри цилиндрической трубы	243
Г. Н. Делягин, Б. В. Канторович. Массообмен в процессе горения топлива в потоке	249
И. И. Палеев, Ф. А. Агафонова. Теплообмен между горячей поверхностью и газовым потоком, несущим капли испаряющейся жидкости	260
В. И. Данилкин, В. Е. Харциев. Процессы массо- и теплопереноса в мембранах в неизотермических условиях	269
Г. А. Остроумов. Гидродинамическое объяснение электрических свойств изолирующих жидкостей	277
Н. И. Гельперин, В. Б. Кваша. Определение и обеспечение оптимального температурного поля в химических реакторах	282
И. С. Павлушенко, Л. Н. Брагинский, Н. Н. Смирнов, П. Г. Романков. Влияние механического перемешивания на процессы массообмена при химических превращениях	302
В. П. Мотулевич. Тепло- и массообмен в лобовой точке притупленных тел, омываемых потоком жидкости при наличии гетерогенных химических реакций	308
Л. И. Комарова. Естественный конвективный тепло- и массообмен при химических реакциях	324
И. П. Слободяник. Новый метод анализа процессов химической сорбции в насадочных колоннах	330
Р. Ш. Сафин, Н. М. Жаворонков, А. М. Николаев. Исследование процессов физической абсорбции и хемосорбции в аппарате ротационного типа	334
Ф. Ф. Зигмунд. К расчету кристаллизаторов с воздушным и вакуум-охлаждением	341
И. Л. Любошиц. Глубокая сушка фрезерного торфа и его полукоксование в падающем слое при наружном обогреве	347
С. М. Репринцева. Процесс термического разложения фрезерного торфа в падающем слое при наружном обогреве	353
А. В. Ралко. Тепло- и массоперенос в процессах обжига	357
Ю. А. Финяев. Процесс выделения летучих при выгорании торфяных частиц	369
Дискуссия	375

§ 2. 化学工学(国井大蔵編)

- 2.1. 触媒反応管内の温度と濃度分布の解法 永田進治ら(京都大学, 工, 化学工学教室) Vol. 26, 569
- 2.2. 垂直円管内における空気自然対流の速度 清水賢, 森田徳義(名古屋大学, 工, 化学工学科) Vol. 26, 687
- 2.3. 粘性流体の熱伝達に関する近似解 村上泰弘(東洋レーヨン株式会社技術部中央研究所) Vol. 26, 873
- 2.4. 輻射伝熱について
H. C. Hottel (Dept. of Chem. Eng., M. I. T., Mass., U. S. A.)
A. F. Sarofim ()
竹内千郷(千代田化工建設株)
- 2.5. 大きな温度範囲をもつ充てん層の熱伝達 外山茂樹(東京工業試験所) Vol. 26, 976
- 2.6. 冷却式装置内の溶液濃度および温度の変化 谷本明(東京工業大学化学工学科) Vol. 26, 1140
- 2.7. 熱サイフォン作用に及ぼす空気の循環速度 清水賢, 森田徳義(名古屋大学, 工, 化学工学科) Vol. 26, 1232
- 2.8. 管内層流熱伝達に関する一計算 宗像健(九州大学, 工, 化学機械科) Vol. 26, 1085
- 2.9. 粒子-粒体間の熱伝達 W. E. Ranz (Univ. of Minnesota, Minneapolis, Minn., U. S. A.)
- 2.10. 流れを伴う充填層の伝熱 国井大蔵(東京大学, 工, 化学工学科) Vol. 26, 750
- 2.11. 非ニュートン流体の熱伝達 平井英二(金沢大学, 工学部) Vol. 26, 754

§ 3. 工業化学雑誌(国井大蔵編)

- 3.1. 過塩素酸アンモニウム推薬の火炎温度 土屋荘次(東京大学, 航空研究所, 東京都目黒区駒場町) Vol. 65, 843(1962)

§4. Chemical Eng. Science (国井大蔵 編)

- 4-1. "The Effect of Heat Transfer between the Phases on the Performance of Countercurrent Distillation Columns", (S. Y. Liang (Dept. of Chem. Eng., Imperial College, London, S. W. 7, England) and W. Smith), 17, 11 (1962)
- 4-2. "Thermal Diffusion with Laminar Flow in a Duct", (J. C. R. Turner (Dept. of Chem. Eng., Univ. of Cambridge, Pembroke Street, Cambridge, England)), 17, 95 (1962)
- 4-3. "The Effect of Natural Convection on Viscous-Flow Heat Transfer in Horizontal Tubes", (D. R. Oliver (Chem. Eng. Dept., Univ. of Birmingham, England)), 17, 335 (1962)
- 4-4. "On the Solution of the Convection Equation in Laminar Boundary Layer Flows", (A. Acrivos (Dept. of Chem. Eng., Stanford Univ., California, U.S.A.)), 17, 457 (1962)

§5. Chemical Eng. Progress (国井大蔵 編)

- 5-1. "Gas Velocity Effects on Heat Transfer in Direct Heat Rotary Dryers", (P. Y. McCormick (DuPont Co., Wilmington, Del., U.S.A.)), vol. 58, No. 6, 57 (1962)
- 5-2. "Superheated Solvent Drying in a Fluidized Bed", (Louis Basel (Crawford & Russel Inc., Stanford, Conn. U.S.A.) and Edward Gray (Dorr-Oliver Inc., Stanford, Conn., U.S.A.)), vol. 58, No. 6, 67 (1962)
- 5-3. "Mass and Heat Transfer through Fixed and Fluidized Beds", (A. S. Gupta and George Thodos (Northwestern Univ., Evanston, Ill., U.S.A.)), vol. 58, No. 17, 58 (1962)
- 5-4. "Economics of Using Heat Transfer Promoters", (L. B. Evans and S. W. Churchill (Univ. of Michigan, Ann Arbor, Michigan, U.S.A.)), vol. 58, No. 10, 55 (1962)

- 5-5. "Inductively Heated High Temperature Reactor", (W. E. Ranz and B. A. Bydal (Univ. of Minnesota, Minneapolis, Minn., U.S.A.)), vol. 58, No. 12, 43 (1962)
- 5-6. "Heat Transfer in Falling-Film Long-Tube Vertical Evaporators", (J. R. Sinek and E. H. Young (The Univ. of Michigan, Ann Arbor, Mich., U.S.A.)), vol. 58, No. 12, 74 (1962)
- §6. Transactions, American Society of Heating, Refrigerating and Air-Conditioning Engineers (内田秀雄 編)
- 6-1. "Operating Economy of Air-Cooled Refrigerant Condensers", (Otto J. Nussbaum and Mark Lichtenstein (Kramer Trenston Company)), vol. 68, No. 1772, p. 9
- 6-2. "A Method of Crossflow Cooling Tower Analysis and Design", (N. Zamuner (Vitro Engineering Co.)), vol. 68, No. 1773, p. 27
- 6-3. "Selection of Hot Junction Temperatures for Minimum Fin Area Thermoelectric Refrigerators", (Charles L. Feldman (Joseph Kaye & Company, Inc.)), vol. 68, No. 1775, p. 48
- 6-4. "Integrated Radiation-Convection Cooling System Design and Performance", (Gershon Meckler (Meckler Engineering Company)), vol. 68, No. 1781, p. 141
- 6-5. "Solar Heat Gains through Three Types of Flat Window Glass", (L. F. Schutrum (Research Supervisor, ASHRAE Laboratory)), vol. 68, No. 1782, p. 167
- 6-6. "Energy Sources and Requirements for Residential Heating", (R. C. Jordan (Wood Conversion Company), G. A. Erickson (Director of Technical Sales Service) and R. R. Leonard (Wood Conversion Company)), vol. 68, No. 1783, p. 174
- 6-7. "An Instrument for the Measurement of the Humidity of Air", (J. D. Wentzel (National Mechanical Engineering Research Institute, Pretoria, Union of South Africa)), vol. 68, No. 1784, p. 204

- 6-8. "Electronic Analog Computer Solution of Combined Heat Problems", (Donald G. Rich (The Research Department of the Carrier Corporation) and Gerald K. Gable (The Development Department of the Carrier Corporation)), vol. 68, No. 1785, p. 221
- 6-9. "Heat and Mass Transfer in Dehumidifying Extended Surface Coils", (W. L. Bryan (Mechanical Engineering Dept., Case Institute of Technology)), vol. 68, No. 1786, p. 237
- 6-10. "An Analog Evaluation of Methods for Controlling Solar Heat Gain through Windows", (D. G. Stephenson and G. P. Mitalas (Division of Building Research, National Research Council, Ottawa, Canada)), vol. 68, No. 1787, p. 248
- §7. Univ. of Minnesota, Heat Transfer Laboratory, Publications, Technical Reports, Theses (1952 以降) (平田 賢 編)

I. Publications

1. "Developments in Convective Heat-Transfer Research," (E. R. G. Eckert), pp. 309-318 in Proceedings of the Second Midwestern Conference on Fluid Mechanics, Columbus: Ohio State University Press. 1952.
2. "Heat Transfer," (E. R. G. Eckert), Ind. and Eng. Chem., vol. 45, pp. 951-956. May, 1953.
3. "Calculation of Transpiration-Cooled Gas-Turbine Blades," (J. N. B. Livingood and E. R. G. Eckert), Trans. Am. Soc. Mech. Engrs., vol. 75, pp. 1271-1278. October, 1953.
4. "Temperature Distribution in the Walls of Heat Exchangers with Noncircular Flow Passages," (E. R. G. Eckert), pp. 175-186 in Preprint of Papers, Heat Transfer and Fluid Mechanics Institute 1952, Stanford: Stanford University Press, 1952; pp. 703-718 in Proceedings of the Third Midwestern Conference on Fluid Mechanics, Minneapolis: University of Minnesota Press. 1953.

