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Palavras do Editor

Neste número, nosso boletim continua homenageando grandes nomes da estatística brasileira que certamente contribuíram para a construção da comunidade bayesiana em nosso país. Dessa forma, foi com grande prazer que convidamos o professor Carlos Alberto Dantas ou Caio, como a maioria o conhece, para nos contar um pouco sobre a história de construção e consolidação do departamento de Estatística do Instituto de Matemática e Estatística (IME) da USP. De lá saíram, e continuam saindo, diversos estatísticos cuja pesquisa em inferência bayesiana é referência para nossa comunidade.

Aproveito também para agradecer ao professor Caio e ao seu entrevistador, o professor Carlos Alberto de Bragança Pereira, atual chefe do departamento de Estatística do IME, por nos concederem uma valiosa cópia do relatório redigido por Jerzy Neyman por ocasião de sua visita ao Brasil, em 1961. Nele estão as propostas para a construção do departamento de Estatística e que nortearam o trabalho do professor Caio e de outros que cooperaram para a formação do departamento. É com grande satisfação que oferecemos, como anexo a este boletim, o histórico relatório na íntegra, dada a importância científica do mesmo.

Trazemos ainda relatos de importantes eventos internacionais de nossa comunidade ocorridos no exterior (IX ISBA) e no Brasil (II Bayesianismo). Também anunciamos eventos a ocorrerem nos próximos meses.

Desde já agradecemos pela colaboração e mais uma vez convidamos todos os que desejarem criticar, sugerir ou ajudar a entrarem em contato com este editor.

Boa leitura!

Índice

Entrevista do Professor Carlos Alberto Barbosa Dantas (Caio)

Por Carlos A. B. Pereira

Foi com muita satisfação que recebi do editor do Boletim da ISBrA a incumbência de entrevistar um líder da estatística brasileira: Carlos Alberto Barbosa Dantas, o Caio para os amigos e para a comunidade acadêmica em geral. O Caio nasceu no dia 23 do mês de maio de 1936, em Nuporanga, Estado de São Paulo. Mudou-se para Campinas com dois anos de idade e para São Paulo, capital, em 1950. Veio viver, com sua família, em uma vila do folclórico bairro da Bela Vista, perto da já promissora Avenida Paulista. Cursou a graduação em Física na prestigiosa Faculdade de Filosofia, Ciências e Letras (FFCL)

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da Universidade de São Paulo (USP) entre 1954 a 1959. Recebeu seus títulos de mestrado e doutorado pela Universidade da Califórnia, em Berkeley. Foi professor do científico em escola de prestígio de São Paulo. Deu aulas no Cursinho do Grêmio da FFCL, do qual foi seu diretor por dois anos. No meu entender, Caio foi o mentor da filosofia que norteou a formação do que conhecemos hoje como Departamento de Estatística (MAE) do IME-USP. Difícil seria nos anos sessenta existir no Brasil um instituto com a palavra "estatística" em sua denominação. Notem que computação era área já prestigiada da matemática aplicada e nem este importante nome fez parte da denominação de nosso instituto. Éramos na época considerados matemáticos de segunda categoria. Nesta entrevista, tento tirar do Caio as histórias que ele vivenciou e que nos contam como chegamos ao departamento de excelência que temos hoje.

O prestígio do Caio dentro da academia foi tamanho que, além de passar pelas diversas funções da administração do IME, chefia do departamento de Estatística, Comissão de Graduação (CG), Comissão de Pós Graduação (CPG) e direção do IME, foi Pró-Reitor de graduação e candidato a reitor da USP. Para se ter uma idéia desse prestígio do Caio dentro da academia, o professor Antônio Cândido, mesmo com idade avançada, fez questão de participar da homenagem que fizemos para o Caio na época da compulsória, aos setenta anos. Antônio Cândido é considerado uma dos mais importantes intelectuais brasileiros.

Caio organizou o quarto SINAPE em 1982 e naquele ano tivemos um contingente considerável de participantes. Se não estou enganado, foram mais de 900 participantes: enchíamos o anfiteatro da Faculdade de Arquitetura e Urbanismo (FAU) da USP. Vamos então para nossa conversa sobre um pouco da história da formação da estatística brasileira.

Carlinhos - Caio, é uma satisfação estar aqui conversando com você. Afinal você é pernambucano, campineiro ou paulistano? Fale-nos um pouco de sua vida pré-universitária. Às vezes penso ser você pernambucano. Tive certeza por algum tempo que era campineiro e às vezes você parece mesmo um paulistano.

Caio - Carlinhos, a satisfação é toda minha, pois esta entrevista me alegra por poder relembrar boa parte da trajetória que percorremos juntos e da qual tenho gratas lembranças. Sou paulista, nascido mesmo em Nuporanga, Estado de São Paulo.

Carlinhos - Conte-nos um pouco de sua juventude e de suas escolhas profissionais. Quando e onde você proferiu suas primeiras aulas?

Caio - Desde criança gostava muito de matemática. Foi graças à nota de matemática que entrei no ginásio, pois não gostava muito de português. O leitor irá pasmar-se com o fato de, naquela época, haver um pequeno vestibular para entrar no curso ginasial das excelentes escolas públicas. Entrei na Escola Normal Carlos Gomes de Campinas. Nós, eu e minha família, nos transferimos para São Paulo em 1950. De 1951 a 1953 cursei o colegial no Ginásio Estadual Antonio Firmino de Proença, no bairro da Mooca. Dei aulas de matemática para ter um dinheirinho enquanto cursava o colegial. Minhas primeiras aulas para uma classe regular foram de matemática e física no Cursinho do Grêmio da FFCL da USP.

Carlinhos - Qual a atividade de seus pais? Você veio de uma família mais abastada ou de classe média?

Caio - Minha família era de classe média, apesar de meu pai, Dr. Fiel de Menezes Dantas, médico formado pela Faculdade de Medicina da Praia Vermelha no Rio de Janeiro, ser filho de usineiros em Sergipe. Formado, voltou para Sergipe, mas entendeu que não havia boas condições de exercer a medicina naquela localidade. Transferiu-se para São Paulo e foi clinicar em Nuporanga, onde se casou com Maria Aparecida Barbosa Dantas, minha mãe. Ela foi professora normalista e posteriormente fez pedagogia na FFCL, tornando-se diretora de ginásio. Tenho três irmãs, Maria Regina Barbosa Dantas, formada em Biblioteconomia na FFCL e viúva do saudoso colega e amigo Flavio Wagner Rodrigues, Maria Lucia e Maria Stela Barbosa Dantas ambas médicas. Meu pai, apesar de udenista, tinha um profundo senso de respeito pelo ser humano. Não fazia qualquer discriminação, entre ricos e pobres no exercício da medicina. Como consequência desta filosofia, preferiu ser um médico de instituições públicas. Daí nossa vida de classe média: pai médico assalariado e mãe professora.

Carlinhos - Será que a formação médica de seu pai influenciou sua escolha futura para a Faculdade de Saúde Pública (FSP-USP)?

Caio - Eu posso afirmar que não. Creio que o destino foi o responsável por esta oportunidade que segurei com muita satisfação. Como já disse acima, minha vocação foi nas áreas de exatas: especificamente a matemática, física e a química me atraíam desde o ginásio. O professor de química no científico era licenciado pela FFCL e foi dele que ouvi as primeiras menções a esta instituição. Na indecisão entre física e matemática acabei optando por física, pois achava que tinha um campo mais amplo de possibilidades de trabalho e, segundo explicações que recebi, os dois cursos tinham grande parte em comum.

Carlinhos - Pode nos falar agora sobre a época em que esteve cursando Física na FFCL? O que mais influenciou você para a sua participação intensa na política universitária USPIANA? Sinta-se à vontade para matar a saudade daqueles ricos anos de luta!

Caio - A entrada na FFCL foi algo que transformou minha vida. Encontrei nessa Faculdade um ambiente totalmente inesperado e demorou pouco tempo para integrar-me. Existiam grupos políticos de várias tendências: Juventude Universitária Católica, União da Juventude Comunista, socialistas, trotskistas e grupos não articulados de direita que não eram tão vocais. Passei a integrar um grupo composto por socialistas e trotskistas. Nossa chapa venceu as eleições para a diretoria do grêmio da FFCL em 1956; fui eleito secretário geral. Nesse mesmo ano participei de um congresso de faculdades de filosofia em Aracaju com a finalidade de coordenar a oposição na UNE junto aos centros acadêmicos de Recife, Salvador e Aracaju. A chapa que apoiamos venceu com um carioca para presidente, quebrando uma hegemonia da direita na UNE. Fato interessante é que em Recife o contato a procurar era um assessor do prefeito Pelópidas Silveira chamado Enildo Galvão Pessoa. Na casa de Enildo conheci seu irmão mais jovem, nosso querido colega e amigo Djalma Galvão Carneiro Pessoa, que finalizava o colegial.

O Grêmio, um verdadeiro porão na Maria Antonia 258, possuía não só uma grande efervescência política, mas também acomodava um forte ambiente cultural e acadêmico. Era frequentado pelos alunos e por grande parte da comunidade da Faculdade, incluindo professores como o algebrista L. H. Jacy Monteiro e o astrônomo Abrahão de Moraes. Eram exímios jogadores de xadrez. Com estes mestres eu conversava sobre xadrez e temas de matemática e física. Lembro-me do saudoso colega e grande amigo Roberto Malet, aluno de matemática, que me introduziu nas leituras de Poincaré e Bertrand Russell.

Nas disciplinas de licenciatura em física e matemática, as aulas de Análise Matemática de Omar Catunda, Carlos B. de Lyra e Elza Gomide estimularam meu interesse pela matemática, bem como as aulas de Álgebra Linear de Candido Lima S. Dias e Jacy Monteiro. Na física tive excelentes professores como Mário Schemberg, Abrahão de Moraes e José Goldemberg, para citar alguns. Tivemos também professores alemães e japoneses, uns radicados no Brasil e outros visitantes.

Carlinhos - Como se deu seu primeiro contato com o mundo da estatística?

Caio - No último ano da física cursei, como optativa, a disciplina de Geometria Diferencial com o professor Alexandre Martins Rodrigues. Ao final do ano ele me disse que um amigo da Faculdade de Medicina, professor Michel Rabinovitch, pediu que ele indicasse um aluno de último ano, com boa formação matemática, para ser assistente da professora Elza Berquó na cadeira de Bioestatística da Faculdade de Higiene e Saúde Pública. Esta indicação do Alexandre proporcionou-me o início de uma segunda etapa fundamental de minha vida. Elza explicou-me que desejava criar um grupo forte em metodologia e teoria estatística para dar apoio ao pessoal das aplicações da estatística; em especial aquelas da área de saúde. Disse-lhe então que teria enorme prazer em aceitar aquele desafio. Entretanto, afirmei que não via condições de adquirir a formação necessária no Brasil; Elza também pensava assim. Disse que procuraria encontrar condições para que eu pudesse ir estudar nos Estados Unidos.

Em junho de 1960 fui nomeado primeiro assistente da Elza. Iniciei então um seminário com médicos sob direção da Elza; fazíamos a leitura do livro do Dixon e Massey. Foi de fato meu primeiro contato com a estatística. Ao mesmo tempo, como minha primeira atividade docente na USP, eu escolhi uma lista de Tópicos de Cálculo para apresentar aos médicos que frequentavam o nosso convívio, seguindo um dos livros de Bento Jesus Caraça.

Carlinhos - Como você e a Elza escolheram Berkeley para seu doutorado?

Caio - Em março de 1961 Jerzy Neyman veio a São Paulo convidado pelo Reitor Antonio Barros de Ulhôa Cintra em viagem financiada pela Fundação Ford. O objetivo era estudar a possibilidade da criação de um Instituto de Estatística na USP. Neyman entrevistou quase todos os professores de estatística da USP. Elaborou então um relatório que foi entregue ao Reitor. Neste relatório apresentou a fundamentação necessária para a criação do Instituto e elaborou em detalhes uma proposta para seu funcionamento. Entreguei uma cópia deste relatório para se possível adicionar a esta nossa entrevista; gostaria que todos lessem esse importante documento que foi, em minha opinião, indispensável para poder traçarmos o caminho que seguimos.

Foi Neyman quem nos sugeriu as universidades onde eu deveria obter o título de PhD: Stanford ou Berkeley. Acabei optando por Berkeley e a Elza conseguiu uma bolsa de estudos da Organização Mundial de Saúde (OMS) com duração de um ano.

Carlinhos - Você já era casado naquela época?

Caio - Casei-me com a Benê, que estava no último ano do curso de direito no Largo de São Francisco, em maio de 1960. Luis, nosso primeiro filho, nasceu em janeiro de 1961. Parti só para os Estados Unidos em junho daquele ano, pois tinha que me apresentar em Washington na Organização Panamericana de Saúde. Benê e Luis me encontraram em Berkeley somente em agosto devido a problemas de saúde na família.

Carlinhos - Encontrei muitos contemporâneos seus ao longo de minhas andanças, os Doutores Bickel, Doksum, Sen e Jogdeo, por exemplo. Creio que o Pedro Fernandez e o Djalma também estiveram por lá na sua época. Fale algo sobre o ambiente de Berkeley durante seu doutorado.

Caio - Cheguei a Berkeley com uma formação muito limitada em estatística. Além de tópicos estudados no Dickson-Massey, havia estudado alguns capítulos da parte introdutória do Cramér, o livro de estatística mais importante da época, e cursado uma disciplina de Teoria da Medida com o professor Edson Farah do Departamento de Matemática da FFCL. Ao ser entrevistado por LeCam ele me apresentou duas questões: lembro-me que em uma delas pediu que eu calculasse a integral de Lebesgue da função que escreveu na lousa. Disse-lhe então que bastava calcular a integral de Riemann devido a ser uma função contínua. A outra já não lembro, mas era do mesmo gênero. Ao final de nossa conversa disse para me inscrever nas disciplinas básicas do programa de doutoramento: Probabilidade Avançada e Estatística Avançada nos dois semestres seguintes. As disciplinas de estatística foram lecionadas pelo excelente professor Erich Lehmann. Devido à minha fraca formação, passei por dificuldades, mas estudei com colegas com melhor preparo, principalmente indianos; consegui assim sair-me bem ao final.

