زلزله خیزی ایران

ازسال ۱۹۰۰ تاسال ۱۹۶۹

از

محمد بنی صدر

تقدیم شده به امپریال کالج دانشگاه لندن

دفترتحقیقات واستانداردهای فنی

نشریه شماره یک

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پیشگفتار

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علی اکبرمعین فر

ازاقدامات مفیدی که درسالهای اخیربرای بررسی زلزله درمورد کشورایران انجام شده است کوششهائی است که ازطرف بخش مهندسی زلزله امپریال کالج دانشگاه لندن تحت نظرآقای دکترآمبریزی Dr. N. N. Ambraseys انجام میگیرد ـ نامبرده باجمع آوری نوشته های خطی قدیمی واسناد تاریخی وهمچنین تهیهٔ مدارك علمی جدید توانسته است اطلاعات گرانبهائی درمورد زلزله های ایران فراهم آورد وبا سفرهای متعددی که اغلب وی وهمکارانش بنابرماٴموریت سازمان علمی وفرهنگی یونسکو پس ازهرزلزله شدید بایران وترکیه انجام داده اند توانسته است این اطلاعات راتکمیل ونتیجه گیری های ارزنده ای ازآنهابعمل آورد .

پس اززلزله مخرب دهم شهریورماه ۱۳٤۱ بوئین زهرابین امپریال کالج دانشگاه لندن ودفترفنی سازمان برنامه همکاری نزدیکی ازنظرمبادله اطلاعات بوجودآمد وبراثرهمین همکاری بودکه آقای محمد بنی صدرکارشناس دفترفنی سازمان برنامه توانست تحت نظر دکترآمبریزی مدت یکسال دربخش مهندسی زلزله امپریال کالج بمطالعه پرداخته وبااستفاده ازمدارك واسناد موجود درآن بخش وباجدیت لازم زلزله خیزی کشورایران را درسالهای بین ۱۹۰۰ تا ۱۹٦۹ بررسی ورساله حاضرراتدوین نماید .

اطلاعات مربوط بخساراتی که زلزله درسالهای قبل ازسال ۱۹۰۰ بمناطق ازایران وارد ساخته است ازکتب تاریخی ونقل وقایع نویسان بدست می آید لکن باتوجه بپراکنده بودن جمعیت کشورویکنواخت نبودن تکاثف نسبی جمعیت درنقاط مختلف، این قبیل اطلاعات رانمی توان بامقیاس واحدی سنجید زیراچه بسا درنقاطی ازکشورکه فاقد جمعیت بوده زلزله های شدیدی روی داده که ازدسترس وقایع نویسان دوربوده است ویاخبری ازآن به آنان نرسیده وتوجهشان راجلب نکرده است درحالیکه درپاره ای نقاط پرجمعیت کشور زلزله های ضعیف تربعلت خسارات مالی وتلفات جانی فراوان توانسته است نظراین بناء نویسان راجلب کند .

مقدمات کاری که اکنون عرضه میگردد از چندی قبل در دفتر فنی سازمان برنامه فراهم شد و از آنجا که در زمرهٔ کارهای تحقیقاتی و مطالعاتی است که از سالهای پیش در دفتر فنی شروع گردید اینک که همزمان با بوجود آمدن دفتر تحقیقات و استانداردهای فنی این کار نیز به ثمر رسیده است بعنوان اولین نشریه دفتر تحقیقات و استانداردهای فنی سازمان برنامه در دسترس گذارده میشود .

دفتر تحقیقات و استانداردهای فنی

زلزله هائیکه پس ازسال ۱۹۰۰ ثبت شده اند میباشد یا خیر؟ لکن این مطالعات معیاری برای مناطق مختلف کشورازنظرگرایش بفعالیت زلزله ای بدست می دهد .

هدف این رساله آن است که کلیه اطلاعات مربوط به زلزله هائی که پس ازسال ۱۹۰۰ در ایران بوقوع پیوسته است جمع آوری ومراکزوقوع آنهارا در نقشه ای مشخص سازد بموازات این کارنقشه تکتونیك کشوربرای مشخص ساختن مناطقی که زلزله های قبلی خسارات بزرگ درآن مناطق وارد ساخته است ویابعبارت دیگراحیانا" درآتیه نیزخساراتی وارد خواهد آمد مورد توجه واقع گردیده است .

درفصل اول این رساله توضیحات کافی درمورد وضع ساختمانهای روستائی کشورواشکالات مربوط به تعیین شدت زلزله که ازطریق ملاحظه خرابی های حاصله ازآن بدست می آید ذکرشده است وخصوصا" ذکراین نکته جالب است که چه بسیارساختمانهاکه دراثریك زلزله خراب نشده اندلکن بعلت وجود ترکهائی که درآنهاایجاد شده تضعیف ودرزلزله های بعدی اگرچه این زلزله هاضعیف تراززلزله اول بوده اند بکلی ویران شده اند — ایمنن نکته ایست که همواره درتعیین وتخمین شدت زلزله (Intensity) موجب گمراهی میگردد وبهمین علت است که گاه برای زلزله های کوچك شدت های بزرگ اعلام میشود که دورازواقعیت میباشد . درنقشه شماره ۳ که ضمیمه رساله میباشد مراکزکلیه زلزله هائی که ازسال ۱۹۰۰ به بعد درایران روی داده است محاسبه ونمایانده شده است دراین نقشه دایره های توخالی برای زلزله هائی است که بزرگی "Magnitude" آنها دردست نیست وسایردایره های سیاه که بقطرهای مختلف است به تناسب برای زلزله های بابزرگی "Magnitude" کمتراز۳ تابزرگی بیش ۷ میباشد .

بطوریکه درمتن رساله توضیح داده شده است زلزله های مندرج درنقشه اکثر درروی دونوار یکی تقریبا" درامتداد البرزودیگری درامتداد زاگروس توزیع شده است وگرچه این موضوع نمودار فعالیت زیاد درامتداد این دونوارمیباشد ولی ممکن است همانطوریکه نویسنده رساله احتمال داده است علت پربودن این دونواروفوراطلاعاتی باشدکه ناشی ازتکاثف نسبی زیاد جمعیت دراین نقاط وهمچنین وجودپایگاه های نزدیك است (درقسمت شمالی پایگاههای کشور شوروی ودرقسمت غرب پایگاههای کشورهای ازمنائی) — بهرصورت بااین حال نمی توان فراموش کرد که کشورایران درامتداد وحوالی دورشته البرزوزاگروس دارای استعداد زلزله

ازسال ۱۹۰۰ به بعد رفته رفته نصب دستگاههای زلزله نگاردرجهان متداول گردید وبنابراین اطلاعات حاصله ازاین پایگاههامی تواند مفید واقع شود وباتوجه باینکه دراین دوره روزنامه هائی موجود بوده است که به نقل اخبارپرداخته اند این اخبار وآن اطلاعات توانسته است دررساله حاضرمفید واقع شود وگرچه دراین جانیزبعلت پراکندگی جمعیت ونبودن معیارواحد برای ارزیابی اخبارنوشته های جرایدنمی توانسته است صد درصد بایك مقیاس سنجیده شود ولی تهیه کننده رساله توانسته است با انطباق اطلاعات علمی ونیزسنجیدن اخبارمحلی ارقامی بدست آورد .

ازسال ۱۹۳۰ به بعدکه تعداد پایگاههای زلزله سنجی درجهان بمقدارقابل توجهی افزایش یافت واخبارجراید نیزباجزئیات وتفصیل بیشتری درروزنامه هامنتشرشد اطلاعات بدست آمده بیشترقابل اعتمادگردید وتقریبا" این اطلاعات بامقیاس واحدی قابل سنجش است .

آقای بنی صدرتوانسته است باتوجه به پراکندگی اطلاعات وهم آهنگ نبودن آنها ونبودن یك مقیاس ومعیارسنجش واحد تاحدودی ارقام مناسبی برای مراکزوقوع زلزله های ایران درزرد ورزمانی هفتادساله بیابد وباینکاربایدارج فراوان گذارد .

کاربنی صدرازنظرتدوین نقشه زلزله خیزی کشورایران برای یك دوره هفتادساله درخور توجه است ومسلما" آن عده ازکسانی راکه دراین رشته بررسی هائی مینمایند بکارخواهد آمد . باین جهت مناسب دیدکه اکنون که نامبرده دورازکشوراست بااجازه ازخوداوبا کسب نظرازبخش مهندسی زلزله امپریال کالج دانشگاه لندن که درحقیقت این مطالعات متعلق بآن بخش است رساله وی راتکثیرکند وازآنجاکه اصل رساله بعلت آنکه به امپریال کالج دانشگاه لندن تقدیم گردیده است بزبان انگلیسی است مفیدانست که بااستفاده ازمتن رساله خلاصه وتوضیحی بزبان فارسی اضافه نماید .

بطوریکه درمقدمه رساله ذکرشده است تاریخ زلزله کشورایران بخوبی شناخته نشده است وکتب ورسالات چاپی که بطورمدون زلزله خیزی ایران راتوضیح دهدکم است وباین ترتیب نمیتوان بطورقاطع معین نمودکه آیازلزله های قبل ازسال ۱۹۰۰ ازنظربزرگی درهمان حدود

برای تهیه نقشه مربوط به توزیع انرژی آزاد شده توسط زلزله ها مورد استفاده قرارگرفته است این نقشه ها مربوط به یک دوره هفتاد ساله ازسال ۱۹۰۰ تاسال ۱۹۶۹ (نقشه شماره ۵) ودو دوره فرعی که اولی بین سال ۱۹۰۰ وسال ۱۹۵۰ (نقشه شماره ۶) ودیگری بین سال ۱۹۵۰ وسال ۱۹۶۹ (نقشه شماره ۷) است ومیتواند تااندازه ای حدود احتمال وقوع زلزله رادرآتیه درپاره ای ازنقاط کشوربیان کند .

درنقشه شماره ۸ منحنی نگاریتمی که درمحورطولها بزرگی زلزله (Magnitude) ودرمحورعرض هاتعداد دفعاتی که زلزله ای باین بزرگی درظرف مدت هفتاد سال بوقوع پیوسته است برای تمام وسعت کشورترسیم گردیده است ـ این منحنی ازلحاظ احتمال وقوع زلزله ای بابزرگی معین درایران می تواندعنوان راهنماداشته باشد .

برای ترسیم منحنی فوق مقادیرثابت A و B موجود درروابطه $\log N = AM + B$ که در آن N تعداد دفعات زلزله و M بزرگی زلزله است بااستفاده ازاطلاعات موجود حساب گردیده است ودرنتیجه رابطه تجربی $\log N = 5.79 - 0.67\ M$ بدست آمده است وچون این تعداد زلزله برای مساحتی معادل ۲/۹ میلیون کیلومترمربع وبرای حدود هفتاد سال است (سالهای بین ۱۹۰۰ تا ۱۹۶۹) نویسنده رساله نتیجه گرفته است که بطورمتوسط احتمال وقوع زلزله ای بابزرگی M یابیشتردرهریکصد کیلومترمربع ازایران درهریکسال به تعداد N_1 است بطوریکه $\log N_1 = 1.5 - 0.67\ M$ بطورکلی درنتیجه گیری که نویسنده رساله میکند توضیح میدهد که توجهی به نقشه زلزله خیزی که تدوین شده است (نقشه شماره ۳) ونقشه تکتونیک کشور (نقشه شماره ۴) نشان میدهد که اغلب زلزله هائیکه دردوره زمانی هفتادساله بوقوع پیوسته است دردونواحی که اولی درطول گسل (Fault) فعال شاهرود درجنوب البرز ودیگری درجنوب غربی کشوردرطول گسل (Fault) زاگروس است .

گسل اصلی اول ازحدود مشهد شروع وبطرف شیروان ـ بجنورد ـ شاهرود ـ دامغان وسپس تهران وبوئین زهرا ادامه یافته وتاهمدان میرسد همچنین مطالعه وتطبیق نقشه های ۳ و۴ نشان میدهد که بموازات این گسل ودرامتداد گسل درونه که ازحدود تربت حیدریه میگذرد تاکنون زلزله هائی بوقوع پیوسته است .

گسل اصلی دوم ازحوالی خوی شروع شده بطرف کرمانشاه وبعدی بسوی شیراز ادامه داردوتا

خبری فراوانی است .

در این رساله مشخصات تعداد ۱۴۴۳ زلزله از منابع مختلف اعم از پایگاهها و یا بصورت خبری اخذ و از کدام منبع مربوط در روی کارت های آی ـ بی ـ ام منعکس شده است و در مواردی که اختلافاتی بین محاسبات مرکز زلزله (Epicenter) در گزارشهای پایگاههای مختلف بوده است با استفاده از حروف A و B و C و غیره شماره زلزله بصورت مکرر در آمده است و منبع مربوط جداگانه ذکر گردیده لکن در تهیه نقشه همیان شماره اصلی منظور شده است ـ مقدار بزرگی (Magnitude) زلزله ها که در کارتها منظور شده است متوسط مقادیری است که برای یک زلزله معین از منابع مختلف اخذ شده است . در مورد اطلاعاتی که جنبهٔ خبری داشته و از روزنامه ها اخذ شده است نویسندهٔ رساله توانسته است تنها از نظر مختصات مرکز وقوع (Epicenter) تا حدود قابل قبولی که با حقیقت تطبیق کند ارقامی یافته و در کارتها منظور کند و بدیهی است در این قبیل موارد که منبع آن در کارت ها با حروف PRS مشخص شده است ذکر اطلاعات اضافی دیگر که مربوط به بزرگی زلزله (Magnitude) و یا عمق زلزله (Focus) باشد بعلت آنکه تنها منبع مورد مراجعه اخبار جراید بوده است و نمودار دستگاه زلزله نگار در دست نیست غیر مقدور بوده است .

بطور کلی در تهیهٔ کارت ها بغیر از جراید زمان سی منبع مورد استفاده واقع گردیده است که اسامی آنها در متن رساله در مقابل علامات اختصاری که در کارتها بکار برده شده مندرج است .

در نقشه شماره ٤ صفحه رساله گسل های موجود کشور (Faults) ترسیم گردیده است در این نقشه گسل های اصلی فعال با خط های ضخیم و گسل های فعال دیگر با خط نازک و بالاخره گسل های فرعی درجه دوم با خط نازکتر نمایش داده شده است که به ترتیب با اعداد ۱ و ۲ و ۳ نمایانده شده است .

در قسمت چهارم از فصل دوم رساله نویسنده اطلاعاتی در مورد زلزله های مهم ایران از سال ۱۹۰۰ به بعد و میزان خسارات و تلفات ناشیه داده است که قابل توجه میباشد .

اطلاعات جمع آوری شده در وهله اول برای تهیه نقشه مراکز زلزله ایران (نقشه شماره ۳) بکار رفته است همچنین همانطوریکه در فصل سوم رساله توضیح داده شده است این اطلاعات

که در بخش مذکور کمال همکاری وهمگامی را با این برنامه داشته اند تشکر کند امید است که هر برگی که بر دفتر مطالعه زلزله در کشور ایران اضافه میشود موجب تنومنده وقدمی در راه بهبود وضع فعلی ساختمانی کشور باشد .

بند رعباس میرسد وبطوریکه در نقشه شماره ۳ ملاحظه میشود تعداد زلزله هائی که در این نوار حاصل شده است قابل توجه است ــ در کرمان وبم بطورکلی قسمت جنوب شرقی کشورنیززلزله هائی بـــه موازات گسل این ناحیه بروزکرده است که حاکی ازفعال بودن این قسمت ازخاك کشوراست .

نویسنده رساله برای بررسی بیشتر درمورد انرژی آزاد شده در امتداد این گسل بااستفاده ازمطالعا که آقای دکترآمبریزی (Dr. Ambraseys) درمورد زلزله بوئین زهرا انجام داده وبامراجعـــه بمقاله نامبرده تحت عنوان (An Earthquake Engineering Study of Buyn-Æara) که درسومین کنفرانس جهانی مهندسی زلزله درسال ۱۹٦۵ درزلاند جدید ارائه کرد ومقـــاله ای تحت عنوان (Early earthquake in North Central Iran) که درمجله مجمع زلزله شناسی آمریکا منتشرساخته است نتیجه میگیرد که درآتیه احتمال وقوع زلزله درفاصله مناطقی که انرژی آزاد شده درآنها حداکثرمی باشد زیاد است (قسمت هائیکه انرژی آزاد شده درآنها حداکثـــر می باشد درنقشه شماره ۱۰ باسایه مشخص شده است .)

باتوضیحات فوق وباتوجه بفعال بودن گسل شاهرود ونزدیکی این گسل باشهر تهران وبخصـوص باتوجه به زلزله هائیکه دراین دوره هفتاد ساله درامتداد گسل مذکورحادث شده است ایـــن نتیجه گیری شاید آئین بزرگی است که درمورد شهرتهران دراین رساله بیان میشود وامید اســـت بدون آنکه ایجاد وحشت عمومی کرده ومردم بی تقصیـــر وبی خبـــر ازهرجارا متوحش سازد نظـــر گروه فنی کشورومقامات رسمی مسئول رابخود جلب کند .

کاری که بنی صدر طی مدت اقامت خود درامپریال کالج بدون تحمیل هزینه ای برکشورانجـــام داده است نمونه ای ازانجام مطالعات وتحقیقات سالم وبدون سروصدا است که بسیارارزنـــده است وحق آن است که ازآقای دکترآمبریزی (Dr. Ambraseys) رئیس بخش مهندســـی زلزله امپریال کالج که کمك های زیادی بانجام این برنامه نموده اند واکنون نیزباقبول یکی دیگر ازکارشناسان سازمان برنامه دربخش خـــود مقدمـــات ادامـــه کـــار بنـــی صـــدر رافـــراهـــم کـــرده انـــد وهمچنیـــن آقـــای دکتـــر چـــالینکـــو(Dr. J.S Tchalenko

Many thanks to Dr. Ambroseys and Dr. Tchelenko for their reports on earthquakes which have been occured in Iran in the last two years of 1969 and 1970. These reports have been gatherd by Mr. R. Arian and are added as appendix III in this paper.

برای آنکه آخرین اطلاعات موجود در این رساله ذکر شده باشد کلیه زلزلهائیکه در دوساله ۱۹۶۹ و ۱۹۷۰ در ایران روی داده است وسیله آقای رضا آرین کارشناس سازمان برنامه که اینک در امپریال کالج دانشگاه لندن دوره تخصصی مهندسی زلزله را میگذرانند جمع آوری وبعنوان ضمیمه به این نشریه اضافه گردید .

اطلاعاتی که درمورد ماه دسامبر ۱۹۷۰ داده شده است کامل نیست وبایستی بعداً تکمیل گردد . ت م

No.	Date	Time (GMT) H	M	S	Epicenter				Mb	Depth KM	
84.	1 Aug. 1970	11	40	39	37.5	N	55.6	E	4.9	33	USA
85	20Aug. 1970	15	29	52	29.3	N	51.6	E	4.4	33	USA
86.	30Aug. 1970	16	17	31	37.4	N	56.0	E	5.1	33	USA
87.	3 Sept.1970	22	38	09	40.0	N	53.6	E	4.4	36	USA
88.	8 Sept.1970	12	45	07	28.6	N	58.9	E	4.8	21	USA
89.	3 Oct. 1970	02.	47	41.	34.1	N	47.3	E	4.5	24	USA
90.	3 Oct. 1970	06	57	02	36.1	N	51.4	E	4.1	68	USA
91.	7 Oct. 1970	02	20	37	27.8	N	56.5	E	5.0	43	USA
92.	18Oct. 1970	06	10	39	27.3	N	55.0	E	4.8	40	USA
93.	20 Oct.1970	10	34	19	27.6	N	56.7	E	4.9	44	USA
94.	27 Oct.1970	20	11	05	26.5	N	55.3	E	4.4	16	USA
95.	9 Nov. 1970	17	41	42	29.5	N	56.9	E	5.5	106	USA
96.	12Nov. 1970	13	10	06	38.3	N	57.2	E	4.6	63	USA
97.	21 Nov.1970	08	35	59	40.0	N	48.3	E	5.1	68	USA
98.	29 Nov.1970	17	37	46	39.6	N	54.6	E	4.7	53	USA
	12 Dec.1970	11	16	13	37.2	N	55.4	E	4.5	46	USA
	26 Dec.1970	19	52	04	27.8	N	57.9		4.8	7.4	USA

Date for the month of Dec. not completed

No.	Date	Time (GCT) H	M	S	Epicenter		M	Depth KM	
30.	3 Nov. 1969	21	53	16	26.70 N	53.70 E	5.0	8	USA
31.	4 Nov. 1969	20	17	48	40.30 N	50.30 E	5.0	29	USA
32.	4. Nov.1969	21	05	57	40.20 N	50.20 E	-	N	USA
33.	5 Nov. 1969	19	02	18	26.50 N	53.60 E	-	N	USA
34.	6 Nov. 1969	04	36	01	26.30 N	53.70 E	5.0	N	USA
35.	7 Nov. 1969	13	18	44	26.70 N	53.30 E	4.6	N	USA
36.	7 Nov. 1969	15	16	04	26.60 N	53.70 E	5.0	N	USA
37.	7 Nov. 1969	16	30	30	26.60 N	53.30 E	5.0	N	USA
38.	7 Nov. 1969	18	33	60	27.90 N	60.10 E	6.1	35	USA
39.	8 Nov. 1969	00	38	48	26.70 N	53.70 E	-	N	USA
40.	11 Nov.1969	00	30	35	33.40 N	55.00 E	5.0	N	USA
41.	15 Nov.1969	23	58	52	26.80 N	53.50 E	4.9	42	USA
42.	23 Nov.1969	11	40	45	38.30 N	55.50 E	4.9	38	USA
43.	24 Nov.1969	15	44	23	38.40 N	55.20 E	4.8	49	USA
44.	25 Nov.1969	09	16	07	38.30 N	55.50 E	4.8	N	USA
45.	28 Nov.1969	01	29	28	36.20 N	45.20 E	4.7	16	USA
46.	1 Dec. 1969	13	04	34	26.50 N	53.50 E	4.7	14	USA
47.	2 Dec. 1969	22	46	16	33.90 N	58.60 E	5.1	N	USA
					YEAR 1970				
48.	3 Jan. 1970	13	20	04	32.6 N	48.70 E	4.4	33	USA
49.	3 Jan. 1970	16	35	48	32.60 N	48.80 E	5.0	32	USA
50.	7 Jan. 1970	18	23	36	40.20 N	50.10 E	4.6	40	USA
51.	9 Jan. 1970	09	23	05	38.50 N	55.40 E	4.8	23	USA
52.	19 Jan.1970	17	19	26	36.90 N	48.80 E	4.4	27	USA
53.	19 Jan.1970	19	31	59	25.30 N	61.30 E	4.4	N	USA
54.	20 Jan.1970	11	00	13	30.70 N	51.40 E	4.9	25	USA
55.	27 Jan.1970	14	05	52	36.80 N	54.90 E	5.1	35	USA

No.	Date	Time (GCT) H	M	S	Epicenter		M	Depth KM	
56.	22 Feb.1970	10	45	19	32.50 N	48.60 E	-	N	USA
57.	23 Feb.1970	11	22	26	27.80 N	54.50 E	5.5	20	USA
58.	25 Feb.1970	15	07	51	37.40 N	55.70 E	5.0	36	USA
59.	28 Feb.1970	19	58	48	27.8 N	56.30 E	5.5	35	USA
60.	1 Mar. 1970	20	12	45	34.00 N	58.90 E	5.2	39	USA
61.	6 Mar. 1970	19	40	07	28.20 N	57.50 E	4.7	69	USA
62.	10Mar. 1970	22	06	34	28.40 N	57.50 E	4.7	67	USA
63.	14 Mar.1970	01	51	44	38.60 N	44.70 E	5.3	23	USA
64.	15 Mar.1970	15	10	39	32.20 N	49.40	-	65	USA
65.	17 Mar.1970	23	19	42	33.90 N	59.70 E	5.0	19	USA
66.	21 Mar.1970	13	23	14	27.80 N	54.60 E	4.6	42	USA
67.	1 Apr. 1970	23	54	06	28.00 N	56.70 E	5.1	62	USA
68.	3 Apr. 1970	20	53	55	37.10 N	54.60 E	5.2	43	USA
69.	4 Apr. 1970	10	58	09	37.00 N	59.40 E	4.8	8	USA
70.	16Apr. 1970	01	26	52	38.70 N	48.60 E	4.9	78	USA
71.	11 May.1970	03	12	20	28.50 N	52.30 E	5.1	22	USA
72.	18 May.1970	06	55	26	27.60 N	52.90 E	4.7	40	USA
73.	7 June1970	17	48	34	33.00 N	49.00 E	4.7	50	USA
74.	16 June1970	17	25	02	29.60 N	51.30 E	4.3	38	USA
75.	27 June1970	07	57	53	35.20 N	50.70 E	4.9	14	USA
76.	30 June1970	15	35	32	31.40 N	53.70 E	4.0	12	USA
77.	11 July1970	22	41	16	37.60 N	49.00 E	5.1	65	USA
78.	12 July1970	01	16	09	30.40 N	51.70 E	6.0	-	USA
79.	21 July1970	10	39	14	29.30 N	52.20 E	4.5	20	USA
80.	30 July1970	00	52	20	37.80 N	55.90 E	5.7	19	USA
81.	30 July1970	02	02	02	37.60 N	55.80 E	4.8	10	USA
82.	30 July1970	02	35	12	37.50 N	55.80 E	4.9	N	USA
83.	30 July1970	13	26	09	37.50 N	55.80 E	-	-	USA