5. "Convective Heat Transfer at High Velocities," (E. R. G. Eckert), pp. 173-193 in Heat Transfer Symposium 1952, Ann Arbor: Engineering Research Institute, University of Michigan. 1953.
6. "Transpiration and Film Cooling," (E. R. G. Eckert), pp. 195-210 in Heat Transfer Symposium 1952, Ann Arbor: Engineering Research Institute, University of Michigan. 1953.
7. "Convective Heat Transfer for Mixed, Free, and Forced Flow Through Tubes," (E. R. G. Eckert and A. J. Diaguila), Trans. Am. Soc. Mech. Engrs., vol. 76, pp. 497-504. May, 1954.
8. "Heat Transfer," (E. R. G. Eckert), Ind. and Eng. Chem., vol. 46, pp. 932-937. May, 1954.
9. "Heat Transfer to Mercury in Turbulent Pipe Flow," (H. A. Johnson, J. P. Hartnett, and W. J. Clabaugh), Trans. Am. Soc. Mech. Engrs., vol. 76, pp. 505-511. May, 1954.
10. "Heat Transfer to Lead-Bismuth and Mercury in Laminar and Transition Pipe Flow," (H. A. Johnson, J. P. Hartnett, and W. J. Clabaugh), Trans. Am. Soc. Mech. Engrs., vol. 76, pp. 513-517. May, 1954.
11. "The Tabulation of Imperfect-Gas Properties for Air, Nitrogen, and Oxygen," (N. A. Hall and W. E. Ibele), Trans. Am. Soc. Mech. Engrs., vol. 76, pp. 1039-1056. October, 1954.
12. "Simultaneous Turbulent and Laminar Flow in Ducts with Noncircular Cross Sections," (E. R. G. Eckert and T. F. Irvine, Jr.), J. Aeronaut. Sci., vol. 22, pp. 65-66. March, 1955.
13. "Heat Transfer," (E. R. G. Eckert, J. P. Hartnett, and H. S. Isbin), Ind. and Eng. Chem., vol. 47, pp. 647-658. March, 1955.
14. "Investigation of the Energy Distribution in a High Velocity Vortex Type Flow," (E. R. G. Eckert and J. P. Hartnett), pp. 25-35 in Symposium on the Vortex Tube as a True Free Air Thermometer, Chicago: Armour Research Foundation. May, 1955.

15. "Engineering Relations for Friction and Heat Transfer to Surfaces in High Velocity Flow," (E. R. G. Eckert), J. Aeronaut. Sci., vol. 22, pp. 585-587.
16. "Compressibility Deviations for Polar Gases," (N. A. Hall and W. E. Ibele), Trans. Am. Soc. Mech. Engrs., vol. 77, pp. 1003-1009. October, 1955.
17. "Experimental Determination of the Thermal-Entrance Length for the Flow of Water and of Oil in Circular Pipes," (J. P. Hartnett), Trans. Am. Soc. Mech. Engrs., vol. 77, pp. 1211-1220. November, 1955.
18. "Variation of Maximum Thermal Stress in Free Plates," (P. J. Schneider), J. Aeronaut. Sci., vol. 22, pp. 872-873. December, 1955.
19. "Studien zum Umschlag laminar-turbulent der freien Konvektions-Strömung an einer senkrechten Platte," (E. R. G. Eckert, E. Soehngen, and P. J. Schneider), pp. 407-418 in 50 Jahre Grenzschichtforschung, Braunschweig: Vieweg and Sohn. 1955.
20. "Measurements of the Energy Separation in a High Velocity Vortex Type Flow," (E. R. G. Eckert and J. P. Hartnett), pp. 69-92 in Proceedings of the Fourth Midwestern Conference on Fluid Mechanics, Lafayette: Engineering Experiment Station, Purdue University Press. 1955.
21. "Heat Transfer," (E. R. G. Eckert, J. P. Hartnett, H. S. Isbin, and P. J. Schneider), Ind. and Eng. Chem., vol. 48, pp. 655-668. March, 1956.
22. "Effect of Diffusion in an Isothermal Boundary Layer," (E. R. G. Eckert and P. J. Schneider), J. Aeronaut. Sci., vol. 23, pp. 384-387. April, 1956.
23. "Measurement of Total Emissivity of Porous Materials in Use of Transpiration Cooling," (E. R. G. Eckert, J. P. Hartnett, and T. F. Irvine, Jr.), Jet Propulsion, vol. 26, pp. 280-282. April, 1956.

24. "Flow in Corners of Passages with Non-circular Cross sections," (E. R. G. Eckert and T. F. Irvine, Jr.), pp. XI to XI8 in Reprints of Papers, Heat Transfer and Fluid Mechanics Institute, Stanford: Stanford University Press, 1955; Trans. Am. Soc. Mech. Engrs., vol. 78, pp. 709-718. May, 1956.
25. "Engineering Relations for Heat Transfer and Friction in High-Velocity Laminar and Turbulent Boundary-Layer Flow Over Surfaces with Constant Pressure and Temperature," (E. R. G. Eckert), Trans. Am. Soc. Mech. Engrs., vol. 78, pp. 1273-1283. August, 1956.
26. "Theoretical Study of Mass Transfer Cooling by Injection of a Light Weight Gas," (E. R. G. Eckert and P. J. Schneider), p. 14 in Proceedings of Fifth Biennial Technical Conference, Minneapolis: Rosemount Aeronautical Laboratories, University of Minnesota, Research Report No. 137. October, 1956.
27. "Mechanical Energy from Solar Energy," (R. C. Jordan and W. E. Ibele), pp. 81-101 in Proceedings World Symposium on Applied Solar Energy, Menlo Park, Stanford Research Institute. 1956.
28. "Selection of Optimum Configuration for a Heat Exchanger with One Dominating Film Resistance," (E. R. G. Eckert and T. F. Irvine), American Society of Mechanical Engineers, Paper No. 56-S-20. 20 pages + Figures.
29. "Mass Transfer Cooling in a Laminar Boundary Layer with Constant Fluid Properties," (J. P. Hartnett and E. R. G. Eckert), Trans. Am. Soc. Mech. Engrs., vol. 79, pp. 247-254. February, 1957.
30. "A New Method to Measure Prandtl Number and Thermal Conductivity of Fluids," (E. R. G. Eckert and T. F. Irvine, Jr.), J. Appl. Mech., vol. 24, pp. 25-28. March, 1957.
31. "Effect of Axial Fluid Conduction on Heat Transfer in the Entrance Regions of Parallel Plates and Tubes," (P. J. Schneider), Trans. Am. Soc. Mech. Engrs., vol. 79, pp. 765-773. May, 1957.

32. "Experimental Study of the Velocity and Temperature Distribution in a High Velocity Vortex-Type Flow," (J. P. Hartnett and E. R. G. Eckert), pp. 135-145 in Preprints of Papers, Heat Transfer and Fluid Mechanics Institute, Stanford: Stanford University Press, 1956; Trans. Am. Soc. Mech. Engrs., vol. 79, pp. 751-758. May, 1957.
33. "Heat Transfer," (E. R. G. Eckert, J. P. Hartnett, T. F. Irvine, Jr., and P. J. Schneider), Ind. and Eng. Chem., vol. 49, pp. 565-576, March, 1957; "Review of Heat Transfer Literature 1956," Mech. Eng., vol. 79, pp. 433-444. May, 1957.
34. "The Effect of Combustion on Heat Transfer to the Skin of a Vehicle Re-Entering the Atmosphere," (E. R. G. Eckert and J. P. Hartnett), pp. 17-1 to 17-12 in Mass Transfer Cooling for Hypersonic Flight, Santa Monica: The RAND Corporation. June, 1957.
35. "Orifice-Metering Coefficients and Pipe Friction Factors for the Turbulent Flow of Lead-Bismuth Eutectic," (H. A. Johnson, J. P. Hartnett, W. J. Clabaugh, and L. Fried), Trans. Am. Soc. Mech. Engrs., vol. 79, pp. 1079-1084. July, 1957.
36. "Simplified Equations for Calculating Local and Total Heat Flux to Nonisothermal Surfaces," (E. R. G. Eckert, J. P. Hartnett, and R. Birkebak), J. Aeronaut. Sci., vol. 24, pp. 549-550. July, 1957.
37. "Temperatures and Thermal Stresses in Transpiration-Cooled Power-Producing Plates and Tubes," (P. J. Schneider), Jet Propulsion, vol. 27, pp. 882-889. August, 1957.
38. "Nusselt Values for Estimating Turbulent Liquid Metal Heat Transfer in Non-circular Ducts," (J. P. Hartnett and T. F. Irvine, Jr.), A.I.Ch.E. J., vol. 3, pp. 313-317. September, 1957.
39. "Experimental Studies of Free Convection Heat Transfer in a Vortical Tube with Uniform Wall Heat Flux," (J. P. Hartnett and W. E. Welsh, Jr.), Trans. Am. Soc. Mech. Engrs., vol. 79, pp. 1551-1557. October, 1957.