Embora a OMS não tivesse interesse em programas de longo prazo, concedeu-me uma extensão da bolsa por mais 10 meses. Falei com o professor LeCam que me informou que eu poderia pleitear, o que fiz e obtive, um teaching-research assistantship. O valor deste auxílio era inferior ao da bolsa do CNPq. Desta forma, apliquei para o auxílio para uma complementação ao valor da bolsa, o que permitiu que tivesse recursos para continuar no programa de doutorado. No semestre seguinte fui indicado para trabalhar como TA do renomado professor David Blackwell. Ministrava a disciplina Estatística Básica utilizando as notas que estava escrevendo. Estas notas se transformaram em seu livro *Basic Statistics*. Tivemos várias conversas sobre o texto quando reportava a ele periodicamente a maneira como eu conduzia minhas aulas de exercícios. Lembro-me com grande satisfação que você e o Wagner fizeram a tradução deste livro. Soube que ainda hoje você o usa em seus cursos.

O Bickel e o Doksum foram meus colegas de turma e Jodgeo já estava um pouco mais adiantado quando cheguei. Sen foi um dos visitantes com quem partilhei um *office*. Os amigos Djalma, Pedro Fernandez e o saudoso Norberto Dachs, só chegaram mais tarde e foram de fato contemporâneos do Morettin.

Em março de 1962 nasceu a Sylvia, nossa segunda criança. Ela nasceu na linda cidade de Walnut Creek, vizinhanças de Berkeley. Sempre ocupado com as tarefas do doutorado e da universidade, eu raramente podia colaborar com as tarefas domésticas: a vida foi difícil para a Benê com dois filhos pequenos. Os três resistiram com bravura e me permitiram obter o título com sucesso. Fiz a qualificação em 1963 tendo recebido o título de mestre: Master in Science (MSc).

Carlinhos - Quem foi seu orientador de tese?

David Blackwell ou Lester Dubins?

Caio - David Blackwell e Lester Dubins ofereceram um seminário sobre programação dinâmica e jogos baseado nos artigos do Blackwell sobre programação dinâmica e no livro do Dubins *How to gamble if you must: inequalities for stochastic processes*. Tratavam em grande parte do mesmo tema mas enquanto Blackwell usava medidas enumeravelmente aditivas, Dubins usava medidas finitamente aditivas. Foram discussões muito ricas e nesse seminário surgiu um problema que viria a ser o tema de minha tese. Blackwell em uma das sessões mencionou que Donald Ornstein havia levantado a questão da existência de políticas ε-ótimas, nos casos de não existência de políticas ótimas. Tudo isto no contexto de programação dinâmica, no sentido de Blackwell. A solução deste problema foi minha tese de doutoramento, orientada por David Blackwell. Este resultado é mencionado na segunda edição do livro do Dubins.

Finalizando esta etapa destaco dois aspectos importantes do departamento de estatística de Berkeley e daquele momento da vida agitada da comunidade Berkeleyana. Com harmonia o departamento acomodava probabilistas importantes como Loève e Freedman e estatísticos de primeira linha como Neyman e Lehmann. Blackwell atuava nas duas áreas e LeCam era uma verdadeira enciclopédia, procurado por todo pós-doc que visitava o departamento. Notei que um possível fator de coesão era o Colóquio de Estatística, um seminário sobre os temas variados, na maioria das vezes apresentados por pesquisadores convidados. Grande parte dos professores e quase todos os alunos assistiam ao Colóquio. O outro aspecto diz respeito aos acontecimentos políticos dos EUA em geral e de Berkeley em particular. Além do assassinato do Kennedy e a crise dos mísseis com os soviéticos, recrudesceu o movimento dos diretos civis com Luther King, com os *Black Panthers* em Oakland e com vários outros líderes como Malcolm X. Tive a oportunidade de assistir ao vivo a um discurso de Malcolm X em Berkeley. Participei do *Vietnam Day Committee* que organizou os dias internacionais de protesto contra a guerra do Vietnã.

Carlinhos - Conte-nos agora sobre seu retorno ao Brasil. Que tipo de recepção aguardava o primeiro PhD em estatística brasileiro?

Caio - Terminei meu doutoramento em janeiro de 1966 e permaneci em Berkeley por mais um semestre como *Acting Assistant professor*. Voltei para o Brasil em julho de 1966. Encontrei o Departamento de Bioestatística, ainda chefiado pela Elza, completamente modificado. Elza elaborou um grande projeto de Dinâmica Populacional de caráter interdisciplinar onde participavam, entre outros, Paul Singer, economista, Ruy Laurenti, médico, Candido Procópio Ferreira, sociólogo, Maria Lucila Milanesi, epidemiologista e vários outros docentes de diversas especialidades. O foco e objetivos do departamento de outrora, quando parti para Berkeley, haviam mudado radicalmente. O acaso ou destino, quem sabe, mais uma vez veio ao meu encontro. O contrato do professor Edson Farah do Departamento de Matemática para reger a cadeira de Estatística Teórica no Departamento de Estatística da FFCL estava terminando. Os professores Cândido da Silva Dias, Carlos Benjamim de Lyra e Chaim Samuel Hönig do Departamento de Matemática propuseram ao diretor da FFCL meu nome para reger a cadeira de Estatística Teórica no departamento de Estatística. Fui nomeado regente dessa cadeira em junho de 1968 pelo professor Eurípedes Simões de Paula, diretor da FFCL.

Carlinhos - Quero lhe agradecer publicamente por se lembrar de mim, mesmo não tendo sido dos bons alunos do curso que você lecionou no IMPA no verão de 1968. Vim para São Paulo no verão de 1969, já formado, para atender ao seu convite e me tornar Auxiliar de Ensino da FFCL no departamento de Estatística. Mas vamos ao que interessa. Cheguei ao departamento com outros colegas, hoje renomados, que também estavam se acomodando: Galvão, Antônio, Josemar, Lisbeth e Josefa Lopes Troya, hoje no exterior. Por outro lado havia um grupo de professores que já pertencia ao departamento: Fava, Nagib, Severo, Álvaro, Clovis, Morettin, Bussab, Canton, Ary, Bernadete, Reny, entre outros. Creio que até o José Pastore foi nosso colega de departamento. Esse título de Regente de Cadeira era equivalente ao de Catedrático, um todo poderoso que se permitia montar ou modificar um departamento? Lembremos que um catedrático equivocado poderia, ao contrário, destruir um departamento.

Caio - Realmente o regente de cadeira tinha poder equivalente ao de um catedrático. Ressalto que este era um cargo temporário, enquanto o de um catedrático era vitalício. O

poder de um catedrático era muito grande e vínhamos lutando pela extinção da cátedra, o que ocorreu com os estatutos da reforma universitária. Paradoxalmente pude utilizar esse poder para implantar a política que queríamos adotar. Aquele relatório elaborado por Neyman em 1961 era profundo e abrangente. No entanto, a estrutura de poder da USP, regida pelos catedráticos, de certo modo dificultou nosso trabalho. Lembremos que tratávamos com muitas escolas que poderiam ceder algum professor que ensinava estatística. Viam algum risco na proposta apresentada por Neyman. Com a experiência e a formação adquiridas em Berkeley em adição aos diálogos com o próprio Neyman, Blackwell e LeCam, procurei seguir ao máximo as diretrizes de Neyman incluídas no relatório.

Com a reforma dos Estatutos da USP em andamento foi criado o Instituto de Matemática e Estatística (IME) com três departamentos: Estatística, Matemática e Matemática Aplicada. As disciplinas de Estatística das várias unidades da USP foram transferidas para o departamento de Estatística. Formou-se assim um departamento de grande porte e responsabilidades. Tornei-me regente da Cadeira de Estatística Teórica enquanto Lindo Fava regia a Cadeira de Estatística Aplicada. Ao tomar posse do novo cargo de regente de cadeira, ministrei Estatística Matemática no segundo semestre de 1968, a mesma disciplina que havia oferecido no IMPA no verão do mesmo ano. Você foi dessa turma juntamente com Basílio, seu irmão, e com outras personalidades de hoje como José Alexandre Scheinkman, Aloísio Araújo, Ruben Klein e Abel Klein. Foi uma turma excepcional com alguns dos alunos percorrendo carreiras brilhantes nas ciências matemáticas. Lembro-me que o convite a você decorreu da impressão que causou pela determinação e capacidade, além de achá-lo uma pessoa afável e aglutinadora. De fato convidei-o para ser docente e cursar o programa de mestrado que estávamos iniciando. Nesse mesmo período, do Josemar Rodrigues recebi carta pleiteando emprego. Josemar havia completado o programa de mestrado do Cienes, Chile. Josefa Lopes Troya mestre em matemática pelo IMPA também mostrou interesse em vir para o departamento. Contei com o apoio do professor Eurípedes Simões de Paula, diretor da Faculdade e do diretor dientífico da FAPESP, Dr. Alberto Carvalho da Silva, para fazer as três contratações. Seriam contratados em tempo parcial e teriam uma suplementação da FAPESP para o valor do contrato em tempo integral. Com a reforma dos estatutos sendo implantada conseguimos que Antonio Galves fosse contratado pela cadeira de estatística da FEA e que tanto ele como Jose Galvão Leite fossem transferidos para o departamento de Estatística do IME. Formamos então um departamento de grande porte ao juntarmos os novos docentes com aqueles que já atuavam em departamentos de estatística da USP.

Carlinhos - Como surgiu a idéia e a forma de iniciar um grupo de excelência em estatística e que resultou em um dos departamentos de mais prestígio da América Latina?

Caio - As iniciativas tomadas no segundo semestre de 68 e no verão daquele ano me auxiliaram a traçar as linhas básicas do projeto de criação de um novo (ou reformulado) departamento de Estatística. Nossos objetivos eram os seguintes: 1. criar um mestrado em estatística com ênfase em teoria e aplicações tanto na área de probabilidade como de estatística; 2. conseguir recursos para enviar nossos docentes para programas de doutorado no exterior; 3. contratar novos docentes com interesses diversos para que pudéssemos cobrir a maioria das áreas de estatística e probabilidade; e 4. estabelecer um programa de professores visitantes de curta e longa duração. Minha opinião, depois de minha passagem por Berkeley, era a de que para construirmos um departamento de excelência seria essencial que as duas grandes áreas, probabilidade e estatística, fossem fortes. O departamento que estava se formando era de fato de grande porte e só com a excelência conseguiríamos sobreviver com galhardia aos desafios que iriam se suceder.

Em 1969 convidei Jacques Neveu, que conhecera em Berkeley, para proferir um curso no departamento. Para esse curso Neveu escreveu as notas "Martingais em tempo discreto" publicadas pelo IME-USP. Neveu participou também, como palestrante, do Colóquio Brasileiro de Matemática de 1969 e ministrou um curso de cadeias de Markov no Recife por convite do Ruy Luiz Gomes. No departamento de estatística o curso de Neveu foi assistido por vários docentes entre os quais Antonio Galves, Galvão e Josemar. Julgo que essa visita foi essencial para que Galves optasse por probabilidade e fosse estudar com Neveu em Paris em 1972.

Ainda em 1969 recebemos o primeiro visi-

tante de longa duração, Fred Charles Leone da Universidade de Iowa. Harold Larson da *Postgraduate Naval School*, Monterey, Califórnia nos visitou em 1970 pelo período de um ano. Ambos ministraram várias disciplinas do mestrado e Larson co-orientou comigo sua dissertação de mestrado, a primeira do departamento. Se minha memória não estiver falha, Uppuluri de *Oak Ridge Labs* e Hans Fölmer da Universidade de Bonn nos visitaram por dois meses no ano de 1971. Norman Severo que visitava Campinas em 1972 ministrou dois cursos em 1972, um em cada semestre. Lembro que a aula de despedida de Norman foi dada por ele em português. Ele passava um ano em Campinas e nós nos aproveitamos dessa visita à UNICAMP.

Carlinhos - Caio estamos fazendo aqui uma viagem ao passado. Voltando um pouco aos velhos tempos lembro que viemos em grupo da ENCE para São Paulo. Em 1969 o Carvalho veio para Campinas e eu para São Paulo. Depois em 1970 vieram a Gabriela, Migon, Wagner e os saudosos Ronaldo e Maul: todos para Campinas. Todo o grupo juntamente comigo inscritos no nosso programa de mestrado da USP. Mais tarde, com o rompimento do pessoal de Campinas com a UNICAMP, o nosso departamento contratou Wagner, Ronaldo e Migon. Maul voltou para o Rio para lecionar na FGV, e Carvalho e Gabi foram para São Carlos. Enquanto Pedro, Clóvis, Bussab e Canton seguiram para o exterior, o grupo de São Paulo era jovem e com muito drive. Você consegue lembrar como foi a façanha de constituir um grupo tão jovem com um foco muito grande na excelência? Como foi a estrutura do mestrado e quantos alunos éramos?