APPENDIX III

NO.	Date	Time (GCT) H	M	S	Epicenter		M	Depth KM	
1.	10 Jan.1969	23	16	37	32.50 N	48.70 E	4.6	62	USA
2.	26 Jan.1969	02	25	56	36.80 N	54.50 E	4.8	48	USA
3.	5 Feb.1969	20	23	52	38.10 N	45.3 E	4.5	N	USA
4.	7 Feb.1969	01	03	06	32.60 N	48.10 E	4.7	51	USA
5.	8 Feb.1969	23	23	35	29.90 N	51.00 E	5.1	52	USA
6.	13 Feb.1969	11	11	26	25.00 N	62.90 E	5.2	N	USA
7.	4 Mar.1969	17	35	49	30.10 N	57.80 E	4.3	59	USA
8.	12 Mar.1969	17	43	34	28.30 N	53.10 E	4.5	16	USA
9.	9 Apr.1969	01	04	49	37.00 N	54.50 E	-	45	USA
10.	14Apr.1969	13	13	22	27.80 N	54.70 E	5.0	44	USA
11.	29Apr.1969	04	37	41	29.60 N	51.50 E	5.6	36	USA
12.	12 May.1969	12	22	45	35.50 N	52.50 E	-	29	USA
13.	12 May.1969	19	09	09	27.80 N	56.50 E	4.9	50	USA
14.	14 May.1969	00	44	34	39.30 N	45.00 E	4.5	36	USA
15.	1 June 1969	12	36	30	26.70 N	60.60 E	4.7	50	USA
16.	4 June 1969	16	21	35	25.60 N	61.10 E	4.7	N	USA
17.	21June 1969	16	35	08	27.40 N	57.50 E	5.3	65	USA
18.	28June 1969	22	32	16	32.30 N	56.10 E	4.7	N	USA
19.	1 July 1969	06	00	55	28.20 N	55.40 E	4.8	95	USA
20.	20July 1969	22	37	30	28.20 N	57.30 E	4.9	57	USA
21.	1 Aug. 1969	23	22	35	34.30 N	45.40 E	4.9	66	USA
22.	23Aug. 1969	19	16	18	33.90 N	58.40 E	5.1	32	USA
23.	1 Sept.1969	23	16	10	30.9 N	49.80 E	4.9	28	USA
24.	2 Sept.1969	13	30	04	30.20 N	57.70 E	5.3	20	USA
25.	3 Sept.1969	23	39	03	34.30 N	59.30 E	4.8	N	USA
26.	25Sept.1969	15	25	29	36.70 N	55.10 E	5.1	32	USA
27.	7 Oct. 1969	14	39	29	36.60 N	43.60 E	4.1	44	USA
28.	20 Oct.1969	16	27	25	32.10 N	49.7 E	4.7	52	USA

```
      IF (XX) 107,107,108
113   EM1=0.5*EM1
      EM2=EM1
107   DO 104 K=1,NY
      YY=YCOR(1)-Y
      IF(ABS(YY).LE. 0.005) GO TO 114
      IF(YY) 110,114,111
114   EM1=0.5*EM1
      EM3=EM1
      EM2=EM2*0.5
      EM4=EM-EM1-EM2-EM3
      GO TO 110
111   Y=Y+DY
      L=L+NX
104   CONTINUE
108   X=X+DX
      L=L+1
103   CONTINUE
110   E(L)=E(L)+EM1
      L1=L+1
      L2=L+NX
      L3=L+NX+1
      E(L1)=E(L1)+EM2
      E(L2)=E(L2)+EM3
      E(L3)=E(L3)+EM4
115   CONTINUE
100   CONTINUE
116   CONTINUE
      NE=NX*NY
      Y=YINT
```

```
      M=1
      K=NK
      DO 5 J=1,NY
      WRITE (6,6)Y
      WRITE (6,4) (E(J),J=M,K)
    6 FORMAT (1HO,2HY=F6.2)
    4 FORMAT (1HO,5E13.4)
      Y=Y+DY
      M=K+1
      K=K+NX
    5 CONTINUE
      RETURN
      END
```

```
$EXECUTE            IBJOB
$IBJOB              FIOCS
$IBFTIC MAIN
        COMMON YCOR(1500),XCOR(1500),ZMAG(1500),NFOD(1500),N(1500),NADATA
        THIS PROGRAM IS TO CALCULATE THE RELEASED ENERGY OF EARTHQUAKES
        WHICH OCCURRED IN IRAN BETWEEN YEAR 1900 TO YEAR 1969
        CALL INPUT
        STOP
        END
```

```
SIBFTC DECKI
      SUBROUTINE INPUT
      DIMENSION E(1300), SOURCE (4)
      COMMON YCOR (1500), XCOR(1500), ZMAG(1500), NFOD (1500), N(1500), NDATA
      XSCALE = 1.700
      YSCALE = 1.725
      READ (5.3) XINT,XFIN,DX,YINT,YFIN,DY
    3 FORMAT (6F10.2)
      READ (5,2) NADATA
    2 FORMAT (16)
      DO 100 1=1,NDATA
      READ (5,1) N (1), NDAY,MON,NYEAR,NHOUR,YCOR (1), XCOR (1),ZMAG (1),
      INFOD (1),SOURCE,NSAFE
    1 FORMAT (15,14,A4,15,17,2F6.2,F4.1.15,4A6,12)
      IF (NSAFE .EQ. 9) GO TO 116
      IF (ZMAG (1) .LT. 1.0) GO TO 115
  102 Z= 12.24+1.44*ZMAG (1)
      EM= 10.0 **Z
      EMI=EM
      EM2=0.0
      EM3=0.0
      EM4=0.0
      L=1
      X= XINT + DX
      Y= YINT + DY
      NX= (XFIN-XINT)/DX+0.1
      NY=(YFIN-YINT)/DY+0.1
      DO 103 J=1,NX
      XX=XCOR (1)-X
      IF (ABS(XX).LE. 0.005) GO TO 113
```

1436	16	OCT	1968	152729	32.60	49.50	4.1		USA
1437	6	NOV	1968	170605	31.70	50.70	4.6	42	USA
1438	12	DEC	1968	185447	35.50	53.50	4.6		USA
			Y E A R		1 9 6 9				
1439	3	JAN	1969	031638	37.10	57.90	5.2	11	USA
1440	10	JAN	1969	231637	32.50	48.70	4.6	62	USA
1441	26	JAN	1969	022556	36.50	54.50	4.8	48	USA
1442	7	FEB	1969	010306	32.60	48.10	4.7	51	USA
1443	8	FEB	1969	232335	29.90	51.00	5.1	52	USA

APPENDIX II

1376	22	JAN	1968	203410	33.80	46.90	5.0	33	USA
1377	22	JAN	1968	212033	33.70	46.80	5.0	10	USA
1378	26	MAR	1968	044220	29.60	51.40	4.9	33	USA
1379	3	APR	1968	133848	32.50	48.90	4.5	34	USA
1380	23	APR	1968	123947	27.70	56.70	5.1	52	USA
1381	26	APR	1968	025822	35.10	50.20	5.1	21	USA
1382	29	APR	1968	170158	39.20	44.30	5.3	34	USA
1383	19	MAY	1968	164950	36.30	53.40	4.7	33	USA
1384	30	MAY	1968	001117	32.60	48.30	4.7	41	USA
1385	30	MAY	1968	011030	27.80	54.00	5.2	27	USA
1386	30	MAY	1968	195306	29.70	51.30	5.2	32	USA
1387	4	JUN	1968	014426	37.50	49.00	4.5	50	USA
1388	4	JUN	1968	065007	32.70	48.30	5.2	40	USA
1389	9	JUN	1968	005634	39.00	46.00	5.0	50	USA
1390	9	JUN	1968	113823	39.00	46.10	4.2	40	USA
1391	13	JUN	1968	230400	29.70	51.50	5.0	33	USA
1392	15	JUN	1968	000824	29.60	51.60	4.5	33	USA
1393	22	JUN	1968	155647	29.60	51.50	4.8	32	USA
1394	23	JUN	1968	091619	29.80	51.20	5.2	34	USA
1395	26	JUN	1968	015415	29.80	51.10	4.9	33	USA
1396	1	JUL	1068	234221	29.90	51.50	4.7	33	USA
1397	8	JUL	1968	112724	28.00	57.00	4.0	33	USA
1398	8	JUL	1968	171528	29.70	51.10	5.0	44	USA
1399	12	JUL	1968	103403	29.80	50.60	4.8	24	USA
1400	14	JUL	1968	223437	39.20	55.70	4.3	33	USA
1401	15	JUL	1968	083337	32.50	48.70	4.6	33	USA
1402	21	JUL	1968	170032	30.10	50.90		33	USA
1403	29	JUL	1968	160342	36.50	53.70	4.8	14	USA
1404	2	AUG	1968	035924	36.60	49.10	4.4	10	USA
1405	2	AUG	1968	133023	27.50	60.90	5.7	62	USA

1406	26	AUG	1968	035909	26.70	55.00	4.6	33 USA
1407	30	AUG	1968	211120	34.90	59.50		33 USA
1408	31	AUG	1968	104737	34.00	50.00		USA
1409	31	AUG	1968	113433	33.90	59.20	5.5	USA
1410	31	AUG	1968	132259	34.10	59.40	4.8	33 USA
1411	31	AUG	1968	140616	34.10	59.40	5.0	18 USA
1412	1	SEP	1968	072730	34.00	58.20	6.3	15 USA
1413	1	SEP	1968	082310	33.70	58.20		16 USA
1414	1	SEP	1968	110402	34.00	59.60	4.8	33 USA
1415	1	SEP	1968	191637	34.20	58.30	5.0	23 USA
1516	1	SEP	1968	211645	34.40	58.00	4.8	44 USA
1417	3	SEP	1968	095347	33.50	59.20	5.0	16 USA
1418	4	SEP	1968	055408	35.10	53.50	4.7	33 USA
1419	4	SEP	1968	080844	33.90	59.20	5.0	24 USA
1420	4	SEP	1968	111935	33.90	50.10	5.1	25 USA
1421	4	SEP	1968	232447	34.00	58.20	5.4	15 USA
1422	6	SEP	1968	022737	34.00	59.30	4.9	27 USA
1423	10	SEP	1968	203158	34.00	59.40	4.7	18 USA
1424	11	SEP	1968	191713	33.90	59.40	5.4	31 USA
1425	14	SEP	1968	134831	28.40	53.10	5.7	33 USA
1426	14	SEP	1968	192023	28.40	53.20	5.1	44 USA
1427	15	SEP	1968	061450	28.30	53.20	4.5	31 USA
1428	15	SEP	1968	094214	34.00	59.40	4.9	20 USA
1429	17	SEP	1968	191509	34.00	58.30		34 USA
1430	19	SEP	1968	051516	34.40	58.00	4.6	48 USA
1431	19	SEP	1968	221238	28.40	53.20	5.1	34 USA
1432	19	SEP	1968	233556	28.30	53.10	4.8	33 USA
1433	1	OCT	1968	181608	38.90	46.00	4.5	56 USA
1434	9	OCT	1968	180604	29.90	53.80		26 USA
1435	13	OCT	1968	013454	34.00	58.70		47 USA

1320	24	OCT	1966	143121	37.70	59.00	5.0	33	USA
1321	8	NOV	1966	031410	36.10	50.90	5.0	23	USA
1322	26	NOV	1966	134930	37.70	58.30	4.9	29	USA
1323	2	DEC	1966	030754	28.20	53.20	5.2	40	USA

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1324	2	JAN	1967	135006	30.60	50.40	5.2	40	USA
1325	9	JAN	1967	015515	27.70	54.50	5.3	17	USA
1326	11	JAN	1967	112046	34.10	45.70	5.4	34	USA-KAR
1327	12	JAN	1967	181420	28.00	54.50	4.9	33	USA
1328	15	JAN	1967	000314	29.70	51.30	4.7	33	USA
1329	29	JAN	1967	035359	26.50	55.30	5.1	42	USA
1330	29	JAN	1967	070600	26.70	55.30	4.9	58	USA
1331	29	JAN	1967	071205	26.50	55.30	4.7	33	USA
1332	29	JAN	1967	075639	26.50	55.20	5.2	38	USA
1333	29	JAN	1967	132031	26.70	55.40	4.8	33	USA
1334	31	JAN	1967	190023	26.50	55.30	5.2	16	USA
1335	31	JAN	1967	200640	26.70	55.50	5.0	46	USA
1336	31	JAN	1967	205250	26.70	55.40		49	USA
1337	1	FEB	1967	010719	26.70	55.30	5.0	19	USA
1338	1	FEB	1967	142108	26.70	55.20		33	USA
1339	11	FEB	1967	151806	30.50	50.70	5.0	42	USA
1340	12	FEB	1967	164604	30.30	50.30	4.6	33	USA
1341	15	FEB	1967	014727	34.50	47.60	5.0	36	USA
1342	16	FEB	1967	115519	35.80	51.90		17	USA
1343	16	FEB	1967	151003	33.80	47.90	4.4	33	USA
1344	21	FEB	1967	151025	31.60	49.20	4.9	55	USA
1345	1	MAR	1967	101249	28.30	57.10	4.9	39	USA
1346	2	MAR	1967	075524	32.10	55.80	4.6	33	USA
1347	15	MAR	1967	162559	30,60	50.80	5.0	43	USA

1348	20	MAR	1967	223044	35.80	44.20		43	USA
1349	25	MAR	1967	222629	27.80	60.30	4.9	41	USA
1350	27	MAR	1967	204748	26.50	58.00	4.5	35	USA
1351	28	AIR	1967	163947	33.60	44.40	4.6	32	USA
1352	28	AIR	1967	193829	28.50	57.50	4.8	24	USA
1353	30	AIR	1967	080917	31.30	49.40	4.5	73	USA
1354	17	MAY	1967	042851	38.70	44.20	4.6	39	USA
1355	20	MAY	1967	214855	29.70	52.20	4.8	42	USA
1356	23	MAY	1967	165938	31.00	50.70		33	USA
1357	7	MAY	1967	223516	26.90	58.00	4.4	41	USA
1358	23	JUN	1967	131510	35.70	49.50	4.4	52	USA
1359	10	JUL	1967	105754	28.20	53.60	4.4	33	USA
1360	14	JUL	1967	114639	35.20	46.40	4.6	59	USA
1361	25	JUL	1967	130039	28.90	54.50	4.5	34	USA
1362	27	JUL	1967	014054	31.70	50.80	5.0	65	USA
1363	1	AUG	1967	165415	39.70	53.30	4.5	33	USA
1364	2	AUG	1967	135514	30.90	53.50	4.5	33	USA
1365	25	AUG	1967	122649	35.40	49.10	4.8	43	USA
1366	2	SEP	1967	080209	36.80	55.10		33	USA
1367	14	SEP	1967	144942	28.40	67.10	4.7	33	USA
1368	27	OCT	1967	080514	34.30	46.20	5.0	68	USA
1369	10	NOV	1967	025056	36.00	53.80	5.0	33	USA
1370	15	NOV	1967	193546	30.70	51.40	4.6	10	USA
1371	21	NOV	1967	150455	30.80	50.40	4.6	33	USA
1372	10	DEC	1967	105252	36.00	53.60	5.0	51	USA
1373	18	DEC	1967	224927	33.60	46.90	5.0	39	USA

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1374	2	JAN	1968	115932	29.40	52.60	5.0	26	USA
1375	10	JAN	1968	104348	27.40	56.20	4.6	55	USA

1263	4	JUN	1965	184058	32.30	55.60	4.8	28	REC-USA
1264	7	JUN	1965	160621	30.60	49.50		41	USA
1265	18	JUN	1965	134936	29.80	51.30	4.6		USA
1266	18	JUN	1965	202037	37.30	57.00	4.0		Z5
1267	21	JUN	1965	002100	28.10	56.00	5.5	28	REC-USA
1268	21	JUN	1965	013039	28.40	55.80	5.0	59	USA
1269	24	JUN	1965	105400	28.90	52.90	4.2		USA
1270	24	JUN	1965	085211	30.70	50.10	4.2	35	USA
1271	19	JUL	1965	085211	30.70	50.10	4.2	35	USA
1272	19	JUL	1965	085500	30.70	50.00	4.2	32	USA
1273	20	JUL	1965	055855	37.20	56.20	4.0		Z5
1274	22	JUL	1965	123022	36.00	57.00	3.5		Z5
1275	24	JUL	1965	051708	37.40	55.20	4.0		Z5
1276	30	JUL	1965	190703	27.90	57.00	4.7	33	USA
1277	3	AUG	1965	062452	36.90	58.10	4.0		Z5
1278	9	AUG	1965	221636	37.30	56.50	4.0		Z5
1279	27	AUG	1965	042322	40.10	49.30	4.2		USA-Z5
1280	8	SEP	1965	053545	32.90	48.40	4.7	51	USA
1281	20	SEP	1965	232323	31.10	50.30	4.6	47	BCI-USA
1282	21	SEP	1965	154600	27.40	55.30	4.5	19	USA
1283	18	OCT	1965	183003	37.30	57.00	4.0		Z5
1284	29	OCT	1965	155942	37.90	48.70	4.6		USA
1285	8	NOV	1965	015727	27.90	57.00	5.2	56	USA
1286	10	NOV	1965	100333	27.20	54.50	4.1		USA
1287	14	NOV	1965	154437	32.80	53.50	3.6		Z5
1288	28	NOV	1965	224946	36.00	56.00	4.0		Z5
1289	6	DEC	1965	141729	36.80	55.70	4.0		Z5
1290	12	DEC	1965	033151	35.10	45.80	4.2		USA
1291	13	DEC	1965	050717	30.90	51.20	4.9	33	USA-REC
1292	23	DEC	1965	035153	37.30	57.40	4.0		Z5

1293	23	DEC	1965	111001	27.70	54.60	4.2		USA

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1294	2	JAN	1966	163307	38.20	57.10	4.1	58	USA
1295	13	JAN	1966	034142	27.50	57.10			USA
1296	16	JAN	1966	200209	30.80	50.20	4.4	21	USA
1297	18	JAN	1966	205412	37.90	57.00		33	USA
1298	31	JAN	1966	123127	32.40	48.80	4.4	11	USA
1299	1	FEB	1966	070746	35.10	46.00	4.4	4	USA
1300	26	FEB	1966	205037	30.50	50.80	4.7	60	USA
1301	16	MAR	1966	103829	34.40	46.00	4.2		USA
1302	9	JUN	1966	222439	27.60	52.50	5.0	8	USA
1303	13	JUN	1966	010353	32.20	54.70	4.8	56	USA
1304	25	JUN	1966	115217	32.60	48.70	4.7	36	USA
1305	9	JUL	1966	170146	27.80	57.10		33	USA
1306	27	JUL	1966	144902	32.60	48.80	5.5	36	USA
1307	27	JUL	1966	153026	32.60	48.80	3.9	45	USA
1308	27	JUL	1966	170602	32.60	49.30		74	USA
1309	27	JUL	1966	180634	32.80	48.70	4.9	36	USA
1310	27	JUL	1966	194009	32.60	49.00	5.2	54	USA
1311	27	JUL	1966	211009	32.60	49.00		60	USA
1312	29	JUL	1966	082046	28.50	51.60	4.8	33	USA
1313	9	AUG	1966	002000	32.80	48.70	4.2	54	USA
1314	30	AUG	1966	064226	32.20	55.10	4.0	33	USA
1315	22	SEP	1966	111306	27.70	52.40	5.0	33	USA
1316	18	SEP	1966	204353	27.80	54.30	6.2	16	USA
1317	24	SEP	1966	100046	27.40	54.50	5.4	33	USA
1318	29	SEP	1966	174434	27.90	54.30	4.9	25	USA
1319	3	OCT	1966	170510	35.70	53.20	4.9	35	USA

1218	4 NOV	1964	042714	38.70	69.30	4.0	24	
1219	8 NOV	1964	103327	29.63	50.95	4.8	36	ISC-NOS-USA-BCI
1220	9 NOV	1964	080648	39.90	48.52	5.1	50	ISC-USANOS ZI.
1220A				40.20	48.60			BCI
1221	10 NOV	1964	154753	37.72	49.16	5.3	55	ISC-USA-NOS-BCI
1222	15 NOV	1964	063323	35.45	45.51	4.7	33	ISC-NOS
1222A				35.80	45.50	4.7	33	BCI-USA-ERM
1223	15 NOV	1964	093347	29.81	50.95	5.0	37	ISC-USA-BCI-NOS
1224	17 NOV	1964	012626	27.57	55.01		46	ISC-USA
1225	22 NOV	1964	221200	32.56	48.78		36	ISC-USA
1226	26 NOV	1964	044901	32.94	49.09	4.6	99	ISC-USA
1227	1 DEC	1964	082153	36.80	54.57	4.5	33	ISC
1227A				37.10	54.30	4.5		NOS
1228	2 DEC	1964	223237	36.60	55.60	4.7	33	USA
1229	3 DEC	1964	223239	36.80	55.34	4.7	33	ISC-NOS-USA
1230	6 DEC	1964	055436	38.20	57.03	4.4	25	ISC-NOS
1231	11 DEC	1964	052556	28.05	52.87	4.9	45	ISC-USA-NOS
1232	11 DEC	1964	124805	28.50	52.98		59	ISC
1232A				29.00	53.20		74	USA
1232B				29.10	52.80		96	NOS
1233	12 DEC	1964	070343	29.70	31.10		55	ISC
1234	18 DEC	1964	003522	28.20	52.80		46	ISC
1234A				27.80	52.80		33	USA
1235	19 DEC	1964	233156	27.50	56.88	5.3	54	ISC
1235A				26.90	57.20			NOS
1235B				28.00	56.90	5.3	50	USA
1236	22 DEC	1964	043636	28.20	56.91	5.7	43	ISC-REC-USA-BCI
1236A				27.80	57.00	6.0		NOS
1237	23 DEC	1964	105224	28.23	56.74	4.8	70	ISC
1237A				27.90	57.00	4.8	33	USA

1237B					27.70	56.70		70	HOS
1238	24	DEC	1964	020608	28.20	57.40		64	ISC-USA

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1239	2	JAN	1965	150908	36.90	58.40	4.0		Z5
1240	13	JAN	1965	220134	37.60	57.00	4.0		Z5
1241	23	JAN	1965	112332	39.10	48.40	4.6	33	REC-USA
1242	24	JAN	1965	120519	36.80	57.20	4.0		Z5
1243	10	FEB	1965	160954	37.60	47.10	5.1	50	REC-USA-Z5
1244	13	FEB	1965	005658	38.20	45.60	4.0		Z5
1245	20	FEB	1965	181826	37.00	57.00	3.9		Z5
1246	23	FEB	1965	230531	37.00	57.70	3.6		Z5
1247	26	FEB	1965	013706	35.10	57.60	5.2	33	USA
1247A					35.60	57.50	5.2		REC
1248	28	FEB	1965	080536	27.60	55.10		33	USA
1249	10	MAR	1965	054448	32.80	49.20	5.4	33	USA-REC
1250	12	MAR	1965	181155	37.40	57.20	4.0		Z5
1251	17	MAR	1965	071856	27.80	56.50	4.9	60	USA
1252	25	MAR	1965	195413	32.20	50.40		45	USA
1253	28	MAR	1965	050944	37.40	57.30	4.0		Z5
1254	19	APR	1965	012004	28.20	56.60	4.7	33	USA
1255	25	APR	1965	163945	30.40	50.60	4.6	34	USA
1256	26	APR	1965	220438	27.30	52.30	4.9	33	USA-REC
1257	4	MAY	1965	051148	31.70	49.10		17	USA
1258	7	MAY	1965	003845	32.40	48.70	4.5	52	USA
1259	7	MAY	1965	010302	36.20	55.00	4.8	33	USA
1260	11	MAY	1965	054429	39.80	51.30	3.6		Z5
1260A					39.90	50.90			USA
1261	12	MAY	1965	114426	34.30	47.40	4.5	33	USA
1262	26	MAY	1965	135803	35.30	44.60	4.7	54	REC-USA

1181	9 JUL 1964	033808	28.80	52.80		50	NOS-ISC
1181A			29.30	52.70		55	USA
1182	4 JUL 1964	231851	34.30	46.00		29	USA
1183	14 JUL 1964	015734	27.10	54.70		54	NOS
1183A			27.56	54.83		54	ISC
1184	21 JUL 1964	114655	27.60	56.46	4.3	46	ISC
1184A			26.80	56.40	4.0	50	NOS-USA
1185	22 JUL 1964	044155	27.60	55.00	4.7	73	NOS-USA-ISC
1186	4 AUG 1964	231851	34.30	46.00	4.5	29	USA-ERG-ISC
1186A			34.00	45.80	4.5		NOS
1187	10 AUG 1964	181841	30.10	57.67	4.5	52	ISC
1187A			30.30	57.70	4.5	13	USA
1187B			29.80	57.70	4.7		NOS
1188	12 AUG 1964	032424	27.20	56.40	4.7		USA
1189	12 AUG 1964	192626	31.00	49.80	5.1	34	USA-NOS-ISC
1190	16 AUG 1964	155245	28.10	52.48		52	ISC
1190A			27.60	52.50		31	NOS-USA
1191	16 AUG 1964	212849	39.70	52.60	4.8	16	USA-ISC-NOS-REC
1192	19 AUG 1964	093310	28.20	52.60	5.6	37	ISC-USA-NOS
1193	19 AUG 1964	152014	28.20	52.70	5.6	47	ISC-USA-NOS
1194	19 AUG 1964	224016	28.20	52.52	4.9	46	ISC-USA-NOS
1195	20 AUG 1964	050849	28.15	52.64	5.1	35	ISC-USA-NOS
1196	20 AUG 1964	053948	28.20	52.60	5.5	33	ISC-USA-NOS
1197	20 AUG 1964	225450	28.80	52.76		92	ISC-USA
1198	21 AUG 1964	075915	28.19	52.59	4.9	44	ISC-USA-NOS
1199	27 AUG 1964	113840	28.18	55.85	5.1	63	ISC-USA
1199A			27.80	55.80			NOS
1200	27 AUG 1964	125652	28.11	55.88	5.3	51	ISC
1200A			27.50	55.90		33	USA
1200B			27.80	55.80	5.0		NOS

1201	1	SEP	1964	[illegible]	[illegible]	50.07		6	ISC-MOS-USA
1202	9	SEP	1964	221943	35.03	45.95	4.5	69	ISC
1202A					34.60	45.70	4.5	68	USA-MOS
1203	14	SEP	1964	152112	28.18	55.86	4.8	49	ISC-USA
1203A					27.80	56.10	4.7		MOS
1204	6	OCT	1964	072327	40.00	53.60	4.0		MOS
1205	13	OCT	1964	065757	34.70	46.00		147	ISC
1205A					34.00	45.10		96	USA
1206	18	OCT	1964	132021	29.64	50.91	5.0	49	ISC-USA-MOS
1206A					28.75	51.25			BCI
1207	18	OCT	1964	212528	27.83	54.86	4.9	53	ISC
1207A					28.00	54.70	4.8	61	USA
1207B					27.20	55.00			MOS
1208	18	OCT	1964	223545	29.71	50.97	4.9	26	ISC-USA
1208A					28.00	51.00			MOS
1209	19	OCT	1964	173844	29.82	51.08		48	ISC
1209A					29.50	50.80			MOS
1209B					29.80	51.20		54	USA
1210	24	OCT	1964	152727	37.00	55.10	4.0		MOS
1211	26	OCT	1964	012919	32.82	49.19		20	ISC-USA-MOS
1212	26	OCT	1964	204724	26.20	55.79		33	ISC
1213	30	OCT	1964	034318	27.90	55.80	4.7	87	ISC
1214	31	OCT	1964	145933	27.87	55.81	4.5	59	ISC-MOS-USA
1215	3	NOV	1964	022551	29.62	51.07	5.0	49	ISC-USA
1215A					29.30	51.00			BCI-MOS
1216	3	NOV	1964	061428	32.80	59.32	4.5	33	ISC
1216A					32.40	59.10	4.5	33	USA
1216B					33.10	59.00			MOS
1217	3	NOV	1964	173609	35.63	50.29	5.0	42	ISC-BCI
1217A					36.00	50.60	5.3	33	USA-REC-MOS