40. "Total Normal Emissivity Measurements for Porous Materials Used for Mass-Transfer Cooling," (T. F. Irvine, Jr., J. P. Hartnett, and E. R. G. Eckert), Abstract, Mech. Eng., vol. 79, p. 1071. November, 1957.
41. "Ein neues Verfahren zum Messen der Prandtlzahl und der Wärmeleitzahl von Gasen," (E. R. G. Eckert and T. F. Irvine), Forschung Geb. Ingenieurwesens, vol. 23, pp. 91-94. 1957.
42. "Incompressible Friction Factor, Transition and Hydrodynamic Entrance Length Studies of Ducts with Triangular and Rectangular Cross-Sections," (E. R. G. Eckert and T. F. Irvine, Jr.), pp. 122-145 in Proceedings of the Fifth Midwestern Conference on Fluid Mechanics, Ann Arbor: University of Michigan Press, 1957.
43. "Introduction to the Transfer of Heat and Mass," (E. R. G. Eckert), Russian translation. Moscow-Leningrad: National Energetic Publishing, 1957. 280 pp.
44. "Mass, Momentum and Heat Transfer - A Survey of the Field," (E. R. G. Eckert), pp. 132-154 in Recent Advances in the Engineering Sciences, New York: McGraw-Hill Book Company. 1957.
45. "Description of a Sensitive Micromanometer," (R. Eichhorn and T. F. Irvine, Jr.), Review of Scientific Instruments, vol. 29, pp. 23-27. January, 1958.
46. "Mass Transfer Cooling of a Laminar Boundary Layer by Injection of a Light-Weight Foreign Gas," (E. R. G. Eckert, P. J. Schneider, A. A. Hayday, and R. M. Larson), Jet Propulsion, vol. 28, pp. 34-39. January, 1958.
47. "Measurements of the Total Absorptivity for Solar Radiation of Several Engineering Materials," (Richard C. Birkebak and J. P. Hartnett), Trans. Am. Soc. Mech. Engrs., vol. 80, pp. 373-378. February, 1958.
48. "Temperature of Parachutes in Supersonic Flow," (J. P. Hartnett), pp. 139-152 in Symposium on Missile and Drone Recovery, Dayton: Wright Air Development Center, Technical Report 58-125, ASTIA DOCUMENT NO. AD 151099. March, 1958.

49. "Generalized Trajectories for Free-Falling Bodies of High-
Drag," (R. D. Turnacliffe and J. P. Hartnett), Jet Propul-
sion, vol. 28, pp. 263-266. April, 1958.
50. "Heat Transfer," (E. R. G. Eckert, J. P. Hartnett, and
T. F. Irvine, Jr.), Ind. and Eng. Chem., vol. 50, pp. 543-
554, March, 1958; "A Review of Heat Transfer Literature
1957," Mech. Eng., vol. 80, pp. 64-75. June, 1958.
51. "Comparison of Experimental Information and Analytical
Prediction for Laminar Entrance Pressure Drop in Ducts
with Rectangular and Triangular Cross Sections," (T. F.
Irvine, Jr., and E. R. G. Eckert), J. Appl. Mech., vol.
25, pp. 288-290. June, 1958.
52. "Solar Collector Surfaces with Wavelength Selective
Radiation Characteristics," (T. F. Irvine, Jr., J. P.
Hartnett, and E. R. G. Eckert), Solar Energy, vol. 2,
pp. 12-16. July-October, 1958.
53. "Local Laminar Heat Transfer in Wedge-Shaped Passages,"
(E. R. G. Eckert, T. F. Irvine, Jr., and J. T. Yen),
Trans. Am. Soc. Mech. Engrs., vol. 80, pp. 1433-1438.
October, 1958.
54. Rearrangement of the Temperature Field in Flow Around a
Bend," (E. R. G. Eckert and T. F. Irvine, Jr.), Trans.
Am. Soc. Mech. Engrs., vol. 80, pp. 1765-1772. November,
1958.
55. "Einfluss eines Verbrennungsvorganges auf den Wärme- und
Stoffaustausch in einer laminaren Grenzschicht," (E. R. G.
Eckert and J. P. Hartnett), Zeitschrift für angewandte
Mathematik und Physik, vol. IXb, Fasc. 5/6, pp. 259-273.
1958.
56. "Mass Transfer Cooling with Combustion in a Laminar
Boundary Layer," (J. P. Hartnett and E. R. G. Eckert),
pp. 54-68, Preprints of Papers, in Heat Transfer and
Fluid Mechanics Institute, Stanford: Stanford University
Press. 1958.

57. "Study of the Air Flow Between Coaxial Disks Rotating with Arbitrary Velocities in an Open or Enclosed Space," (K. G. Picha and E. R. G. Eckert), pp. 791-798 in Proceedings of the Third U.S. National Congress of Applied Mechanics, New York: The American Society of Mechanical Engineers. 1958.
58. "Velocity Measurements in the Boundary Layer and in the Main Flow Between Two Coaxial Disks Rotating with Equal Velocities in Air," (W. E. Welsh, Jr., and J. P. Hartnett), pp. 847-855 in Proceedings of the Third U.S. National Congress of Applied Mechanics, New York: The American Society of Mechanical Engineers. 1958.
59. "The Electrical Analog for Determining Temperature Distribution in Electrical Components," (E. R. G. Eckert, J. P. Hartnett, T. F. Irvine, and Richard C. Birkebak), Appl. and Ind., No. 41, pp. 5-10. March, 1959.
60. "The Influence of Radiation on Convection in Noncircular Ducts," (T. F. Irvine, Jr.), Abstract, Mech. Eng., vol. 81, p. 118. April, 1959.
61. "Addendum To: 'Solar Collector Surfaces with Wave Length Selective Radiation Characteristics'," (T. F. Irvine, Jr., J. P. Hartnett, and E. R. G. Eckert), Solar Energy, vol. III, p. 38. April, 1959.
62. "Combined Forced and Free Convection in a Boundary Layer Flow," (E. M. Sparrow, R. Eichhorn, and J. L. Gregg), The Physics of Fluids, vol. 2, pp. 319-328. May-June, 1959.
63. "Heat Transfer," (E. R. G. Eckert, J. P. Hartnett, and T. F. Irvine, Jr.), Ind. and Eng. Chem., vol. 51, pp. 453-465, March, 1959; "A Review of Heat Transfer Literature 1958," Mech. Eng., vol. 81, pp. 44-55. July, 1959.
64. "The Emissivity and Absorptivity of Parachute Fabrics," (J. P. Hartnett, E. R. G. Eckert, and Richard C. Birkebak), J. Heat Transfer, vol. 81, pp. 195-201. August, 1959.

65. "The Effect of Fuel Types and Admission Method Upon Combustion Efficiency," (H. N. McManus, Jr., W. E. Ibele, and T. E. Murphy), J. Eng. for Power, vol. 81, pp. 423-427. October, 1959.
66. "Turbulent Flow in a Circular Tube with Arbitrary Internal Heat Sources and Wall Heat Transfer," (R. Siegel and E. M. Sparrow), J. Heat Transfer, vol. 81, pp. 280-290. November, 1959.
67. "Laminar Condensation Heat Transfer on a Horizontal Cylinder," (E. M. Sparrow and J. L. Gregg), J. Heat Transfer, vol. 81, pp. 290-296. November, 1959.
68. "Heat Transfer From a Nonisothermal Disk Rotating in Still Air," (J. P. Hartnett), J. Appl. Mech., vol. 26, pp. 672-673. December, 1959.
69. "Determination of Convective Heat Transfer to Non-Isothermal Surfaces Including the Effect of Pressure Gradient," (J. P. Hartnett, E. R. G. Eckert, and Roland C. Birkebak), on pp. 47-70 in Proceedings of the Sixth Conference on Fluid Mechanics, Austin: The University of Texas. 1959.
70. "Free Convection Heat Transfer to Water and Mercury in an Enclosed Cylindrical Tube," (J. P. Hartnett, W. E. Welsh, Jr., and F. W. Larsen), Chemical Engineering Symposium Series, vol. 55, No. 23, pp. 85-91. 1959.
71. "Mass Transfer Cooling in a Steady Laminar Boundary Layer Near the Stagnation Point," (A. A. Hayday), pp. 156-169, Preprint of Papers, Heat Transfer and Fluid Mechanics Institute, Stanford: Stanford University Press. 1959.
72. "Einführung in den Wärme- und Stoffaustausch," (E. Eckert), Berlin: Springer-Verlag, 2nd ed., 1959. 295 pp.
73. "Heat and Mass Transfer," (E. R. G. Eckert and R. M. Drake, Jr.), New York: McGraw-Hill Book Company, Inc., 2nd ed., 1959. 530 pp.