Caio - Começarei pela última parte para ficar em ordem cronológica. O mestrado foi estruturado com duas opções: teoria e aplicações. Seu primeiro ano era composto pelas seguintes disciplinas: Probabilidade I e II e Estatística Matemática I e II. Para probabilidade usávamos o livro do Feller: a primeira parte eram os capítulos de probabilidade e a segunda os capítulos de processos estocásticos. Para Estatística Matemática usávamos o livro de Hogg e Craig e umas notas que escrevi sobre Estatística Matemática e que se tornaram uma publicação do VII Colóquio Brasileiro de Matemática. Estatística Matemática I concentrava-se nos capítulos de variáveis aleatórias com seus momentos e suas transformações. Estatística Matemática II concentrava-se nos capítulos de estatística: estimação pontual e intervalar e testes de hipótese. Naquele Colóquio dei o primeiro curso de Estatística Matemática. As disciplinas Teoria da Medida e Probabilidade Avançada eram exigidas para os alunos que haviam optado por estatística teórica. Os alunos de Estatística Aplicada cursavam análise de variância, modelos lineares e outras disciplinas dadas normalmente por um visitante. Leone lecionou Planejamento de Experimentos, Larson Teoria da Decisão e Uppuluri Processos Estocásticos em biologia. Norman Severo ensinou Teoria das Filas e Processos de Contagem. Nos primeiros anos lecionei as disciplinas de Probabilidade I e II, Teoria da Medida, Estatística Matemática I e II e Probabilidade Avançada. Depois da saída dos visitantes vocês passaram a ensinar aquelas disciplinas por eles lecionadas. Na primeira turma se inscreveram cerca de 40 alunos, incluindo todos vocês. O número de alunos aumentava a cada ano, pois um bom número dos docentes estava inscrito no mestrado. De alunos de fora tivemos cerca de 60 nos primeiros anos. O mestrado se consolidou rapidamente e com isto se formou um corpo docente em condições de criar um Bacharelado de Estatística de bom nível.

O núcleo desse grupo jovem que você mencionou, além dos cariocas Helio e Ronaldo que logo voltaram para o Rio, era formado por você, Galves, Galvão, Josemar, Pedro, Clovis, Bussab, Canton e Wagner. Mais tarde, a Lisbeth também participou do grupo. Todos eram bacharéis em matemática ou em estatística. Acho que a possibilidade aberta para aqueles jovens de irem fazer doutoramento no exterior foi um fator de estímulo que contribuiu para despertar esse *drive*. A meu ver, um fator de sucesso para a formação dos membros desse grupo, além das capacidades individuais, foi a diversidade das escolhas de programas no exterior. As seguintes renomadas universidades foram por nós escolhidas em comum acordo e levando-se em conta as respectivas especialidades: Berkeley, Wisconsin, Chapel Hill, *Florida State*, Cornell, *London School of Economics* e Paris. Cada um de vocês conseguiu formar o próprio grupo de pesquisa estruturando definitivamente o departamento. Nunca é demais lembrar que um departamento é basicamente o grupo de seus professores, o que dizem, o que produzem e a qualidade de seus alunos.

No contexto de nossa diversidade, não po-

deria deixar de mencionar que sendo eu um frequentista, decorrência de minha visão de mundo como físico, fui orientado por um brilhante bayesiano, David Blackwell. O destino quis que eu acabasse orientando meu primeiro mestrado justamente com um trabalho bayesiano tendo você como aluno. Não é necessário falar de seu trabalho e de sua liderança aqui neste fórum. Todos nós reconhecemos os efeitos de seu pioneirismo e observamos no decorrer do tempo o crescimento e a influência dos bayesianos na Estatística.

Com o mestrado já consolidado e com o curso de graduação funcionando a todo vapor demos início à construção do doutorado. No início o programa de doutorado era artesanal, sendo decidido caso a caso. Este programa sistematizou-se com o retorno de outros docentes, como Julio e Heleno, e com a consolidação dos grupos de pesquisa. Para minha satisfação formaram-se grupos fortes tanto em probabilidade como em estatística.

Carlinhos - Fale-nos um pouco de suas atividades de liderança. Quais foram as posições que você ocupou na universidade?

Caio - Em 1982 assumi a direção do IME. Os diretores que me precederam já haviam estabelecido bases sólidas para a organização do Instituto, de modo que julgo que minha tarefa foi essencialmente ajudar a consolidar e ampliar a projeção do IME no âmbito da USP. Um fato que julgo de extrema importância ocorreu na gestão do professor Candido L. Silva Dias. Foi a decisão de ter o IME uma Comissão de Pós-Graduação única para todos seus departamentos; representei o nosso departamento na CPG nos primeiros anos. Representei o IME junto ao CO (Conselho Universitário) onde defendia os interesses de nosso instituto e questões de interesse geral da USP.

Em 1994 fui membro da equipe do Reitor Flavio Fava de Moraes como Pró-Reitor de Graduação. Pude ali realizar alguns projetos que até hoje estão em vigor. Os principais foram os seguintes: 1. programa de recuperação de salas de aula; 2. recuperação modernizada de laboratórios didáticos com novos equipamentos; 3. programa de incentivo a produção de material didático; e 4. implementação de um sistema de avaliação de docentes por alunos. Nos anos de 2004 e 2005 presidi uma comissão designada pelo Reitor que elaborou um projeto de ensino à distância para a USP.

Carlinhos - Falamos das coisas boas e das nossas realizações. Conte-nos um pouco da parte negativa de nossa vida universitária.

Caio - Conquanto os anos de 1968 e 1969 tenham sido muito bons para a estatística, tivemos um recrudescimento da virulência da ditadura, que com o AI5 aposentou 23 eminentes professores da USP entre os quais o reitor em exercício Helio Lourenço de Oliveira, Mario Schemberg, Florestan Fernandes, Villa Nova Artigas entre outros, causando um dano irreparável à nossa universidade. Naquela ocasião, durante os conflitos entre USP e Mackenzie, a Congregação deslocou-se para o prédio da FFCL a fim de tomar providências para proteger nossos alunos. Posteriormente, o diretor designou uma Comissão para relatar os fatos, composta pelos professores Simão Matias (presidente), Antonio Cândido, Ruth Cardoso, Eunice Durham, Carlos B. de Lyra e eu. Fizemos o relato que foi entregue ao Diretor e posteriormente publicado pela FFCL.

Carlinhos - Lembre-nos de algumas personalidades que foram destaque na nossa comunidade acadêmica.

Caio - Tantos são os colegas que após passarem por nossos programas se tornaram ícones tanto na academia quanto na sociedade em geral: brasileira e internacional. Voltando um pouco à pergunta anterior, alguns de vossos colegas vieram para nosso departamento por serem obrigados a se ausentarem de suas origens. Alguns corriam sérios riscos de serem perseguidos. Desses, lembro-me do Roberto Claudio Frota Bezerra, seu colega na primeira turma em 1969, e mais recentemente, do Pablo Ferrari que passou por todos os nossos programas. Roberto, com sua participação na política universitária, além de se tornar reitor por dois mandatos, foi Presidente do Conselho Federal de Educação e do Conselho de Reitores das Universidades Brasileiras. O Pablo, com relação às ciências exatas, é hoje um dos nossos pesquisadores de mais prestígio no meio científico internacional. Evidentemente que, como vocês, eu sei dos inúmeros ex-alunos que são destaque em suas comunidades tanto no Brasil como em outros países. Certamente não teremos espaço para listar todas as conquistas de nossos ex-alunos e colegas. Fiquem certos que não me esqueço de nenhum de vocês, ex-alunos, que fizeram a excelência de nosso programa.

Carlinhos - Acho que iríamos ocupar muito mais espaço ainda se chamarmos por nossas

memórias. Infelizmente temos de terminar e abro aqui espaço para você fazer suas considerações finais. Sinta-se a vontade para falar do que achar importante para este relato histórico.

Caio - Carlinhos, empolgado com o desenrolar da entrevista, esqueci de mencionar que fui *Visiting Associate Professor/Visiting Fellow* no *Operational Research Departament* da *Cornell University* de agosto de 1973 a junho de 1975. Houve aí uma interrupção, pois em janeiro de 1975 fui *Visiting Research Fellow* no departamento de Estatística da Universidade de Bonn. Estive também como *Visiting Fellow* no *Institute for Learning Technologies* do *Teachers College* da Universidade de Columbia no segundo semestre de 2000.

Nessa nossa trajetória acadêmica, entendo que não teria eu conquistado esta agradável trajetória não fosse pela colaboração de pessoas para mim muito importantes. Benê, minha esposa, aceitou adiar a consolidação de sua carreira de advogada para me acompanhar. Mesmo considerando que tenha sido bem sucedida como procuradora, ela ficou afastada, por bom período, da formação de sua carreira profissional. Certa vez você me perguntou qual o caminho eu escolheria se pudesse voltar ao passado. Confirmei a você que gostaria de trilhar os mesmos caminhos percorridos. Embora a carreira universitária possa ter suas barreiras que parecem intransponíveis, o ambiente é algo que nos traz riqueza de valores. Note que embora possamos reclamar de algumas dificuldades ao longo do caminho, meus três filhos estão na academia. Mônica a mais jovem, nascida em 1972 em São Paulo, exerce o cargo de professora doutora de História no Instituto de Estudos Brasileiros da USP. Sylvia, nascida nos Estados Unidos, é professora doutora de Psicologia na UNIFESP, em Santos. Luis, o primogênito, embora tenha se formado em Administração na FEA-USP, fez mestrado na Columbia University e doutorado em Cinema na Escola de Comunicações e Artes da USP, onde hoje é professor. O ensino e a academia definitivamente fazem parte da vida de nossa família.

Finalmente, gostaria de lembrar que o nosso sucesso nos programas de estatística só foi possível com a colaboração que recebemos de colegas de outras instituições. Além de ministrarem disciplinas naqueles anos iniciais, os saudosos professores Euclydes Custódio de Lima e Norberto Dachs orientaram dissertações e teses de alguns de nossos brilhantes alunos. Nosso saudoso Flavio Wagner Rodrigues, meu cunhado, iniciou a colaboração quando ainda estava na Faculdade de Higiene com a Elza e logo se transferiu para o nosso departamento na Cidade Universitária. Pedro Fernandez e Djalma Galvão Carneiro Pessoa também ministraram e orientaram alunos naqueles primeiros anos do programa de mestrado. Djalma inclusive orientou comigo o doutorado do Josemar Rodrigues, alguns anos mais tarde. Creio que as teses do Josemar e do Galves, uma em estatística e outra em probabilidade, tenham sido as primeiras teses de doutorado do IME. Não poderia terminar sem mencionar a boa colaboração que recebemos do nosso Gauss Cordeiro: orientou e co-orientou alguns de nossos brilhantes professores e alunos em suas dissertações e teses.

Carlinhos, obrigado por essa oportunidade a qual considero uma homenagem que a ISBrA e o editor do boletim me concedem.

IX ISBA

Vera Lúcia D. Tomazella
(UFSCar)

O IX Encontro Mundial de Estatística Bayesiana (Valência 9) e o Encontro Mundial da *International Society for Bayesian Analysis* (ISBA) foram realizados no Gran Hotel Bali, na cidade de Benidorm, Espanha, no período de 3 a 8 de junho deste ano. O comitê de organização local, com a presidência do professor José Miguel Bernardo, da Universidade de Valência, e a participação entusiástica de seus membros, produziu um clima muito agradável para o desenvolvimento do encontro. Benidorm é uma das cidades do Levante Espanhol que é um dos destinos turísticos mais importantes do litoral mediterrâneo, tratando-se de uma localidade que é visitada todos os anos por milhões de europeus, que chegam atraídos pelo excelente clima ao longo do ano.

O programa científico incluiu 24 palestras de 30 minutos cada, cuja apresentação foi seguida por 10 minutos de discussão dos convidados, e algumas discussões da platéia. Para o ISBA 2010 foram apresentadas 40 palestras plenárias selecionadas num sistema cego pelo comitê científico, e cerca de 350 trabalhos apresentados em forma de pôster durante os cinco dias das sessões plenárias. Entre os palestrantes convi-

dados tivemos três brasileiros, sendo um deles baseado numa universidade brasileira. Já entre as palestras selecionadas para o ISBA 2010 tivemos Flavio Gonçalves, que está terminando seu doutoramento na Universidade de Warwick e foi aprovado recentemente num concurso para professor assistente da UFJF.

Também foram apresentados pelo ISBA 2010 três tutorias: *Introduction to Bayesian inference* por Sonia Petrone da *Universitá Bocconi* da Itália; *Some topics on Bayesian nonparametrics and mixture models* por Ramsés Mena da *Universidad Nacional Autonoma do México* e *A quick tour to the principles and approaches of decision theory* por Lurdes Inoue da *University of Washington*, EUA.

O encontro discutiu a aplicação da metodologia bayesiana a diferentes temas, mostrando uma nova tendência da Estatística Bayesiana na solução de problemas complexos. Palavras-chaves e lemas como *Think Globally, Act Locally*, *sparsity, regularization, Bayesian Nonparametrics*, e teoria da decisão eram frequentes nas apresentações de palestras e painéis.

O evento contou com a presença de 546 participantes de vários países do mundo e, em particular, com uma grande representatividade de pesquisadores brasileiros representantes de diferentes universidades, tais como UFSCar, UFRJ, UFMG, UNICAMP e USP além daqueles representando universidades da Europa e Estados Unidos.

A cerimônia de abertura do encontro ocorreu no dia 4 de junho, dando início às atividades que ocorriam pelas manhãs. As atividades do ISBA ocorriam pelas tardes e noites. No dia 6 de junho ocorreu o encontro do corpo Geral da ISBA com todos os membros convidados, onde foram discutidos os futuros encontros mundiais. Em 2012 será em Kyoto no Japão e, em 2014, em Cancún no México.

Na tarde do dia 8 de junho ocorreu a apresentação dos trabalhos finalistas do prêmio Savage, organizado pelo comitê da ISBA e, por fim, o banquete da noite seguido do tradicional Cabaré do encontro de Valência. Durante o jantar de gala foi feita a premiação dos ganhadores dos prêmios Savage, DeGroot, Lindley e Mitchel. Vale destacar que a brasileira Lurdes Inoue, professora da *University of Washington*, juntamente com Giovanni Parmigiani, foi agraciada com o prêmio DeGroot de 2010 pelo livro *Decision Theory – Principles and Approaches*.