1144	12	OCT	1963	034500	27.70	54.30			SHR
1145	12	OCT	1963	183000	32.90	59.20			SHR
1146	13	OCT	1963	060000	32.90	59.20			SHR
1147	16	OCT	1963	190200	28.80	58.00	4.9	32	REC-USA
1147A					27.90	57.70	4.8		MOS
1148	27	OCT	1963	025400	34.50	48.5	0		SHR
1149	31	OCT	1963	095657	26.50	55.40	5.3	35	BCI
1149A					27.40	55.60	5.3	35	USA
1149B					27.10	55.80	5.3		MOS
1150	18	NOV	1963	014256	29.30	57.00	5.0	33	USA
1151	18	NOV	1963	163000	39.30	44.50			SHR
1152	4	DEC	1963	0223018	31.30	55.40		35	BCI-USA
1153	7	DEC	1963	090600	30.90	51.30		60	BCI-MOS-US
1154	8	DEC	1963	110805	39.90	48.70	4.5	33	USA-MOS
1155	21	DEC	1963	045039	33.70	51.50	4.5	35	BCI-USA
1156	31	DEC	1963	151810	38.50	45.20	4.6	33	BCI-USA-MO
1156A					38.70	45.70	4.8		Z4

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1157	12	JAN	1964	124551	31.60	49.20	5.2	55	BCI-USA-IS
1157A					31.20	49.10		100	MOS
1158	19	JAN	1964	091300	26.90	54.00	5.6	38	REC-ISC-US
1158A					26.40	54.00	5.2		MOS
1159	30	JAN	1964	122310	32.70	47.80		33	BCI-USA
1159A					29.90	48.20			MOS
1159B					32.40	48.20		33	ISC
1160	8	FEB	1964	062826	37.00	51.00	4.5	57	MOS-ISC
1160A					36.80	50.30	4.7	33	USA
1161	12	FEB	1964	081916	39.00	55.50	4.8	33	MOS-ISC
1161A					39.80	53.40	5.2	33	REC-USA

1162	12	FEB	1964	113351	39.00	55.50		33	MOS
1162A					39.70	56.10		33	ISC
1163	14	FEB	1964	155112	29.20	54.50	4.7	51	USA-ISC
1164	16	FEB	1964	001700	30.10	51.20	5.3	37	BCI-ISC-USA
1164A					29.90	51.20			MOS
1165	19	FEB	1964	203303	28.30	49.00			MOS
1165A					32.20	50.90			ISC
1166	21	FEB	1964	010356	34.50	58.06	4.8	33	ISC-MOS-USA
1167	26	FEB	1964	091655	27.30	54.50	4.6	14	BCI-USA-ISC
1167A					27.10	54.40	4.5		MOS
1168	11	MAR	1964	233423	27.80	57.60	4.6		BCI-ISC
1168A					27.70	57.30	4.6	42	USA
1168B					27.50	57.70	4.5		MOS
1169	17	MAR	1964	120511	26.90	54.00	4.9	33	BCI-USA-ISC
1169A					26.20	54.10			MOS
1170	20	MAR	1964	031543	27.50	55.10	5.2	50	BCI
1170A					28.20	55.00	5.8	43	USA
1170B					27.93	55.21	4.7	64	ISC-MOS
1171	21	MAR	1964	102532	27.00	54.00	4.9	22	BCI-ISC-USA
1172	29	MAR	1964	230343	39.20	49.00	4.0		Z4
1173	13	APR	1964	011400	40.00	51.90	4.8	58	REC-ISC-USA-MOS
1174	9	MAY	1964	074701	29.50	52.40		36	ISC-USA
1175	11	MAY	1964	060741	28.30	57.40	5.1	68	USA-ISC
1157A					27.80	57.40		71	MOS
1176	15	MAY	1964	015600	35.76	49.86		29	ISC
1177	15	MAY	1964	223156	35.90	58.60	4.5	16	MOS
1177A					36.30	58.85		16	ISC
1178	27	MAY	1964	030255	40.00	55.00	4.0		MOS
1179	3	JUN	1964	024542	33.60	59.20		31	MOS-ISC
1180	24	JUN	1964	181044	30.60	52.50		33	ISC

1105	26	MAY	1963	184600	30.50	52.70			SHR
1106	26	MAY	1963	210348	42.50	48.40	4.8	55	BCI
1106A					42.30	48.60	5.3	55	USA
1107	28	MAY	1963	103250	35.70	49.60	4.2	33	BCI-RMY-SHR
1107A					35.40	49.80	4.3	33	USA
1108	29	MAY	1963	004748	27.90	32.40	5.3	44	BCI-USA-ISC-MOS-REC
1109	29	MAY	1963	083508	27.20	59.50	5.4	75	BCI-RMC-ISC
1109A					27.00	59.40	5.0	52	MOS-USA
1109B					27.70	60.00	5.8	50	QUE
1109C					26.75	59.00	5.8	75	PEK
1110	2	JUN	1963		35.00	48.50			SHR
1111	5	JUN	1963	212200	37.60	49.10			SHR
1112	9	JUN	1963	074545	35.00	58.00	4.8		MOS
1113	20	JUN	1963	132900	29.25	51.20			SHR
1114	30	JUN	1963	074110	33.60	49.20	5.1	40	BCI-RMC
1114A					33.20	49.20	5.1	38	USA
1114B					33.40	49.20			SHR
1115	5	JUL	1963	094000	36.50	52.40			SHR
1116	5	JUL	1963	134934	38.80	51.50			BCI
1116A					36.50	52.00			SHR-MOS
1117	6	JUL	1963	133404	27.80	57.70		100	BCI
1117A					28.00	58.00		100	MOS-USA
1118	8	JUL	1963	08506	26.70	55.70	5.0	33	BCI-USA
1118A					27.00	55.50	5.0		MOS
1119	13	JUL	1963	082420	29.60	50.80	5.0	44	BCI-USA-REC-ISC
1119A					29.40	50.90	4.5		MOS
1120	14	JUL	1963	074618	29.60	50.80		33	BCI-USA
1120A					22.00	50.40			MOS
1121	19	JUL	1963	223040	28.30	57.80			BCI
1122	20	JUL	1963	061020	28.10	55.70	5.2	37	BCI-ISC

1122A					27.33	55.00	5.0		MOS
1122B					28.00	56.00			PEK
1122C					27.80	55.60		37	REC-USA
1123	29	JUL	1963	223700	27.60	54.20			SHR
1124	2	AUG	1963	073500	29.00	50.83			SHR
1125	10	AUG	1963	042727	27.90	53.20	46		BCI-SHR
1125A					28.10	53.30	4.8	46	USA
1126	11	AUG	1963	084323	36.90	55.10	4.4	33	BCI-QUE
1126A					37.10	55.20	4.4	33	USA-MOS
1127	11	AUG	1963	172247	38.40	46.00	4.0		Z4
1128	12	AUG	1963	071953	27.90	53.10	5.0	33	BCI-USA
1129					27.70	52.30	5.0		SHR
1130	15	AUG	1963	152024	38.40	45.80	4.0		Z4
1131	17	AUG	1963	215850	36.80	59.80	4.8	33	BCI-USA
1131A					36.80	60.00	4.5		MOS
1131B					36.30	59.60			SHR
1132	2	SEP	1963	044643	38.80	44.50	4.0		Z4
1133	13	SEP	1963	223000	37.50	57.30			SHR
1134	15	SEP	1963	010400	37.50	57.30			SHR
1135	18	SEP	1963	154200	38.50	57.20	5.1	33	REC-USA
1136	18	SEP	1963	224900	26.00	53.00			SHR
1137	19	SEP	1963	185200	25.00	53.00			SHR
1138	20	SEP	1963	103243	38.60	57.10	4.0		MOS
1139	21	SEP	1963	052200	32.00	48.00			BCI.
1140	22	SEP	1963	104048	27.70	54.90	4.6	40	BCI
1140A					28.50	55.00	4.5		MOS
1140B					29.30	55.30	4.7	33	USA-QUE
1141	23	SEP	1963	183346	29.50	50.80	4.8	35	BCI-USA-MO
1142	1	OCT	1963	184838	37.50	55.90	4.0		BCI-MOS
1143	5	OCT	1963	030347	37.60	55.90	4.0		BCI-MOS

1062	2	JAN	1963	173300	33.70	49.90		32	SHR
1063	2	JAN	1963	200000	36.20	50.00			SHR
1064	2	JAN	1963		34.80	49.90			SHR
1065	2	JAN	1963		34.62	50.80			SHR
1066	2	JAN	1963		37.10	50.20			SHR
1068	4	JAN	1963	155000	35.50	47.50			SHR
1069	12	JAN	1963	163600	35.30	50.50			SHR
1070	22	JAN	1963	021012	39.30	48.50	4.5		ZA
1071	24	JAN	1963	154203	27.20	57.20		100	MOS
1071A					28.60	56.40		100	USA
1072	3	FEB	1963	144600	27.20	54.35			SAR
1073	4	FEB	1983	051420	27.30	54.20		34	USA-SHR
1073A					26.70	54.00			MOS-QUE
1074	4	FEB	1963	071800	27.70	54.60	4.5	33	REC-USA
1074A					26.90	54.10			MOS
1075	8	FEB	1963	060310	26.50	55.20	4.1	33	USA
1076	13	FEB	1963	030639	27.70	55.40		33	USA
1077	26	FEB	1963	064000	31.80	49.80			SHR
1078	1	MAR	1963	032002	35.80	59.90	4.6	33	MOS-USA
1078A					35.50	59.50			SHR
1079	9	MAR	1963	214600	36.83	54.50			SHR
1080	9	MAR	1963	231022	34.30	48.82			SHR-TEH
1081	10	MAR	1963	020015	34.30	48.82			SHR
1082	24	MAR	1963	124401	34.80	48.00	5.5	33	BCI-REC
1082A					34.40	49.90	5.5	33	USA-ISC
1082B					33.90	47.80	5.7		MOS
1082C					34.50	47.00	5.5		PEK
1082D					34.50	47.70	5.7		QUE
1082E					37.00	48.00			SHR

1083	24	MAR	1963	224401	34.80	48.00	5.7		BCI
1084	27	MAR	1963	140600	34.50	48.00			SHR
1085	28	MAR	1963	070000	34.50	48.00			SHR
1086	31	MAR	1963		34.00	48.00			SHR
1087	31	MAR	1963	022702	36.90	57.90	4.5	33	MOS-USA-REC
1088	2	APR	1963		36.90	58.00			SHR
1089	5	APR	1963	213611	37.50	48.50			SHR
1090	8	APR	1963	092218	34.30	48.80			SHR
1091	8	APR	1963	133000	34.50	48.00			SHR
1092	12	APR	1963	213500	34.50	48.00			SHR
1093	13	APR	1963	184952	38.60	44.20	4.0		Z4
1094	16	APR	1963	184707	35.80	44.40	5.2	45	BCI-KAR USA-ISC
1094A					35.60	44.20	5.0		MOS-REC
1095	21	APR	1963		34.50	48.00			SHR
1096	23	APR	1963	230218	39.30	55.00	4.5	33	BCI-USA
1096A					39.80	55.20	4.5		REC
1097	24	APR	1963	232217	27.90	55.80		66	BCI
1097A					28.20	55.90			USA
1097B					28.00	56.30			MOS
1098	2	MAY	1963	015821	27.70	54.70	5.8	40	BCI-REC
1098A					28.50	54.90	5.8	46	USA
1098B					28.00	56.00			SHR
1099	3	MAY	1963	015806	28.00	56.00			SHR
1100	4	MAY	1963	104431	30.80	51.70	5.5	35	BCI-USA-REC
1100A					31.50	51.00			MOS
1100B					31.00	50.00			SHR
1101	13	MAY	1963		34.50	48.00			SHR
1102	17	MAY	1963	210700	35.10	49.70			SHR
1103	20	MAY	1963	101900	25.75	56.50			BCI
1104	21	MAY	1963		30.30	57.10			SHR

1024	29	SEP	1962	065346	27.00	57.00	5.5	50	MOS
1024A					28.20	57.40		50	USA
1025	29	SEP	1962	192324	35.00	53.20	4.2		MOS
1026	1	OCT	1962	121360	27.00	54.75	5.8	16	BCI-MOS
1026A					27.90	54.90		16	USA-REC-ISC
1026B					28.00	55.50			QUE
1026C					28.00	52.70			SHI
1027	3	OCT	1962	083000	37.20	57.10	4.0	11	RU
1028	3	OCT	1962	084200	37.20	57.10	3.5	10	RU
1029	5	OCT	1962	200222	36.10	58.60	5.0	33	BCI
1029A					35.00	58.60	5.0		MOS
1029B					35.00	56.75			QUE-ISC
1029C					35.00	58.25			PEK
1029D					35.20	58.80		33	USA
1030	10	OCT	1962	022000	28.93	53.65			SHR
1031	10	OCT	1962	204337	27.90	54.90		47	USA
1032	13	OCT	1962	102337	35.70	50.00	5.6	33	BCI-USA-ISC
1032A					36.00	50.00	5.5		MOS-PEK
1032B					35.70	50.30	5.7		REC
1032C					36.80	49.70			SHI
1033	14	OCT	1962	140344	37.00	44.50			MOS-ERG
1034	16	OCT	1962	072400	35.20	58.45			SHR
1035	16	OCT	1962	115936	34.00	60.50	4.5	33	MOS
1035A					30.60	57.30		33	USA
1036	16	OCT	1962	181300	35.20	58.35			SHR
1037	24	OCT	1962	142500	37.60	56.90	3.5	10	RU
1038	25	OCT	1962	010000	36.70	53.30			SHR
1039	25	OCT	1962	214937	33.40	46.00		20	BCI-USA
1040	30	OCT	1962	140300	36.50	56.80	3.5	10	RU
1041	3	NOV	1962	033708	28.00	56.50			BCI

1042	3	NOV	1962	153700	35.10	58.70			SHR
1043	5	NOV	1962	040300	28.30	53.20			SHR
1044	6	NOV	1962	000948	28.00	55.60	5.7	30	REC-USA-[illegible]
1044A					26.50	55.50			MOS
1044B					30.00	55.00			SHI
1044C					26.50	56.00			REK
1044D					27.75	55.50			QUE
1045	9	NOV	1962	011102	33.50	47.20	5.1	33	MOS-QUE-USA-REC-ISC
1046	10	NOV	1962	013204	27.90	55.70		33	USA
1046A					27.20	56.30			SHR
1047	17	NOV	1962	213900	35.55	52.10			SHR
1048	20	NOV	1962	115600	31.95	51.30			SHR
1049	20	NOV	1962	155200	37.55	45.10			SHR
1050	20	NOV	1962	204547	27.90	54.90		34	USA
1051	22	NOV	1962	140600	28.50	53.55			SHR
1052	2	DEC	1962	221214	36.70	50.00			BCI
1053	2	DEC	1962	222128	35.70	50.00	5.0	36	BCI-MOS-USA
1054	2	DEC	1962	122624	35.50	50.10		26	USA-TEH
1054A					35.70	50.00		26	REC
1055	8	DEC	1962	090254	36.50	55.00	5.0	13	REC-USA
1055A					36.60	54.80	4.8	13	RU-MOS-ISC
1056	12	DEC	1962	143700	35.40	51.26		135	SHR
1057	14	DEC	1962	042300	36.60	56.50	3.5	10	RU
1058	15	DEC	1962		26.55	54.95			SHR
1059	19	DEC	1962	150900	37.40	57.20	3.5	10	RU
1060	24	DEC	1962	141200	38.60	47.90			SHR

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1061	1	JAN	1963	192700	35.40	58.80	4.5		RE-MOS
1061A					35.20	58.80			SHR

989	22	JUIN	1962	050459	29.70	49.20		40	USA
990	27	JUIN	1962	113700	37.60	56.80	3.5	10	RU
991	29	JUN	1962	223542	32.00	48.50	5.7	50	REC-BCI-USA
991A					32.36	48.53			ISC
992	30	JUN	1962	094544	26.50	57.60	4.2	25	BCI
992A					27.60	57.70	4.2	25	MOS-USA
993	3	JUL	1962	063103	28.00	56.20	4.5	25	BCI-USA
993A					27.00	56.00	4.5		MOS
994	8	JUL	1962	090200	36.60	54.80	4.9		CCP
995	9	JUL	1962	162800	37.90	55.10	3.5	10	RU
996	14	JUL	1962	064437	27.80	56.80	4.2	30	MOS
996A					27.30	56.70	30		USA
997	21	JUL	1962	030600	37.00	55.14	4.5	12	CCP-RU
997A					37.00	55.40		40	USA
997B					37.50	55.40	4.5		MOS
998	23	JUL	1962	025700	36.60	53.00			SHR
999	3	AUG	1962	134000	36.70	56.30	3.5	10	RU
1000	6	AUG	1962		32.00	49.50			SHR
1001	12	AUG	1962	081600	36.20	55.00	3.7	10	RU
1002	13	AUG	1962	055800	34.20	48.30			SHR
1003	14	AUG	1962	072745	28.00	55.60	5.0	43	USA
1003A					27.00	55.50	5.0		MOS
1004	15	AUG	1962	051328	29.60	52.10			SHR
1005	20	AUG	1962	043200	37.30	56.20	3.5	10	RU
1006	27	AUG	1962	234900	37.10	58.40			SHR
1007	1	SEP	1962	192040	35.60	49.90	7.1	27	BCI
1007A					35.60	50.00		21	USA-ISC
1007B					35.00	49.30	7.0		MOS
1007C					35.75	48.00			QTE
1007D					35.00	48.75			PEK

1007E					36.00	49.00	7.5		SHS
1008	1	SEP	1962	202737	35.60	49.90	4.5	33	BCI-USA
1008A					35.60	49.70		43	USA
1008B					35.30	49.60		33	AFS
1009	2	SEP	1962	071203	35.70	49.40	5.0	31	BCI-USA
1009A					35.60	49.20		33	AFS.
1010	2	SEP	1962	132118	35.00	48.50	4.0		MOS
1011	3	SEP	1962	020826	35.75	50.00			BCI
1012	4	SEP	1962	133012	35.60	49.90	5.3	24	BCI
1012A					35.60	49.70		24	USA-ISC
1012B					35.00	50.00			PEX
1012C					35.00	49.50	5.0		MOS
1013	5	SEP	1962	225917	40.00	44.00	5.5	33	MOS-ERG
1013A					39.90	44.20	5.8	33	USA-REC
1013B					39.97	44.21			ISC
1014	5	SEP	1962	021205	40.00	44.00			BCI
1015	5	SEP	1962	022817	40.00	44.00			BCI
1016	6	SEP	1962	073035	36.00	52.00			MOS
1017	6	SEP	1962	115021	39.90	44.00			MOS
1018	6	SEP	1962	170425	36.30	49.50	3.7		MOS
1019	11	SEP	1962	001737	39.90	43.90	4.2	33	MOS-ERG
1019A					39.90	44.20	4.2		KAR
1019B					40.00	44.20		34	USA
1020	11	SEP	1962	111505	35.30	49.90	4.0	33	USA
1020A					34.70	48.80	4.0		MOS
1021	16	SEP	1962	120145	33.50	49.50			BCI
1022	19	SEP	1962	072837	29.50	50.00	5.0	66	MOS
1022A					29.90	50.40		66	USA
1022B					30.14	50.40			ISC
1023	20	SEP	1962	131012	35.00	58.50	4.5		MOS

962	3	FEB	1962	030000	30.20	52.00			SHR
963	8	FEB	1962	201015	31.00	49.00	4.5		MOS-BCI
964	13	FEB	1962	190000	38.10	45.30			SHR
965	7	MAR	1962	210803	27.10	57.10		25	USA
966	9	MAR	1962	060000	28.50	53.50			SHR
967	15	MAR	1962	150140	28.40	51.60		20	USA
968	19	MAR	1962	230500	37.50	54.50	4.5	12	CCP-RU
969	28	MAR	1962	052500	37.00	57.40	4.0	11	RU
970	31	MAR	1962	233644	34.00	48.00		25	BCI-USA
971	1	APR	1962	004500	33.60	59.00	6.0	33	REC-USA
971A					33.37	58.93			ISC
971B									PRS 32.89
972	19	APR	1962	115527	38.60	44.00		25	USA-ERG
973	21	APR	1962	002600	32.00	49.00			SHR
974	25	APR	1962	011400	37.20	56.60	4.0	12	CCP-RU
975	26	APR	1962	071700	37.80	56.90	4.0	11	RU
976	26	APR	1962	155259	28.10	56.60		41	MOS
976A					28.50	57.20		41	USA
977	1	MAY	1962	232900	34.50	48.00			SHR
978	6	MAY	1962		27.20	54.30			SHR
979	17	MAY	1962		30.30	52.00			SHR
980	24	MAY	1962		37.00	55.50	4.5	12	RU
981	25	MAY	1962	072900	27.60	54.20			SHR
982	10	JUN	1962	192800	37.60	55.90	3.5	10	RU
983	10	JUN	1962	211400	36.50	52.50			SHR
984	12	JUN	1062	092418	27.00	55.00			BCI
985	15	JUN	1962	100900	37.90	58.50	4.0	10	RU
986	15	JUN	1962	102000	37.90	58.50	4.0	10	RU
987	16	JUN	1962	173600	33.90	48.70			SHR

944A			27.20	57.10		41	USA
944B			27.10	57.20		56	SHR
944C			26.50	57.50		100	MOS
944D			27.43	57.02			ISC
945	I OCT 1961	205746	32.00	52.00			SHR
946	2 OCT 1961	180300	37.03	45.10			SHR
947	3 OCT 1961	093452	37.70	50.80	4.7	59	BCI-TEH
947A			34.30	47.90		59	USA
948	9 OCT 1961	212454	29.00	56.00			BCI
949	14 OCT 1961	070039	33.60	48.10		33	BCI-USA-REC
950	15 OCT 1961	094135	27.75	56.50			BCI
951	22 OCT 1961	225632	27.50	54.60	4.7	33	MOS-USA
952	23 OCT 1961	044022	27.90	54.50	4.7	33	USA-SHR
952A			27.50	54.50	4.7		MOS
953	28 OCT 1961	104542	33.60	48.50	4.7	50	REC-USA-STH
953A			33.33	43.74			ISC
954	5 NOV 1961	084000	34.00	49.00		92	BCI
954A			27.80	55.00		44	USA
954B			28.70	55.10		92	SHR
955	7 NOV 1961	083935	27.80	54.50		33	USA
956	21 NOV 1961	014500	32.50	53.00			BCI
957	27 NOV 1961	002900	28.00	56.00			BCI
958	17 DEC 1961	143324	38.50	50.50	5.0		MOS

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959	20 JAN 1962	033100	34.20	48.90	4.5	33	BCI-USA
959A			29.00	49.50	4.5		MOS
960	24 JAN 1962		28.50	51.50			SHR
961	2 FEB 1962	035538	27.75	54.50			BCI
961A			27.60	54.20			SHR

908	12 JUN 1961	170456	27.10	54.90		49	USA
909	12 JUN 1961	210238	28.00	54.50		33	BCI
909A			27.50	54.30		33	USA
910	12 JUN 1961	214830	27.50	55.10	4.3	35	USA-MOS
911	13 JUN 1961	011201	28.00	54.50			BCI
912	14 JUN 1961	002427	27.90	55.00	5.8	36	USA-MOS
913	14 JUN 1961	090337	28.00	54.50	4.5	34	BCI-MOS
913A			28.00	55.00		34	USA
914	15 JUN 1961	062128	27.00	54.50		35	MOS
914A			27.80	54.80		35	USA
914B			27.70	54.81			ISC
915	15 JUN 1961	195506	28.00	56.00			BCI
916	16 JUN 1961	024530	27.20	54.50		37	USA
917	17 JUN 1961	080553	27.90	55.00	4.9	38	USA-MOS
917A			27.94	54.86			ISC
918	18 JUN 1961	101029	27.80	55.20	4.5	33	USA-MOS-BCI
919	18 JUN 1961	105203	27.30	54.70		33	USA-MOS-BCI
920	18 JUN 1961	145132	28.00	54.90		27	USA-BCI
921	20 JUN 1961	101559	28.90	54.70		45	USA-BCI
922	21 JUN 1961	063925	27.50	55.00	5.2	40	MOS-QUE
922A			27.80	54.80		40	USA-ISC
922B			27.75	54.50			BCI
923	21 JUN 1961	154046	35.00	49.00		33	BCI
923A			34.20	48.30		33	USA
924	21 JUN 1961	191435	27.50	54.75		45	BCI-USA
924A			28.00	54.75			QUE
924B			27.50	55.00			MOS
924C			27.81	54.84			ISC
925	22 JUN 1961	090515	28.00	54.90		43	USA-BCI
926	23 JUN 1961	163500	27.60	55.10	5.4	30	MBC-USA-BCI

926A			27.78	55.03			ISC
927	25 JUIN 1961	124024	27.90	53.70	4.5	54	USA
927A			27.00	53.50	4.5		MOS-BCI-AFA
928	27 JUN 1961	004900	33.50	49.30			REC
929	5 JUI. 1961	081753	27.70	54.80		30	USA
930	8 JUL 1961	063704	26.50	54.25			BCI
931	9 JUL 1961	080537	27.00	55.00	4.7	25	MOS
931A			29.00	54.70		25	USA
931A			27.55	55.20			ISC
932	13 JUL 1961	092848	26.50	54.50		33	MOS
932A			27.40	54.90		33	USA
933	17 JUL 1961	051321	27.00	55.00		16	MOS
933A			27.80	55.10		16	USA
933B			27.55	55.38			ISC
934	20 JUL 1961	202841	27.50	55.50			BCI
935	30 JUL 1961	203841	27.50	55.50			BCI
936	15 AUG 1961						PRS 36.30 59.61
937	5 SEP 1961	140950	36.75	54.50	4.8	33	BCI-USA-MOS-REC
937A			36.40	54.40	5.6		CCP
938	13 SEP 1961	140525	32.00	47.00		97	MOS-ERG
938A			32.90	47.90		97	USA-SHR
939	13 SEP 1961	154821	33.00	47.30			USA
939A			32.80	47.50			SHR
940	14 SEP 1961	080309	33.00	47.40		33	REC-BCI-USA-MOS
940A			32.83	47.54			ISC
941	17 SEP 1961	053000	37.60	57.30	4.9	25	CCP-SHR
942	21 SEP 1961	052204	32.00	48.00			BCI
943	27 SEP 1961	082159	28.50	54.70		33	USA
944	28 SEP 1961	223600	27.20	57.10		40	REC