74. "Mass Transfer Cooling, A Means to Protect High Speed Aircraft." (E. R. G. Eckert), pp. 276-286 in Proceedings of the First International Congress in the Aeronautical Sciences Madrid, London: Pergamon Press. 1959. 2 vols.
75. "Thermal Conductivity of Helium-Air Mixtures," (E. R. G. Eckert, W. E. Ibele, and T. F. Irvine, Jr.), pp. 295-300 in Thermodynamic and Transport Properties of Gases, Liquids and Solids, New York: The American Society of Mechanical Engineers and McGraw-Hill Book Company. 1959.
76. "The Effect of Vapor Drag on Rotating Condensation," (E. M. Sparrow and J. L. Gregg), J. Heat Transfer, vol. 82, pp. 71-72. Feb., 1960.
77. "Heat Transfer," (E. R. G. Eckert, J. P. Hartnett, T. F. Irvine, Jr., and E. M. Sparrow), Ind. and Eng. Chem., vol. 52, pp. 327-339, April, 1960; "A Review of Heat Transfer Literature 1959," Mech. Eng., vol. 82, pp. 47-61. August, 1960.
78. "Flow About an Unsteadily Rotating Disc," (E. M. Sparrow and J. L. Gregg), J. Aero/Space Sci., vol. 27, pp. 252-257. April, 1960.
79. "Pressure Drop and Heat Transfer in a Duct with Triangular Cross-Section," (E. R. G. Eckert and T. F. Irvine, Jr.), J. Basic Engng., vol. 82, pp. 125-138. May, 1960.
80. "Comparison of Turbulent Heat-Transfer Results for Uniform Wall Heat Flux and Uniform Wall Temperature," (R. Siegel and E. M. Sparrow), J. Heat Transfer, vol. 82, pp. 152-153. May, 1960.
81. "Use of Reference Enthalpy in Specifying the Laminar Heat Transfer Distribution Around Blunt Bodies in Dissociated Air," (E. R. G. Eckert and O. E. Tewfik), J. Aero/Space Sci., vol. 27, pp. 464-466. June, 1960.
82. "An International Journal in the Field of Heat and Mass Transfer," (E. R. G. Eckert and O. A. Saunders), Intern. J. Heat and Mass Transfer, vol. 1, No. 1, pp. 1-3. June, 1960.

83. "Thermal Radiation Between Parallel Plates Separated by an Absorbing-Emitting Nonisothermal Gas," (C. M. Usiskin and E. M. Sparrow), Intern. J. Heat and Mass Transfer, vol. 1, No. 1, pp. 28-36. June, 1960.
84. "Analytic Formulation for Radiating Fins with Mutual Irradiation," (E. R. G. Eckert, T. F. Irvine, Jr., and E. M. Sparrow), ARS J., vol. 30, pp. 644-646. July, 1960.
85. "The Effect of Mass Transfer on Free Convection," (R. Eichhorn), J. Heat Transfer, vol. 82, pp. 260-263. August, 1960.
86. "Nearly Quasi-Steady Free Convection Heat Transfer in Gases," (E. M. Sparrow and J. L. Gregg), J. Heat Transfer, vol. 82, pp. 258-260. August, 1960.
87. "Apparent Emissivity and Heat Transfer in a Long Cylindrical Hole," (E. M. Sparrow and L. U. Albers), J. Heat Transfer, vol. 82, pp. 253-255. August, 1960.
88. "Unsteady Turbulent Heat Transfer in Tubes," (E. M. Sparrow and R. Siegel), J. Heat Transfer, vol. 82, pp. 170-180. August, 1960.
89. "Mass-Transfer Cooling in a Turbulent Boundary Layer," (J. P. Hartnett, D. J. Masson, J. F. Gross, Carl Gazley, Jr.). Santa Monica: The RAND Corporation, P-1732, June, 1959; J. Aero/Space Sci., vol. 27, pp. 623-625. August, 1960.
90. "Application of Variational Methods to the Thermal Entrance Region of Ducts," (E. M. Sparrow and R. Siegel), Intern. J. Heat and Mass Transfer, vol. 1, Nos. 2/3, pp. 161-172. August, 1960.
91. "The Steady and Transient Free Convection Boundary Layer on a Uniformly Heated Vertical Plate," (R. J. Goldstein and E. R. G. Eckert), Intern. J. Heat and Mass Transfer, vol. 1, Nos. 2/3, pp. 208-218. August, 1960.
92. "Certain Thermodynamic and Transport Properties of the Atmospheres of Venus, Mars and Jupiter," (W. E. Ibele and T. F. Irvine, Jr.), J. Heat Transfer, vol. 82, pp. 381-386. November, 1960.

93. "An Experimental Study of the Effects of Non-Uniform Wall Temperature on Heat Transfer in Laminar and Turbulent Axisymmetric Flow Along a Cylinder," (R. Eichhorn, E. R. G. Eckert, and A. D. Anderson), J. Heat Transfer, vol. 82, pp. 349-359. November, 1960.
94. "Laminar Skin Friction and Heat Transfer on Flat Plate with Wedge-Shaped Grooves in Flow Direction," (T. F. Irvine, Jr., and E. R. G. Eckert), J. Heat Transfer, vol. 82, pp. 325-332. November, 1960.
95. "Mass Transfer, Flow, and Heat Transfer About a Rotating Disk," (E. M. Sparrow and J. L. Gregg), J. Heat Transfer, vol. 82, pp. 294-302. November, 1960.
96. "Application of Variational Methods to Radiation Heat Transfer Calculations," (E. M. Sparrow), J. Heat Transfer, vol. 82, pp. 375-380. November, 1960.
97. "Temperature Distribution and Heat Transfer Results for an Internally Cooled, Heat-Generating Solid," (E. M. Sparrow), J. Heat Transfer, vol. 82, pp. 389-392. November, 1960.
98. "Engineering Thermodynamics," (N. A. Hall and W. E. Ibele), Englewood Cliffs: Prentice-Hall, Inc. 1960. 643 pp.
99. "A Method of Measuring Total Hemispherical Emissivities at Low Temperature--Results for Pure Iron From 300 to 500 Degrees Rankine," (J. A. Brandt, T. F. Irvine, Jr., and E. R. G. Eckert). pp. 220-227 in Preprint of Papers, Proceedings of the 1960 Heat Transfer and Fluid Mechanics Institute, Stanford: Stanford University Press. 1960.
100. "Flow Visualization Studies of Transition to Turbulence in Free Convection Flow," (E. R. G. Eckert, J. P. Hartnett, and T. F. Irvine, Jr.). Presented at the Annual Meeting of The American Society of Mechanical Engineers, New York, N.Y., November-December, 1960. The American Society of Mechanical Engineers, Paper No. 60-WA-250. 3 pp.
101. "Ablation Cooling of Missiles and Satellites," (E. R. G. Eckert). New York: Society of Automotive Engineers, Inc., 485 Lexington Avenue, Preprint No. 185. Presented at the Summer Meeting in Chicago, June 5-10, 1960.

102. "The Application of Interferometry to Time-Varying Flow Conditions," (E. R. G. Eckert). pp. 12-1 and 12-2 in Symposium on Flow Visualization (Presentation Summaries), ASME Annual Meeting, New York, Nov. 30, 1960.
103. "Introduction to Part 1," (E. R. G. Eckert), pp. xvii to xxviii of vol. 2. Heat Transfer-Incandescent Tungsten of The Collected Works of Irving Langmuir, New York: Pergamon Press. (a set of 12 vols.) 1960.
104. "Measured Pressure Distribution and Local Heat Transfer Rates for Flow Over Concave Hemispheres," (J. P. Hartnett and J. C. Y. Koh). ARS J., vol. 31, pp. 71-74. January, 1961.
105. "Effect of Aspect Ratio and Tube Orientation on Free Convection Heat Transfer to Water and Mercury in Enclosed Circular Tubes," (F. W. Larsen and J. P. Hartnett), J. Heat Transfer, vol. 83, pp. 87-93. February, 1961.
106. "Condensation on a Rotating Cone," (E. M. Sparrow and J. P. Hartnett). J. Heat Transfer, vol. 83, pp. 101-102. February, 1961.
107. "The Influence of Prandtl Number on the Heat Transfer from Rotating Isothermal Disks and Cones," (J. P. Hartnett and E. C. Doland). J. Heat Transfer, vol. 83, pp. 95-96. February, 1961.
108. "The Two Phase Boundary Layer in Laminar Film Condensation," (J. C. Y. Koh, E. M. Sparrow, and J. P. Hartnett), Intern. J. Heat and Mass Transfer, vol. 2, Nos. 1/2, pp. 69-82. March, 1961.
109. "Natural Convection in an Air Layer Enclosed Between Two Vertical Plates with Different Temperatures," (E. R. G. Eckert and Walter O. Carlson). Intern. J. Heat and Mass Transfer, vol. 2, Nos. 1/2, pp. 106-120. March, 1961.
110. "Skin Friction and Heat Transfer for Incompressible Laminar Flow Over Porous Wedges with Suction and Variable Wall Temperature," (J. C. Y. Koh and J. P. Hartnett). Intern. J. Heat and Mass Transfer, vol. 2, No. 3, pp. 185-198. April, 1961.