Um aspecto importante do evento se deveu ao fato desta ter sido a última edição dos chamados encontros de Valência. Eles tiveram início em 1979 e em princípio eram realizados anualmente. Posteriormente passaram a ocorrer de quatro em quatro anos, totalizando nove encontros, todos tendo como organizador José Miguel Bernardo. Em razão de sua aposentaria, ele não organizará mais os encontros, também deixando todos os seus participantes com saudades. Durante a apresentação do cabaré, após o jantar de gala, foi feita uma homenagem a Bernardo, onde cada participante do encontro o presenteou com um chapéu típico do seu país de origem.

II Bayesianismo: Fundamentos e Aplicações

Marcio A. Diniz
(UFSCar)

Entre os dias 1º e 4 de setembro realizou-se em São Paulo, no Memorial da América Latina, o *II Bayesianismo: Fundamentos e Aplicações*. O evento contou com a participação de aproximadamente 70 pesquisadores de diversas áreas. Além de estatísticos, compareceram às diversas sessões do evento físicos, engenheiros e profissionais da área médica de instituições do Brasil, EUA e Inglaterra.

Dentre as universidades brasileiras, participaram pesquisadores da USP, UFRJ, UFSCar, UnB e UNICAMP. Do exterior vieram membros da *Universidade of Warwick*, *State University of New York* em Albany; *University of Chicago* em Illinois e *University of Washington*.

Os tutorias foram apresentados por Lourdes Inoue (Washington) e Ariel Caticha (SUNY-Albany). As apresentações orais foram proferidas por diversos pesquisadores do Brasil e exterior, com destaque para a última sessão, em que foi realizada homenagem ao professor Basílio de Bragança Pereira, por ocasião de seus 65 anos. Dela participaram seus colegas e amigos Marlos Viana, Helio Migon e Francisco Louzada-Neto, além de seu irmão Carlos de Bragança Pereira.

A sessão pôster contou com participação de diversos alunos de pós-graduação e proporcionou ampla interação entre as diversas áreas de pesquisa representadas. As aplicações da inferência bayesiana a essas diferentes áreas do conhecimento geraram resultados muito interessantes.

Para melhor sintetizar o clima da conferência, reproduzimos abaixo, anonimamente, algumas messagens recebidas pela comissão organizadora após o evento.

"Escrevo para parabenizá-los pelo sucesso do Bayesianismo II. Foram dias muito agradáveis, com apresentações de trabalhos muito interessantes e com boa participação também dos alunos. Foi bastante especial."

"Thank you very much for the opportunity to attend this meeting - it was a very interesting experience and a great learning opportunity."

"This is a note to thank you for inviting me to speak at such a stimulating workshop. The organisation was friendly and faultless. The talks were of a very high standard. But most of all the symbiosis at the interface of physics and statistics was extremely stimulating. This was definitely the highest quality conference I have attended this year. There seem to be many excellent students and young researchers of Statistics in Briazil! Congratulations and thanks again for inviting me."

"Please accept my congratulations for the fantastic Bayesian Workshop you organized in the beginning of September in SP: High quality invited talks - high quality meeting, therefore."

Eventos

- **XII Escola de Modelos de Regressão**, Fortaleza – CE, Brasil, 13 a 16 de março de 2011. (*http://www.emr12.ufc.br*)

  O objetivo maior da XII Escola de Modelos de Regressão é reunir a comunidade estatística brasileira para discutir e difundir novas idéias e técnicas na área de teoria, modelagem e aplicações de regressão. A Escola objetiva fomentar vários aspectos, mais especificamente: promover o encontro de professores, pesquisadores e profissionais; possibilitar o encontro de estudantes com professores de outras instituições de ensino e pesquisa e, também, com profissionais de estatística e áreas afins; apresentar e discutir inovações teóricas, metodológicas e tecnológicas; divulgar aplicações relevantes nas mais variadas áreas do conhecimento e realizar debates sobre a interação destas áreas do conhecimento e a sociedade.

  Conferencistas:

  Abel Rodríguez (*University of California*, Santa Cruz, EUA)

  Audrey Helen Mariz de Aquino Cysneiros (UFPE)

  Carlos Antonio Abanto Valle (UFRJ)

  Claudio José Struchiner (FIOCRUZ)

  Francisco Cribari (UFPE)

  Giovani Loiola da Silva (IST, Universidade Técnica de Lisboa, Portugal)

  Helio dos Santos Migon (UFRJ)

  Jean-Paul Fox (*Twente University*, Holanda)

  Manuel Galea-Rojas (*Pontificia Universidad Cátolica*, Chile)

  Marc G. Genton (*Texas A&M University*, EUA)

  Ramiro Ruiz-Cárdenas (UFMG)

  Reinaldo B. Arellano-Valle (*Pontificia Universidad Cátolica*, Chile)

  Victor Leiva (*Universidad de Valparaíso*, Chile)

- **Fifth Brazilian Conference on Statistical Modelling in Insurance and Finance**, Maresias – SP, Brasil, 10 a 15 de abril de 2011. (*http://www.ime.usp.br/bcsmif/5th/*)

  A quinta edição desta conferência tem como objetivo apresentar trabalhos que estejam na fronteira das aplicações de modelagem de dependência em ciências atuariais e finanças. Ela é aberta às comunidades acadêmica e não-acadêmica, recebendo, além de pesquisadores da academia, profissionais de bancos, consultorias, agências governamentais e companhias de seguro. Todas as palestras serão proferidas em inglês e mais informações podem ser encontradas no endereço eletrônico disponibilizado acima.

  Conferencistas e palestrantes convidados:

  Emiliano Valdez (*University of Connecticut*, EUA)

Hansjoerg Albrecher (*University of Lausanne*, Suíça)

José María Sarabia (*Universidad de Cantabria*, Espanha)

Narayanaswamy Balakrishnan (*McMaster University*, Canadá)

Antonio Sanhueza (*Universidad de La Frontera*, Chile)

Aristidis K. Nikoloulopoulos (*University of East Anglia*, Grã-Bretanha)

Dani Gamerman (UFRJ)

David Vyncke (*Universiteit Gent*, Bélgica)

Emily Fox (*Duke University*, EUA)

Harry Joe (*University of British Columbia*, Canadá)

Julio Stern (USP)

Kostas Zografos (*University of Ioannina*, Grécia)

Roger Nelsen (*Lewis & Clark College*, EUA)

Victor Leiva (*Universidad de Valparaíso*, Chile)

Yurii Suhov (*University of Cambridge*, Grã-Bretanha)

- **7^{th} International Symposium on Bioinformatics Research and Applications**, Central South University, China, 27 a 29 de maio de 2011. (*http://www.cs.gsu.edu/isbra11/*)

  Este simpósio -*International Symposium on Bioinformatics Research and Applications (ISBRA)*[1] - tem como objetivo promover um fórum entre pesquisadores e desenvolvedores de bioinformática e biologia computacional. Serão aceitos trabalhos em todas as áreas relacionadas a bioinformática e biologia computacional, inclusive sobre o desenvolvimento de sistemas experimentais ou comerciais. Mais informações podem ser encontradas no endereço eletrônico disponibilizado acima.

- **2011 International Workshop on Objective Bayesian Analysis**, Xangai, China, 11 a 15 de junho de 2011. (*http://www.sfs.ecnu.edu.cn/Obayes2011/*)

  Dando prosseguimento aos encontros sobre a metodologia bayesiana objetiva, esse encontro pretende facilitar a troca de conhecimento dos avanços recentes na área e estabelecer parcerias entre os pesquisadores que dedicarão esforços para problemas em aberto e novas direções para mais investigações. Mais informações podem ser encontradas no endereço eletrônico disponibilizado acima.

[1] Não confundir com a sigla de nossa sociedade.

Convidamos todos a se tornarem membros da ISBrA. O procedimento é simples, basta fazer o pagamento da anuidade da ISBA no sítio *http://www.bayesian.org* e depois enviar o comprovante de pagamento para *isbra@ime.usp.br*.

Apêndice: O Relatório Neyman - 1961

ORGANIZATIONAL OUTLINE OF THE PROPOSED INSTITUTE OF STATISTICS AT THE UNIVERSITY OF SÃO PAULO

By Jerzy Neyman

Professor of Statistics and Director of the
Statistical Laboratory of California, Berkeley,
California.

Jerzy Neyman

SUMMARY AND RECOMMENDATIONS

1 - The future Institute of Statistics at the University of São Paulo is visualized as a center of research and instruction in mathematical statistics designed to produce future professors and research workers in this subject. If organized on these lines, the Institute will be the first organization of its kind in Latin America.

2 - In order to be successful in the above role, the Institute should publish a journal of its own, given to papers on theories of probability, theory of statistics and significant applications. This journal should be published in international languages.

3 - The report contains a detailed plan of courses of lectures to be offered in the curriculum of future specialists in mathematical statistics. This plan extends over four years of undergraduate study and should lead to a bachelor's degree in statistics. Over the first two years the curriculum is dominated by courses in pure mathematics which suggests a link between the Institute of Statistics and the Department of Mathematics.

4 - Some of the statistical courses indicated in the plan can be tought by statisticians already available at the University of São Paulo and the report contains a few specific suggestions on these lines. It is hoped that the statisticians concerned will consent to assume this extra responsability.

5 - In order to supply fully qualified teachers of other courses, it is recommended to establish four professorships in the Institute. For this purpose, at least three young Brazilian scholars should be given the opportunity to study abroad. Three persons should be sent at the earliest possible convenience. One of them should specialize in mathematical theory of probability and the others in theory of statistics. The report contains more or less specific suggestions in this respect, visualizing that the specialization of one of the candidates in statistics would take two years and the specialization of two others, including the prospective probabilist, three years.

6 - In order to begin the functioning of the Institute without delay it is recommended to rely on teaching, by visitors from abroad. Taking into account the gradual development of the teaching program on the one hand, and the subsequent return to their duties of Brazilian scholars specialing abroad, the need for visiting professors appears as follows:

One visiting professor for the 1st year
Two visiting professors for the 2nd year
Two visiting professors for the 3rd year
One visiting professor for the 4th year

7 - Each visiting professor would be expected (i) to teach one undergraduate course specified in the program, (ii) offer an advanced seminar on the subject of his recent studies for interested young scholars in São Paulo and (iii) to write a 20-30 pages article, perhaps connected with the subject of the seminar, to be published in the Journal of the Institute.

8 - In order to insure successful development of the Institute of Statistics designed to meet the purposes described above, it is essential that it be a unit of the University entirely independent of all the existing units. In particular, it is recommended that the Institute not be considered as an extension either of the Department of Mathematics or of the Department of Statistics in the Faculty of Philosophy. The reason is that these two units have their own important

functions to perform, one being the training of mathematicians and the other the supplying of statistical training to future teachers of secondary schools and to future social workers. These functions are parallel to those of the future Institute of Statistics, but do not coincide with them.

9 - In order to maintain contact with the fields of application and in order to take part in the intellectual life of the State of São Paulo, the Institute should organize a discussing and consultative body, perhaps labeled the Statistical Research Council. This Council should include representatives of all significant statistical units of the University and of statistical research units outside of the University.

The purpose of the Council is to discuss and to organize delicate statistical studies requiring cooperation of the Institute and of some other research units, perhaps the State Department of Statistics, health authorities, etc. The results of such studies should be of interest to the general public and should be discussed in meetings open to the public and to the press. It is hoped that, eventually, the Statistical Research Council will become the vehicle for impartial studies of problems of general importance referred to it by the Government of the State.

TABLE OF CONTENTS

I - Appraisal of the current status of statistical research amd instruction at the University of São Paulo and of the existing needs.

In order to establish the present status of statistics at the University of São Paulo and the existing needs, two meetings were held at the Department of Statistics of the Faculty of Hygiene and Public Health. The first meeting took place on Tuesday, 14th of March and the other on Tuesday, 21st. of March. The following persons attended at leastone of these meetings: Prof. Milton da Silva Rodrigues, Chairman of the Department of Statistics at the School of Philosophy; Prof. Lindo Fava from the Department of Statistics at the School of Philosophy; Prof. Affonso de Toledo Piza, Professor of Statistics at the School of Statistics at the School of Economics; Prof. Luiz Bueno, Professor of Statistics at the School of Economics; Prof. Ruy Aguiar da Silva Leme, from the School of Engineering; Prof. Walter P. Leser from the School Paulista of Medicine, Federal University; Prof. Omar Catunda from the Department of Mathematics of the School of Philosophy; Dr. Constantino Fraga Junior, Chief of the Statistical Service at the Instituto Agronômico, Campinas, State of São Paulo; Dr. Adolfo Penha from the Instituto Biológico; São Paulo; Dr. Paulo Mello Freire from the Instituto Biológico, São Paulo. Subsequently the information obtained at these discussions was supplemented in conversations with Professors Ruy Aguiar da Silva Leme, Candido Lima da Silva Dias, Affonso de Toledo Piza and with Dr. Celeste de Andrade, the Director of the Department of Statistics of the State of São Paulo.

When the bulk of the present report has been already compiled, including the list of courses of instruction recommended for the proposed Institute of Statistics, the whole material was subjected to a thorough discussion in a whole day conference held on Thursday, Mardh 30. This conference was attended by Drs. Berquó, Fava, Fraga, Penha, Freitas Bueno, Leme and Rodrigues, all connected

with the University of São Paulo. In addition, there was an interested visitor from Belo Horizonte, M. G., Dr. J. M. Pompeu Memória. This conference was very useful to the present writer by indicating certain changes in the earlier part of the report and by suggesting certain organizational recommendations given at the end.

A brief summary of activities of the various statistical groups at the University of São Paulo is presented in Table 1.