864	13	SEP	1960	121803	32.50	53.00			BCI
865	14	SEP	1960	125852	36.60	57.70		34	USA
866	14	SEP	1960	224242	27.75	53.00			BCI
867	21	SEP	1960	230504	31.80	50.50	5.0	29	FS
867A					31.80	50.50		65	BCI-USA
867B					30.00	50.00			MOS
868	25	SEP	1960	083628	28.40	53.20	5.5	53	FS-USA
869	5	OCT	1960	015854	32.25	56.25			BCI
870	17	OCT	1960	105309	32.00	48.00			BCI
871	4	NOV	1960	165200	27.00	54.00	5.8	33	FS
872	19	NOV	1960	192516	30.50	51.50	5.3	33	BCI-FS
873	25	NOV	1960	112442	39.50	47.50	6.0	33	FS
874	3	DEC	1960	221600	30.00	52.00	5.0	33	BCI-USA-FS
876	25	DEC	1960	112442	39.50	47.50	5.0	33	BCI-ERG-FS

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877	19	JAN	1961	033722	39.90	54.70	4.2		MOS
878	23	JAN	1961	094730	34.00	57.00			BCI
879	11	FEB	1961		37.00	50.00			BCI
880	12	FEB	1961	103118	38.00	47.00		60	BCI-ERG
880A					36.90	44.40		60	USA
881	24	MAR	1961	111100	26.50	53.00			BCI
882	2	APR	1961	125211	26.90	55.10		33	USA
883	4	APR	1961	115909	30.30	50.50		25	USA-ERG
884	6	APR	1961	181241	27.80	56.70	5.8	100	REC
884A					27.80	56.70		109	BCI-USA
884B					27.75	55.25	6.6		QUE
884C					26.00	56.50	5.3		MOS
884D					28.20	56.78			ISC

885	28 APR	1961	055626	31.20	57.20		20	USA
885	17 MAY	1961	013739	35.00	59.00	4.5	33	USA _ BCI - MOS
887	21 MAY	1951	194413	30.75	57.00	4.7	32	BCI - MOS
887A				30 . 10	57. 20		32	USA
888	5 JUN	1961	033106	29.00	54.50	5.3	30	MOS
888A				27.90	55.10		30	USA
889	5 JUN	1961	061133	23.50	54.90		36	USA
889A				27.88	54.79			ISC
890	5 JUN	1961	094619	30. 10	52.40		25	USA
891	11 JUN	1961	051000	27.90	54.70	6.9	35	REC
891A				27.90	54.60	6.7	37	USA
892	11 JUN	1961	053014	27.80	55.00	5.6	62	USA - BCI - TEH
892A				27.93	54 .51			ISC
893	11 JUN	1961	061042	27.80	54.90		45	USA - BCI - ISC
894	11 JUN	1951	061924	27.80	54.90			BCI
895	11 JUN	1961	0631	27.80	54.90			BCI
896	11 JUN	1961	064250	27.70	55.10		41	BCI - USA - ISC
897	11 JUN	1961	065129	27.80	54.90	5.1	49	BCI- USA - TEH
897A				27.67	54.59			ISC
898	11 JUN	1961	080410	27.60	55.30	4.4	70	BCI USA - TEH
899	11 JUN	1961	092139	27.80	55.00	4.6	48	USA - TEH - MOS
900	11 JUN	1961	100304	27.70	55.00	4.0	42	BCI - USA - MOS
901	11 JUN	1961	112409	23.10	54.70	4.8	33	USA - TEH
902	11 JUN	1961	123023	27.80	54.40	5.5	35	USA - MOS
903	11 JUN	1961	123127	28.20	54.60	6.0	35	USA - REC - BCI
903A				27.89	54.74			ISC
904	11 JUN	1961	124259	30.90	55.30	4.2	61	USA - BCI - TEH
905	11 JUN	1961	135758	27.80	54.60	5.2	34	USA - BCI - TEH - MOS
906	11 JUN	1961	150617	27.80	54.50	4.7	39	USA - MOS
907	11 JUN	1961	231308	27.80	54.90	4.3	42	USA - BCI - TEH

818A					34.50	48.50			USA
819	20	APR	1960	210208	27.50	54.50			BCI
820	23	APR	1960	062616	31.50	50.50	5.7		BCI-USA-FS
821	24	APR	1960	121426	27.60	54.10	5.9		REC
821A					27.60	54.50			FS-ISC
821B					28.00	54.50			USA
822	24	APR	1960	121440	28.00	54.30	5.8		FS
823	27	APR	1960	173932	28.00	54.30	5.3		FS-USA
824	27	APR	1960	180917	28.00	54.50	5.2		FS
825	18	APR	1960	055706	28.00	54.30	4.0		FS-BCI
826	2	MAY	1960	224839	27.70	54.20	4.5		FS
827	3	MAY	1960	065904	27.70	54.20	5.4		REC ISC
827A					27.30	55.00	5.4		FS
827B					29.50	55.00			USA
828	15	MAY	1960	030048	28.30	59.00			BCI
829	18	MAY	1960	084057	27.25	52.50	5.3		REC
829A					27.00	52.50			FS-USA
829B					27.12	53.13			ISC
830	20	MAY	1960	041433	27.50	53.00	5.2	100	FS-USA-ISC
831	25	MAY	1960	125000	27.30	54.30	5.1		FS
832	27	MAY	1960	010710	27.00	55.00	4.0		FS
833	28	MAY	1960	194201	29.80	52.30	5.0		FS-STH
834	2	JUN	1960	072230	33.50	60.00	5.2		FS-USA-ISC
834A					36.50	60.50			REC
835	2	JUN	1960	124238	33.50	49.00	5.0		BCI-REC-FS
835A					33.05	48.78			ISC
836	5	JUN	1960		28.50	54.00			BCI
837	7	JUN	1960	220951	31.00	51.00	5.0		BCI-FS
838	10	JUN	1960	134921	26.50	53.00	5.0		BCI-NOR
839	14	JUN	1960	080820	27.75	54.25			BCI-SER

840	18	JUN	1960	003530	34.00	47.50	4.0		FS
841	23	JUN	1960	033742	37.00	49.50	6.5		FS
842	23	JUN	1960	132308	34.50	50.50			BCI
843	25	JUN	1960	211134	30.00	56.00	5.0		MOS
843A					32.00	56.50			USA
844	27	JUN	1960	125118	32.00	50.00	4.3		BCI-FS
845	30	JUN	1960	123702	32.00	56.00			BCI
846	4	JUL	1960	034336	30.00	32.00	4.9		BCI-REC-FS
847	4	JUL	1960	114530	30.00	52.00	4.3		BCI-FS
848	9	JUL	1960	033330	28.00	25.50	4.6		FS
849	10	JUL	1960	134912	26.50	53.00	5.1		FS
850	10	JUL	1960	225610	26.50	53.00	5.0		FS
851	14	JUL	1960	080820	27.80	54.30	4.7		FS
852	23	JUL	1960	132348	34.50	50.50	5.1		BCI-FS
853	25	JUL	1960	164930	32.50	48.50	4.6		BCI-FS
854	25	JUL	1960	211136	32.00	56.50	5.0		REC-FS-USA-MOS
855	28	JUL	1960	170001	31.30	57.50	5.0		FS
856	29	JUL	1960	164543	27.50	54.50	4.9	100	FS-USA
857	30	JUL	1960	123712	32.00	56.00			BCI
858	31	JUL	1960	222653	27.50	54.50	5.3		MOS
858A					28.00	55.00	5.3		FS-USA
858B					28.07	54.42			ISC
859	31	JUL	1960	235300	27.50	56.00	4.8		FS
860	1	AUG	1960	022054	27.50	55.00	6.3	33	MOS-QUE.
860A					28.00	54.30		67	USA
860B					28.00	54.30	6.3	33	FS-ISC
861	1	AUG	1960	035201	28.00	54.28		60	BCI
862	2	AUG	1960	151057	28.00	54.30	5.8		FS
863	23	AUG	1960	085811	29.10	59.80	5.6	64	REC-FS-USA
863A					29.33	60.01			ISC

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775	7	JAN	1959	202943	31.00	56.50			GUE
776	7	JAN	1959		27.04	54.11			ISC
777	3	FEB	1959	083706	26.00	57.50			BCI
778	20	FEB	1959	104300	32.50	48.75			BCI
779	2	MAR	1959	112200	33.50	50.00			USA
779A					33.12	49.46			ISC
780	3	MAR	1959	213119	40.00	48.50			BCI-ERG
781	8	MAR	1959		36.00	53.00		60	USA
782	8	MAR	1959	002000	36.20	58.00	4.5		CCI
783	25	MAR	1959	064100	32.75	50.00			BCI
784	1	APR	1959	223657	39.25	49.00			BCI-ERG
785	29	APR	1959	002330	328.00	55.00			NOS
786	1	MAY	1959	082357	36.50	52.00	5.3		REC-USA
786A					37.00	51.50			BCI
786B					36.50	51.50			SRK-ISC
787	14	MAY	1959	210715	34.50	57.00			NOS
788	29	MAY	1959	234600	33.00	51.50			BCI
789	31	MAY	1959	130144	37.50	49.00			USA-ISC
790	20	JUN	1959		36.50	51.00	4.0		KSR
791	24	JUN	1959	071900	31.00	50.50			BCI
792	24	JUN	1959	160200	31.75	50.25			BCI.
793	31	JUL	1959	102804	38.50	49.00	4.7		USA-REC-CCI
793A					38.83	49.38			ISC
794	13	AUG	1959	003300	40.00	48.00	5.3		REC
794A					40.00	49.00			USA
794B					39.80	48.20			CCP-ISC
795	19	SEP	1959	160200	30.00	50.00			BCI
796	9	OCT	1959	032948	30.00	57.00			BCI

797	14	OCT	1959	073000	39.50	49.50	4.5	CCP
798	23	OCT	1959	105423	39.50	59.00		USA
798A					33.34	58.84		ISC
799	25	NOV	1959	005800	38.50	50.30	4.2	CCP
800	8	DEC	1959	125045	31.00	57.00		USA-ISC

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801	2	JAN	1960	144135	25.80	55.00	4.9	FS
802	6	JAN	1960	225652	32.00	54.50	5.0	FS
803	26	JAN	1960	014836	28.50	56.00	4.9	FS
804	4	FEB	1960	070720	29.00	52.00	5.1	FS
804A					28.50	52.50		USA
805	17	FEB	1960	200500	29.40	52.30		BCI
806	20	FEB	1960	144008	37.50	44.50	5.6	BCI-ERG-FS
807	20	FEB	1960	144936	37.50	44.50	4.6	BCI-ERG-FS
808	2	MAR	1960	121805	32.00	50.25	5.8	BCI-FS
809	7	MAR	1960	005140	34.50	55.00	4.3	REC-USA-FS
809A					34.48	55.35		ISC
810	7	MAR	1960	114300	37.50	57.30	4.5	CCP
811	14	MAR	1960	201431	29.00	49.50	4.8	FS-USA
812	19	MAR	1960	145412	38.50	44.50	4.7	BCI-ERG-FS
813	20	MAR	1960	104118	39.00	44.00	5.0	BCI-ERG-FS
814	20	MAR	1960	222518	33.30	46.00	5.2	BCI-FS
815	20	MAR	1960	223230	38.25	46.00	4.7	BCI-ERG-FS
816	24	MAR	1960	232105	31.25	51.00	6.0	BCI-STH-FS
817	2	APR	1960	223600	34.00	48.00	5.1	BCI-FS-ISC
817A					33.50	48.50		QUE
817B					36.00	50.00		USA
817C					34.70	48.00		SHR
818	2	APR	1960	232744	34.00	48.00		BCI-STH-ISC

731	26 APR	[illegible]	[illegible]	30.00	43.[illegible]	[illegible]
732	2 MAY	1958	2:00:12	25.00	55.[illegible]	[illegible]
733	5 MAY	1958	05:11:35	36.50	48.50	[illegible]
733A				35.57	44.[illegible]	[illegible]
734	2 JUN	1958	09:[illegible]:50	31.00	50.[illegible]	[illegible]
735	10 JUN	1958	00:[illegible]:05	30.50	51.[illegible]	[illegible]
736	10 JUN	1958	21:[illegible]:57	30.50	50.[illegible]	[illegible]
737	14 JUN	1958	20:[illegible]:40	33.00	47.[illegible]	[illegible]
738	17 JUN	1958	10:[illegible]:01	36.25	53.[illegible]	[illegible]
738A						[illegible]
739	24 JUN	1958	03:[illegible]:[illegible]	[illegible]	[illegible]	[illegible]
740	25 JUN	1958	01:[illegible]:40	35.00	51.[illegible]	[illegible]
740A				35.25	52.[illegible]	[illegible]
741	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
742	2 JUL	1958	22:[illegible]:48	30.00	51.[illegible]	[illegible]
743	26 JUL	1958	15:53:[illegible]	31.00	52.[illegible]	[illegible]
744	14 AUG	1958	11:[illegible]:00	34.30	47.[illegible]	[illegible]
744A				34.50	48.[illegible]	[illegible]
744B				34.13	47.[illegible]	[illegible]
745	14 AUG	1958	12:26:19	34.00	47.50	[illegible]
745A				34.[illegible]	47.[illegible]	[illegible]
746	15 AUG	1958	04:[illegible]:00	34.50	48.50	[illegible]
747	15 AUG	1958	[illegible]:[illegible]:[illegible]	34.50	48.[illegible]	[illegible]
747A				34.38	47.[illegible]	[illegible]
747B						[illegible]
748	15 AUG	1958	19:13:44	34.50	48.00	[illegible]
748A				34.50	47.[illegible]	[illegible]
748B						[illegible]
748C						[illegible]
	16 AUG	1958	21:[illegible]:[illegible]	34.00	48.[illegible]	[illegible]

750	17	AUG	1958	034740	34.00	48.00		BCI
751	17	AUG	1958	035100	34.00	48.50		BCI
752	17	AUG	1958	064636	34.00	48.00		BCI MOS
753	17	AUG	1958	111600	34.00	48.00		BCI
754	19	AUG	1958	155450	34.50	48.28		BCI
754A								PRS 35.00 48.30
755	24	AUG	1958	080230	34.00	48.50		BCI
756	25	AUG	1958	040445	34.00	48.50		BCI
757	31	AUG	1958	091815	28.50	62.00		USA
758	3	SEP	1958	013405	33.80	47.50	5.0	BCI
758A					34.00	47.00		USA
759	9	SEP	1958					PRS 28.50 53.55
760	10	SEP	1958	034936	34.00	48.50		BCI
761	16	SEP	1958	142230	34.50	59.50	5.1	BCI-USA
762	21	SEP	1958	161830	36.00	49.00	5.5	REC
763	23	SEP	1958	171300	37.20	56.10	4.5	CCP
764	6	OCT	1958	093000	36.50	54.00	5.2	CCP
764A					37.50	54.50		USA-MOS
764B					37.32	54.39		ISC
765	14	OCT	1958	100607	28.50	58.50		BCI
766	14	OCT	1958	100642	28.50	58.50		BCI
767	23	OCT	1958	154300	33.60	46.20	5.1	ISC
767A					34.50	47.00		USA
768	26	OCT	1958	124030	37.50	44.50	5.6	USA-ERG-ISC
769	2	NOV	1958	091428	36.75	51.50	4.0	BCI
770	12	DEC	1958	132948	31.00	57.00		SCI
771	18	DEC	1958	073320	27.00	54.00		BCI-MOS
772	21	DEC	1958	041814	27.00	54.00		BCI
773	23	DEC	1958	032806	27.00	57.00		BCI

686	2	JUL	1957	011654	36.00	52.70	4.5		CCI
687	2	JUL	1957	045610	36.00	52.80	4.5		CCP
688	2	JUL	1957	050922	35.90	52.70	4.5		CCP
689	2	JUL	1957	142243	36.00	52.70	4.5		CCP
689A					35.90	52.40			OMO
690	4	JUL	1957	224347	35.90	52.20	4.5		CCP
691	7	JUL	1957	181250	36.00	53.00	4.5		CCP
692	9	JUL	1957	090911	36.00	52.70	4.5		CCP
693	21	JUL	1957	150827	39.00	46.00	4.2		BCI-ERG
693A					38.50	43.00	4.2		CP
694	30	JUL	1957	014314	33.00	48.00			BCI-STH-ERG
695	9	AUG	1957	000206	39.90	53.90	4.2		CP
696	18	AUG	1957						IRS 27.20 54.35
697	19	AUG	1957	072224	38.00	49.00	4.5		BCI-CCP
698	24	AUG	1957	215000	37.10	56.80			CP
699	5	SEP	1957	113600	28.20	53.70	5.0		REC-ISC
700	23	SEP	1957	041030	27.00	58.00			BCI
701	30	SEP	1957	204500	31.00	47.50			BCI-STH
702	8	OCT	1957	114724	36.40	54.50			CP
703	11	OCT	1957	194430	31.00	55.00			BCI
704	25	OCT	1957	082420	36.40	53.20	4.5		CP-CCP
705	13	DEC	1957	014520	34.60	47.75	7.0	6	REC-BCI
705A					34.41	47.67			ISS
705B					34.50	48.00			USA
705C					34.00	47.00		SJG	SRK
706	16	DEC	1957	230528	34.00	48.00	5.1		USA
707	25	DEC	1957	112639	34.50	47.50			BCI
708	31	DEC	1957						PRS 38.05 46.15

709	2	JAN	1958	194[illegible]	34.60	47.80		BCI-ISC
709A					34.50	48.00		USA
710	2	JAN	1958	221438	34.60	47.80		BCI
711	6	JAN	1958	095412	34.50	48.00		BCI
711A								PRS 34.80 48.50
712	8	JAN	1958					PRS 34.50 48.00
713	14	JAN	1958					PRS 36.47 52.35
714	15	JAN	1958	131532	40.00	51.50		BCI-USA
715	16	JAN	1958	020416	36.50	53.00		BCI-REC
715A								PRS 36.47 52.35
716	22	JAN	1958					PRS 35.00 48.30
717	28	JAN	1958	171500	35.80	58.10	4.7	CCP
717A					36.00	58.50		BCI-USA
718	28	JAN	1958					PRS 34.30 48.81
719	30	JAN	1958	083000				PRS 35.20 58.40
720	30	JAN	1958					PRS 34.07 49.70
721	3	FEB	1958	01000				PRS 37.40 49.50
722	3	FEB	1958	192712	32.00	55.50		BCI-ISC
722A					32.50	56.00		USA
723	3	FEB	1958	193000				PRS 31.88 54.41
724	9	FEB	1958	092650				BCI NOETH OF IRAN
725	16	FEB	1958		27.50	61.00		QUE
726	27	FEB	1958	035600	35.30	58.90	4.7	CCP
726A					35.00	58.00		BCI
727	1	MAR	1958	092649	27.50	55.00	4.7	BCI-MOS-ISC
727A					28.00	54.50		USA
728	3	MAR	1958	134753	34.00	58.50		BCI
729	9	APR	1958	043632	29.00	52.00	5.0	BCI-RNC-MOS-ISC-USA
729A					27.50	51.50		QUE
730	15	APR	1958	062418	40.00	45.00		BCI-ENG

636A					28.00	57.00		ISS-USA
637	30	JUN	1956	113706	35.50	57.25		BCI-USA
638	1	JUL	1956					PRS 31.97 49.2
639	7	JUL	1956	103033	37.50	56.00	4.5	CP
639A					37.50	56.25	4.5	BCI-REC
639B					37.80	56.10	4.5	CCP
640	14	JUL	1956	122906	38.50	53.70		CP
641	16	JUL	1956	051756	28.50	54.50		BCI
642	21	JUL	1956	165008	38.30	57.40		CP
643	8	AUG	1956	113808	32.50	49.00	4.7	BCI-STH
644	20	OCT	1956	051707	37.90	57.40		CP
645	29	OCT	1956					PRS 38.15 48.18
646	31	OCT	1956	140344	27.25	54.50	6.4	BCI-REC
646A					26.00	55.00	6.0	MOS
646B					26.50	54.50		USA
647	31	OCT	1956	142219	27.00	54.50		USA
648	31	OCT	1956	222115	27.00	54.50		USA
649	31	OCT	1956	233600	27.00	54.50		USA
650	1	NOV	1956	055234	27.50	54.00		USA
651	3	NOV	1956	174015	37.90	58.10		CP
652	4	NOV	1956	215610	38.20	58.30		CP
653	7	NOV	1956	104030	38.00	58.20		CP
654	16	NOV	1956	140406	27.75	54.75		BCI
655	16	NOV	1956	161038	37.90	58.00		CP
656	21	NOV	1956	114530	38.00	58.30		CP
657	21	NOV	1956					PRS 27.20 54.35
658	22	NOV	1956					PRS 32.45 48.35
659	24	NOV	1956					PRS 32.45 48.35
660		DEC	1956					PRS 27.20 54.35
661		DEC	1956	201611	37.90	58.30		CP

662	7	DEC	1956					PRS 27.20 54.3
663	14	DEC	1956	043024	37.90	58.10		CP
664	14	DEC	1956	122055	38.30	58.30		CP
665	19	DEC	1956	105433	38.00	58.00		CP
666	22	DEC	1956	071120	37.90	58.10		CP
667	24	DEC	1956					PRS 27.20 54.39
668	26	DEC	1956	030423	38.00	58.10		CP

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669	7	JAN	2957					PRS 27.20 54.3
670	21	JAN	1957	013000				PRS LALI
671	7	MAR	1957					PRS 36.10 50.3
672	16	MAR	1957	004342	34.50	52.50	5.0	BCI
672A					35.00	52.50	5.0	MOS-ISS
672B					35.00	53.00		USA-USC
673	23	APR	1957		33.35	52.45		PRS
674	26	APR	1957					PRS 30.20 52.00
675	5	MAY	1957	192500	31.50	49.50		BCI-STH
676	6	MAY	1957	141950	37.20	51.80	4.5	CP
676A					36.45	51.51		ISC
677	6	MAY	1957	150647	36.00	51.00	5.0	USA
677A					37.10	51.70	5.0	CCP-MOS
678	17	MAY	1957		36.00	52.00		USA
679	29	MAY	1957	100255	38.00	45.50		BCI-ERG-CI
680	9	JUN	1957	224400	37.40	55.80	4.5	CCP
681	30	JUN	1957	030000	35.00	51.00		BCI
682	30	JUN	1957	113706	35.50	57.25		BCI
683	2	JUL	1957					IRS 27.20 54.3
684	2	JUL	1957	004200	36.10	52.30	7.4	REC-BCI
685	2	JUL	1957		36.00	53.00	6.5	SHP

593	1	AUG	1955					PRS 34.80 48.50
594	22	AUG	1955	121905	36.00	56.00	4.7	CP-CCI
595	29	AUG	1955					PRS 35.26 59.21
596	17	SEP	1955	070000				PRS 35.26 59.21
597	23	SEP	1955	050000				PRS 34.50 48.00
598	7	NOV	1955	103000				PRS 39.35 44.50
599	14	NOV	1955	040000				PRS 37.00 49.50
600	23	NOV	1955					PRS 36.80 54.10
601	24	NOV	1955					PRS 35.47 52.04
602	29	NOV	1955	181500				PRS 32.41 51.41
603	4	DEC	1955	140208	33.70	48.80	5.5	BCI-ISS
603A					34.00	49.00		USA
603B								PRS 33.50 48.90
604	5	DEC	1955	151500				PRS 35.43 55.10
605	17	DEC	1955	080642	33.70	48.80	5.7	BCI-USA-STH
605A								PRS 33.49 48.37
606	20	DEC	1955	163000				PRS 35.43 55.10
607	21	DEC	1955	160000				PRS 35.43 55.10
608	30	DEC	1955					PRS 31.44 49.52

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609	1	JUN	1956	130000				PRS 34.20 48.40
610	3	FEB	1956	131604	34.00	47.00	5.5	USA
610A					31.10	46.60		ISS
611	14	FEB	1956	133000				PRS 37.10 58.50
612	15	FEB	1956	154923	27.50	52.70	5.7	REC-STH
612A					28.00	53.00		USA-QUE
613	16	FEB	1956	231600	37.40	55.90		CP
614	1	MAR	1956	124757	27.50	52.75	5.4	BCI
614A					27.00	52.00	5.5	MOS

614A					28.50	52.00		SHI
615	3	MAR	1956					PRS 36.80 54.10
616	6	MAR	1956	085528	28.00	52.50	5.6	USA-MOS
616A					26.50	51.00		SHI
617	6	MAR	1956	090940	28.00	52.50		USA
618	6	MAR	1956	205312	28.00	52.50	4.5	USA-MOS
619	7	MAR	1956	140430	28.00	52.50		BCI
620	9	MAR	1956	153326	28.00	52.50	4.5	USA-MOS
621	9	MAR	1956	164454	28.00	52.75	5.0	BCI
621A					26.00	53.50		QUE-USA
622	26	MAR	1956	234650	36.90	56.90		CP
623	30	MAR	1956	081709	37.20	57.20		CP
624	7	APR	1956					PRS 36.40 48.30
625	11	APR	1956	223000				PRS 36.16 49.58
625A								PRS 37.40 49.50
625B								PRS 37.18 49.60
626	12	APR	1956					PRS 31.17 48.43
627	12	APR	1956	223448	37.25	50.25	5.5	BCI-USA
627A					38.00	50.00	5.5	MOS
627B								PRS 37.18 50.00
628	13	APR	1956	020000				PRS 37.18 50.00
629	20	APR	1956	004500				PRS 37.18 50.00
630	8	MAY	1956	205000	28.00	52.80		BCI-USA
631	19	MAY	1956	141430	28.00	52.75	4.7	BCI-MOS
632	2	JUN	1956	233000				PRS 37.18 50.00
633	8	JUN	1956	021500				PRS 36.85 54.42
634	20	JUN	1956	103943	27.25	60.00		BCI
635	25	JUN	1956	125204	30.50	60.00	5.0	MOS-USA
635A					31.50	59.00		BCI-ISS
636	29	JUN	1956	021827	28.50	57.25	4.5	BCI-REC