111. "Thermal Conductivity and Prandtl Number of Carbon Dioxide and Carbon-Dioxide Air Mixtures at One Atmosphere," (J. L. Novotny and T. F. Irvine, Jr.). J. Heat Transfer, vol. 83 pp. 125-132. May, 1961.
112. "Analysis, Results, and Interpretation for Radiation Between Some Simply Arranged Gray Surfaces," (E. M. Sparrow, J. L. Gregg, J. V. Szel, and P. Manos). J. Heat Transfer, vol. 83, pp. 207-214. May, 1961.
113. "Radiation Heat Transfer in a Spherical Enclosure Containing a Participating Heat-Generating Gas," (E. M. Sparrow, C. M. Usiskin, and H. A. Hubbard). J. Heat Transfer, vol. 83, pp. 199-206. May, 1961.
114. "Temperature-Dependent Heat Sources or Sinks in a Stagnation Point Flow," (E. M. Sparrow and R. D. Cess). Applied Scientific Research, Section A, vol. 10, pp. 185-197. June, 1961.
115. "A Review of Heat Transfer Literature 1960," (E. R. G. Eckert, T. F. Irvine, Jr., E. M. Sparrow, and W. E. Ibele). Part I. Mech. Eng., vol. 83, pp. 34-42. July, 1961. Part II. Mech. Eng., vol. 83, pp. 50-57. August, 1961. "Heat Transfer, A Review of Current Literature," Intern. J. Heat and Mass Transfer, vol. 3, No. 3, pp. 222-248. October, 1961.
116. "Velocity Distributions, Temperature Distributions, Effectiveness and Heat Transfer for Air Injected Through a Tangential Slot into a Turbulent Boundary Layer," (J. P. Hartnett, R. C. Birkebak, and E. R. G. Eckert). J. Heat Transfer, vol. 83, pp. 293-306. August, 1961.
117. "Film Boiling in a Forced-Convection Boundary-Layer Flow," (R. D. Cess and E. M. Sparrow). J. Heat Transfer, vol. 83, pp. 370-376. August, 1961.
118. "Radiative Heat Exchange Between Surfaces with Specular Reflection," (E. R. G. Eckert and E. M. Sparrow). Intern. J. Heat and Mass Transfer, vol. 3, No. 1, pp. 42-54. August, 1961.

119. "Subcooled Forced-Convection Film Boiling on a Flat Plate," (R. D. Cess and E. M. Sparrow). J. Heat Transfer, vol. 83, pp. 377-379. Aug., 1961.
120. "Flow Visualization and Velocity Measurement in Natural Convection with the Tellurium Dye Method," (R. Eichhorn). J. Heat Transfer, vol. 83, pp. 379-381. August, 1961.
121. "Free Convection with Blowing or Suction," (E. M. Sparrow and R. D. Cess). J. Heat Transfer, vol. 83, pp. 387-389. August, 1961.
122. "Effects of Superheated Vapor and Noncondensable Gases on Laminar Film Condensation," (E. M. Sparrow and E. R. G. Eckert). A.I.Ch.E.J., vol. 7, pp. 473-477. September, 1961.
123. "A Review of Binary Laminar Boundary Layer Characteristics," (J. F. Gross, J. P. Hartnett, D. J. Masson, and Carl Gazley, Jr.). Intern. J. Heat and Mass Transfer, vol. 3, No. 3, pp. 198-221. October, 1961.
124. "The Effectiveness of Radiating Fins with Mutual Irradiation," (E. M. Sparrow, E. R. G. Eckert, and T. F. Irvine, Jr.). J. Aerospace Sci., vol. 28, No. 10, pp. 763-773. October, 1961.
125. "Heat Transfer to Longitudinal Laminar Flow between Cylinders," (E. M. Sparrow, A. L. Loeffler, Jr., and H. A. Hubbard). J. Heat Transfer, vol. 83, pp. 415-422. November, 1961.
126. "Fully Developed Pressure Drop in Triangular Shaped Ducts," (L. W. Carlson and T. F. Irvine, Jr.). J. Heat Transfer, vol. 83, pp. 441-444. Nov., 1961.
127. "Radiant Interchange between Circular Disks Having Arbitrarily Different Temperatures," (E. M. Sparrow and J. L. Gregg). J. Heat Transfer, vol. 83, pp. 494-503. November, 1961.
128. "The Effect of a Magnetic Field on Free Convection Heat Transfer," (E. M. Sparrow and R. D. Cess). Intern. J. Heat and Mass Transfer, vol. 3, No. 4, pp. 267-274. December, 1961.

129. "Heat Transfer, Temperature Recovery, and Skin Friction on a Flat Plate Surface with Hydrogen Release into a Laminar Boundary Layer," (E. R. G. Eckert, A. A. Hayday, and W. J. Minkowycz). Intern. J. Heat and Mass Transfer, vol. 4 (published in May 1962), pp. 17-29. Dec., 1961.
130. "Experiments on the Transpiration Cooled Anode of an Electric Arc," (P. A. Schoeck and E. R. G. Eckert), pp. 193-207 in Preprint of Papers, Proceedings of the 1961 Heat Transfer and Fluid Mechanics Institute. Stanford: Stanford University Press. 1961.
131. "Velocity Distributions, Temperature Distributions, Effectiveness and Heat Transfer in Film Cooling of a Surface with a Pressure Gradient," (J. P. Hartnett, R. C. Birkebak, and E. R. G. Eckert). pp. 682-689 in International Developments in Heat Transfer, Part IV, Section A, Paper No. 81, New York: The American Society of Mechanical Engineers. 1961.
132. "Unsteady Heat Transfer from a Rotating Disk and at a Stagnation Point," (E. M. Sparrow and R. D. Cess). pp. 468-474 in International Developments in Heat Transfer, Part II, Section B, Paper No. 55. New York: The American Society of Mechanical Engineers. 1961.
133. "Helium Prandtl Number Measurements and Calculated Viscosity and Thermal Conductivity," (P. D. Stroom, W. E. Ibele, and T. F. Irvine, Jr.). pp. 870-875 in International Developments in Heat Transfer, Part IV, Section B, No. 105. New York: The American Society of Mechanical Engineers. 1961.
134. Recent Advances in Heat and Mass Transfer, New York: McGraw-Hill Book Co. 1961. 404 pp.
pp. 55-81 "Engineering Relations for Heat Transfer and Friction in High-Velocity Laminar and Turbulent Boundary-Layer Flow over Surfaces with Constant Pressure and Temperature" (E. R. G. Eckert)
pp. 142-160 "Mass Transfer Cooling in Laminar Boundary Layer with Constant Fluid Properties" (J. P. Hartnett and E. R. G. Eckert)

- pp. 353-371 "The Variable Fluid-Property Problem in Free Convection" (E. M. Sparrow and J. L. Gregg)
135. "Theory of Heat and Mass Transfer," (E. R. G. Eckert and R. M. Drake). Russian translation. Moscow: State Energetics Publishing House. 1961. 680 pp.
136. Encyclopoedic Dictionary of Physics. (Editor-in-Chief: J. Thewlis), New York and London: Pergamon Press. 1961. (Contributions by: R. C. Birkebak, E. R. G. Eckert, W. E. Ibele, J. L. Novotny, P. A. Schoeck, H. A. Simon, O. E. Tewfik, and E. R. G. Winter)
137. "An Investigation of Anode Heat Transfer in High Intensity Arcs," (P. A. Schoeck and E. R. G. Eckert). pp. 1812-1831 in Proceedings of the Fifth International Conference on Ionization Phenomena in Gases, Amsterdam, Holland: North-Holland Publishing Co. 1961.
138. "Sensitivity of Skin Friction and Drag to the Distribution of Suction or Blowing," (E. M. Sparrow and E. R. G. Eckert). J. Aerospace Sci., vol. 29, pp. 104-105. January, 1962.
139. "Radiant Interaction between Fin and Base Surfaces," (E. M. Sparrow and E. R. G. Eckert). J. Heat Transfer, vol. 84, pp. 12-18. February, 1962.
140. "Thermal Radiation Characteristics of Cylindrical Enclosures," (E. M. Sparrow, L. U. Albers, and E. R. G. Eckert). J. Heat Transfer, vol. 84, pp. 73-81. February, 1962.
141. "A Comparison of Predicted and Measured Friction Factors for Turbulent Flow Through Rectangular Ducts," (J. P. Hartnett, J. C. Y. Koh, and Stuart McComas). J. Heat Transfer, vol. 84, pp. 82-88. February, 1962.
142. "Some Measurements of a Wake-Boundary Layer Interaction," (R. Eichhorn and T. L. Eddy). J. Appl. Mech. vol. 29, No. 1, pp. 177-180. March, 1962.