Table 1

Main statistical units at the University of São Paulo and main points of their activities

Institution	Professors or equivalent	Emphasis
Agriculture		
1 -Institute	Constantino Fraga Jr.	Design of experiments (Animal and vegetal)
2 -School	Pimentel Gomes (*)	Design of experiments (Animal and vegetal)
3 -Sec.Zoothechny	Benjamin Cintra	
Biological Institute	Paulo Mello Freire [illegible] Penha A. Bitancourt Hermano Vaz Arruda	)Design of experiments in the domain of medicine)and veterinarian and plants pathology.)Bioassay)
Economics	Affonso Toledo Piza (*) Luiz de Freitas Bueno(*) Flávio Manzoli	Sampling, Demographic Statistics. Economic Statistics - Econometrics. Mechanical Processing, Treatment of Data, Game Theory
Engineering	Ruy Aguiar da Silva Leme(*)	Quality Control, Programing,Operating Research
Hygiene and Public Health	Elza S. Berquó (*)	Biostatistics I - Vital Statistics. Biostatistics II- Methodological (Descriptive Statistics,Testing of hypotheses,Estimation)
Medicine (Federal University)	Walter S.Pereira Leser(*)	Medical Statistics.
Medicine (Ribeirão Preto,Univ.of São Paulo)	Geraldo Garcia Duarte	Medical Statistics.Design of Experiments.
Philosophy (Instruction for students in psychology,educ.and social sciences)	Milton da Silva Rodrigues(*) Lindo Fava (*)	Descriptive Statistics,Inductive Statistics (elementary level) Post Graduate course in inductive Statistics Sampling (Post Graduate) Descriptive Statistics,Inductive Statistics.
Veterinary Medicine	Adolfo Ribeiro Neto(*)	Epidemiology and Statistics (Descriptive and Inductive).

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Table I indicates a considerable number of statistical groups at the University of São Paulo conducting very useful work. Some of these groups are attached to research institutions in which statistics is a necessary tool in daily work. Others are departments of instruction combined with the usual research activities. The common feature of all these groups is that statistical theory is treated not as an independent domain of study but rather as a tool in substantive research or as an element in the educational pattern of students specializing in some other domain like agricultural experimentation, economics, engineering etc. This enumeration includes the Department of Statistics in the Faculty of Philosophy, Arts and Sciences. The undergraduate statistical courses tought in this Department are parts of studies in Psychology, Education and Social Sciences designed to train future teachers in secondary schools and there is no university degree in statistics.

Other common feature of the existing statistical groups are a detachment from the theory of probability and a low mathematical background of the audiences. In this latter respect, the audience at the School of Engineering may be an exception.

The deficiency of training statisticians as such is understood by many groups and intense efforts are made to remedy the situation on the graduate and research level. Here the following should be mentioned.

(i) A course in probability is given sporadically in the Department of Mathematics.

(ii) A special two-year graduate course "Statistical Analysis", initiated some time ago by Dr. William G. Madow (a visitor from the United States), is being given at the Department of Statistics, Faculty of Philosophy.

(iii) A lively group of young assistants at the Department of Statistics, Faculty of Hygiene and Public Health is engaged in a seminar type of modern theories of probability and statistics. Because of the particular location of this group, the mathematical level of its activities is surprizing. This spirit of modern stu -

dies appears a heritage from the untimely deceased Professor Pedro Egydio de Oliveira Carvalho, whose active interest in the theory of statistics and whose extra curricular courses in this discipli - ne were attended by faculty members from a number of departments and left an idellible imprint on statistical developments at the University of São Paulo.

(iv) A modern approach to sampling surveys, with the theoretical results used by the State of São Paulo Department of Statistics, and the studies in econometrics and theory of games are being developed by the group in the Department of Economics.

(v) A long series of research papers, mainly substantive but involving theoretical developments in the theory of experimentation, maintain a steady flow from the agricultural and biological research institutions. Here, following the tradition established by the late Professor Wilfred Stevens and by visits of Dr. Frank Yates (both from England), the applied statisticians are trained on the job.

The plausible conclusion is that the main needs in statistics atthe University of São Paulo, the needs that the proposed Institute of Statistics might fill, lie in the organization of a systematic training of specialists in theory of statistics and probability and in the integration of the current, somewhat dispersed efforts in this direction, made at the various units of the University.

The following organizational outline of the proposed Institute of Statistics has been compiled with the idea that, when organized and developed, this Institute will become a center of research and instruction in Statistics per se, capable of providing the basic education of future professors of statistics. Thus, the emphasis in the recommended structure of the Institute and in its teaching program is on what is missing in the present system of instruction:a systematic study in theory of probability and theory of statistics, both with a substantial mathematical background .

Along with this emphasis on theory, a special machinery is recommended to insure a steady contact with applied research already conducted by the existing statistical units of the University and with the research of particular interest to the Government of the State of São Paulo.

In order to clarify the recommended organization of the Institute of Statistics, it may be useful to compare it with certain centers abroad.

(i) Columbia University has a Department of Mathematical Statistics producing outstanding Ph. D.'s in this subject and, in addition, a considerable number of units of statistical research and instruction where statistics plays a subsidiary role and where scholarly degrees are given not "in statistics" but in other subjects like genetics, astronomy, economics, etc. etc. Some of these units are quite prominent. One of them is the statistical unit in Teachers' College. It may be roughly compared with the present Department of Statistics in the Faculty of Philosophy in São Paulo. Another very prominent statistical unit at Columbia is in the School of Public Health which, through its Head, Professor John Fertig, exercises a broad intellectual influence, including São Paulo. The corresponding unit in São Paulo is the Department of Statistics at the Faculty of Hygiene and Public Health, where Professor Fertig is a frequent visitor.

The proposed Institute of Statistics at the University of São Paulo would be a unit corresponding to the Department of Statistics at Columbia.

(ii) The University of California, Berkeley - Here, in addition to statistical group in substantive domains, such as agriculture, farm economics, economics proper, bussiness administration, genetics, electrical engineering, industrial engineering, public health etc., there is a large Department of statistics which, alone, trains specialists in statistics and gives degrees in that subject. Some of the statistical groups in substantive units in Berkeley are

quite prominent. For example, it was a pleasure to find in the writings of some statisticians in São Paulo references to papers by Professor G. B. Dantzig, currently in the statistical group in the Department of Industrial Engineering in Berkeley. Incidentally Professor Dantzig obtained his Ph. D. degree in what is now the Department of Statistics in Berkeley.

The various statistical units at the University of São Paulo are comparable to the statistical group in substantive units at the University of California, Berkeley. The role of the proposed Institute of Statistics at São Paulo would be that of the Department of Statistics in Berkeley.

II - Purposes of the Institute of Statistics

1 - To serve as a center (as of now, unique in Latin America) of research and instruction in statistical theory and thereby to provide the opportunity in São Paulo for training research statisticians and future professors of statistics.

(Currently, those wishing to specialize in statistics have to go abroad).

2 - To cooperate with other units of the University and also with other research institutions, governmental or private, in the more delicate statistical studies they may be conducting.

3 - To serve as a forum for scientific contacts among statisticians active in the various units of the University and from outside of the University.

4 - To participate in the intellectual development of the State of São Paulo and in that of Brasil by fostering the statistical thinking and information of the general public.

III - Implementation

1 - In order to implement point (1) above, the Institute of Statistics should offer a four year course of undergraduate instruction in Probability Theory, Theory of Statistics, the appropriate mathematical prerequesites and in the principal fields of appli

cations, leading to a scholarly degree in statistics of the same kind as given by other comparable university units, such as the Department of Mathematics.

The undergraduate program will be followed by a post-graduate course of instruction leading to a Ph. D. degree in Statistics.

The details of the program of instruction, particularly those pertaining to mathematical preparation, have been arranged jointly with Professor Dias, the Chairman of the Department of Mathematics, who kindly promised the cooperation of his Department in the form of a readjustment of its teaching program so as to meet the needs of statistics.

The details are given in Section V.

2 -In order to implement the second point of the program, the Institute should organize a consultative group, perhaps to be called, Statistical Research Council, composed of representatives of various units of the University, governmental and private research institutions. This consultative group would meet at regular intervals, perhaps once or twice a year, for the purpose of discussion of current or intended statistical studies in which active participation of the Institute may be desirable. The nature of these studies will depend on local developments and interest and the following may serve as plausible examples:

(a) Local ecology of fish population and the regulation of fishiries promising the highest catch consistent with the maintenance of fish population.

(b) Factors influencing the health of the population, perhaps with reference to employment and social status.

(c) Factors influencing the income in farming, perhaps as a basis for some govermental action.

(d) The organization of sampling surveys.

3 -In order to implement the third point of the program the Institute should :

(i) Organize scientific meetings, perhaps four times a year, for the purpose of presentation and discussion of results of significant statistical research. These meetings might be modeled on quartely meetings of the Royal Statistical Society, with just one large paper presented and with extensive prepared dis - cussion.

(ii) The Institute should publish a journal, perhaps under the title "Estatística Teórica e Aplicada". Here again the most desirable scheme appears to be that of the Royal Statistical Society, whose two currently published journals ("General" and "Methodological") print (a) the papers presented at the Society's meetings, (b) complete texts of the discussion and (c) papers that may be submitted in addition to those presented at the meetings.

To begin with at least, the Journal of the Institute would combine theory and significant applied research.

While scientific meetings and the journal are mentioned in the present third point of the implementation plan, their im - portance is supreme. Without any risk of exaggeration, one might say that the possibility of publishing a proper journal, printed in the usual manner (not mimeographed or lithoprinted) is a con - dition sine qua non of the success of the whole Institute. Here are a few illustrative examples:

(a) The theoretical statistical research started in En- gland with the founding of the journal "Biometrika" , which esta- blished the famous Department of Statistics, University College, London, as the then world center of this discipline.

(b) The same thing happened with the great Scandinavian Statistical Center at Stockholm. The journal which was instrumental in this case is the "Skandinavisk Aktuarietidskrift" .

(c) The United States did not have theoretical statisti- cal research to speak of until the foundation of the "Annals of Mathematical Statistics" in about 1930.

(d) The present remarkable development of mathematical statistics in Japan is due to the founding of three journals.

(e) The Indian Statistical Institute owes its successful development and importance to the publication of the journal "Sankhya".

While in Latin America there are published several statistical journals, none of them is seriously given to theory and their status may be judged by the tendency of Latin American statisticians to publish their results abroad.

The success of the proposed journal will depend very much of several factors, such as a wise editorial policy and, to a considerable extent, on the language of published papers.

The wisdom of the editorial policy could be measured by a proper balance between purely theoretical papers and significant applied studies. Another criterion of editorial wisdom is a combination of liberalism in certain domains of research, where the output is low and needs to be encouraged, and of reasonable restrictiveness in other domains. Also, particularly at the early stages, the editor should take the initiative in seeking good papers by good authors.

As to the language, the predominant consideration seems to be that the journal should enter the international community of journals published elsewhere and be accessible to the statisticians all over the world. With this in mind, the present writer wishes to urge that the papers published in the journal be formulated either exclusively or, at least, predominantly in international languages, that is in English, French or German. It is realized that a rule of this kind will present difficulties, particularly with regard to papers presented at the scientific meetings of the Institute and their subsequent discussion which must be in Portuguese. However, these difficulties are perhaps not insuperable. One possibility is to use the junior personnel of the Institute to prepare translations.

In order to be able to specilize in theory of statistics, the assistants at the Institute will have to use international literature and, therefore, will have to learn the languages. Also, the work on the translations, undoubtelly conducted in cooperation with the authors, will introduce the assistants to the studies of the authors concerned and help in becoming trained statisticians.

In a number of countries, in order to stimulate research, the relevant journals offer honoraria to the authors.This has been (possibly still is) the case in Sweden, Germany, Russia, Poland, Japan and is still the policy of the Proceedings of the Berkeley Symposia. It would be most desirable to have a similar policy in the Institute of Statistics. This is particularly important because of the surprisingly small difference in salaries of productive professors and their assistants who, occasionally,are quite far from the starting point of scientific activity.

4 - In order to implement the last point of the plan, in addition to scientific meetings discussed above, the Institute should organize, perhaps twice a year, semiscientific meetings , open to the public and the press, concerned with applicational statistical studies conducted in cooperation with other institutions as described in point 2. The Statistical Research Council would be the authority for selecting the subjects of such meetings. They would include the presentation of the results of a given study made by the person chiefly responsible for it, a prepared discussion and discussion from the floor. Given a wise choice of subjects and just a little publicity in advance of a meeting of this kind, the whole project is likely to develop in to an important cultural institution influencing the public opinion.

In order to insure this role to the semiscientific meetings at the Institute, the wisdom of the choice of subject cannot be overemphasized and this must be taken into account in

deciding about the composition of the Statistical Research Council. In addition to the members elected by the various units of the University involved in statistical research, the Council should have several ex-officio members representing the State Department of Statistics, the Office of the Governor, perhaps health authorithies and the like.

The idea of the Statistical Research Council, of the cooperative research and of meetings with public debate, is modeled on the activities of certain institutions in Britain, including the Medical Research Council, the Royal Statistical Society and some others. The particular kind of activity that is visualized may be illustrated by the example of occasional complaints of employees that the working conditions in a given industry affect adversely their health. Such complaints may be justified or not and the authorities of the State may wish the problem to be investigated by an impartial group of scholars. The Statistical Research Council at the Institute of Statistics might be the institution to which the authorities of the State would refer the matter. The question whether a given set of conditions does or does not increase the sickness experience of the workers can be investigated in a cooperative study between medical specialists and statisticians. Indeed, as illustrated by the relevant British publications, the statistical aspects of the study are quite delicate and involve many pitfalls. When completed, a study of this kind might be presented at a meeting organised by the Statistical Research Council and subjected to a public debate. Undoubtelly, the contents of the study and the debate will find their way into the newspapers, thus establishing a desirable relationship between the Institute of Statistics and the general public.

It must be clear that in a rapidly developing region like the State of São Paulo, there must be a number of problems, not necessarily of health, involving statistical research on which the various agencies of the government would like to have

an impartial study. The proposed Statistical Research Council and the facilities of the Institute of the Institute of Statis - tics might become a regular machinery for conducting such re - search and for its public debate.

In addition to problems suggested by the Government, the Statistical Research Council will be in the position to ini- tiate studies on its own initiative. For example, the general public in São Paulo might welcome authoritative reports, and pu- blic discussion, on a controversial question like smoking and can cer or on some particularly successful results of operations re - search etc., etc.