543	21	MAR	1953	020131	37.90	57.80		CP
544	1	APR	1953	022435	35.50	55.20	4.0	CP
545	2	APR	1953	041500				PRS 33.59 [illegible]
546	18	APR	1953	063234	37.00	54.30	4.5	CCP-CP
547	22	APR	1953	203000				PRS 36.85 [illegible]
548	11	MAY	1953	154500	33.00	48.25		BCI-STH
549	28	MAY	1953	043000				PRS 36.56 [illegible]
549A								PRS 36.80 [illegible]
550	6	JUN	1953	000224	35.60	59.00	4.5	CCP-CP
550A								PRS 35.26 [illegible]
551	7	JUN	1953	023500				PRS 36.55 54.42
552	11	JUN	1953	172730	39.80	47.80		CP
553	24	JUN	1953					PRS 37.60 [illegible]
554	25	JUN	1953	212218	37.00	58.00		CP
555	29	JUN	1953					PRS 35.43 [illegible]
556	5	JUL	1953	065154	39.90	50.00	4.8	CP-KAR
557	11	JUL	1953	152508	35.90	55.10	4.5	CP-CCP
558	24	JUL	1953	053056	36.80	55.40	4.5	CP-CCP
559	24	JUL	1953	162930	35.50	55.00	4.7	CP-CCP
560	2	SEP	1953	014533	35.70	53.50		CP
561	22	SEP	1953					PRS 35.23 52.34
562	14	OCT	1953	233000				PRS 35.23 52.34
563	29	OCT	1953					PRS 34.80 45.80
564	14	DEC	1953	151210	37.30	56.80	4.2	CP
565	30	DEC	1953	040900	34.00	48.00	5.1	SCI-USA-PTR

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566	3	JAN	1954	075108	40.00	49.69	4.6	CP-KAR
567	30	JAN	1954	214321	32.50	55.75		BCI
568	18	MAR	1954	071714	39.70	54.00	4.2	CP

569	6	MAR	1954	143508	28.70	55.00		REC
569A					28.30	54.20		ISS
570	18	MAY	1954	074400	30.50	53.50		BCI-STH
571	20	MAY	1954	040600	30.50	53.20		BCI-STH
572	7	JUN	1954					PRS ASTANEH-ASHRAF
573	24	JUN	1954					PRS 37.62 58.41
574	25	JUN	1954	213500	30.00	52.00		BCI-STH
575	16	AUG	1954	145900	39.00	48.70	4.5	CP-KAR
576	20	AUG	1954	033000				PRS 28.98 50.83
577	2	SEP	1954	224700	35.30	52.00	4.5	CP
577A								PRS 35.23 52.34
578	8	OCT	1954	004306	36.00	57.50	4.0	CP
579	12	OCT	1954	203839	26.75	56.50		ECA
580	22	OCT	1954	224729	38.90	45.80	4.6	CP-ISS
581	23	OCT	1954	060000				PRS 32.40 51.41
582	27	OCT	1954	205223	37.00	58.50		CP
582A								PRS 37.18 50.00
582B								PRS 37.16 50.20
583	1	NOV	1954	210958	37.10	57.30	4.8	CP-CCP-USA
584	11	NOV	1954	051400	27.30	53.30	5.5	REC
585	23	NOV	1954	043000				PRS 29.63 52.55
586	27	DEC	1954	003702	36.50	58.50		CP

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587	9	JAN	1955	043130	38.50	43.90	4.4	CP-KAR
588	29	JAN	1955	005755	37.10	58.80		CP
589	13	MAR	1955	166805	28.00	56.75		BCI
590	21	MAY	1955	155636	40.00	52.00	4.2	CP
591	8	JUN	1955	175059	39.00	51.00		CP

497	[illegible]	NOV	1951	105700	39.00	55.40			CP	
498	13	NOV	1951	140147	36.10	52.50	4.5		ISS	
498A					35.70	53.20	4.5		CP	
499	15	NOV	1951	004121	38.90	57.50			CP	
500	17	NOV	1951	103900	38.80	55.40			CP	
501	22	NOV	1951	205034	37.20	55.10			CP	
502	29	NOV	1951	073300	33.00	58.00			REC	
503	30	DEC	1951	182107	28.00	57.00			ISS	
503A					28.50	58.30			REC	

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504	1	MAR	1952						PRS	37.04 45.10
505	10	MAR	1952						PRS	35.20 58.40
506	3	APR	1952						PRS	37.10 58.50
507	10	APR	1952						PRS	37.38 46.23
508	10	APR	1952	105000					PRS	35.80 52.10
509	18	APR	1952	052603	38.50	45.00			ISS	
510	26	MAY	1952	050748	37.90	58.80			CP	
511	5	JUN	1952	050000					PRS	37.18 50.00
512	24	JUN	1952	074200	37.30	57.40	4.5		CCP	
513	18	JUL	1952	004351	37.50	50.10			ISS	
513A									PRS	37.18 50.17
514	1	AUG	1952	103036	29.80	51.80			ISS	
515	3	AUG	1952	143000	33.70	47.50			BCI-STH	
516	4	AUG	1952	014933	31.50	49.30			BCI	
516A					31.10	49.80			BCI-STH	
517	13	AUG	1952	143045	33.70	46.80			ISS-[illegible]	
518	30	AUG	1952	061455	32.50	52.00			BCI-[illegible]	
518A					32.10	55.80			ISS	
519	15	SEP	1952	043128	32.80	58.50			ISS-CCP-[illegible]	

520	[illegible]	SEP	1952	184121	27	.80	64	ISS
521	30	SEP	1952	025043	39.00	44.20	4.5	CP-KAR ISS
522	9	OCT	1952	191220	36.70	54.50	4.7	ISS-CCP-CP
523	19	OCT	1952	09[illegible]000				PRS 37.18 50.[illegible]
524	28	OCT	1952					PRS 27.20 54.[illegible]
525	4	DEC	1952	150057	27.30	53.20		ISS
526	23	DEC	1952	223000				PRS 31.44 49.52
526A								PRS 31.17 48.43
526B								PRS 30.05 50.15
527	29	DEC	1952	173650	38.00	58.10	5.0	CCP-CP

YEAR 1953

528	15	JAN	1953	131512	27.90	54.80		ISS
528A					2[illegible].80	54.50		REC
529	15	JAN	1953	200600	31.50	58.00		REC
530	16	JAN	1953	174937	38.00	57.90		CP
531	25	JAN	1953	123351	37.90	57.40		CP
532	27	JAN	1953					PRS 38.54 44.9[illegible]
533	30	JAN	1953	233539	38.00	57.70		CP
534	1	FEB	1953	183636	38.40	45.10	4.6	CP-KAR
535	12	FEB	1953	081531	35.80	55.00	6.[illegible]	ISS-REC
535A					35.30	55.20	6.2	CP
535B					35.20	55.00		MOS
536	13	FEB	1953	043628	35.60	54.70	4.5	CP-CCP
537	13	FEB	1953	183500				PRS 37.04 45.[illegible]
538	14	FEB	1953					PRS 35.26 53.[illegible]
539	19	FEB	1953					PRS 37.90 56.[illegible]
540	25	FEB	1953	152826	37.20	57.80		CP
541	1	MAR	1953					PRS 29.62 51.6
542	21	MAR	1953	015216	38.10	57.90		CP

451	6	APR	1950	063000					PRS 38.18 44.77
452	1	MAY	1950	081502	38.50	45.00	4.8		ISS-KAR
452A					39.00	44.30			CP
452B									PRS 33.93 50.40
453	2	MAY	1950	164259	36.50	58.50	4.5	12	CP-CCP-RU
453A					38.00	58.50			ISS
454	9	MAY	1950	111656	38.40	58.40	6.0	14	ISS-CCP-RU-REC-CP
455	31	MAY	1950	043216	38.30	58.00	4.0	11	RU-CP
456	24	JUN	1950						PRS 36.74 54.95
456A									PRS 38.90 44.93
457	30	JUN	1950	054500					PRS 35.20 32.00
458	20	JUL	1950	090218	37.10	55.90			CP
439	3	AUG	1950	080000					PRS 36.47 52.35
460	8	AUG	1950	052914	38.40	58.40	4.5		ISS-RU-CP
461	8	AUG	1950	093657	38.40	58.40			BCI
462	20	AUG	1950	184000					PRS 35.70 52.60
463	1	SEP	1950	082646	37.70	53.60			CP
464	24	SEP	1950	225638	34.50	60.70			ISS
464A					34.00	62.00			REC
465	29	SEP	1950	014405	40.00	54.60	4.6		ISS
465A					40.00	55.80	4.7		CP
465B					40.00	56.00	4.5		CCP
466	12	NOV	1950	163736	33.30	58.00			ISS
467	12	NOV	1950	220056	33.30	58.00			ISS
468	25	NOV	1950	171839	37.00	44.00	4.7		KAR-REC

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469	16	JAN	1951	175350	39.20	49.50	4.6		ISS-KAR-CP
470	16	JAN	1951	233756	37.50	58.20			CP
471	4	FEB	1951	174630	38.30	58.60			CP

472	10	[illegible]	1951	020500	[illegible]			PRS 36.80 53.90
473	22	FEB	1951		[illegible]			PRS 36.80 53.90
474	5	MAR	1951	22004	38.40	58.60		CP
475	12	MAR	1951	154536	39.30	48.50	4.8	ISS-CP
475A								PRS 38.48 47.05
476	14	MAR	1951	230231	38.20	58.20		CP
477	15	MAR	1951	100102	38.40	44.00	4.8	KAR
478	1	APR	1951	073000				PRS 37.62 58.4[illegible]
479	15	APR	1951	181500				PRS 34.60 50.80
480	22	APR	1951	063241	34.80	52.10		ISS
480A								PRS 35.40 51.26
481	11	MAY	1951	011958	37.60	57.60		CP
482	5	JUN	1951	033450	36.50	48.50	5.0	BCI-ISS
483	9	JUN	1951	112203	32.00	50.00	6.2	REC-PER
483A					32.20	49.30		ISS-STH
484	17	JUN	1951	184623	35.70	57.00	4.5	ISS
484A					35.60	58.00		CP
485	8	JUL	1951	190145	36.70	57.70		CP
486	19	JUL	1951	222721	27.10	51.70		ISS
487	25	JUL	1951	230936	37.50	57.00	4.5	CCP-CP
488	16	AUG	1951	235210	28.00	57.00	6.0	ISS-REC
488A								PRS 27.15 57.00
489	28	AUG	1951	140000				PRS 27.15 57.09
490	9	SEP	1951					PRS 28.98 50.83
491	20	SEP	1951	1300000				PRS 37.40 57.92
492	8	OCT	1951	113203	31.20	56.80		ISS
493	13	OCT	1951					PRS 27.18 56.27
494	26	OCT	1951	120000				PRS 37.07 49.70
495	26	OCT	[illegible]	223000				PRS 37.40 49.50
496	28	OCT	[illegible]	[illegible]	27.30	57.30		ISS

408C									PRS 27.15 57.09
409	8	MAY	1949	090000	37.30	44.60	4.9		KAR
410	13	MAY	1949	050312	27.20	56.20			ISS
411	14	JUN	1949	091000	37.90	58.30	4.0	11	RU
412	20	JUN	1949	051700	38.00	58.00	4.0	11	RU
413	22	JUN	1949	015045	34.00	45.50			ISS-ERG
413A									PRS 38.18 44.77
414	26	JUN	1949	071200	37.90	58.50	3.5	10	RU
415	3	JUL	1949	011100	37.70	58.40	3.5	10	RU
416	3	JUL	1949	211000	37.70	58.60	3.5	10	RU
417	4	JUL	1949	034040	27.50	56.00			USA-ISS-REC
418	5	JUL	1949	023000	27.20	56.20			ISS
419	5	JUL	1949	214800	37.70	58.10	3.5	10	RU
420	21	JUL	1949	212600	26.30	58.70			ISS
421	3	AUG	1949	234400	37.60	58.90	3.5	10	RU
422	5	AUG	1949	071439	27.20	56.20			ISS
423	7	AUG	1949	015400	37.60	58.30	3.5	10	RU
424	24	AUG	1949	095100	37.60	58.60	3.5	10	RU
425	28	AUG	1949	221700	36.70	57.50	4.5	12	CCP-RU
426	29	AUG	1949	151600	37.70	58.20	3.5	10	RU
427	2	SEP	1949	014733	35.30	44.60	4.5		ISS-KAR
427A									PRS 35.98 45.90
427B									PRS 36.24 46.25
428	5	SEP	1949	191900	37.80	57.20	4.0	11	RU
429	15	SEP	1949	125300					PRS 38.18 44.77
430	21	SEP	1949	132100	37.60	58.05	4.0	11	RU
431	23	SEP	1949	173600	37.40	58.08	3.5	10	RU
432	13	OCT	1949	102630	36.60	44.50	5.0		ISS-ERG-KAR
433	14	OCT	1949	194500					PRS 38.18 44.77
434	5	NOV	1949	150545	36.60	55.20	5.0	13	CH-CCP-RU

434					37.00	53.00			ISS -57-
434B					37.00	55.00			USA
434C									PRS 36.85 54.42
435	22	NOV	1949	152116	28.00	57.00			ISS-REC
436	10	DEC	1949						PRS 31.44 49.52
437	14	DEC	1949	034350	36.00	59.00	5.0	12	ISS-CP-CCI-RU
438	16	DEC	1949	232400	27.00	54.50			ISS
439	17	DEC	1949	011315	38.00	57.00	4.7	12	ISS-CP-CCI-RU
439A									PRS 37.47 57.31

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440	19	JAN	1950	172715	27.30	53.20			ISS
440A					27.70	53.00			REC
441	19	JAN	1950	231053	27.30	53.20			ISS
442	22	JAN	1950	040713	27.30	53.20			ISS
443	30	JAN	1950	100323	34.00	45.50			ISS
443A									PRS 35.98 45.90
443B									PRS 36.52 46.20
444	1	FEB	1950						PRS 28.98 50.83
445	2	FEB	1950	224513	25.50	54.00			ISS
446	14	FEB	1950	000559	36.70	55.30	4.5	11	ISS
446A					36.60	54.70	4.5	11	CP-RU
446B									PRS 36.80 54.10
447	3	MAR	1950	225356	37.60	58.20	4.0	11	CP-RU
448	3	MAR	1950	233314	37.60	58.00	4.0	11	CP-RU
449	10	MAR	1950						PRS 27.20 54.35
450	6	APR	1950	024327	37.90	58.60	5.1	13	ISS
450A					38.10	58.20	5.2		CP-CCI
450B					38.00	60.00	5.0	13	RU-REC
450C									PRS 37.52 59.35

369	26	APR	1948	072413	35.30	44.60	4.5		ISS-ERG-KAR
370	1	MAY	1948	170000					PRS 36.85 54.42
370A									PRS 36.80 54.10
371	10	MAY	1948	013000					PRS 38.54 44.94
372	17	JUN	1948	140822	39.50	49.00			ISS
372A									PRS 36.16 50.00
372B									PRS 36.40 48.30
373	18	JUN	1948	184432	37.50	57.80	5.7		ISS-CP-CCP-RU
374	30	JUN	1948	193139	36.50	49.00			ISS
374A									PRS 37.18 49.38
374B									PRS 36.16 50.00
374C									PRS 36.40 48.30
375	1	JUL	1948	020000					PRS 34.07 49.70
376	5	JUL	1948	135314	29.50	57.50	5.7		ISS
376A					30.50	58.50	5.7		REC
376B									PRS 29.10 58.35
377	7	JUL	1948						PRS 36.75 49.40
378	30	JUL	1948						PRS 36.90 54.05
379	30	JUL	1948	033007	31.00	49.00			ISS
379A									PRS 31.17 48.43
380	5	AUG	1948	223514	31.00	49.00			ISS
381	8	AUG	1948						PRS 28.85 52.57
382	8	AUG	1948	111811	33.20	59.00			ISS
383	2	OCT	1948	030000					PRS 33.64 46.43
384	3	OCT	1948	203000					PRS 36.30 59.61
385	5	OCT	1948	202000	37.60	57.80	7.2	16	REC
385A					37.90	58.60			ISS
385B					37.80	58.60	7.0	16	CP-CCP-RU
386	6	OCT	1948	0124444	37.40	58.80	5.7	14	CP-CCP-RU
386A					37.90	58.60			ISS

387	8	OCT	1948	145200	38.00	53.50	4.3		CP
388	10	OCT	1948						IRS 37.40 57.92
389	17	OCT	1948	061625	37.30	59.00	4.7	12	CCP-CP-RU
389A					37.90	58.60			ISS
389B									PRS 37.62 58.41
390	22	OCT	1948	173000					PRS 29.49 52.18
391	23	OCT	1948	122000					IRS 37.08 59.48
392	24	OCT	1948						PRS 37.40 57.92
393	25	OCT	1948	100000					IRS 29.62 51.65
394	2	NOV	1948	152424	38.30	59.20	4.7	12	ISS-CCP-RU
395	4	NOV	1948	144700	37.30	58.50	4.0	11	RU
395A									PRS 37.08 59.48
396	6	NOV	1948	144000					PRS 28.85 52.57
397	25	NOV	1948	210000					PRS 38.18 44.77
395	3	DEC	1948	073000					PRS 36.80 54.10
399	19	DEC	1948	045810	37.60	58.60	4.5	12	RU-CCP
400	24	DEC	1948	010000					PRS 37.62 58.41

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401	11	JAN	1949	200703	37.00	57.00	4.5	12	CP-RU-CCP
402	13	JAN	1949	224500					PRS 35.23 52.34
403	19	JAN	1949	194100	37.30	58.30	4.0	11	RU
404	6	MAR	1949	163640	29.80	51.80			STH-ISS
405	13	MAR	1949	134800	37.90	58.30	4.0	11	RU
406	22	APR	1949	023000					PRS 36.70 53.30
406A									PRS 35.76 53.32
407	23	APR	1949	062500					PRS 36.18 58.80
408	24	APR	1949	042208	27.20	56.20	6.0	100	ISS
408A					27.00	56.00	6.0	100	USA-REC
408B									PRS 27.18 56.27

329B									PRS 29.62 51.65
329C									PRS 28.98 50.83
330	19	MAR	1946	020000					PRS 34.30 48.81
332	27	JUL	1946	162542	35.60	45.00	5.5		ERG-ISS-KAR
333	17	AUG	1946	094803	35.60	45.80	5.6		ERG-ISS-GR
334	17	AUG	1946	233737	35.60	45.80	5.6		ERG-ISS
334A					35.00	46.00	5.5		GR-KAR
335	19	SEI	1946	001120	29.50	57.50			ISS
336	3	OCT	1946	153739	39.50	44.00	5.0		ISS-ERG
336A					38.80	44.20			REC
337	4	NOV	1946	214744	40.00	54.60	7.1	15	ISS-GR
337A					39.70	54.60	6.5	15	CP-CCP-RU
337B					39.90	54.20	7.5		REC
338	7	DEC	1946						PRS 34.30 48.81
339	13	DEC	1946						PRS 34.07 49.70

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340	2	JAN	1947	141103	28.50	51.50			ISS
341	30	JAN	1947	033000					PRS 38.18 44.77
342	3	MAR	1947	063000					PRS 32.89 59.20
343	9	MAR	1947	120000					PRS 32.89 59.20
344	4	MAY	1947	004955	26.30	55.40			ISS
345	23	JUN	1947	115044	40.00	54.60	4.2	12	ISS-CP-CCP
346	30	JUN	1947	033640	35.50	59.00	4.2	12	CP-CCP-RU
346A									PRS 36.30 59.61
347	10	JUL	1947	150000					PRS 33.54 46.87
348	13	JUL	1947	145121	36.20	58.00	4.2	11	ISS
348A					36.30	57.50	4.2	11	CR-RU

348B								PRS 37.47 57.31
349	23	JUL	1947	060000				PRS 33.54 46.87
350	5	SEP	1947	061500				PRS 35.83 51.77
351	7	SEP	1947	090000				PRS 29.62 51.65
352	23	SEP	1947	122809	33.70	58.70	6.7	ISS-GR
352A								PRS 33.73 59.18
353	25	SEP	1947	182510	33.30	58.70		ISS
354	26	SEP	1947	030431	33.30	58.70		ISS
354A								PRS 36.20 58.83
354B								PRS 33.88 57.43
355	27	SEP	1947	081610	33.30	58.70		ISS
356	3	OCT	1947	061346	26.00	57.20	6.2	ISS
356A					27.50	58.00	6.2	GR
356B					25.80	57.40		REC
357	6	OCT	1947	151814	33.30	68.70		ISS
357A								PRS 33.30 58.80
358	11	OCT	1947	183000				PRS 25.65 57.77
359	11	OCT	1947	190000				PRS 35.80 52.10
360	29	OCT	1947	220538	28.00	61.00		ISS
361	13	NOV	1947	024442	33.30	58.70		ISS
362	1	DEC	1947					PRS 35.70 52.70

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363	19	JAN	1948	073000				PRS 37.47 57.31
363A								PRS 37.40 57.92
364	1	FEB	1948	233824	27.00	58.00		ISS
365	10	FEB	1948	203000				PRS 34.20 48.40
366	11	FEB	1948	153109	35.60	45.80		ERG-ISS
367	1	MAR	1948	153000				PRS 34.20 48.40
368	14	MAR	1948	211812	33.20	59.00		ISS

				Y E A R 1 9 4 2							
291	18	MAR	1942	061000	35.30	55.00	4.5	12	CCP-RU		
291A					37.00	53.50			CP		
292	27	MAR	1942	183803	39.80	54.00	5.0		CP-CCP		
293	7	JUN	1942		27.00	54.50			ISS		
294	29	JUL	1942		29.50	57.50			ISS		
				Y E A R 1 9 4 3							
295	31	DEC	1943		28.00	61.00			ISS		
				Y E A R 1 9 4 4							
296	5	APR	1944	180553	36.00	54.80	5.2	13	CP-CCP-RU		
296A					36.70	54.50			ISS		
297	5	APR	1944	180553	36.00	54.80	5.2		CCP		
298	5	APR	1944						PRS	32.45	48.35
299	5	APR	1944	182930	36.00	54.80	4.7	12	CCP-RU		
300	11	APR	1944	162200	36.00	53.00			CP		
301	27	MAY	1944						PRS	36.90	54.87
302	28	JUN	1944	025721	36.00	45.00	5.5		KAR		
303	29	JUL	1944	050000					PRS	36.90	54.87
304	19	JUL	1944	050000					PRS	34.32	47.07
305	23	JUL	1944	123000					PRS	30.30	57.09
306	13	AUG	1944	163000					PRS	36.85	54.42
307	29	AUG	1944	135000					PRS	36.85	54.42
308	9	NOV	1944	193940	38.00	48.40	4.2		ISS		
308A									PRS	37.42	47.20
				Y E A R 1 9 4 5							
309	1	JUN	1945						PRS	37.42	47.72
310	2	JUN	1945	203000					PRS	36.20	57.70

311	11	JAN	1945	020302	26.30	55.40			ISS	
312	15	JAN	1945	172121	26.30	55.40			ISS	
313	1	FEB	1945	195333	36.50	57.70	5.0	13	ISS-RU	
313A					36.00	59.30	5.0		CCP-CP	
314	12	MAR	1945	013856	33.40	47.30			ISS-STH	
315	10	MAY	1945	061000					PRS	35.40 51.26
316	11	MAY	1945	201728	34.80	52.10			ISS	
316A									ISS	35.23 52.34
316B									PRS	35.30 52.40
316C									PRS	35.40 52.30
317	11	MAY	1945	203000					PRS	35.40 51.26
318	19	JUN	1945	010000					PRS	36.23 52.34
319	21	JUL	1945	013321	37.50	45.00	4.8		ISS	
319A					38.80	43.30	4.8		KAR	
320	5	SEP	1945	013340	38.60	57.20	4.7	12	ISS	
320A					38.20	57.50	4.7	12	CCP-CP-RU	
321	27	SEP	1945	090000					PRS	36.32 50.15
322	29	SEP	1945						PRS	34.07 49.70
323	28	OCT	1945	180000					PRS	35.23 52.34

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324	14	JAN	1946	120000					PRS	37.87 45.60
325	18	JAN	1946	123000					PRS	36.50 52.80
326	10	FEB	1946	131325	32.50	59.30			ISS	
326A									PRS	32.89 59.20
327	12	FEB	1946						PRS	33.33 48.86
327A									PRS	32.60 59.80
328	2	MAR	1946	204658	35.30	44.60	4.5		ISS-KAR	
329	12	MAR	1946	022154	022154	29.80	51.80	6.1	ISS-STH	

253	12	MAY	1937		29.50	57.50			ISS
254	21	MAY	1937		29.00	54.00			ISS
255	19	NOV	1937	023600	32.50	49.00.			ISS-STH

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256	26	JAN	1938	034002	33.20	46.40	6.2		ISS-PER-ERG
257	23	APR	1938		27.30	53.20			ISS
258	19	JUL	1938	194500	35.20	59.30	4.5		ISS-CP
259	19	DEC	1938	185534	36.20	53.00			ISS-USA

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260	25	JAN	1939		30.30	50.80			ISS
261	25	JAN	1939	110222	31.00	50.00	5.6		GR
262	28	MAR	1939	213500	36.40	58.00	5.0		CCP
263	6	APR	1939	040800	35.00	54.30	5.6		ISS
263A					35.50	54.50	5.6		GR
264	10	JUN	1939	013641	33.50	56.50	5.6		GR
264A					34.20	56.60			ISS
265	10	JUN	1939		33.00	58.00			ISS
266	24	JUL	1939		27.30	53.20			ISS
267	18	AUG	1939		27.00	54.50			ISS
268	28	AUG	1939	213536	36.40	58.00	5.0	13	RU
268A					35.20	59.30			ISS
269	19	SEP	1939	032400	38.00	57.80	5.2	13	CP-RU-CCP
269A					38.60	57.20			ISS
270	4	NOV	1939	101524	32.00	49.50	6.5		GR
270A					32.50	49.00			ISS-STH
271	8	NOV	1939	172100	36.20	58.00	5.2	13	ISS-RU
271A					35.50	58.80	5.2		CCP-CP
272	28	NOV	1939	142200	32.20	49.30			ISS-STH