143. "Magnetohydrodynamic Flow and Heat Transfer about a Rotating Disk," (E. M. Sparrow and R. D. Cess). J. Appl. Mech., vol. 29, pp. 181-187. March, 1962.
144. "Heat Radiation between Simply-Arranged Surfaces Having Different Temperatures and Emissivities," (E. M. Sparrow). A.I.Ch.E. J., vol. 8, pp. 12-18. March, 1962.
145. "To Ernst Schmidt on His 70th Birthday," (E. R. G. Eckert). Intern. J. Heat and Mass Transfer, vol. 5, pp. 113-115. March-April, 1962.
146. "Thermische Untersuchung eines Elektrischen Hochstromlichtbogens mit poröser, Gasgekühlter Anode," (E. R. G. Eckert, Peter A. Schoeck, and E. R. F. Winter). Intern. J. Heat and Mass Transfer, vol. 5, pp. 295-306. March-April, 1962.
147. "The Effect of Subcooled Liquid on Laminar Film Boiling," (E. M. Sparrow and R. D. Cess). J. Heat Transfer, vol. 84, pp. 147-156. May, 1962.
148. "Analysis and Experiment for Free Convection Boundary Layers with Non-Similarity Boundary Conditions," (E. M. Sparrow). Pohlhausen Anniversary Volume, Mathematicus Umbraticola, U.S. Air Force Office of Aerospace Research, pp. 145-174. May, 1962.
149. "Absorption and Emission Characteristics of Diffuse Spherical Enclosures," (E. M. Sparrow and V. K. Jonsson). J. Heat Transfer, vol. 84, pp. 183-189. May, 1962. Also in National Aeronautics and Space Administration TN D-1289. 19 pp. June, 1962.
150. "A Two-Phase Boundary Layer and Its Drag Reduction Characteristics," (E. M. Sparrow, V. K. Jonsson, and E. R. G. Eckert). J. Appl. Mech., vol. 29, pp. 408-411. June, 1962.
151. "Buoyancy Effects on Horizontal Boundary-Layer Flow and Heat Transfer," (E. M. Sparrow and W. J. Minkowycz). Intern. J. Heat and Mass Transfer, vol. 5, pp. 505-512. June, 1962.

152. "Efflux of Thermal Radiation from a Cylindrical Cavity Irradiated from an External Source," (E. M. Sparrow). National Aeronautics and Space Administration TN D-1313. 26 pp. June, 1962.
153. "Effects of Deceleration in Man on Plasma 17-Hydroxycorticosteroids," (Peter Schoeck and Franz Halberg). Minnesota Medicine, vol. 45, pp. 625-631. June, 1962.
154. "Radiant Emission from a Parallel-Walled Groove," (E. M. Sparrow and J. L. Gregg). J. Heat Transfer, vol. 84, pp. 270-271. August, 1962.
155. "On the Coupling between Heat and Mass Transfer," (O. E. Tewfik, and C. J. Shirtliffe). J. Aerospace Sci., vol. 29, pp. 1009-1010. August, 1962.
156. "Measurement of Low Speed Gas Flows by Particle Trajectories: A New Determination of Free Convection Velocity Profile," (R. Eichhorn). Intern. J. Heat and Mass Transfer, vol. 5, pp. 915-928. October, 1962.
157. "Heat Transfer, A Review of Current Literature," (E. R. G. Eckert, T. F. Irvine, E. M. Sparrow, and W. E. Ibele). Intern. J. Heat and Mass Transfer, vol. 5, pp. 1023-1050. October, 1962.
158. "Radiant Absorption Characteristics of Concave Cylindrical Surfaces," (E. M. Sparrow). J. Heat Transfer, vol. 84, pp. 283-293. Nov. 1962.
159. "An Enclosure Theory for Radiative Exchange between Specularly and Diffusely Reflected Surfaces," (E. M. Sparrow, E. R. G. Eckert, and V. K. Jonsson). J. Heat Transfer, vol. 84, pp. 294-300. Nov. 1962.
160. "Laminar Heat Transfer in Tubes under Slip-Flow Conditions," (E. M. Sparrow and S. H. Lin). J. Heat Transfer, vol. 84, pp. 363-369. November, 1962.
161. "Absorption of Thermal Radiation in a V-Groove Cavity," (E. M. Sparrow and S. H. Lin). Intern. J. Heat and Mass Transfer, vol. 5, pp. 1111-1115. November, 1962.

162. "Radiating Effectiveness of Annular-Finned Space Radiators, Including Mutual Irradiation between Radiator Elements," (E. M. Sparrow, G. B. Miller, and V. K. Jonsson). J. Aerospace Sci., vol. 29, pp. 1291-1299. Nov., 1962.
163. "Laminar Flow in Triangular Ducts," (E. M. Sparrow). A.I.Ch.E. J., vol. 8, pp. 599-604. Nov. 1962.
164. "Heat-Transfer Characteristics of Several Radiator Finned-Tube Configurations," (E. M. Sparrow and W. J. Minkowycz). National Aeronautics and Space Administration, NASA TN D-1435. 46 pp. November, 1962.
165. "Hot-Wire Measurements of Turbulence Correlations in a Triangular Duct," (C. J. Cremers and F. R. G. Eckert). J. Appl. Mech., vol. 29, pp. 609-614. December, 1962.
166. "Thermal Diffusion Effects on Energy Transfer into a Turbulent Boundary Layer with Helium Injection," (O. E. Tewfik, E. R. G. Eckert, and C. J. Shirtliffe). pp. 42-61 in Preprint of Papers, Proceedings of the 1962 Heat Transfer and Fluid Mechanics Institute, Stanford: Stanford University Press. 1962.
167. "Measurement of Radiation Properties of Solid Materials," (R. C. Birkebak, J. P. Hartnett, and E. R. G. Eckert). pp. 563-574 in Progress in International Research on Thermodynamic and Transport Properties, New York: The American Society of Mechanical Engineers and Academic Press. 1962.
168. "Equilibrium Partial Pressures in the Systems $C + H_2 + N_2$ and $C + H_2 + NH_3$ at Temperatures from 1000 to 12000 °K" by H. Kroepelin, D. E. Kipping and H. Pietruck (translated by E. R. F. Winter and C. J. Cremers). pp. 626-648 in Progress in International Research on Thermodynamic and Transport Properties, New York: The American Society of Mechanical Engineers and Academic Press. 1962.

169. "Discussion of Error in the Calculation of Simultaneous Equilibria" by Dr. K. K. Neumann (Doctor's dissertation) (translated by E. R. F. Winter and C. J. Cremers). pp. 209-217 in Progress in International Research on Thermodynamic and Transport Properties, New York: The American Society of Mechanical Engineers and Academic Press. 1962.
170. "Temperature Distribution in an Electric Arc Operated in a Hydrocarbon-Nitrogen Atmosphere," by H. Kroepelin and D. E. Kipping (translated by E. R. F. Winter and C. J. Cremers). pp. 649-655 in Progress in International Research on Thermodynamic and Transport Properties, New York: The American Society of Mechanical Engineers and Academic Press. 1962.
171. "Slip Flow in the Entrance Region of a Parallel Plate Channel," (E. M. Sparrow, T. S. Lundgren, and S. H. Lin). pp. 223-238 in Preprint of Papers, Proceedings of the 1962 Heat Transfer and Fluid Mechanics Institute, Stanford: Stanford University Press. 1962.
172. "Transpiration Cooling in a Magnetohydrodynamic Stagnation Point Flow," (E. M. Sparrow, E. R. G. Eckert, and W. J. Minkowycz). Appl. Sci. Res., Sec. A, Vol. 11, Issue No. 1, pp. 125-147. 1962.
173. "Research During the Last Decade on Forced Convection Heat Transfer," (E. R. G. Eckert). Presented at the International Heat Transfer Conference, Aug. 28-Sept. 1, 1961, Boulder, Colorado. 8 pp.
174. "Heat Transfer and Skin Friction for Turbulent Boundary-Layer Flow Longitudinal to a Circular Cylinder," (E. M. Sparrow, E. R. G. Eckert, and W. J. Minkowycz). Presented at the Winter Annual Meeting of The American Society of Mechanical Engineers, New York, Nov. 25-30, 1962. The American Society of Mechanical Engineers Paper No. 62-WA-7. 7 pp.
175. "A New and Simpler Formulation for Radiative Angle Factors," (F. M. Sparrow). Presented at National Heat-Transfer Conference, Houston, Texas, Aug. 5-8, 1962. The American Society of Mechanical Engineers, Paper No. 62-HT-17. 7 pp.

176. "Free-Molecule Tube Flow and Adiabatic Wall Temperature," (E. M. Sparrow, V. K. Jonsson, and T. S. Lundgren). Presented at National Heat-Transfer Conference, Houston, Texas, Aug. 5-8, 1962. The American Society of Mechanical Engineers, Paper No. 62-HT-35. 8 pp.
177. "Pressure Drop and Liquid Film Thickness of Two-Phase Annular and Annular-Mist Flows," (S. F. Chien and W. E. Ibele). Presented at Winter Annual Meeting of The American Society of Mechanical Engineers, New York, Nov. 25-30, 1962. The American Society of Mechanical Engineers Paper No. 62-WA-170. 8 pp.
178. "Heat Transfer and Forces for Free-Molecule Flow on a Concave Cylindrical Surface," (E. M. Sparrow, V. K. Jonsson, L. S. Lundgren, and T. S. Chen). Presented at Winter Annual Meeting, The American Society of Mechanical Engineers, New York, Nov. 25-30, 1962. The American Society of Mechanical Engineers, Preprint No. 62-WA-181. 9 pp.