The results of studies of the kind described are like ly to be too valuable not to appear in print. Originating from lo cal problems, they will be interesting to Brazilian public and must be published in Portuguese. One possible outlet is the "Re - vista Brasileira de Estatística" published by the Brazilian Ins - titute of Statistics and Geography. Another is the Journal of the Inter-American Statistical Institute. From time to time the papers of the kind discussed may be elegible, in whole or in part, for the publication in the Journal of the Institute.

IV - The Statistical Laboratory

Statistical work, no matter in what direction it might be conducted, always involves computations. For this reason, while a theorist in statistics need not do any numerical computa- tions himself, he is necessarily expected to be able to organize computations to be performed by others. The ability to do so may be acquired only by the inclusion in the program of training of a reasonable dose of numerical work. This requires a certain amount of computational equipment in the form of desk computers and of a set of numerical tables. Also, the training in computations requi res that certain courses of lectures be accompanied by laboratory work involving the use of desk computers.

Quite apart from training of future statisticians, computational facilities will be needed in connection with the research work of the members of the Institute of Statistics. The perusal of the current statistical literature will show that, almost invariably, the development of a new test of a statistical hypothesis or of a method of estimation is accompanied by some numerical table facilitating the practical use of the new theoretical result. Usually, the original publication includes a relatively small table of exploratory character computed at the Statistical laboratory to which the author of the new theory is attached. Subsequently, larger tables may be prepared by other institutions specializing in computational work.

Because of the above peculiarity of statistical research, all the existing centers of statistical instruction include a subdivision, usually called the Statistical Laboratory, destined to perform three functions.

(i) Participation in the teaching program.

(ii) Computation, mostly of exploratory character, performed in connection with the research, both theoretical and empirical, of the academic staff of the Institute.

(iii) Semi-empirical studies on subjects brought from outside of the Institute.

(i) In connection with (i) the Laboratory should have a "Student's Laboratory room" equipped with tables, reference books and unexpensive desk computers. While electric desk computers are a great convenience, it is not unusual, particularly in Europe, to use hand operated machines for purposes of training students. For the time being at least, the laboratory should be planned perhaps for a dozen students, which means 12 tables and 12 computing machines.

(ii) In connection with (ii)the Statistical Laboratory should have a "Research Computing Room" with a good assortment of numerical tables and a battery of electric desk computers. It is recommended that this battery, to be called "basic" include a good adding machine and three ordinary calculators, perhaps Frieden , Marchant or Monroe. The present writer's preference is for Monroe which is very convenient. However, the Marchant machines , though somewhat less convenient in use, appear substantially sturdior and require less servicing.

In accordance with the above, and for the initial period, the staff of the Statistical Laboratory should consist of two professional computers, to be selected out of the numerically minded students in mathematics or statistics who do not contemplate independent research, of two assistants to conduct laboratory work with students, and of a secretary-typist. One of the professors at the Institute should assume charge of the Laboratory. Whenever needed, all other professors should have easy access to the facilities of the Laboratory.

(iii) The studies on subjects brought from outside the Institute are a most usual feature of all the statistical laboratories known to the present author. Most frequently, these studies originate with the various governmental institutions. In the United States these institutions are the National Science Foundation,the National Institutes of Health, the Office of Naval Research etc., etc. In the Statistical Laboratory at Berkeley the research projects of this kind include effectiveness of artificial rain making, methods of estimating fish population, theory of carcinogenesis , stochastic cosmology, problems of inventory, and also pure theory of probability and statistics.

In planning the Institute of Statistics at the University of São Paulo it is to be anticipated that similar research projects will have to be dealt with, particularly in connection with the activities of the Statistical Research Council.

Ordinarily, the research done on the outside projects is being paid for by the sponsoring outside institution. The payments are made on the basis of a contract between the sponsoring institution and the University. In the United States there are several features of contracts that are common to all of them and several others that differ from one university to the next.

The common features of the U.S. contracts for research include the following:

(a) Contract funds are used to pay assistants and secretarial help, especially appointed for the project.

(b) The academic staff, that is professors, engaged in the particular research receive extra compensation for work during the summer vacation at the rate of one-nineth of the annual salary for each summer month worked. However, research on the project is performed all year.

(c) Project funds are usually available to cover travel expenses and subsistance of members of projects attending scholarly meetings.

(d) Each university receives a certain "overhead " payment of varying amounts. In some cases the overhead is 15 percent of the total of the whole budget, in some others the over - head may be as large as 60 percent.

(e) In return for the financial support, the support giving institution expects that the publications resulting from project research bear an acknowledgment, more or less : "This paper was prepared with partial support of ....."

The features of research projects which vary from one university to another include the availability of project funds for equipment and for increases in regular salary of professors. The more solid universities, including the University of California, insist on the principle that the usual salary of the regular staff be paid entirely out of the university budget. However,uni-

versities exist in which project work of their faculty plays a substantial part of the general university budget and here the salary of a professor working on a project may be substantially higher, even during the academic year, than that of his less fortunate colleague who has no project work.

In the opinion of the present writer, the policy just described is not sound and leads to all sorts of frictions and to a considerable waste of time spent on hunting remunerative but, frequently, uninteresting research projects. It may be appropriate to mention a derogatory term coined to describe the dependence of an institution on paid research projects, namely "projectitis".

While the university salary for equal work should be equal, if anyone performs extra work extending over one's vacation or holidays, it is natural to expect that this extra work be properly compensated and, if the academic year lasts nine months, the extra month spent on work during the summer, does seem to deserve extra pay at the rate of one-nineth of the regular annual salary.

Incidently, some of the U.S. research supporting institutions support research done abroad. This includes the National Institutes of Health and it is not impossible that, if properly organized, the Institute of Statistics at São Paulo will obtain some financial support from this very venerable institution.

Success with outside projects depends very much upon the availability of competent scientific personnel. Then there is need for an extra room in the Statistical Laboratory and a few more desk calculators in addition to the "basic" battery.

A special condition should be mentioned. This is that no research project can be successful unless its subject is interesting to those performing the research. Thus, while it is desirable to provide facilities for project work, the Institute of Statistics should not be required to study subjects which are of

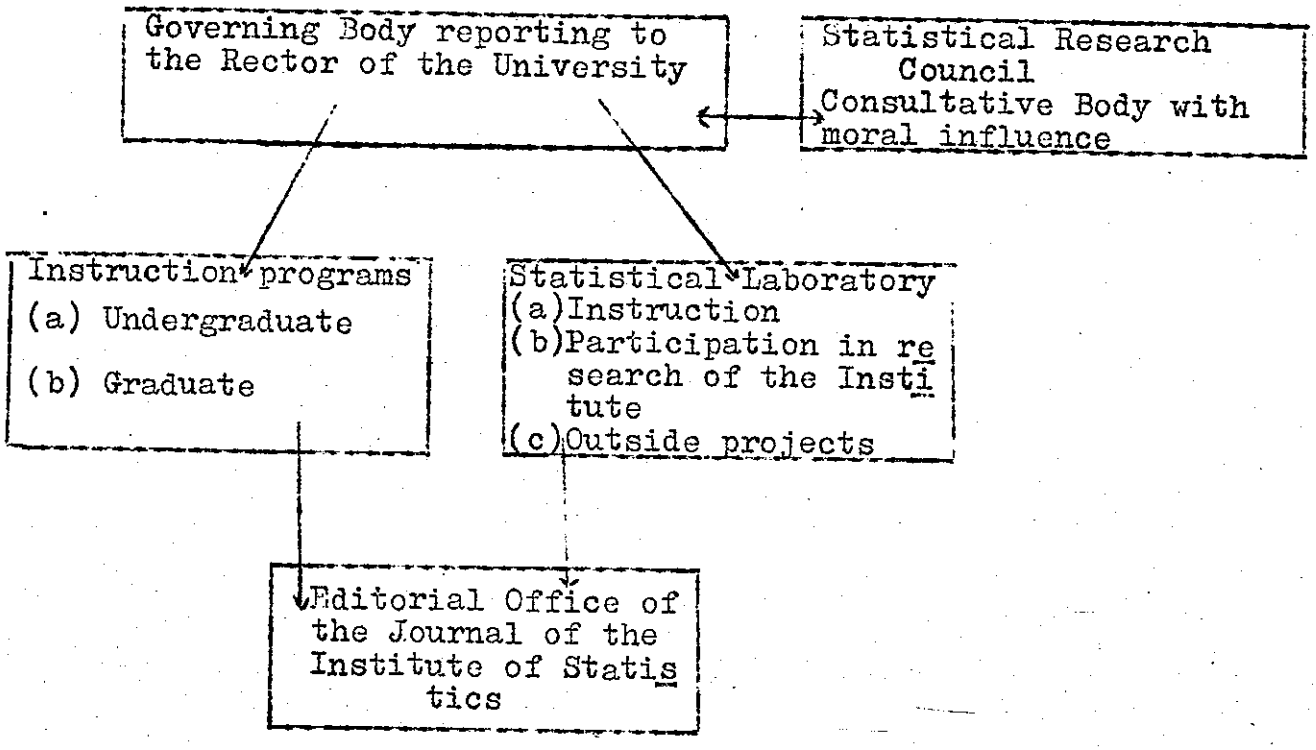
no interest to its professors. Also, contracts for research should be so written as to insure independence of thought, freedom of selection of the method of study and a certain amount of freedom in the choice of particular questions to be answered. Finally, the amount of periodical reporting to the sponsoring institution should be kept within reasonable bound.

V - Library of the Institute of Statistics

No scholarly unit is viable, unless it has an easily accessible library. The library of the proposed Institute of Statistics should contain a reasonable assortment of books on statistics, probability and on the some of the most relevant disciplines of pure mathematics. Also, special care should be taken to obtain all the more important statistical journals, with back volumes, say from 1945. As the journal of the Institute develops in importance, the current issues of many foreign journals may be obtained through an exchange arrangement.

VI - The Organizational Structure of the Institute of Statistics

With all the above in mind, it is recommended that the structure of the Institute of Statistics be as in the following diagram:



All the five panels of this diagram have been already discussed to a certain extent. The present section of the report is meant to provide details. Here it is logical to begin with the instruction program, which is basic. Its contents will indicate the desirable administrative set-up and also the immediate steps to be taken to create the Institute.

(i) Instruction program - Because of the historical circumstances explained in some detail in the writer's article "Indeterminism in Science and New Demands on Statisticians" (J. Am. Stat. Assoc., Vol. 55, 1960, pp 625-639), a copy of which is attached to the present report, the modern theory of statistics, including its sections most needed for applied research, is a strictly mathematical discipline very closely connected with the theory of probability. Both these theories use in their development a number of other mathematical disciplines. The foremost of them is the theory of measure, both in the Euclidean and in the

abstract spaces, and the theory of integration, particularly in the sense of Lebesgue-Stieltjes. The Radon-Nikodym theorem plays a vital role. Also, it is difficult to move about without concepts of topology, modern algebra and functional analysis.

With this in mind, a reasonable program of study for a future professor of statistics must include a substantial grounding in which might suggest the desirability of treating statistics as a post-graduate subject of study open to graduates in pure mathematics. This is certainly a possibility and is the policy adopted in several institutions.

However, human mind is so constructed that the same number of hours of study of a given system of concepts extending over several years mean much more than if they are concentrated in a brief period. For this reason, most of the contemporary centers of probability and statistics tend to offer courses on probability and statistics beginning just as early as possible in the student's academic life even though, over a year or two, this has to be done using only most elementary mathematical tools. A technical remark : a general definition of probability is formulated in terms of measure defined on σ-field of subsets of a "fundamental probability set". This particular detail makes it impossible to give the students of the first year the general definition of probability. Also, this makes it desirable to begin lectures on measure and integration just as early as practicable, perhaps during the second year of study. To avoid difficulties with the lack of the concept of measure and still teach probability during the first year, one must limit oneself to finite fundamental probability sets and, instead of measure, use the number of elements of a subset.

The specific aim of the program of the four year curriculum is to provide the students with statistical and probabilistic education sufficient for them to act as research statisticians (not top level) in the governmental and industrial research institutions and as junior teachers of the subject in substantive units of a university. The degree of competence needed for the above purposes, roughly corresponding to M.A. degree standing in statistics in the universities in the United States, may be symbo

lized by the ability to read critically a substantial proportion of papers published in standard statistical journals, perhaps as follows.

(a) Annals of Mathematical Statistics, U. S. A.
(b) J. Roy. Statistical Society, Series B, Methodological, England.
(c) Statistical and probabilistic papers in the Annales de l'Institut Henri Poincaré, France.
(d) Skandinavisk Aktuarietidskrift, Sweden.
(e) Teoria Vieroyatnostey , U.S.S.R.
(f) Sankhya, India.
(g) Annals of Statistical Mathematics, Japan.

The mathematical prerequisites for this ability consist, first, in the general mathematical maturity possible to develop by the study of any branches of mathematics, and, second, in a few specific disciplines already mentioned, very ably summarized in the excellent book by Harald Cramér: "Mathematical Methods of Statistics" (Princeton University Press, 1946).

Remark : Cramér's book is a classic which markes an epoch in the development of statistics as a mathematical discipline. It has been translated into many languages, including Polish and Russian. The publication of this book in Portuguese would have an excellent effect on the development of statistical thinking in Brazil. Also, the preparation of the Portuguese translation might be a very instructive subject for post-graduate seminar work in the proposed Institute of Statistics in São Paulo.

The achievements in probability theory contemplated for graduates of the Institute of Statistics might be symbolized by indicating about one-half of the book of M. Loève or, if this appears too abstract, by the book by E. Parzen.

The contemplated competance in theory of statistics might be symbolized by the books of E. L. Lehmann (Wiley, 1959) of Leopold Schmetterer (Springer, 1956) and of Smirnov (USSR Government Press).