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273	4	MAY	1940	210154	35.25	58.25	6.5		GR
273A					35.80	58.10			ISS
273B					35.50	58.90			USA
274	5	MAY	1940		34.70	57.50			ISS
275	1	JUN	1940		27.00	54.50			ISS
276	6	JUL	1940	072014	33.20	46.40			ISS-ERG
277	6	JUL	1940	174511	33.20	46.40	5.6		ISS-ERG
278					33.50	46.50	5.6		GR
279	11	JUL	1940	012329	39.30	47.50	4.4		ISS-ERG-KAR
279A					39.20	47.80			CP
280	19	JUL	1940	045326	37.70	57.50	4.7	12	CP-CCP-RU
281	25	SEP	1940	193120	36.20	52.20	5.0		CCP
281A					36.40	52.10			ISS
282	18	OCT	1940	122544	38.50	45.00	5.5		ISS-ERG
282A					39.60	42.20	5.5		CP
283	16	DEC	1940		28.00	57.00			ISS

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284	4	FEB	1941		27.30	53.20			ISS
285	16	FEB	1941	163903	33.75	59.00	6.2		GR
285A					33.30	58.70			ISS
286	28	MAR	1941		28.30	54.20			ISS
287	29	MAR	1941		28.30	54.20			ISS
288	10	JUN	1941	203844	33.20	46.40	5.6		ISS-ERG
288A					32.00	47.50	5.6		GP
289	15	JUN	1941		27.30	53.20			ISS
290	28	AUG	1941	001835	33.40	47.30			ISS-STH

208A						45.00	5.6		GR-ENG
209	26	FEB	1934		27.50	37.50			ISS
210	10	MAR	1934		26.30	52.50			ISS
211	13	MAR	1934	233300	30.50	51.70			ISS-STH
212	18	MAR	1934		26.50	52.50			ISS
213	19	MAR	1934		27.00	52.50			ISS
214	8	JUN	1934		39.00	48.50			ISS
215	13	JUN	1934	221028	27.50	62.50	7.0	80	CUT
216	31	AUG	1934		27.50	53.30			ISS
217	29	OCT	1934	161518	39.80	47.50	5.6		CP-KAR
218	2	NOV	1934	220600	40.00	49.00	4.5		CP
218A					39.90	49.30			ISS

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219	6	JAN	1	212458	39.50	46.20	4.5		CP-ISS-KAR
220	5	MAR	1935	102637	36.20	53.00	5.8	13	CCP-RU
220A					36.30	53.50			ISS
220B					36.50	53.00	6.0		CHO
221	11	APR	1935	231443	36.10	53.50	6.7	15	CCP-GR-ISS
221A					36.50	53.00	6.7		CHO
222	12	APR	1935	001114	36.00	53.10	5.5	13	CCP-RU
222A					36.30	53.50			ISS
223	12	APR	1935	003344	36.00	52.00	5.2	13	CCP-ISS-RU
224	12	APR	1935	010635	36.00	53.50	5.5	13	CCP-CP-RU
224A					36.30	53.50			ISS
225	12	APR	1935	124430	36.00	53.40	5.5	13	CP-RU
226	12	APR	1935	223148	35.90	53.50	5.0	13	CP-CCP-RU
227	13	APR	1935	022907	34.80	52.20			ISS
228	15	APR	1935	230435	35.90	54.00	4.2	12	CCP-CP-RU
229	17	APR	1935		36.30	53.50			ISS

230	31	MAY	1935	131600	32.10	47.80			ISS-STH
231	2	JUL	1935		25.50	55.20			ISS
232	8	SEP	1935	011602	36.40	54.10	4.2	11	CP-RU
232A					37.30	54.40			ISS
233	22	SEP	1935		29.00	61.00			ISS
234	15	OCT	1935		28.70	51.90			ISS
235	27	OCT	1935		27.60	54.60			ISS

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236	8	JAN	1936		27.00	52.50			ISS
237	24	FEB	1936	162931	33.50	48.00			ISS-STH
238	17	APR	1936		28.00	55.70			ISS
239	21	APR	1936		28.00	55.70			ISS
240	17	JUN	1936		25.50	55.20			ISS
241	30	JUN	1936	192606	33.50	60.50	6.2		ISS
241A					33.00	60.00	6.2		GR
241A					33.00	60.00	6.2		GR
242	16	AUG	1936		26.60	55.50			ISS
243	20	AUG	1936	020800	30.50	51.70			ISS-STH
244	28	AUG	1936	001950	33.50	46.50			ISS
245	7	SEP	1936		29.00	61.00			ISS
246	6	NOV	1936		28.50	56.80			ISS

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247	7	JAN	1937	132331	40.20	44.40	5.2		KAR
248	7	JAN	1937	204742	40.10	44.30	4.4		CP-KAR
249	13	FEB	1937		31.50	56.00			ISS
250	7	MAR	1937	191045	38.50	45.00	4.6		ISS-KAR
250A					38.40	43.70	4.5		CP
251	7	APR	1937	183059	34.80	52.10			ISS
252	11	MAY	1937		29.50	57.50			ISS

171	21MAY	1931	120054	39.00	44.50	4.2		CP
172	25MAY	1931	214148	39.30	46.40	4.0		CP
173	4 JUL	1931	210050	37.50	45.50	4.7		ISS
173A				38.00	45.60	4.7		CP
173B				38.00	45.00	4.8		KAR
174	5 JUL	1931	175700	39.00	48.50	4.4		CP
174A				39.00	47.50			ISS
174B				39.90	48.50	4.6		KAR
175	8 JUL	1931		33.70	49.40			ISS
176	28JUL	1931	173625	29.50	52.00	5.6		GR
176A				29.40	51.40			ISS
177	7 AUG	1931	104900	40.00	60.00	4.7		CP-ISS
178	8 AUG	1931	085416	37.00	58.50	5.3	13	GR-ISS
178A				37.00	59.00	5.0	13	CP-CCP-RU
179	24AUG	1931	213512	27.00	60.00			USA
180	27AUG	1931		38.70	46.10			ISS
181	29AUG	1931	123000	32.00	49.00			ISS-STH
182	2 SEP	1931		30.50	54.50			ISS
183	16NOV	1931		27.50	55.00			ISS
184	24DEC	1931	230005	37.30	44.80	4.8		ISS-KAR

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185	22JAN	1932	004856	33.50	48.00	5.6		ISS-STH-ERG
185A				33.00	47.00			GR
186	4 FEB	1932	211809	26.50	62.25	5.6		GR
187	15MAR	1932	101810	34.20	48.00	5.6		ISS-GR
188	15MAR	1932		39.70	44.00			ISS
189	7 MAY	1932	145409	36.50	45.00	5.6		GR-ERG
189A				36.20	45.00	5.1		KAR
189B				36.30	44.90			ISS

190	20	MAY	1932	191611	36.50	53.50	5.3	13	RU-GR
190A					36.00	54.00	5.0		CCP
190B					36.30	53.50			ISS
191	24	MAY	1932	232926	37.80	48.20	4.5		ISS-KAR
192	16	JUN	1932	120900	38.70	46.10	4.3		ISS-CP-KAR
193	10	AUG	1932	170000	38.30	46.30	4.3		CP
193A					38.70	46.10	4.4		ISS-KAR
194	8	SEP	1932	072532	30.70	58.40	5.6		ISS
194A					31.00	58.50	5.6		GR
195	12	SEI	1932	233737	39.00	50.00	4.9		ISS
195A					39.50	50.50	4.9		CP-KAR

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196	21	FEB	1933	190259	27.50	57.50	5.6		GR-ISS
197	26	FEB	1933		27.50	57.50			ISS
198	16	APR	1933	065446	39.00	48.50	4.8		ISS-CCP-KAR
199	5	OCT	1933	132945	35.00	57.75	6.0		GR
199A					35.10	57.80			ISS
200	6	NOV	1933	070716	39.30	46.60	5.1		CP
200A					39.00	43.50			ISS
201	28	NOV	1933	110918	32.00	56.00	6.2		GR-ISS
202	12	DEC	1933		32.20	55.80			ISS
203	14	DEC	1933		32.20	55.80			ISS

Y E A R 1 9 3 4

204	1	JAN	1934		32.00	56.10			ISS
205	2	JAN	1934	205538	30.00	57.50	5.6		GR-ISS
206	4	FEB	1934	132714	30.50	51.70	6.2		GR-ISS
207	16	FEB	1934		26.00	54.80			ISS
208	22	FEB	1934	080713	38.70	45.10	5.6		CP-ISS-KAR

125	3 AIR	1930	063200	32.50	47.00		ISS-STH
126	15 [illegible]	[illegible]	[illegible]	28.00	54.00	5.6	GR
126A				29.00	54.00		ISS
127	6 MAY	1930	070322	37.00	44.00	5.4	KAR
128	6 MAY	1930	223423	38.00	44.50	7.0	ERG-GR-CP-KAR
128A				37.00	44.00		ISS
129	7 MAY	1930	092930	37.00	44.00	4.5	KAR
130	7 MAY	1930	134748	37.50	45.00	4.8	KAR
130A				37.30	45.10	4.7	CP
130B				37.50	45.50		ISS
131	8 MAY	1930	142330	37.70	45.20	5.1	KAR
132	8 MAY	1930	153524	37.30	44.80	6.0	KAR
133	8 MAY	1930	233622	37.30	44.80	4.5	KAR
134	9 MAY	1930	014300	37.00	44.00	4.6	ISS-KAR
135	9 MAY	1930	080000	37.50	45.00	4.4	KAR
135A				37.30	44.80		ISS
136	9 MAY	1930	210800	37.50	43.50	4.5	KAR
137	10 MAY	1930	110300	35.00	46.00	4.6	KAR
138	10 MAY	1930	214322	37.50	44.00	4.7	ISS-KAR
139	11 MAY	1930	223546	27.50	55.00	6.0	GR-ISS
140	12 MAY	1930		27.50	55.00		ISS
141	13 MAY	1930		27.50	55.00		ISS
142	21 MAY	1930	135051	37.00	44.00	4.6	KAR
143	23 MAY	1930	094820	37.00	44.00	5.2	KAR-ISS
144	29 MAY	1930	171455	37.50	45.50	5.5	KAR-ISS
145	4 MAY	1930	072807	37.90	45.10	5.3	KAR-ISS
145A				38.30	45.00	5.3	CP
146	8 JUL	1930		28.70	51.90		ISS
147	9 JUL	1930		37.00	44.00		ISS

148	3 AUG	1930	220951	37.30	44.80	5.0	KAR-ISS
149	17AUG	1930		27.50	55.00		ISS
150	21AUG	1930	065520	37.00	44.00	4.7	ISS-KAR
151	23AUG	1930		27.50	55.00		ISS
152	2 SEP	1930.	185848	30.00	51.50	5.6	GR
152A				29.40	51.40		ISS
153	5 SEP	1930		27.50	55.00		ISS
154	6 SEP	1930		31.20	61.60		ISS
155	2 OCT	1930	153312	35.80	52.10	5.0	ISS-CP
156	6 OCT	1930		37.00	58.50		ISS
157	7 OCT	1930	205306	35.80	52.10		ISS
158	18OCT	1930		29.40	51.40		ISS
159	25OCT	1930	233425	37.90	45.10	5.0	ISS-KAR
160	5 DEC	1930		33.50	46.50		ISS
		Y E A R		1 9 3 1			
161	4 JAN	1931	201000	32.50	53.00		ISS-STH
162	6 FEB	1931	052012	39.50	46.30	4.5	CP
163	6 FEB	1931	202854	39.50	46.30	4.2	CP
164	27APR	1931	165038	39.30	46.00	6.5	CP-KAR
164A				38.75	46.00	6.5	GR-ISS
164B				38.80	46.00	6.5	PER
165	27APR	1931	180520	40.00	47.00	4.9	KAR
165A				39.50	46.00		CP
166	3 MAY	1931		30.50	54.50		ISS
167	5 MAY	1931	064215	26.50	54.00	5.6	GR
167A				26.00	54.80		ISS
168	7 MAY	1931		26.00	54.80		ISS
169	8 MAY	1931	090603	39.00	46.00	4.2	CP-KAR
170	12MAY	1931	102513	37.50	45.50	5.5	CP

84	27 MAR	1928		32.00	59.00			ISS
85	28 MAR	1928		40.00	47.00			ISS
86	14 APR	1928	131644	35.30	54.40	5.2		CP
85A				35.50	55.00			ISS
87	15 APR	1923		28.70	51.90			ISS
88	26 APR	1923	154001	37.50	55.00	4.5	12	ISS-RU
88A				37.40	55.40	4.5		CP-CCP
89	30 APR	1928		27.60	57.80			ISS
90	1 MAY	1928	155800	38.50	60.00	4.2	11	ISS-RU
90A				37.00	61.20	4.2		CCP
91	14 AUG	1928		27.60	57.80			ISS
92	21 AUG	1928	190200	35.50	59.00	5.0	12	CP-RU
92A				36.10	61.60	4.5		CCP
93	26 AUG	1928		28.70	51.90			ISS
94	27 AUG	1928		28.70	51.90			ISS
95	18 SEP	1928	080700	32.50	53.00			ISS-STH
96	21 SEP	1928		35.50	59.00			ISS
97	6 NOV	1928	134235	40.00	53.50	4.7		GR
97A				39.70	53.30			ISS
97B				39.80	53.30	4.7		CP

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98	21 JAN	1929		30.50	54.50			ISS
99	5 FEB	1929	015700	31.50	47.50			ISS-STH
100	26 MAR	1929		28.00	62.00			ISS
101	1 MAY	1929	153727	37.40	58.00	6.4	15	CP-CCP-RU
102	1 MAY	1929	153730	38.00	56.80	7.1		GR
102A				38.00	58.00			ISS
103	1 MAY	1929	224244	37.00	57.60	4.7	12	CP-CCP-RU
104	3 MAY	1929	162001	37.80	57.80	5.0	13	CP-CCP-RU

			38.40	57.70		ISS
105	4 MAY	1929	063113	37.50	58.20 4.5	12 CO-CCP-RU
105A				38.40	57.70	ISS
106	13 MAY	1929	053200	35.50	55.50 4.5	12 CCP-RU
106A				38.40	57.70 4.5	CP
106B				38.70	57.70	ISS
107	13 MAY	1929	132709	37.70	57.40 5.5	13 CP-RU
107A				38.00	56.80	ISS
108	17 MAY	1929		32.00	57.00	ISS
109	13 JUL	1929	073630	37.00	58.50 5.5	13 ISS-CP-RU
110	15 JUL	1929	074414	33.70	49.40 6.2	ISS-STH
110A				32.00	49.50 6.2	GR
111	16 JUL	1929		28.70	51.90	ISS
112	25 JUL	1929	001712	37.20	57.80 5.5	13 CP-CCP-RU
112A				37.70	57.80	ISS
113	7 AUG	1929	202225	35.00	44.00 4.8	KAR
114	11 AUG	1929		30.50	54.50	ISS
115	3 SEP	1929		26.40	62.30	ISS
116	2 OCT	1929		28.70	51.90	ISS
117	27 OCT	1929		33.50	48.00	ISS
118	29 OCT	1929	055339	27.50	55.00 5.6	GR
118A				27.50	54.50	ISS
119	29 OCT	1929		25.00	51.50	ISS
120	5 NOV	1929	100604	37.50	45.50 4.4	ISS
121	20 NOV	1929		27.50	55.00	ISS
122	24 DEC	1929		37.50	60.00	ISS
123	25 DEC	1929	222542	38.40	49.20 4.0	CP
		Y E A R		1 9 3 0		
124	15 FEB	1930		28.70	51.90	ISS

41	1 JAN	1924	151700	38.20	6060	4.6	12	RU-CCP
42	18 JAN	1924		29.50	56.00			ISS
43	19 FEB	1924	065955	39.00	47.50	5.5	50	CP-ISS-KAR
44	30 MAY	1924		27.50	53.80			ISS
45	30 JUN	1924		27.50	53.80			ISS
46	3 JUL	1924		35.50	55.00			ISS
47	13 SEP	1924	143405	38.66	44.00	6.7		ERG
47A				40.00	42.00	6.7		CP
48	27 SEP	1924		37.00	53.00	5.4		ISS
49	27 SEP	1924	042736	39.50	43.90	5.0		CP-KAR
49A				40.00	42.00			ISS
50	8 NOV	1924	090500	35.50	48.00			ISS
51	10 NOV	1924	210856	35.50	48.00			ISS
52	11 NOV	1924	155340	35.50	48.00			ISS
53	12 NOV	1924	092820	35.50	48.00			ISS
54	11 DEC	1924		25.20	56.80			ISS
		Y E A R	1 9 2 5					
55	12 MAR	1925	112000	39.00	55.00	4.5		ISS-CP
55A				40.00	58.00	4.5		CCP
56	2 MAY	1925		34.00	61.50			ISS
57	11 JUL	1925		29.50	59.50			ISS
58	30 JUL	1925		30.00	51.00			ISS
59	30 JUL	1925	184500	35.00	44.00	4.5		KS
60	24 SEP	1925		27.50	55.00			ISS
61	10 DEC	1925	055930	37.20	57.80	5.0	13	CP-CCP-RU
62	18 DEC	1925	055300	30.00	51.00			ISS-STH
		Y E A R	1 9 2 6					
63	2 APR	1926	115600	35.00	44.00	4.8		KAR-ISS

64	23 APR	1926		27.50	55.00			ISS
65	19 MAY	1926	211355	26.50	59.00	5.6		GR
65A				27.20	59.50			ISS
66	8 JUL	1926	145912	39.70	44.00	4.5		KAR

Y E A R 1 9 2 7

67	29 MAY	1927	181000	38.70	58.40	4.5		CCP
68	9 MAY	1927	103147	27.50	56.00	6.3		GR
68A				28.50	56.00			ISS
69	15 JUN	1927	064610	35.50	48.00			ISS
70	7 JUL	1927	200630	28.00	62.00	6.5	100	ISS
70A				27.00	62.00	6.5	100	GR
71	22 JUL	1927	035510	34.70	54.00	6.2		ISS
71A				34.50	53.00	6.2		GR
71B				34.50	53.50			PER
72	22 JUL	1927		35.50	54.00			ISS
73	23 JUL	1927	201700	34.70	54.00			ISS-STH
74	23 JUL	1927	224000	34.70	54.00			ISS-STH
75	24 JUL	1927		28.50	56.00			ISS
76	27 JUL	1927		34.70	54.00			ISS
77	29 JUL	1927	113900	35.50	55.00			ISS
78	30 JUL	1927		28.70	51.50			ISS
79	31 OCT	1927	062300	36.50	49.00			ISS
80	12 NOV	1927	144550	32.50	46.50	5.6		ERG-GR-STH-ISS
80A				32.30	46.50			PER
81	15 NOV	1927	143900	33.50	48.00			ISS
82	16 NOV	1927		27.50	53.80			ISS

Y E A R 1 9 2 8

83	24 MAR	1928	105316	37.80	47.30	4.9		ISS-KAR

11	18 APR	1911	181436	32.00	56.00	6.7	50	GR

Y E A R 1 9 1 2

12	24 FEB	1912	143600	37,00	59.50	4.9	12	CP-RU
12A				37.50	60.50	4.7		CCP

Y E A R 1 9 1 3

13	24 MAR	1913		27.50	53.80			ISS
14	16 APR	1913	060000	38.80	48.50	5.2		KAR
15	25 APR	1913	041300	39.50	58.00	4.8		CP
15A				39.50	58.00	4.7		CCP

Y E A R 1 9 1 4

16	1 NOV	1914	215200	38.40	45.40	4.3		CP

Y E A R 1 9 1 6

17	11 OCT	1916	030500	39.50	45.50	4.5		CP-KAR

Y E A R 1 9 1 7

18	2 JAN	1917	002812	38.00	48.50			ISS
19	15 JUL	1917	174800	34.00	46.00			PUL-STH
19A				33.50	46.50			ISS
20	24 JUL	1917		33.50	46.50			WIL
21	23 NOV	1917	041700	33.50	46.50			ISS
22	24 NOV	1917		33.50	46.50			ISS
23	28 NOV	1917	144224	36.50	59.10	5.3	13	CP-CCP-RU
24	28 NOV	1917	174300	36.50	58.40	4.6	12	CCP-RU
24A				36.50	60.00	4.7		CP

Y E A R 1 9 1 8

25	24	MAR	1918		34.50	57.10			ISS
26	25	MAY	1918		32.00	57.00			WIL
			Y E A R		1 9 1 9				
27	8	JAN	1919	101230	40.00	47.00	5.4		ISS-CP-KAR
28	14	JUL	1919		40.00	60.00			ISS
			Y E A R		1 9 2 0				
29	25	MAY	1920		33.50	46.50			ISS-WIL
30	14	OCT	1920		36.20	44.00	4.7		KAR
			Y E A R		1 9 2 1				
31	6	DEC	1921		40.00	45.50			ISS
			Y E A R		1 9 2 2				
32	21	MAR	1922	165600	33.00	50.00			ISS-STH
			Y E A R		1 9 2 3				
33	25	MAY	1923		32.00	57.00			ISS
34	25	MAY	1923	222100	35.30	59.20	5.5		RU
35	18	JUN	1923		34.80	46.00			ISS
36	14	SEP	1923		29.50	59.50			ISS
37	17	SEP	1923	070914	35.50	55.00	6.2	14	GR-ISS
37A					37.20	57.70	6.0	14	CCP-RU-CP
38	22	SEP	1923	204738	29.50	56.00	6.9		ISS
38A					29.00	56.50	6.9		GR
39	23	SEP	1923		29.50	56.00			ISS
40	29	NOV	1923		31.20	61.60			ISS
			Y E A R		1 9 2 4				

APPENDIX I

SNO	DAY	MO.	YEAR	TIME	EPICENTRE		MAG	FOD	SOURCE
				Y E A R	1 9 0 2				
1 1	1	9	JUN	1902	26.70	56.10			WIL
				Y E A R	1 9 0 3				
	2	24	JUN	1903	39.00	49.00			GR
				Y E A R	1 9 0 5				
	3	9	JUN	1905	38.00	46.00			ERD
				Y E A R	1 9 0 8				
	4	10	JUN	1908	35.10	55.00			WIL
	4A				35.50	55.00			WIL
	5	23	JUN	1908	33.30	50.20			WIL
	5A				33.05	50.05			WIL
	6	26	SEP	1908 062800	38.00	44.00	6.0		KAR
				Y E A R	1 9 0 9				
	7	23	JAN	1909 024803	33.30	50.20	7.4		STH-HEC
	7A				33.00	53.00	7.4		GR
	8	26	JAN	1909 225600	39.10	45.50	4.9		KAR
	9	11	APR	1909 040200	36.00	45.00	5.6		KAR
				Y E A R	1 9 1 0				
	10	4	DEC	1910 140200	38.80	48.80	5.1		KAR
				Y E A R	1 9 1 1				

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areas between Budjnurd and Semnan, Amol and Hamadan, Khoi and Kermanshah, Hamadan and Golpaigan might be the scence of a future catastrophic earthquake.

Since specific prediction of the time and magnitude of future earthquakes is at the present time impossible, the past seismic history of a region is of great importance to the designer, and areas with a well documented seismic history could be a test site for prediction of future earthquakes.

CONCLUSION

A review of the earthquake history of Iran shows that this country is in a seismic region. Most of the seismic activity originated along the pre existing faults, or branches of these faults. The main seismic activity in Iran during the last sixty-nine years was along two bands, one in the north, and another in the southwest. The high casualty rate and damage is due to the weak construction, poor workmanship and absence of building regulation. Dangerous spots should be avoided for the site of important constructions. It is better to build on firm ground although close to a potential fault than some distance away from it on poor ground.

The numerous earthquakes which occurred in Iran during the last sixty-nine years should bring up the following three important factors.

1) Cumulative effects of a sequence of shocks on any type of construction.

2) Necessity for proper code and regulations, not only for the design, but also for proper repair and strengthening of damaged structures.

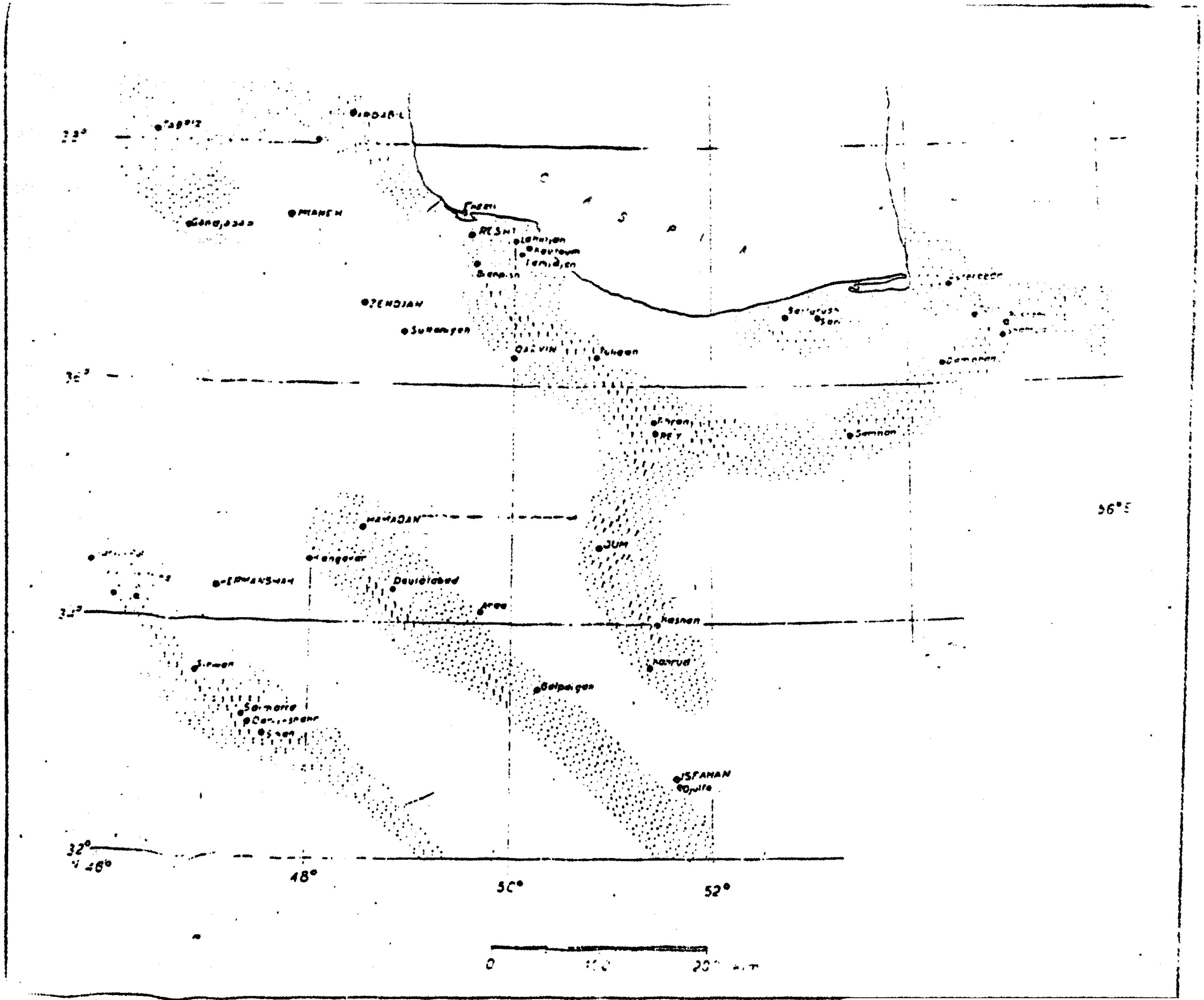
3) Through study of the overall stability of a site.