HEAT TRANSFER LABORATORY

II. Technical Reports

<u>No.</u>	<u>Title</u>	<u>Authors</u>
1	Laminar, Transitional and Turbulent Flow in Triangular Passages, WADC TR 54-443, October 1954	Eckert, Irvine, and Eichhorn
2	Flow Equation for Multicomponent Fluid Systems. Part I - General Equations; Part II - Binary Boundary Layer Equations August 1955	N. A. Hall
3	Investigation of the Energy Distribution in a High Velocity Vortex Type Flow. June 1955	Eckert and Hartnett

<u>No.</u>	<u>Title</u>	<u>Authors</u>
4	Mass Transfer Cooling in a Laminar Boundary Layer with Constant Fluid Properties. October 1955	Hartnett and
5	Effect of Diffusion in an Isothermal Binary Boundary Layer. November 1955	Eckert and Schneider
6	Experimental Study of the Velocity and Temperature Distribution in a High Velocity Vortex Type Flow. September 1955	Eckert and Hartnett
7	Transport Properties for Binary Gas Mixtures. January 1956	Schneider and Carlson
8	Mass Transfer Cooling of a Laminar Air Boundary Layer by Injection of a Light-Weight Gas. April 1956	Eckert, Schneider, and Koehler
9.	Analysis of Laminar Heat Transfer in Wedge-Shaped Passages. WADC TR 56-98. April 1956. ASTIA DOC. NO. AD 110 451	Eckert, Irvine, and Von
10.	Simplified Procedures for the Calculation of Heat Transfer to Surfaces with Non-uniform Temperatures. WADC TR 56-373. July 1956	Hartnett, Eckert, Birkebak, and Sampson
11.	Incompressible Friction Factor, Transition and Hydrodynamic Entrance Length Studies of Ducts with Triangular and Rectangular Cross-Section. WADC TR 58-85. April 1957 ASTIA DOCUMENT NO. AD 151 027	Eckert and Irvine
12	Mass-Transfer Cooling in High Speed Laminar Couette Flow	Eckert and Schneider

<u>No.</u>	<u>Title</u>	<u>Authors</u>
13	The Calculation of the Wall Temperature Along Surfaces which are Exposed to a Fluid Stream when the Local Heat Flow Through the Surfaces is Prescribed. WADC TR 57-315. May 1957 ASTIA DOCUMENT NO. 118 333	Eckert, Hartnett, and Birkebak
14	Mass Transfer Cooling of a Laminar Boundary Layer by Injection of a Light-Weight Foreign Gas. AFOSR TN 57-323. June 1957 ASTIA DOCUMENT NO. 132 395	Eckert, Schneider, Hayday, and Larson
15.	Rearrangement of the Temperature Field in Flow Around a Bend. August 1957	Eckert and Irvine
16	Exact Solution of Laminar Heat Transfer in Wedge-Shaped Passages with Various Boundary Conditions. WADC TR 57-224. July 1957 ASTIA DOCUMENT NO. AD 118 190	Yen
17	Transient Temperatures of Parachutes During Descent and Generalized Trajectories for Free-Falling Bodies of High Drag (Note: This one paper was published.)	Eckert, Hartnett, and Turnacliff Turnacliff and Hartnett
18	Values of Emissivity and Absorptivity of Parachute Fabrics. WADC TN 57-433. December 1957	Hartnett, Eckert, and Birkebak
19.	Mass Transfer Cooling in a Laminar Boundary Layer in Steady Two-Dimensional Stagnation Flow. AFOSR TN 58-337. April 1958 ASTIA DOCUMENT NO. 154 241	Hayday

<u>No.</u>	<u>Title</u>	<u>Authors</u>
20	Calculation of Convection Heat Transfer to Non-Isothermal Surfaces Exposed to a Fluid Stream with Wedge Type Surface Pressure Gradient. WADC TR 57-753. July 1958 ASTIA DOCUMENT NO. AD 142 236	Hartnett, Eckert, and Roland Birkebak
21	An Experimental Study of the Effects of Non-Uniform Wall Temperature on Heat Transfer in Laminar and Turbulent Axisymmetric Flow Along a Cylinder WADC TR 58-33. July 1958 ASTIA DOCUMENT NO. AD 207 906	Eichhorn, Eckert, and Anderson
22	Pressure Drop and Heat Transfer in a Duct with Triangular Cross-Section. WADC TR 59-222. April 1959	Eckert and Irvine
23	*Friction and Heat Transfer on Flat Plates with Longitudinal Wedge Shaped Indentations. WADC TN 59-138. July 1959	Irvine and Eckert
24	Experimental Studies for Determining Heat Transfer on the Ribbons of First Type Parachutes. WCLE TN 59-345. September 1959	Schoeck, Hool, and Eckert
25	Effect of Buoyancy Forces on Mass Transfer Cooling	Eichhorn
26	A Note on Mass Transfer Cooling of a Compressible Boundary Layer with Non-uniform Surface Temperatures	Hayday

* This was published under the title: Laminar Skin Friction and Heat Transfer on Flate with Wedge-Shaped Grooves in Flow Direction.

<u>No.</u>	<u>Title</u>	<u>Authors</u>
27	Heat Transfer, Temperature Recovery, and Skin Friction on a Flat Plate Surface with Hydrogen Release into a Laminar Boundary Layer. AFOSR TN 60-1417. February 1961	Eckert, Hayday, and Minkowycz
28	The Multiphase Hypersonic Laminar Boundary Layer on a Flat Plate Part I. Boundary Layer Solution. November 1960	Koh and Hartnett
29	The Multiphase Hypersonic Laminar Boundary Layer on a Flat Plate Part II. A Simplified Calculation Method. November 1960	Hartnett and Koh
30	Analytic Formulation for Radiating Fins with Mutual Irradiation ARL TN 60-160. September 1960	Eckert, Irvine, and Sparrow
31	Some Measurements of a Wake-Boundary Layer Interaction ARL TN 60-159. September 1960	Eichhorn and Eddy
32	Measurement of Temperature Profiles in Laminar and Turbulent Axisymmetric Boundary Layers on a Cylinder with Non-Uniform Wall Temperature ARL TN 60-161. October 1960	Eckert, Eichhorn, and Eddy
33	Solar Absorptivities and Infrared Total Emissivities of Animal Integuments from the Minnesota Area. March 1961	Roland Birkebak and Richard Birkebak
34	Velocity Distributions, Temperature Distributions, Effectiveness and Heat Transfer in Film Cooling of a Surface with a Pressure Gradient. March 1961	Hartnett, Richard Birkebak, and Eckert

<u>No.</u>	<u>Title</u>	<u>Authors</u>
35	A Study of the Motile Responses of Animals to Radiation Fields and to Other Physical and Biotic Factors in the Natural Environment (Progress Report No. 1). Aug. 1960	Warner, Tester, Jacobson, Lindmeier, Hartnett, and Birkebak
36	A Study of the Motile Responses of Animals to Radiation Fields and to Other Physical and Biotic Factors in the Natural Environment (Progress Report No. 2). April 1961	Warner, Tester, Jacobson, Lindmeier, Richard C. Birkebak, and Roland C. Birkebak
37	Measurement of Radiation Properties of Solid Materials. July 1961	R. C. Birkebak, Hartnett, and Eckert
38	Measurement of Heat Transfer From a Circular Cylinder to an Axial Air Stream with Air Injection into a Turbulent Boundary Layer. August 1961	Tesfik, Eckert, and Jurewicz
39	Thermodynamic Charts for Argon up to 10^5 °K with Illustrative Examples (by Karl-Friedrich Knoche)	translated by: Winter and Cremers
40	Thermal Diffusion Effects in Laminar Boundary Layers of Binary Mixtures. April 21, <u>1959</u>	Hayday, Irvine, Eckert
41	The Effects of Slot Geometry in Film Cooling. March 1962	Eckert and Birkebak
42	An Investigation of the Anode Losses in Argon Arcs and Their Reduction by Transpiration Cooling. Sept. 1961	Schoeck, Eckert, and Wutzke
43.	Temperature Distribution in a Low Mass Flux Argon Plasma Jet. December 1961	Winter and Cremers

<u>No.</u>	<u>Title</u>	<u>Authors</u>
44	Thermodynamics and Transport Processes in Multicomponent Systems (by Fran Bosnjaković). January 1962	Translated by: Simon and Winter
45.	Equilibria in the Systems C + H ₂ + N ₂ and C + H ₂ + NH ₃ at Temperatures from 1000 to 12000 °K (by H. Kroepelin, D. E. Kipping, and H. Pietruck). August 1961	translated by: Winter and Cremers
46	Discussion of Error in the Calculation of Simultaneous Equilibria (by Dr. K. K. Neumann (Doctor's dissertation). August 1961	translated by: Winter and Creamers
47	Temperature Distribution in an Electric Arc Operated in a Hydrocarbon-Nitrogen Atmosphere (by H. Kroepelin and D. E. Kipping). August 1961	translated by: Winter and Cremers
48	Thermal Diffusion in Laminar Boundary Layers of Binary Mixtures over a Solid, Adiabatic Flat Plate. June 1962	Hayday, Eckert, Minkowycz
49	Study on Two Phase Boundary Layer (Skin Friction and Heat Transfer for Liquid Flow over a Porous Wall with Gas Injection). August 1962	Hirata

III. THESES

Master's Theses

1. "Thermal Effects in Air Cooled Turbine Blades," (Jack S. Laney), University of Minnesota, May, 1952. (Advisor: Dr. Eckert)
2. "Reduction of Turbulence in a Low Speed Wind Tunnel," (Roger Eichhorn), University of Minnesota, October, 1955. (Advisor: Dr. Eckert)