On the applied side, one should mention the book on

the Analysis of Variance by Henry Scheffé and the memorable book "The Design of Experiments" by R. A. Fisher.

With these general ideas in mind, and using kindly advice of Professor Candido Lima da Silva Dias, program of study in the proposed Institute of Statistics was compiled as given below. One of the primary considerations in compiling it was the feasibility of this program, particularly for the first two or three years, with a minimum of new courses and with a maximum use of existing facilities. Programs of study and readjustment and the redistribution of material tought are a matter of continuous concern in all centers of instruction. Thus it is to be anticipated that, after several years of experience, the originally adopted program of study would be reviewed and, most probably , revised.

The specific list of undergraduate courses recommended is as follows.

New courses are identified by successive letters of the alphabet in parenthesis: (a),(b),...etc. This identification is used in the discussion that follows.

1st. year

Mathematical courses	1. Mathematical Analysis 2. Analytical and projective geometry 3. Physics	As currently tought to students in Mathematics.
Statistical course	4. (a) First course on probability and statistics (2 semesters).	

2nd. year

Mathematical courses

1. Mathematical analysis, as currently tought with the exception that (as suggested by Prof. Dias) the theory of complex variables, now included in the third year curriculum, would be transferred to the second year.
2. Algebra, as tought currently (possibly limited to 1 semester of matrix algebra)
3. (b) Elements of the theory of measure and integration, ending with Lebesgue-Stieltjes integral (A new course, 2 semesters)

Statistical courses

4. (c) Descriptive statistics (1 semester)
   (d) Theory of sampling surveys (1 semester)
5. (e) Second course on probability and statistics (2 semesters).

3rd. year

Mathematical courses

1. Advanced analysis (1 semester)
   (f) Orthogonal expansions (A new course, 1 semester)

Statistical courses

2. (g) Advanced theory of probability (2 semesters)
3. (h) Advanced theory of statistics (2 semesters)
4. (i) Analysis of variance (1 semester)
   (j) Design of experiments (1 semester)

4th year

1. (k) Special stochastic processes (those brought out by applications and then found interesting enough to become special fields of study, e.g. birth and death processes, etc.) (2 semesters).
2. (l) Asymptotic theory of statistical tests and of methods of estimation (1 semester).
3. (m) Sequential analysis (1 semester).
   (n) Information theory (1 semester).
4. (o) Theory of games (1 semester).
5. Courses on various fields of application, with a year to year rotation of subjects.

The subjects of the courses should be selected in accordance with the interests of the available teaching personnel, mostly in statistical units in Substantive Departments of the University of São Paulo and in its various research institutions.

Here are a few examples.

(i) Operations research

(ii) Theory and practice of bio-assay

(iii) Sequential experimentation

(iv) Various aspects of agricultural experimentation

etc.

(ii) Brief description of new courses - In a university, the details of a course should be appropriately determined by the professor teaching it. Therefore, the following remarks are brief and are designed to indicate the kind of material that is recommend. In some cases this material is symbolized by the specification of a book containing it.

(a) First course on Probability and Statistics, two semesters of the 1st. year of study.

A conceptual course - The purpose of this course is to introduce the students at their early days of university life to basic concepts of probability and statistics at such level of generality as is accessible to them at this stage. While the absence of the concept of measure imposes a severe restriction on generality, it is recommended to avoid compromises of rigour. The material recommended for the first semester is compiled in a book by the present writer "First Course on Probability and Statistics" (Henry Holt & Co.). However, the third chapter of this book given to applications to genetics, is exaggerated and only short excerpts from it are recommended for lectures.

The material for the second semester, all possible to give on an elementary level, should include:

Expectations. Probability generating functions. Inequalities of Markov and of Bienaymé-Chebyshev, (leading to a natural introduction of the concept of the standard error).

Convergence in probability. Problem of statistical point estimation with the Gaussian loss function (square of the difference between estimator and the parameter). Variance of a linear combination of several random variables, independent or not. Unbiasedness of estimators. The inequality of Fréchet (frequently called, inappropriately, the Cramér-Rao inequality). Minimum variance umbiased estimators. Illustrations on binomial, Poisson and other easy distributions.

The above general plan is usually followed in the first two semesters of study at Berkeley, the material for the second semester being available in mimeographed notes. However, the same general effect on students, perhaps with some advantages, may be achieved during the first year of study using properly selected sections of the book by W. Feller (probability), supplemented by selected statistical sections of the German book by Van de Waerden.

It is recommended that the course of lectures, perhaps 3 hours a week, be accompanied by practical exercises, perhaps two hours a week, with students being called to the blackboard to solve problems.

(b) Elements of the theory of measure and integration, two semesters, second year of study. The material for this course is ably compiled in the book by Harald Cramér "Mathematical Methods of Statistics". This particular book is very useful by indicating not only the function-theoretical material needed but also, in the subsequent sections, the reasons why it is needed. However, it was the present writer's experience that Cramér's book is not very good as a text book for the course now discussed. Considerations of economy of space and time must have forced Cramér to use a very compact method of presentation and young students find it difficult.

When teaching this particular course, the present writer prefers to adhere to the original book by Lebesgue "Leçons sur l'integration et la recherche des fonctions primitives". Naturally, quite a few adjustments appear necessary.

In this course, too, practical exercises, with students solving problems on the blackboard, are very useful not only for students but also for assistants who conduct the exercises.

(c) Descriptive statistics - One semester, second year of study, possibly two hours a week of lectures and 4 - 6 hours of numerical work at the "Students' Laboratory Room".This is a partly "conceptual" and partly "manipulative" course of study.

The material appropriate for this course is available in the book by M. G. Kendall and U. Yule. The chapters concerned with the so-called "inference" are weak and should be omitted.The laboratory work should be so conducted that the students learn to obtain numerical results with the indicated accuracy, say to 3 places of decimals, to four etc. A substantial part of the material for the course in descriptive statistics is reflected in Professor Milton da Silva Rodrigues' excellent "Vocabulário Brasileiro de Estatística" and he may be an excellent instructor for this course.

(d) Theory of Sampling surveys - One semester, second year of study. The character of this course is mixed : partly conceptual and partly manipulative. With two specialists in its subject in the University of São Paulo (Professors Lindo Fava and Affonso Toledo Piza) who are likely to teach this course, it is hardly necessary to enlarge on its contents. There is a number of books available, including one in Portuguese (by William Madow) and another in Spanish (by P. V. Sukhatme). Also, as a matter of historical interest the instructor may wish to refer to the original article by the present writer in which many current ideas

were introduced. Published a quarter of a century ago in English, it has been recently republished in Spanish in the Journal of the Inter-American Statistical Institute, December 1959.

(e) Second Course on Probability and Statistics - Two semesters, second year of study. Character : partly conceptual and partly manipulative. The first semester of this course, during which the students will be still unfamiliar with the concept of measure, should be given to the minimum variance linear unbiased estimators or, essentially, to the Gaussian theory of least squares. The presentation might be modeled on the article by F.N.David and J. Neyman published in the Statistical Research Memories, Vol. II, 1938. The instructor is likely to provide a number of useful applications to regression analysis, simple experimental designs (Randomized Blocks, Latin Squares) etc.

During the second semester, the students will have had some notions of measure theory. This should be immediately used to introduce the concept of probability as a quotient of measures (replacing numbers of elements) on subsets of an infinite fundamental probability set. A simple remark will be sufficient to show that the integral of a non-negative function satisfies the definition of measure and this will introduce the concept of probability density. Another useful conceptual element of the course is the idea that, for a given fundamental probability set and a given σ-field of subsets, there may be a variety of different measures defined, each corresponding to a different experimental set - up, leading to a "random selection" of an element of the fundamental probability set. Here the famous example invented by Poincaré, referring to the "random selection" of a chord in a circle, is very instructive. (See the relevant section of the book "Lectures and Conferences on Mathematical Statistics and Probability " by the present writer).

The essential purpose of instruction during the second semester of the course discussed should be to train the students to manipulate probability densities. The typical problem is : given

the probability density of random variables X_1, X_2, ..., X_n and given a function T of these variables, to deduce the probability density of T. Mathematically, the problem reduces to that of changes of variables, with the use of Jacobians, and of calculating multiple integrals. The Department of Mathematics is likely to welcome this section of the course as providing a field of applications, occasionally of considerable interest to the students, for some of the material tought in the course of Analysis.

As a matter of exercise, the course should include the deduction of the distributions of the various statistics of frequent use,"Student's" t, Fisher's z, X^2, etc. However, the reasons why these statistics are of any interest will be treated in the third year course on statistics and one should not waste time on the treatment of this question during the second year of study, because at this stage this treatment cannot be adequate.

Unfortunately, thus far no single book is available for the second semester of the present course and the writer suggests a combination of selected sections of this "Lectures and Conferences" and of appropriate section of Cramér's book already mentioned.

(f) Orthogonal expansions - One semester, third year of study. This is a conceptual course and one rather difficult to teach. The material recommended is given in the first chapters of the book "Orthogonalreihen" by Kaczmarz and Steinhaus. One of the essential points to emphasize is that the orthogonal expansion of a function may but need not represent that function. If at all possible, it is desirable to include in this course some elements of the problem of moments (included in the book by Kaczmarz and Steinhaus) emphasizing the possibility (and examples) that it may have one, zero or an infinity of solutions. The relevant criteria,while most desirable, will be probably too difficult for the students but might be considered for a post-graduate seminar, with the book of V.J.A. Shohat e J.D. Tamarkin ("The problem of Moments", New York, American Mathematical Society, 1943), as a background.

(g) Advanced Theory of Probability - Third year of study, two semesters. This is a conceptual course. It should present the modern theory without any compromises of rigour and generality. Depending upon the intellectual capacity of the students, the material should include the first several chapters of the book by M. Loève. If this proves too abstract, the next possibilities are the recent book by E. Parzen or, even, the chapters on probability in the already quoted book by Cramér.

(h) Advanced Theory of Statistics - Third year of study, two semesters. It is recommended to use as texts either the book of E. L. Lehmann "Testing of Statistical Hypotheses" or the book by Leopold Schmatterer "Einführung in die Mathematische Statistik".

(i) Analysis of Variance - Third year of study, one semester. This is a partly conceptual but mostly manipulative course, with an extensive use of matrix algebra. It is recommended that the material be selected from (a much too large) book by Henry Scheffé.

(j) Design of Experiments - Third year of study, one semester. The conceptual part of the course is represented by the concept of randomization due to R.A. Fisher, which is basic for the theory of experimentation. The course might be modeled on the Fisher's famous book "The Design of Experiments". However, the University of São Paulo is fortunate in having on its staff several specialists in the theory of experimentation in the research units in agriculture (Dr. Fraga, Prof. Pimentel Gomes) in biology (Prof. Garcia Duarte, Dr. Mello Freire) and in engineering (Prof. Leme) who could teach the course with the greatest success, possibly in turn, and who are likely to have their favourite books in mind . Also, it would be desirable to write an entirely new book in Portuguese.

(k) Special Stochastic Processes - Fourth year of study, two semesters. This is a conceptual and a most interesting course

to teach. The writer recommends that the first semester be spent on the book by W. Feller, omitting those sections whose contents would have been covered by the earlier courses of the program . Then, the second semester could be given to the discussion of one particular special stochastic process. One possibility is to use for this purpose the article by D.G. Kendall published in about 1952 in the Annales de l'Institute Henri Poincaré . Another possibility is the article by Walter Smith published in about 1959 in the J. Roy. Stat. Soc. Series B.

(1) Asymptotic theory of statistical tests and methods of estimation - Fourth year of study, one semester. This is a conceptual course in which a number of probability theory limiting theorems would have to be used, expected to be acquired by the students during the third year course on Advanced Theory of Probability. Strict adherance to mathematical rigour would help the students to free themselves from certain unfounded beliefs established in the early days of development of statistical theory and then throughtlessly repeated in a galaxy of books. The concepts of asymptotic normality, consistancy and efficiency of estimators are essential. However, it is also essential for the students to know that, for example, the definition of an asymptotically efficient estimator, implying that its asymptotic variance is minimum, is empty, because no such estimator exists.

The basic material for the course is given in the frequently quoted book by Cramér. However, the problem of a systematic search for optimal asymptotic procedures is not adequately covered in this book and here certain original articles have to be consulted, perhaps as follows.

1. J. Neyman, "Contribution to the theory of the X^2" Proc. First Berkeley Symposium on Math. Stat. and Probability, Berkeley, 1949.

2. J. Neyman, "Optimal asymptotic tests of composite statistical hypotheses", Probability and Statistics, The Harald Cramér Volume, pg. 213, 1959.

3. LeCam,L.,"On the asymptotic theory of estimation and testing hypotheses" , Proc.Third Berkeley Symposium on Mathematical Statistics and Probability, Vol. 1(1956), pp.129-156.

(m) Sequential Analysis - Fourth year of study, one semester. The subject of this course is one of the most modern sections of statistical theory, developed during the World War II, mostly by Abraham Wald, and has most important implications in a number of fields. The University of São Paulo is fortunate in having on its staff a specialist in this discipline in the person of Professor Elza Berquó whose thesis, trating a three-decision problem represents an important contribution to the theory of sequential analysis. It is natural to presume that Professor Berquó would be teaching the course and the description of its contents is superfluous.

(n) Information theory - Fourth year of study, one semester. A very interesting conceptual course with most important implications in electronics. There is a very good book by A. Y. Khinchin, originally written in Russian and recently republished in English.

(o) Theory of games - Fourth year of study, one semester. There is a very good book in English by David Blackwell and M. S. Girshick.

No attempt is made at this time to recommend material for the graduate courses. They must be adjusted to the teaching personnel that will be available, which is not yet in sight. One unavoidable element of the graduate program is, of course, a seminar in which both the students and professors would participate. As already mentioned at the outset of the present report, a seminar of this kind, concerned with modern theories of probability and statistics, already exists at the Department of Statistics, Faculty of Hygiene and Public Health. It is natural to expect that, in due course, with the establishment of the Institute of Statistics, this activity will be transferred to the Institute and considerable enlarged.