These are some of the important factors that should be considered in the design and construction of structures which are necessary to resist earthquakes.

f the assumption of a uniform stored energy is valid, the expectancy of an earthquake occuring in the future between those areas where the gradient of energy released is maximum is more than in other areas. An earlier paper on Seismicity of Iran indicates that these areas that are now quiescent have been active in the past. The adopted (Fig. 10) from refefence No. 11 shows the active areas of the past. The heavey shaded areas shown in (Fig. 10) are regions over which the effects of earthquakes should have been felt most strongly. The following quotation from the same reference is very appropriate at this time.

> "The recent earthquake of 1962 at Buyin south of Qazvin shows a revival of activity after a period of rest of nearly 300 years. This event belongs to the same zone of seismic activity which, according to historical data and to the tectonics of the region, passes a few Kilometers north of Tehran, a modern city about half a century old which so far experienced no earthquake damage of any consequence. The nearby old city of Rey has been destroyed many times; the last time was 800 years ago".

It is possible that these areas that are quiescent now and have been active in the past will be active again in the future, especially



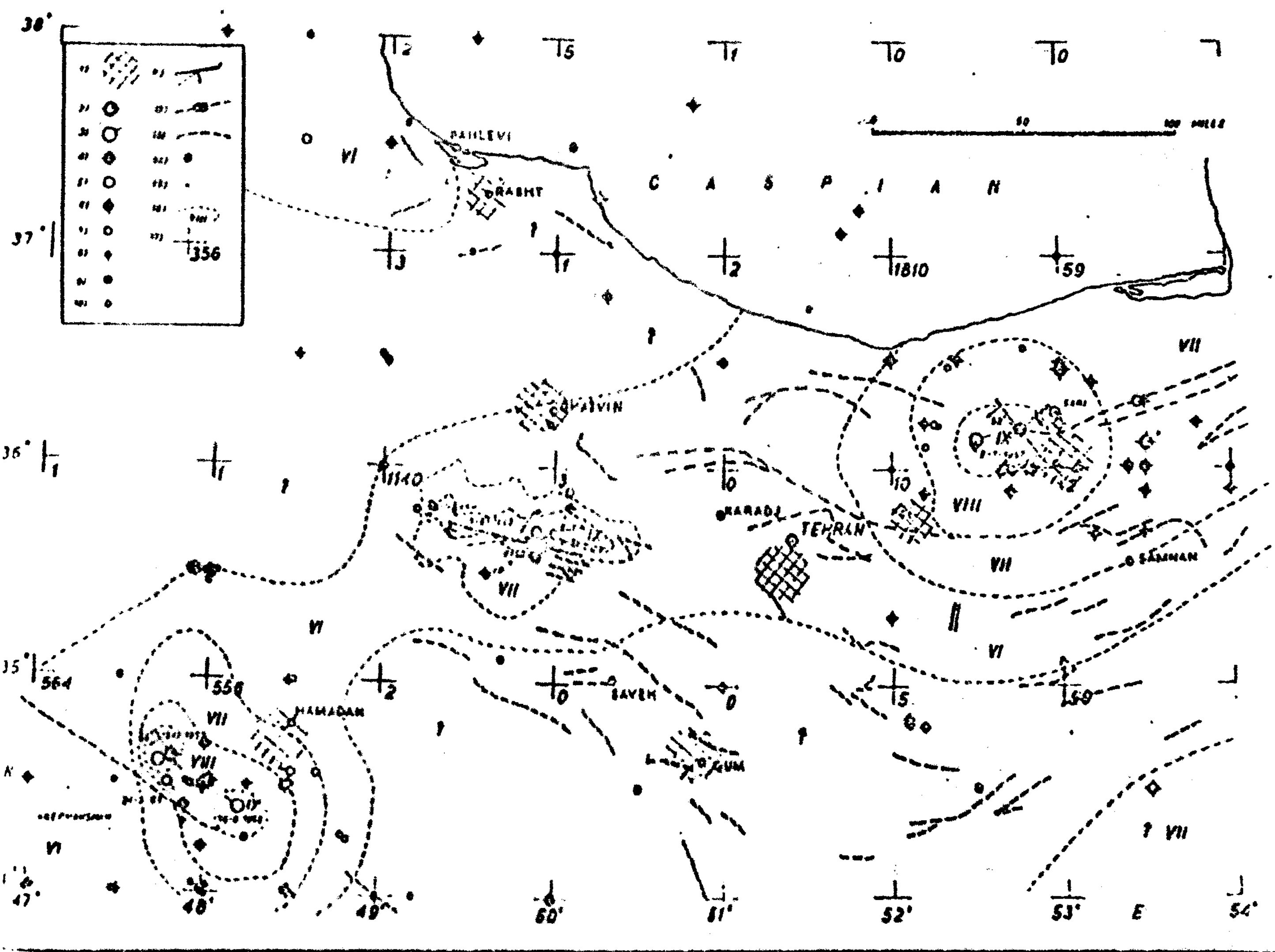
CASPIA
TABRIZ
ARDABIL
MIANEH
RESHT
ZENDJAN
Sultaniyeh
QAZVIN
HAMADAN
Daulatabad
QUM
Kashan
Golpaigan
ISFAHAN
Djulfa
REY
Semnan
48°
50°
52°
56°E
32°

running along the Zagros fault, from Khoi through Kermanshah and Shiraz to Bandar-Abbas. There have been some earthquakes around Kerman and Bam along Kuhbanon and Naibadon faults. For a clear picture of the first band, a reference to (Fig. 9) shows a bigger scale of the area which has been adopted from reference No. 8. The explanation of figures are as follow.

(1) Regions devastated by earthquakes between 850 AD and 1872.

(2), (4), (6) (8) Microseismic epicenters of intensity group II, III, IV, and V respectively. (9) Microseismic epicenter of unknown intensity group. (3), (5), (7), (10) Macroseismic epicenters of intensity group II, III, IV and V respectively; small lines point to corresponding microseismic epicenters. (11) Fault-plane solution data. (12) Fault breaks from field eveidence. (13) Major regional fault trends. (14) Towns. (15) Villages, settlements. (16) Maximal isoseismals for the period 1933-1963. (17) Unit energy values in ergs 10^{16} per year per 100 sq. kms. Intensities in (MM).

To associate the energy released map of Iran (Fig. 5) with these maps it is clear that in some regions the energy that has been released is maximum.

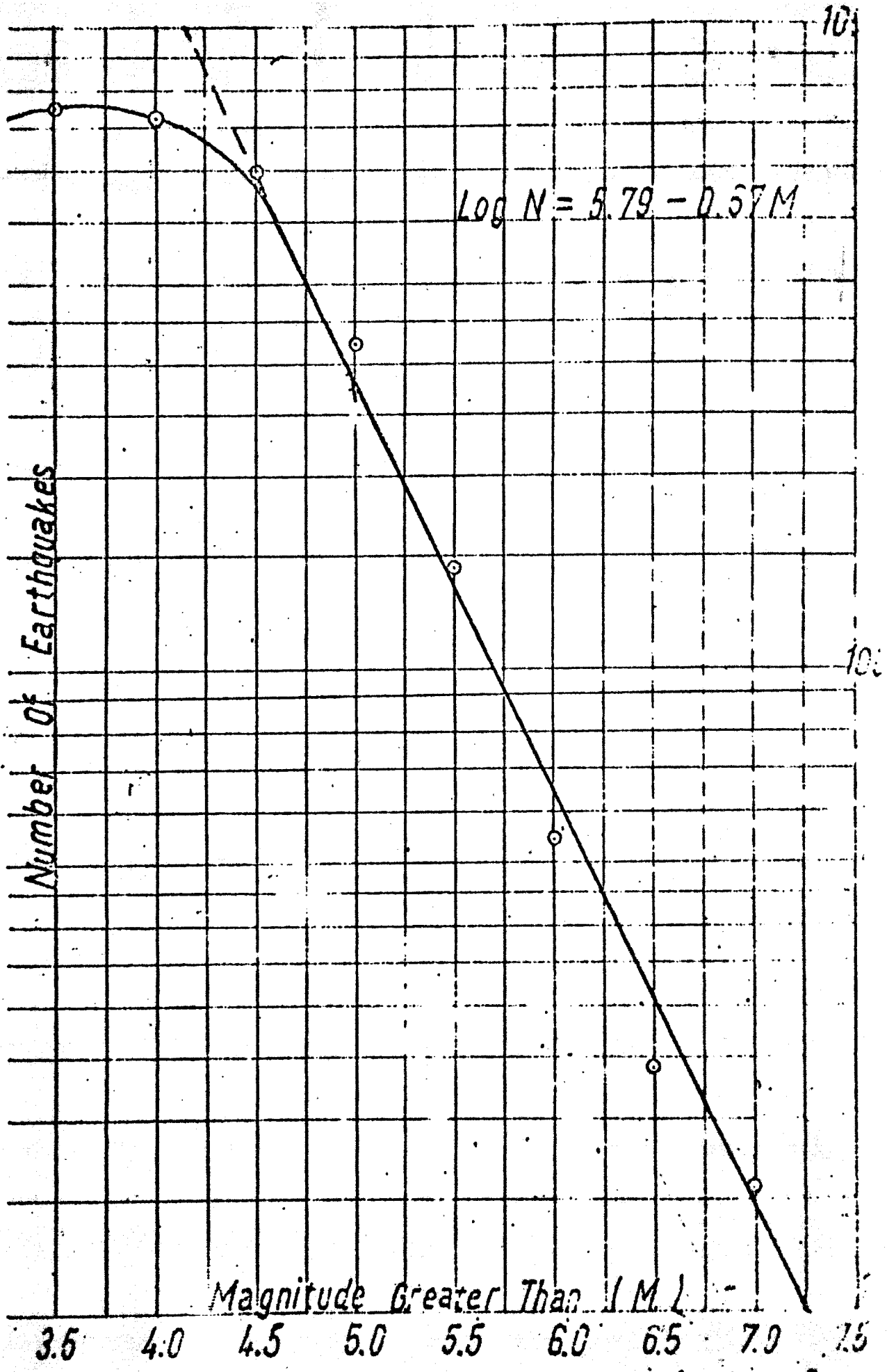


C A S P I A N
PAHLEVI
RASHT
QAZVIN
KARADJ
TEHRAN
SAMNAN
HAMADAN
SAVEH
QUM
IX
VIII
VII
VI
38°
37°
36°
35°
47°
48°
49°
50°
51°
52°
53°
54°
E
1810
1140
356
556
564

are impossible to predict, the above formula will merely give the recurrence interval of number of earthquake of specified magnitude for every hundred square kilometers.

Earthquake frequency study based on the data covering the past few centuries has failed to reveal any significant information, and could be misleading. The purpose of this report is not to help in the predicting of future earthquakes, but rather to show where past earthquakes have caused damage and may cause in the future. It seems that seismic activity in Iran originates along the pre-existing faults or branches of these faults. To study the collected data and frequency distribution curve (Fig. 8) indicates that most of these earthquakes fall on the class d $5.9 \geqslant M \geqslant 5.5$, and some shocks of class c and b also occur. The largest shock recorded after 1900 is in order of magnitude of 7.5. All the earthquakes after 1900 to the present are shallow earthquakes with a focal depth of between 20-40 Kilometers.

A reference to the map of epicenters (Fig. 3) and tectonic map of Iran (Fig.4), shows that most of these earthquakes in a period of sixty-nine years occurred in two main bands, the first band running along the Shahrud fault in the southern part of the Elburz mountains, from Mashad through Shirvan, Budjnurd, Shahrud, Damghan, Tehran and Buyin-Zahra to Hamadan. There have been some earthquakes along the same band along the Doruneh fault which by-passes Torbut-Hydari. The second band is in the south-west of Iran


Log N = 5.79 − 0.57M
Number of Earthquakes
Magnitude Greater Than (M)
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0

(Fig. 2)

where N= number of earthquakes in sixty nine years, and A and B are constants, and M is magnitude.

for M= 5.0 N=280 log N= 2.447

M= 6.0 N=60 log N= 1.778

therefore A= -0.67 and B = 5.79

then the equation becomes:

$$\log N = 5.79 - 0.67M$$

for a period of sixty-none years.

Assuming that $N_1 = N/69$ where N_1 is number of earthquakes for one year

$$\log N_1 = \log N - \log 69$$

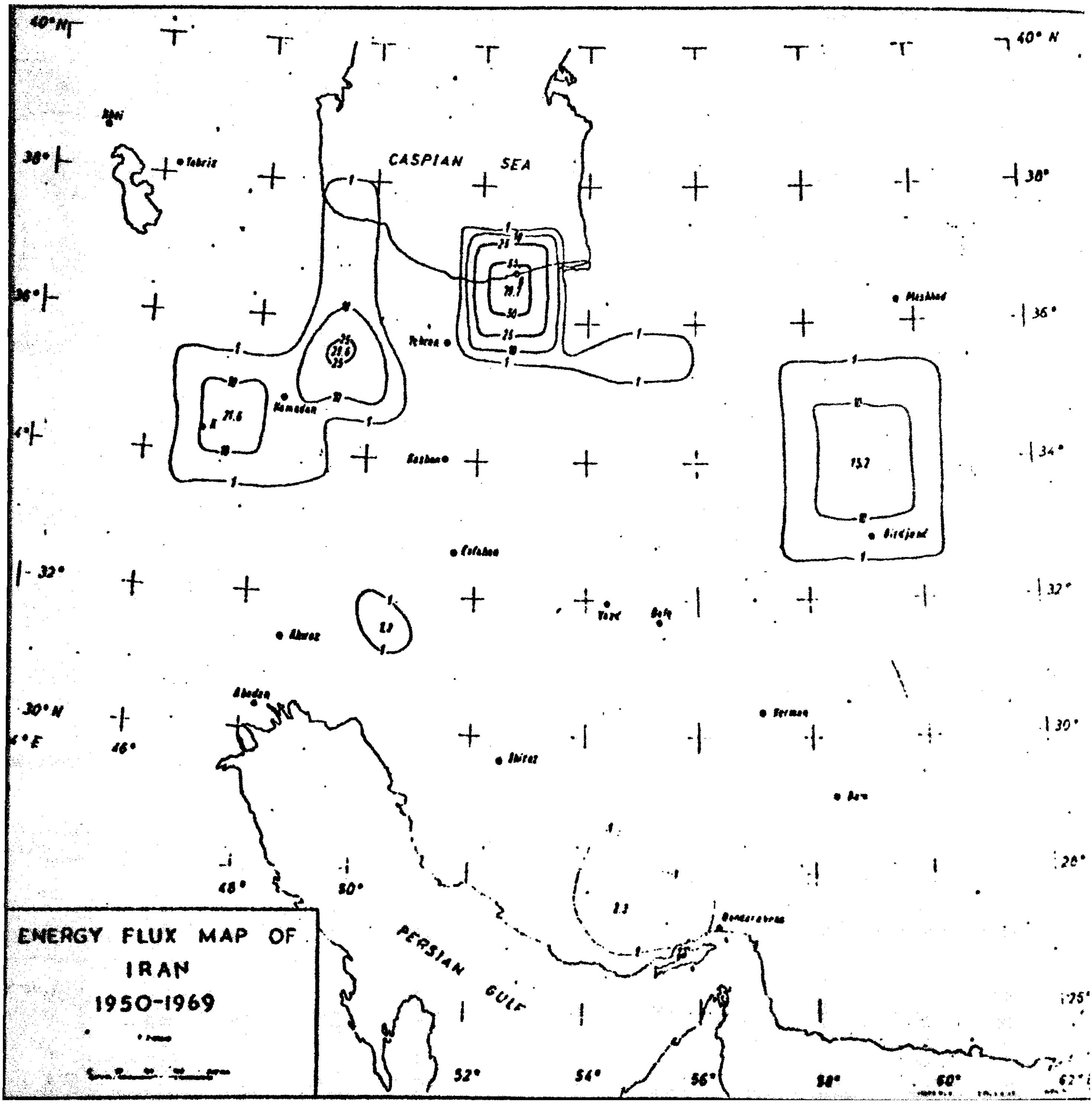
$$\log N_1 = 3.95 - 0.67M$$

The above equation governs a total area of 2.9×10^6 kilometers square; for every hundred square kilometers we have:

$$\log N_{1,100} = 1.5 - 0.67M$$

where $N_{1,100}$ is a probable number of earthquakes of magnitude M or greater for one year in every hundred square kilometers.

Since precise conditions to which all the future projects are subjected


40° N
CASPIAN SEA
Tabriz
Tehran
Hamadan
Kashan
Mashhad
Esfahan
Yazd
Ahwaz
Abadan
Kerman
Shiraz
Bam
PERSIAN GULF
38°
36°
34°
32°
30° N
30°
28°
26°
25°
46°
48°
50°
52°
54°
56°
58°
60°
62°
ENERGY FLUX MAP OF
IRAN
1950-1969

the potential energy stored in the material is converted to mechanical work in an earthquake, such as movement of the crustal block, or crushing of material along the fault zone, and partly is dissipated in heat. Energy of an earthquake which is radiated in the form of elastic waves, is related to the magnitude of earthquake by the following formula;

(Bath 1958) : $\log E = 12.24 + 1.44\,M$

in which E is the energy in (ergs) and M is the magnitude in (MM) scale.

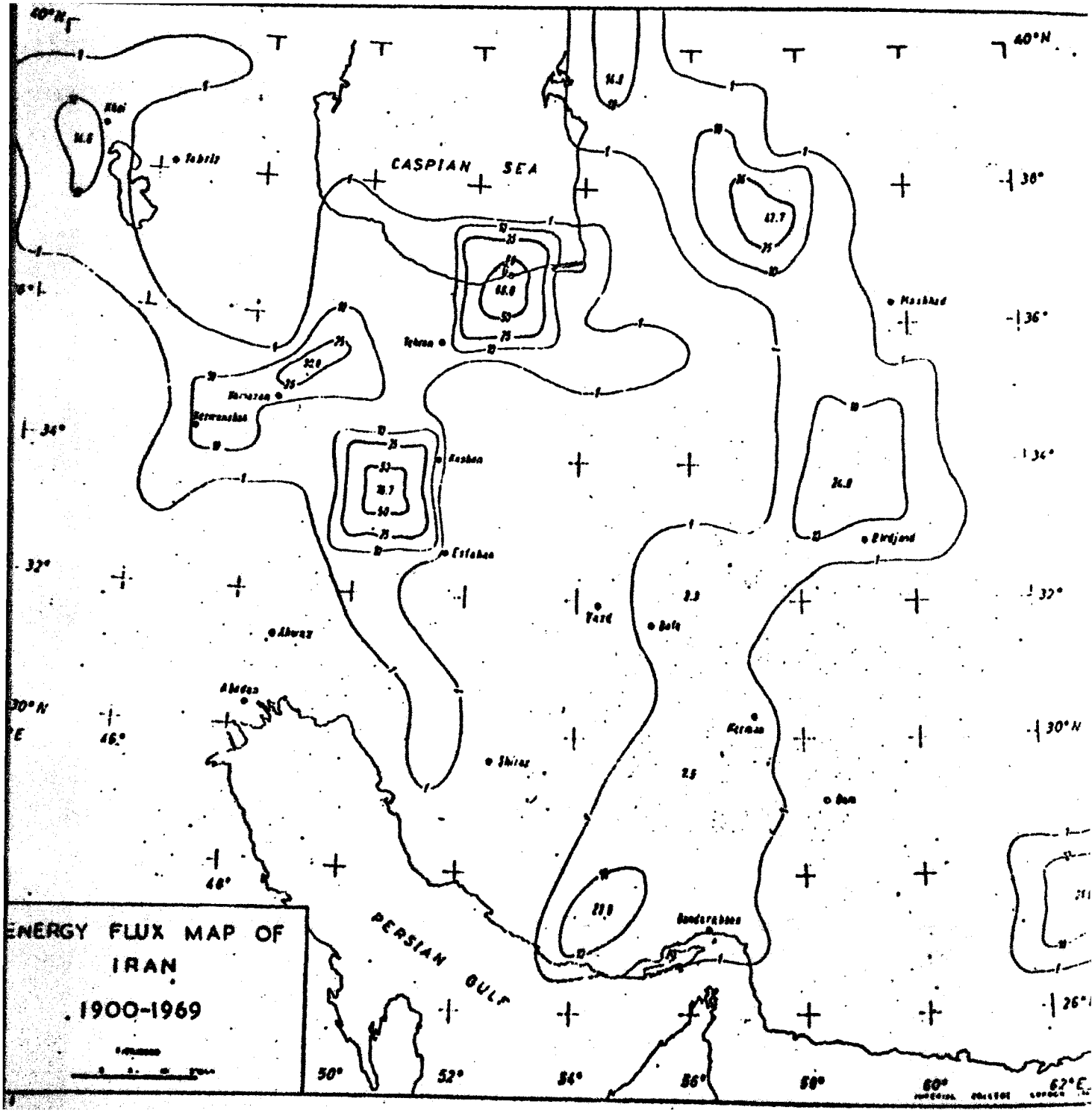
In these energy distribution maps (Figs 5, 6, 7), the cumulative energy release for every 2,500 square kilometers of area has been calculated and equal energy lines have been plotted (all the figures have the coefficient of 10^{21} ergs). The pattern shows the energy released in Iran during a period of 69 years. To relate this map with the tectonic map of Iran, it is possible to conclude the probable region of future earthquakes.

FREQUENCY DISTRIBUTION LOGARITHM OF NUMBER OF EARTHQUAKES VERSUS MAGNITUDE (log N - M)

From collection of data a curve of magnitude against number of earthquakes for sixty-nine years has been constructed (Fig. 8).

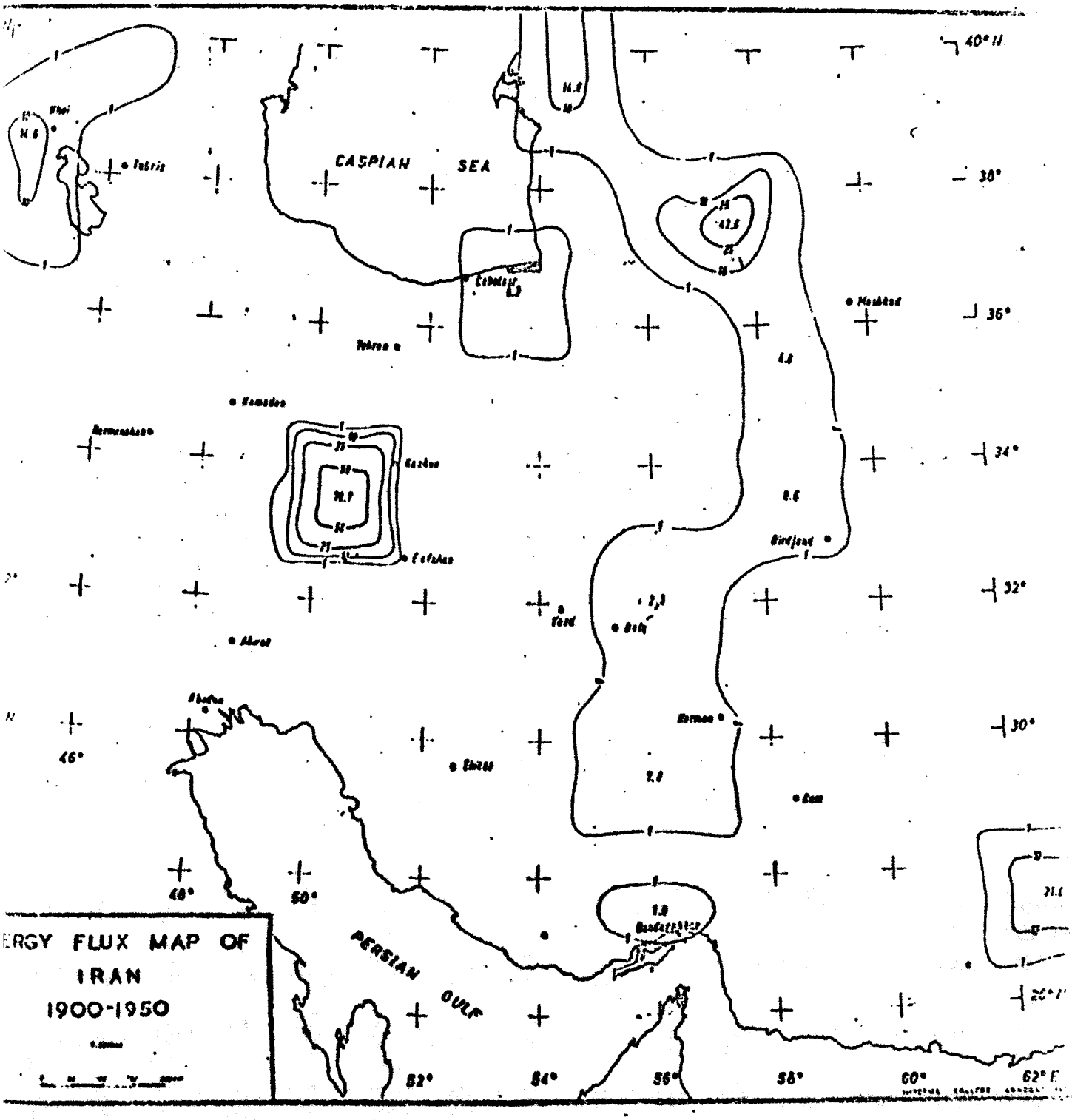
The governing equation for the curve of Figure 8 is:

$$\log N = AM + B$$



ENERGY FLUX MAP OF IRAN

1900-1969


CASPIAN SEA
PERSIAN GULF
40° N
38°
36°
34°
32°
30°
46°
48°
50°
52°
54°
56°
58°
60°
62° E
ERGY FLUX MAP OF
IRAN
1900-1950

90,000 square miles. Several new fault scarps were formed and a narrow zone extending east-west for over 60 miles was disrupted by fault movements. Near the fault zone, the shock was felt with an intensity IX (MM) to VIII (near Rudok only IX), and caused damage to 324 villages with a total population of 199,500. It killed 12,225 and injured 2,776 persons.