3. "Calculation of the Local Convective Heat Flow Distribution Along a Plane Surface When the Prescribed Wall Temperature is Approximated by a Series of Linear Segments," (Richard Leon Sampson), University of Minnesota, October, 1955. (Advisor: Dr. Eckert)
4. "The Experimental Determination of the Total Absorptivity of Several Important Engineering Materials for Solar Radiation," (Richard Clarence Birkebak), University of Minnesota, September, 1956. (Advisor: Dr. Hartnett)
5. "An Investigation of the Velocity Distribution in Air Flow Between Two Parallel Rotating Disks," (William E. Welsh, Jr.), University of Minnesota, April, 1957. (Advisor: Dr. Hartnett)
6. "An Investigation of Incompressible Flow Measurement for Orifice Plates," (John Arthur Burt), University of Minnesota, July, 1957. (Advisor: Dr. Ibele)
7. "Determination of Pressure Losses for Flow over Staggered Vee-Gutters," (John Donald Rom), University of Minnesota, June, 1958. (Advisor: Dr. Ibele)
8. "Theoretical and Experimental Investigations of the Transport Properties of Carbon Dioxide and Carbon Air Mixtures," (Jerome Leroy Novotny), University of Minnesota, 1958. (Advisor: Dr. Irvine)
9. "Inclined Orifice Coefficients for Compressible Flow in Circular Ducts," (Clarence Adams Lysdale), University of Minnesota, March, 1959. (Advisor: Dr. Ibele)
10. "Experimental Friction Factors for Fully Developed Turbulent Flow in Smooth Triangular Ducts," (Larry William Carlson), University of Minnesota, August, 1959. (Advisor: Dr. Irvine)
11. "Thermal Conductivity Predictions for Binary Gas Mixtures," (Bruce C. Lindahl), University of Minnesota, August, 1959. (Advisor: Dr. Ibele)

12. "An Investigation of the Flow Field and Heat Transfer Associated with a Single Isothermal Disk Rotating in Still Air," (Aemer D. Anderson), University of Minnesota, September, 1957. (Advisor: Dr. Hartnett)
13. "An Experimental Investigation of the Directional Emissivity Characteristics of Porous Metals," (Sherwood G. Talbert), University of Minnesota, December, 1959. (Advisor: Dr. Hartnett)
14. "A New Method for the Experimental Determination of the Total Hemispherical Emissivity with Results for Pure Iron from 300 to 500°C," (James Andrew Brandt), University of Minnesota, March, 1960. (Advisor: Dr. Eckert)
15. "Discharge Coefficients for Inclined Orifices in Circular Tubes," (Bruce Harvey Johnson), University of Minnesota, June, 1960. (Advisor: Dr. Ibele)
16. "Effect of Aspect Ratio and Tube Orientation on Free Convection Heat Transfer to Water and Mercury in Enclosed Circular Tubes," (Floyd Walter Larsen), University of Minnesota, June, 1960. (Advisor: Dr. Hartnett)
17. "Heat Transfer to Turbulent Boundary Layers with a Pressure Gradient," (Thomas F. McCarthy), University of Minnesota, December, 1960. (Advisor: Dr. Hartnett)
18. "Temperature Profiles and Heat Transfer Associated with a Single Isothermal Disk Rotating in Still Air," (Stuart T. McComas), University of Minnesota, December, 1960. (Advisor: Dr. Hartnett)
19. "Heat Transfer from a Cylinder in Crossflow with Transpiration Cooling," (Bruce Virgil Johnson), University of Minnesota, December, 1960. (Advisor: Dr. Hartnett)
20. "The Experimental Determination of Spectral Normal Reflectivity of Several Engineering Materials From 0.1 to 10.0 Microns," (Roland Clement Birkebak), University of Minnesota, December, 1960. (Advisor: Dr. Hartnett)

21. "An Experimental Investigation of the Characteristics of Turbulence in a Triangular Duct," (Clifford John Cremers), University of Minnesota, June, 1961. (Advisor: Dr. Eckert)
22. "Turbulent Flow and Heat Transfer in Tubes under Slip Flow Conditions," (Wolodymyr J. Minkowycz), University of Minnesota, December, 1961. (Advisor: Dr. Sparrow)
23. "Transpiration Cooling of a Cylinder in Cross Flow with Helium Injection," (Lawrence Steve Jurewicz), University of Minnesota, December, 1961. (Advisors: Drs. Eckert and Tewfik)
24. "Equation of State and Transport Properties of Helium," (Kwang-tien Shih), University of Minnesota, June, 1962. (Advisor: Dr. Ibele).

Ph.D. Theses

1. "An Extension of the Law of Corresponding States," (Warren Edward Ibele), University of Minnesota, August, 1953. (Advisor: Dr. Newman Hall)
2. "A Study of Conductive Heat Transfer with Change of Phase-Mathematical and Analogue Solutions," (Theodore L. Gershun), University of Minnesota, December, 1955. (Advisor: Dr. Eckert)
3. "A New Method for the Experimental Determination of Prandtl Numbers and Thermal Conductivities of Gases, Results for Air," (Thomas F. Irvine, Jr.), (University of Minnesota, March, 1956. (Advisor: Dr. Eckert)
4. "Interferometric Studies of Convective Flow Phenomena in Vertical, Plane, Enclosed Air Layers," (Walter O. Carlson), University of Minnesota, April, 1956. (Advisor: Dr. Eckert)
5. "An Experimental Investigation of Film Establishment, Film Profile Dimensions, Pressure Drop, and Surface Conditions in Two Phase Annular Flow," (Howard N. McManus, Jr.), University of Minnesota, May, 1956. (Advisor: Dr. Eckert)

6. "An Experimental Study of the Flow Between Two Rotating Coaxial Discs," (Kenneth G. Picha), University of Minnesota, July, 1957. (Advisor: Dr. Eckert)
7. "An Experimental Investigation of the Turbulent Boundary Layer in Supersonic Flow Around Unyawed Cones with Small Heat Transfer and Correlations with Two Dimensional Data," (Walter S. Bradfield), University of Minnesota, August, 1957. (Advisor: Dr. Eckert)
8. "An Experimental Study of Local Convective Heat Transfer and Pressure Drop for Laminar and Turbulent Flow of Air Within a Uniformly Packed Bed of Spheres at Three Different Porosities," (Robert D. Turnacliffe), University of Minnesota, September, 1957. (Advisor: Dr. Eckert)
9. "Interferometric Study of the Steady State and Transient Free Convection Thermal Boundary Layers in Air and in Water About a Uniformly Heated Vertical Flat Plate," (Richard J. Goldstein), University of Minnesota, March, 1959. (Advisor: Dr. Eckert)
10. "An Analytical Investigation of Combined Free and Forced Convection and a New Method to Measure Free Convection Velocity Profiles," (Roger Eichhorn), University of Minnesota, September, 1959. (Advisor: Dr. Eckert)
11. "Measurements of Friction and Local Heat Transfer for Turbulent Flow of a Variable Property Fluid (Water) in a Uniformly Heated Tube," (Redfield W. Allen), University of Minnesota, September, 1959. (Advisor: Dr. Eckert)
12. "Experimental Investigation of Liquid Film Thicknesses and Pressure Drop of Vertical, Downward, Annular, Two-Phase Flow," (Sze-Foo Chien), University of Minnesota, June, 1961. (Advisor: Dr. Ibele)
13. "An Investigation of the Energy Transfer to the Anode of High Intensity Arcs in Argon," (Peter A. Schoeck), University of Minnesota, December, 1961. (Advisor: Dr. Eckert)
14. "An Interferometric Investigation of Laminar Free Convection in Carbon Dioxide Near Its Critical Point," (Harold A. Simon), University of Minnesota, March 1962. (Advisor: Dr. Eckert)

15. "Fundamental Equations of Multicomponent Fluid Continua with an Application to Problems Encountered in Mass Transfer Cooling with a Reacting Light Weight Gas," (Alexander Arthur Hayday), University of Minnesota, June, 1962. (Advisors: Dr. Eckert and J. E. Scorrin)

上記リスト文献について、紹介を得たい場合は、平田さんに連絡されれば便宜をはかっていると思います。

平田さんは年末頃迄ミネソタ大学に居られる予定です。

宛先は

Dr. Masaru Hirata c/o Dept. of Mechanical
Engineering, University of Minnesota, Minneapolis,
Minnesota, U. S. A.

「伝熱研究」投稿規定

1. 本誌は伝熱に関する論文の予報，討論，国の内外の研究・技術の紹介，研究者の紹介，情報，資料，ニュースなどを扱います。
2. 本誌には，日本伝熱研究会の会員の誰もが自由に投稿できます。
3. 投稿原稿の採用・不採用は，編集委員会によつて決定されます。
4. 採用の原稿は，場合によつて，加筆もしくは短縮を依頼することがあります。
5. 投稿原稿は，採用・不採用の何れの場合でも執筆者に返送されます。
6. 採用された原稿についての原稿料は，当分の間ありません。
7. 原稿用紙は，A・4原稿用紙を使用して下さい。
8. 本誌の仕上りは，当分の間謄写によつて行ないますから，図面は現寸大のものを書いて下さい。
9. 原稿の送り先は，下記宛にお願いします。

東京都港区麻布龍土町10，東京大学生産技術研究所内

日本伝熱研究会編集委員会

伝熱研究

Vol.2.No.5

1963年3月31日発行

発行所 日本伝熱研究会
東京都港区麻布龍土町10
東京大学生産技術研究所内
電話(408)4291番(代表)
振替 東京 14749

(非売品) (謄写をもつて印刷にかえます)