(iii) Governing body of the Institute of Statistics - The Director and the Acting Director - Normally, the governing body of the Institute would probably consist of a council composed of all professors, with an elected chairman. However, the "organizational period" of some five or six years will present special problems requiring special administrational set-up. Furthermore, closer examination of circumstances suggest that even this several year long organizational period must be subdivided into a 2 year "initial period" and a subsequent "fundamental organizational period". The reason for this somewhat elaborate plan is the non availability of personnel.

It is suggested that during the first 5-6 years after the founding of the Institute the responsability for running the Institute be vested in just one person, the Director of the Institute who should be a mathematical statistician of standing and with a reasonable interest in application. If one were available immediately, there would be no need for the further subdivision into the "initial" and the "fundamental" organizational periods.

As things are, it seems unavoidable to contemplate a period, the "initial" period, during which the functions of the Director would have to be performed, on a temporary basis by an Acting Director.

Since the teaching program for the first two years of study in the Statistical Institute must be dominated by courses in pure mathematics, it is natural that the Acting Director of the Institute be sought among Professors of Mathematics of the University of São Paulo. In conversations conducted during the past two weeks, the present writer obtained the impression that Professor Candido Lima da Silva Dias, the present Chairman of the Department of Mathematics, has a sympathetic interest in the development of the Institute of Statistics. Therefore, he may perhaps consent to take care of the Institute's business over the initial period which, one may hope, will be brief.

(iv) Personnel requirements - In order to valuate the requirements of personnel necessary for conducting the teaching program described above, it is assumed that normally each professor would be teaching two courses each semester. Also, it is assumed that, whenever possible, the recommended new courses will be tought by the already existing professional staff. Table 2 lists the recommended new courses, identified by the consecutive letters of the alphabet. The second column is divided into two parts indicating whether the given course is properly in statistics or an essentially mathematical course. The similarly divided third column gives the unit value of each course. Asteriks mark those courses for which the instructors are readily available in São Paulo. Here a two-semester course is assigned the value of units and a one-semester course the value of one half. The last column gives the accumulation of units for those courses for which there appears to be no instructor available. This column is meant to assess the personnel requirements during the successive years of existance of the Institute of Statistics. Thus, for example, during the first year after the establishment of the Institute there will be just one unit new course to teach. During the second year, the number of units in statistics for which no instructor is available will grow to 2.0 and these will be an extra unit in mathematics, etc.

Table 2

List of new courses with their unit values

Year of study	Courses	Number of units		Cumulative total of unstarred courses	
		Statistics	Mathematics	Statistics	Mathematics
I	(a)	1.0		1.0	
II	(b)		1.0		
	(c)*	0.5*			
	(d)*	0.5*			
	(e)	1.0		2.0	1.0
III	(f)		0.5		
	(g)	1.0			
	(h)	1.0			
	(i)	0.5			
	(j)*	0.5*		4.5	1.5
IV	(k)	1.0			
	(l)	0.5			
	(m)	0.5*			
	(n)	0.5			
	(o)	0.5		7.0	1.5

* A Brazilian lecturer available.

It will be seem that the normal teaching load connected with the four year instruction programin the proposed Institute is nine units in statistics and probability and one and a half unit of courses in pure mathematics. However, if it is found possible to have the four starred courses tought by professors who are already on the staff of the University of São Paulo, then the requirements of new academic staff in statistics will drop to seven units. Assuming that the teaching load of the Director will be one-half that of a professor, this means the necessity of obtaining the services of four professors in statistics plus one professor to teach the new mathematical courses. According to the local preference the later may be tought either by statisticians or by mathematicians. However, the following suggestions for immediate action are written with reference to the strictly statistical personnel.

The obvious way of obtaining this personnel is through the combination of intense training of qualified Brazilian young persons interested in the subject and of inviting visitors from abroad, one of whom may serve as the Director. Taking into consideration the number of statistical and probabilistic courses, out of the four future professors in the Institute, one should be a probabilist and the remaining three-statisticians. All the candidates for this intensive training must have mathematical education acquired either through formal study at a univer ity or through independent study and research. Another essential point is the interest in the subject and , most desirable, some achievements in theory or in the applications of the relevant disciplines. Finally, the candidate should be young. The intensive training should be conducted in one of the recognized centers abroad.

In probability theory the present writer wishes to recommend Berkeley where an extensive system of courses and of seminars is offered year after year under the guidance of one of the most outstanding probabilists, Michel Loève. In addition to Loève there is a substantial group of very active young scholars. The

alternative possibilities are the University of Illinois (Professor J. L. Doob) and Princeton (Professors Bochner and Feller). The advantage of Berkeley consists in the fact that the probabilists in the two other centers do not teach probability year after year and there is the possibility that during a given year there will be few if any courses in probability.

The candidate for studying probability in one of the center abroad, selected by Professor Dias, is Mr. Alésio di Caroli. Currently Mr. Alésio is an assistant professor in measure theory and this application makes him a particularly promising prospect for a future probabilist. His training abroad should be planned for three years.

For the specialization in the theory of statistics the writer suggests the choice among the centers in Berkeley, at Stanford, at Columbia and at Cornell. Of these four, the Department of Statistics in Berkeley is the largest. However, each of three other centers has a number of highly talented and active professors, S. Karlin in Stanford, Herbert Robbins at Columbia and J. Wolfwitz at Cornell, to name only a few. If several young Brazilian scholars are sent to the United States for statistical studies, it may be desirable to send them to different centers so as to secure for the University of São Paulo the broadest possible variety of fruitful ideas. As to the candidates for statistical studies abroad, one is obvious, but there are some difficulties in finding more.

The obvious candidate is Professor Elza Berquó who combines a university degree in pure mathematics with an active interest in theory of statistics which resulted in her thesis in sequential analysis. In addition, Professor Berquó has several publications involving applications and some less modern sections of statistical theory. Some time ago, Professor Berquó studied in the School of Public Health in Columbia. However, her theoretical interests brought her to the Columbia Department of Statistics where she acquired considerable grounding in theory. Finally, Professor

Berquó's activities in her Department, including the advanced theoretical seminar, which I found to be on a surprisingly high level, suggest that she is likely to become the leading scholar in the proposed Institute of Statistics. In order to facilitate this achievement, Professor Berquó should spend a couple of year at one of the centers abroad, away from administrative chores in her Department and devoting her full time to studies and to the several subjects of research in which she is interested and, also, to the organizational details in the chosen center.

In addition to Professor Berquó there appear to be two more candidates for statistical-theoretical studies abroad. However these two candidates are less obvious to the present writer. They are J. M. Pompeu Memória, currently on the staff of the University of Minas Gerais and Geraldo Garcia Duarte of the School of Medicine at Ribeirão Preto, the University of São Paulo.

I met Mr. Memória at the meeting of the Biometric Society held in São Paulo on March 29 and saw him later at a conference discussing the original draft of the present report. My information about Mr. Memória is limited to that his original university studies were in mathematics, that he studied statistics, first at the Iowa State College under Professor Snedecor and, subsequently, at Cambridge, England, under Dr. John Wishart. In both cases the emphasis was on the practical analysis of variance and on the design of experiments. This suggests that Mr. Memória is an essentially applied statistician and, therefore, not very likely to become one of the key members of the Statistical Institute meant to emphasize theory. However, in a few casual conversations I had with Mr. Memória, I was greatly impressed by his very considerable familiarity with the modern literature on theory.(In addition Mr. Memória appears to have quite a formidable memory, in a complete harmony with his last name!). My impression that, in spite of the lack of formal mathematical education, Mr. Memória is quite competent in theory was confirmed in conversation with several persons

who know Dr. Memória well. While this impression should be confirmed by a study of Mr. Memória's publications it is clear that he is actively interested in theory of statistics. This, then, makes him a plausible candidate for foreign studies of probability and theory of statistics.

My information about Mr. Duarte is all second hand. This is that he holds a university degree in mathematics, is a "livre docente" in statistics, studied for a year in the United States under Professor [illegible] (essentially, applied statistics) and has a number of published papers on statistical problems of medicine. Mr. Duarte's thesis is concerned with moments of discrete distributions, a rather old fashioned subject, having little to do with the modern theoretical developments. Mr. Durate enjoys high repu - tation as a theorist among the statisticians in São Paulo and the possibility of his development into a key statistical theorist should be carefully examined.

If it is found impossible to secure immediately three fully qualified candidates for statistical theoretical studies abroad, there is of course the possibility of beginning with one or two and hoping that, within a year or two, some of the younger people with mathematical education, perhaps some of the participants in Prof. Berquó's seminar, achieve the degree of maturity and promise justifying a grant for foreign studies.

Quite apart from the plan for intensive training of future professors, native Brazilians, in order to put the Statistical Institute on its feet, it is unavoidable to consider visitors from abroad.

In order to be worth bringing over, a visitor should be of some standing and this will create the following problems. First, a visitor of this category is not likely to be available for more than one academic year other than by coming to assume a permanent position. Thus as a general rule, the visitors, in successive years will have to be different persons. Second, in order to tempt a person of standing to come for a year to São Paulo to teach two elementary courses, he will have to be

paid a very high salary and even then he will not be enthusiastic. A satisfactory solution would be to let the visitor teach just one elementary course and then to conduct a seminar, mostly for young members of the staff, in which he could present the results of his own recent research. Because of the probable lack of preparation of the audience, the visitor may have a difficulty in presenting his results, but he will like the job. Also his visit in São Paulo will have deeper consequences than if the visiting scholar were just to teach two elementary courses.

The conclusion is that, if in a given year there are two one unit courses to teach, representing jointly a normal teaching load of one professor, not one but two visitors will be needed to take care of them. However, one of the visitors may be a junior person.

With these details in mind, and on the assumption that the founding of the Institute will be accompanied by sending abroad of three young Brazilian scholars, of which one will return after two years and the other two after three years, the teaching program in the Institute over the first four years could be provided for as follows.

Table 3

Distribution of unstarred courses among visitors and new Brazilian professors

Year	Nº of units of statistical courses without asterisks in Table 2	Nº of Visitors	Nº of new Brazilian professors returning from abroad
1	1.0	1	-
2	2.0	2	-
3	4.5	2	1
4	7.0	1	3

Table 3 indicates that a realistic plan of creating the Institute of Statistics as described in the present report will require the following steps.

1. Sending for studies abroad at least 3 young Brazilian scholars, one of them a future probabilist and two future

mathematical statisticians. It appears realistic to expect that the specialization of one statistician (Prof.Berquó) will be completed in two years while that of the two others persons will require three years.

2. Bringing over to São Paulo visiting professors.
   1 during the first year of functioning of the Institute
   2 during the second
   2 during the third
   1 during the fourth.

Thereafter, the Institute may be expected to produce more personnel of its own and function normally.

VII - Organizational status of the proposed Institute of Statistics within the University of São Paulo - The necessity of the present section occurred to the writer in connection with some discussions at one of the conferences with professors at São Paulo. The question is whether the proposed Institute should be organizationally connected with one of the already unit of the University of São Paulo, perhaps with the Department of Statistics in the Faculty of Philosophy or with the Department of Mathematics.

The present writer wishes to urge that any such idea be abandoned. The existing units of the University exist and have been developed in order to meet certain specific needs. They developed a certain modus vivendi and a modus operandi dictated by these needs and conditioned by the organizational structure of the University. The purpose of the proposed Institute is to meet some other needs and to provide new facilities. Also, at the very start the Institute will be a new organism requiring special care to develop properly. If it is attached to any existing unit with vigorous structure, well established functions and traditions, the Institute will not become a new unit but merely an enlargement of one of the old units.

By its spirit, the proposed Institute of Statistics is closer to the Department of Mathematics than it is to the Department of Statistics in the Faculty of Philosophy. Therefore, one might think that an

affiliation

~~application~~ with the Department of Mathematics will be advantageous. Because of the large number of mathematical courses neededfor statistics, some kind of organizational link between the Department of Mathematics and the Institute does seem desirable. However, if this link is strong it is most doubtful that the Institute will develop into a unit integrating statistical activities all over the University as planned above. Its activities will be reduced to those of a few more chairs within the Department of Mathematics.

The possibilities visualized above are those of a depen - dence of the proposed Institute on the existing units of the University. There is, of course, the reverse possibility that some of the existing units become dependent on the proposed Institute. This possibility is no less undesirable than the earlier one. The cooperation between the old university units and the new Institute would be most fruitful. Any kind of dependence is likely to defeat the purpose of the Institute.

Statistical Research Council - As visualized in the earlier pages, the functioning of the Statistical Research Council should begin when the Institute will acquire its own personnel, not earlier than after two years after its establishment. At that time an organizational meeting should be called by the Director of the Institute to determine the composition of the Council and to frame its functions.

The Journal of the Institute - It is not realistic to expect that the publication of the Estatística Teórica e Aplicada could begin immediately after the establishment of the Institute of Statistics. As in the case of the Statistical Research Council, the journal would have to wait until the Institute has its own staff and its Director. However, the provisions for the journal and, particularly, for its budget should be made simultaneously with the other provisions for the Institute ,This implies a room for the editorial office, the usual office equipment, etc. Also, it would be good to have funds for the honoraria.

The starting of a journal is not an easy matter and the contents of its first few issues may be decisive. In this connection it is good to remember that for the first four years of the Institute's existence there are expected visitors from abroad, presumably active scholars who, in addition to teaching normal courses, will conduct seminars. The contents of a seminar course, properly summarized could be excellent contributions to the first several issues of the journal and, therefore, the present writer wishes to urge that visiting professors be requested to prepare such papers, to be published in the journal. With good luck, the discussions at the seminar courses may stimulate research by some members of the audience and, as a result, during the third year of the existence of the Institute, the first issue for the Estatística Teórica e Aplicada may be ready for the printers. If this happens, the continuing fruitful existence of the Institute will be assured.