31 August 1968

Dasht Biaz Earthquake: On August 31, 1968, an earthquake with a magnitude of 7.3 occurred at the east central part of Iran in Khorasan province. The earthquake happened in a rather isolated and thinly populated area, and the focal depth was less than 15 kilometers. The shock was associated with at least 80 km of east-west faulting. Maximum relative displacement of 4.5 m lateral and 1.2 m vertical were measured on single ruptures, but the cumulative strike-slip movemens across the fault zone, which in places is 300 m wide, was much larger.

The shock destroyed about 12,000 houses and killed more than 10,000 people

CHAPTER IV

APPLICATION

The collected data has been used to construct a epicenter map for Iran (Fig. 3), and also a distribution map of energy (Figs. 5, 6, 7) and a frequency distribution logarithm of number of earthquake versus magnitude (Fig. 8) The main purpose of these mpas is to show the time dependence of past earthquakes and the pattern of their occurrence in the past. The energy release map has been plotted on three separate sheets for the periods of 1900-1969 (Fig. 5), 1900-1950 (Fig. 6) and (Fig. 7) for the period 1950-1969. If the assumption of a uniform stored energy is valid, the expectancy of an earthquake occuring in the future between those areas where the gradient of energy released is maximum is more than in other areas.

To associate energy flux map with map of epicenters and tectonic of Iran, it is possible to suspect the location of future earthquakes.

1. DISTRIBUTION OF SEISMIC ENERGY IN IRAN

An earthquake is caused by a sudden release of the strain energy stored in the crust. After an earthquake at the surface almost all the stored energy is released; in deeper shocks only part of it is released. Part of

3 October 1948

A very strong earthquake demolished five villages near Daregaz, and 352 persons were killed and 540 injured. The earthquake was felt in Meshhad, Shirvan, Bojnurd, [redacted]

5 October 1948

A strong earthquake of magnitude 7. 2 completely destroyed the City of Ashkabad (USSR) and [redacted]

12 February 1953

A destructive earthquake demolished Torud and its neighbourhood, causing an enormous death toll. About 9000 people were killed and 54 injured. 500 houses [redacted]

31 October 1956

A destructive earthquake of magnitude 6. 4 occurred in Lar near Bosto and some 225 persons were killed and more than 3, 000 were injured.

2 July 1957

A strong earthquake of magnitude 7. 4 occurred in Mazandaran. In Bal and its vicinity over 1, 000 people were killed and many villages were destroyed.

A destructive earthquake of magnitude of 7.0 shook western part of Iran and caused great damage to Farsinaz, Kangavar and many other villages. Some 1, 500 people were killed and 20, 000 became homeless.

16 August 1952

An earthquake demolished many villages and caused great loss of life and property in Nahavand and nearby villages. Over 100 villages were completely ruined and some 200 persons killed.

24 April 1960

A destructive earthquake of magnitude 5.9 demolished the city of Lar. All the buildings were completely ruined and some 1, 500 persons killed.

11 June 1961

An earthquake with magnitude 6.9 occurred in Lar, causing some damage t the old city and 60 people were killed.

1 September 1962

Buyin-Zahra Earthquake: On september 1, 1962, at about 19 h. 20 m.(GMT north-west of Iran was shaken by a strong earthquake of magnitude 7.1. The shock was felt with an intensity greater than III (MM) over an area of about

the field right after the earthquake The epicenters that can be assessed using macroseismic data are sometimes quite different from those found instrumentally. Assigning intensity to a particular area is a matter of personal judgement. Two isoseismal maps drawn by two people are not the same. The accuracy of the map and information is dependent on the experience and judgement of the person assigning intensity to a particular area. Macroseismic information exists for only few earthquakes in Iran. A short description of some important earthquakes in Iran is given belwo.

23 January 1909

A strong earthquake with magnitude 7.4 occurred in Lourestan with probable epicenter between Brojerd and Esfahan. After shocks continued for several days. Damage extended from Brojerd towards Esfahan for 36 Km. Lavan was completely destroyed. A total of 128 villages were damaged, and more than 1,700 men killed, not including the women and children.

1 May 1929

An earthquake with magnitude of 7.1 occurred in the province of Khorasan with damage from Bandargaz to Kalat. The towns of Shirvan

and Bujnurd were severely damaged and in Ashkabad 1,000 people were killed. A cleft 3 yards wide was opened between the towns Khaki and Bagham. This cleft extended to a distance of 18 miles. Casualties amounted to 3,253 killed, 1,121 injured, 88 villages destroyed and 6,542 cattle killed.

6 May 1930

An earthquake with magnitude 7.0 occurred in the Azarbaizan and Salmas area and all the houses, mosques and bazaars were destroyed.

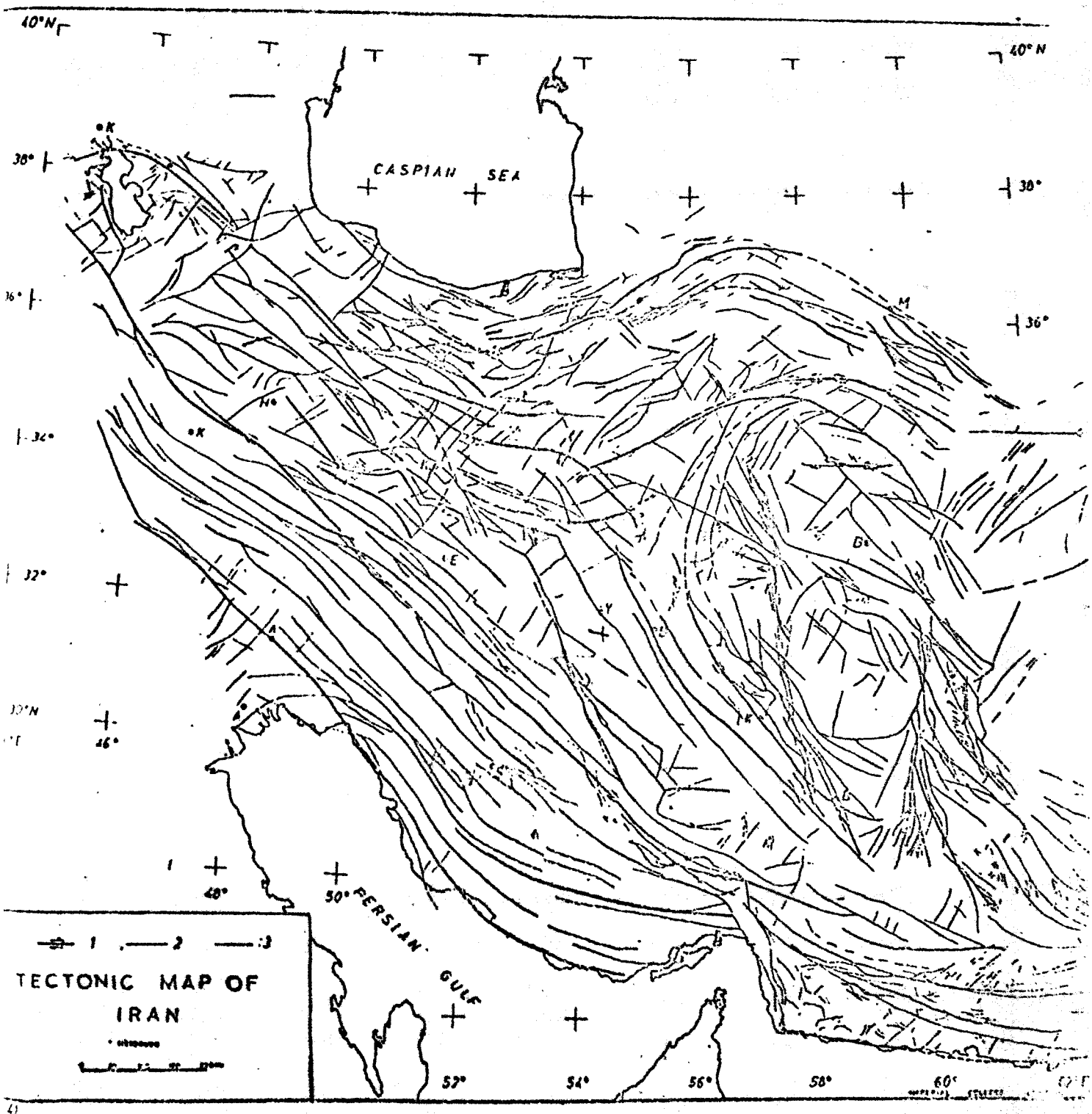
An earthquake of magnitude 6.7 occurred south-east of Sari. 27 villages were destroyed and nearly 400 people killed.

11 May 1945

In Firuzkoh a severe earthquake occurred, and in Garmsar nearly everything was demolished. Altogether some 2,000 houses were ruined and 20 persons were killed and 80 wounded.

23 September 1947

A destructive earthquake demolished some villages near Ghain and caused a large death toll and great damage. In Dulat Abad, 170 were killed and 58 injured, and in Sarayan, Gharmeh and Hesarian some 12 persons were killed and 43 persons were injured.


40°N
40°N
CASPIAN SEA
38°
36°
34°
32°
30°N
46°
48°
50°
52°
54°
56°
58°
60°
PERSIAN GULF
1
2
3
TECTONIC MAP OF IRAN

registered. Whenever there is macroseismic information available this is indicated in Appendix I by the letter PRS (PRESS).

1. SOURCES OF INFORMATION

The source of information used in this report are as follows (standardised at Imperial College).

	Source	Period covered
1.	Wil: Willson	1902, 1908, 1917-20
2.	Gr: Gutenberg and Richter	1903 1909-11, 1923-47
3.	ERD: Erdbebenwarte	1905
4.	KAR: Karnik	1908-67
5.	STH: Stahl	1909, 1917, 1922-60
6.	Hec: Heck	1909
7.	Ru: Rustanovic	1912, 1917, 1923-50, 1962
8.	CP: USSR station bulletins	1912-57
9.	CCP: Atlas USSR earthquake	1912-13, 1917, 1923-62
10.	ISS: International Seismology Summary.	1913, 1917-56
11.	PUL: Pulkovo	1917

12.	ERG: Ergin	1924, 1927, 1932, 1940-41, 1946-62
13.	KS: Ksara	1925
14.	PER: Peronaci	1927, 1931, 1938
15.	USA: United States, Coast and Geodetic Survey.	1931, 1938-40, 1949, 1953-69
16.	Gut: Gutenberg	1934
17.	OMO: Omori	1935
18.	REC: Revue pour l'etude des Galamites.	1946-65
19.	BCI: Bureau Central International de Seismologic	1952-64
20.	MoS: Moskva	1953-64
21.	Que: Quetta	1956-63
22.	SHI: Shillong	1956-62
23.	SHR: Shiraz	1957-64
24.	SRK: Shirokova	1957
25.	HAG: Hagiwara	1958
26.	FS: Fisher	1960
27.	Teh: Tehran	1961-63
28.	AFS: Afshar	1962
29.	Z4: Fizika Zemli	1964
30.	Z5: Fizika Zemli	1965

CHAPTER II

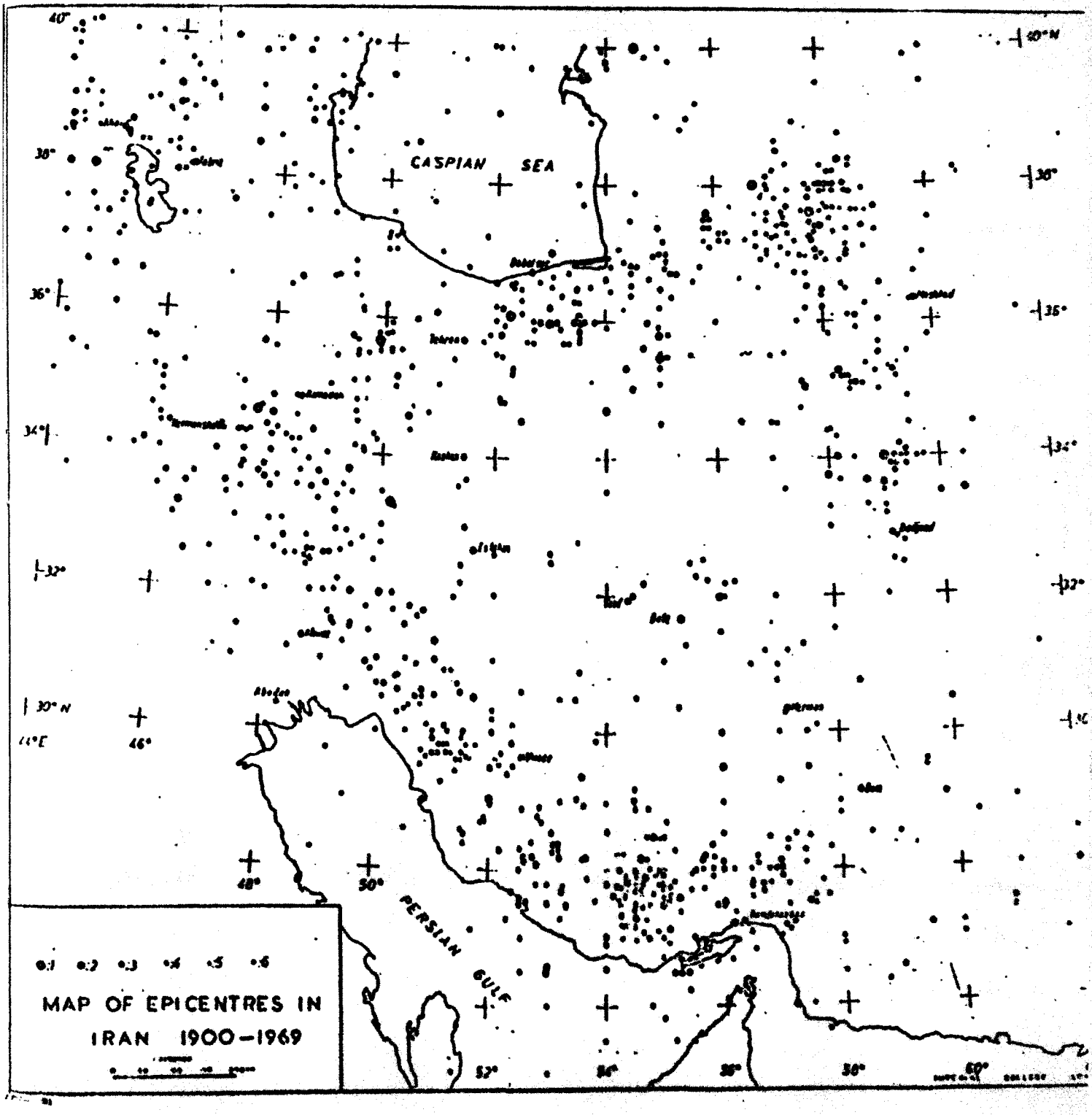
ANALYSIS OF DATA

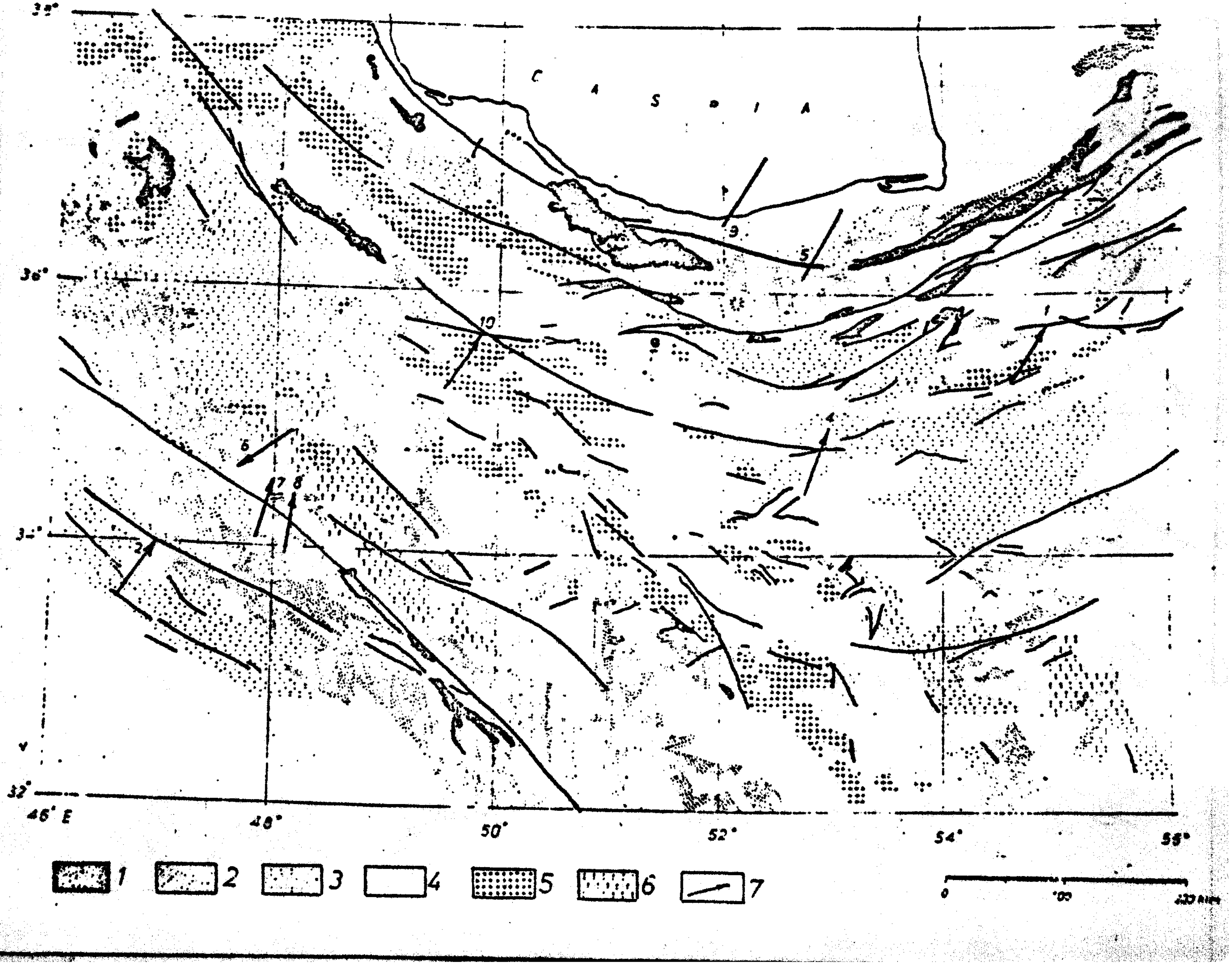
The data gathered for this report has been used to construct a map of epicenter for Iran (Fig. 3). This map is based exclusively on instrumental data which is available at the Engineering Seismology Section of Imperial College. Data has also been gathered from different sources such as ISS, BCIS, USGGS, USSR stations, as well as from other sources. For each earthquake the date, time, coordinate of the epicentre, magnitude, focal depth and sources of information have been recorded on IBM Cards, a print out of which is shown in Appendix I. Epicenters have been generally recorded to the nearest hundredth of degree latitude and longitude but this does not reflect a corresponding accuracy. The origin time is given in GMT in hours, minutes and seconds. There are many earthquakes for which different epicenters are given by different seismic networks. The epicenter used in this map has been designated by a serial number, while alternative epicenters are recorded by the same serial number but with an additional letter such as A, B, C, etc. showing the quality of the determinants. The magnitude used is the average of the magnitudes available for the same event. There is a discrepancy in focal depth determination between stations, and therefore all the available focal depths have been

critically. Existing data has been influenced by past and peresent culture. In certain regions where there is a number of good stations nearby and effective news media, minor shocks can be recorded, whereas this is not the case in a desert area. Availability of information depends on population, density of stations and newspapers; a region that has these factors has adequate information coverage.

4. DISTRIBUTION OF SEISMIC ACTIVITY AND CORRELATION BETWEEN ACTIVITY AND TECTONICS FOR THE PERIOD 1900-1969.

A glance at the location of epicentres on the map (Fig. 3) shows that most of the activity for the period of 1900- 1969 is spread through northern and western parts of Iran. There are two main distinct bands, one starting from the north-east and extending towards the north-west along the Elburz mountain and the Caspian Sea coasts. The second band starts from the north-west and extends towards the western and southern parts of Iran along the Zagros range. These two bands of seismic activity align with pre-existing faults, or with branches of these faults. Due to the fact that the northern epicentres are very close to numerous U. S. S. R. seismic stations and the western epicentres are close to European stations, and also because both these areas of concentrated activity are densely populated, we have a good collection of information. The rest of the country, especially the central parts of Iran, being sparsely populated and isolated from the rest of the country by Kavir, we don't have adquate information for it.


CASPIAN SEA
PERSIAN GULF
MAP OF EPICENTRES IN
IRAN 1900–1969



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4) Quaternary alluvial deposit.

5) Ignoous rocks of different periods.

6) Pre-Devonian Palezoic sehists and marbles.

7) Axis of compression calculated from fault-plane solutions.

All the material related to geology of Iran has been adopted from references Nos. 9, 10, 28, 34 and 68.

2. COMPILATION OF INFORMATION

The collection of information of damage is not very accurate, since the population in Iran is not uniformly distributed. The existing information up to the 1900 is mostly based on historical data and due to sparse population in some regions it is impossible to collect uniform information. There is some information to be found between the years 1900 to 1930 through newspapers and recording stations that existed at that time. From 1930 to the present, the improvement of technology, the increase in the number of seismic stations and the advancement of newspaper and news media results in more reliable and uniform information.

3. ASSESSMENT OF HOMOGENEITY OF DATA

The available information is not homogenous and it must be considered

end of Palaozoic time is subjected to a different upheaval.

3. Geoanticlinal zone of the beginning of Alpine cycle which in Palocene underwent a general upheaval; in the north it suffered a relative subsidence.

4. Geoanticlinal zone of the beginning of Alpine cycle. Since Palocene undergoes a slight differential sagging (for central Iran).

4. Geoanticlinal zone of first half cycle. Second half undergoes depression In Palocene sharp sagging. . In Niocene-Quarternary, depression and upheavals (North of Elburz and Caspian Sea Coasts).

5. Tectonic thrust computed from fault plane.

a- epicentre

b- Dip of fault plane in degree

c- Compression

d- Dip of compression in degree

e- Strike of fault plane

A reference to (Fig. 2) shows the geology of different regions. The explanation of figures are as follows:

1) Devonian and Pre-Triassic rocks.

2) Cretaceous and Jurrassic limestone.

3) Mio-Pliocene conglomerated sandstone.

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heavy rain and snow, and not being repaired properly in the past, and are now exceedingly weak. Distribution of the damage in different localities is due to facts such as proximity to the epicentre, poor construction and workmanship and the absence of building regulation. There are many factors involved in designing in earthquake regions; the design of all important sturctures should, therefore, include earthquake forces.

Since specific prediction of the time and magnitude of future earthquakes is at the present time impossible, the past seismic history of Iran is of great importance to the designer.

1. LOCATION AND GENERAL GEOLOGY OF IRAN

Iran comprises the region between 25°-40° latitude (N) and 43°- 62° longitude (E). To the north is the Caspian Sea and U. S. S. R., to the east is Afghanistan and Pakistan, to the south is the Gulf of Oman and Persian Gulf, and to the west is Saudi Arabia, Iraq and Turkey.

In the north are the Elburz mountains and in the south-west is the zagros range, at the centre is the depression of Dasht-Kavir and in the west is Dasht-Lut. The Alpide belt that passes through Asia becomes

wider in Iran. The country can be divied geologically into three parts, the Elburz mountains which run east-west direction in the north, the Zagros range in the south-west and the Mobil zone which is an intensely folded mountain country at the centre. Most of Iran, including central Iran, went through all types of a fully developed Alpine-type orogency and tectonization during Mesozoic and Tertiary time in spite of the prevailing character in preorogenic time. A typical geosynclinal development is recognized in the zagros range and east Iranian ranges. In central Iran geosynclinal deposition took place in late Mesozoic time. A reference to (Fig. 1) will show the following characteristics:

1. Geoanticlinal zone of the first half of the Alpine cycle in upper Jurassic and lower Jurassic upheavals are born. The growth of a general upheaval took place in the second half of the cycle. In lower Cretaceous upheaval begins and an interruption in the folded accumulation which ceases with the Semonian transgression. At the end of Cretaceous, the Elburz mountains emerge and later on deposits accumulated only on the periphery of the upheaval.

2. Geoanticlinal zones since the beginning of the Alpine cycle. At the end of Cretaceous this zone is involved in intense sagging. From the

INTRODUCTION

There is very little printed material on the seismicity of Iran, and the seismic history of the region is not very well known. The population in Iran is not spread uniformly thoughout the country and for some regions it is difficult to collect information about past earthquakes. There is very little published information to suggest that any known earthquake prior to 1900 was as large as any of the shocks recorded after 1900. From the period of 1900.to the present, however, we have more information, but this is scattered in the literature.

The purpose of this report is to collect the available seismic information for the period after 1900 and to construct for the whole country a map of instrumental epicenters. Also, to associate the generalised tectonic map of Iran with this map and to identify critical areas where earthquakes have caused great damage and may cause in the future again. Earthquake history, however, does not always suffice to describe the seismic potential of a region, but it may indicate regions which are of low seismic periodicity, and for which seismo-tectonic studies may prove them to be of laten activity.

CHAPTER I

STATEMENTS OF THE PROBLEM

A strong earthquake always leaves behind many collapsed buildings and causes belated structural damage. This damage may not show up immediately; but it weakens the structure and a future earthquake may cause additional damage or collapse. Poor construction in a seismic area can be fatal. In many cases structures withstood the first shock but became progressively damaged by the earthquakes that followed. The cumulative effect of these earthquakes is considerable and difficult to repair.

Iran is a country which is frequently effected by earthquakes, and certain regions in the country are shaken more often than others. This can be shown to be true by gathering of data from past earthquakes. The houses in the rural communities in Iran are built close together in clusters, as this was the traditional pattern of village development which is best suited to the communities during uneasy years. With very few exceptions, all the houses in villages in Iran are one storey adobe brick or mud dome with a mud wall and very heavy roof constructions. Most houses are very old and have suffered considerable damage in the past through earthquakes,

ACKNOWLEDGEMENTS

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TABLE OF CONTENTS

THE SEISMICITY OF IRAN

(1900-1969)

Submitted to the
Imperial College of Science
and
Technology of University of London

in partial fulfilment for the D. I. C.

by

M. Banisadr, B. Sc. (Civil Eng.)

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