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ATR-74(7910)-1, VOL II

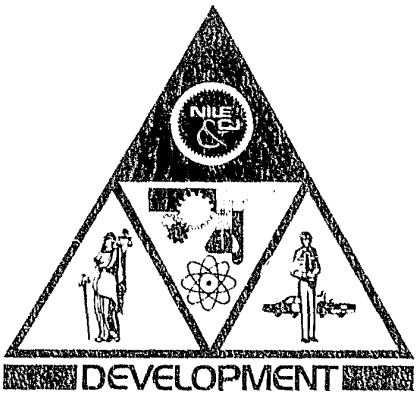
EQUIPMENT SYSTEMS IMPROVEMENT PROGRAM

SURVEY AND ASSESSMENT BLOOD AND BLOODSTAIN ANALYSIS PROGRAM

Volume II: Appendices

Enforcement Development Group

April 1974



Prepared for

NATIONAL INSTITUTE OF LAW ENFORCEMENT AND CRIMINAL JUSTICE
Law Enforcement Assistance Administration
U.S. Department of Justice

THE AEROSPACE CORPORATION

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Approved

John O. Eylar, Jr., Director
Law Enforcement Development
Group

CONTENTS

PREFACE

This volume, Volume II of a two-volume report, presents the bibliography developed in the study and the survey questionnaire. Volume I presents the main technical discussion.

The bibliography, Appendix A, is composed of references not already cited under "Notes" in Volume I. It is organized in three sections to maximize the usefulness to the reader. Pertinent references for which full abstracts were available from the source, such as from Chemical Abstracts, have the abstract reproduced in Section 1. Section 2 lists those references for which only one-sentence abstracts were found in the source. Section 3 contains references for which only titles and author were available.

Appendix B consists of the questionnaire used for the survey. Telephone calls and visits were made using the questionnaire as a guide in conducting the interview. In addition, copies of the questionnaire were left during visits or mailed to those laboratories which expressed willingness to take the additional time required to complete it and to return it to The Aerospace Corporation. The questionnaire is composed of two sections, the first covering questions to be asked of criminalistics laboratories practicing some type of blood individualization, the second covering information of interest in determining genetic variant frequency of occurrence. The second part therefore contains questions put to blood banks and other research organizations contacted to determine the extent of their potential contribution to the cooperative data collection effort. The questionnaire is included to permit the reader to judge the extent of the coverage provided by this survey.

APPENDIX A. BIBLIOGRAPHY

1. References with Full Abstract

a. Blood Analysis Methodology

Possiblity of determination of erythrocyte acid phosphatase (AP) and phosphoglucomutase (PGM1) types in the blood of dead persons and in blood stains] Herzog P, et al.
Cesk Patol 8:27-31, May 72 (Eng. Abstr.) (Cze)

The effect of storage upon the activity of phosphoglucomutase and adenylate kinase enzymes in blood samples and bloodstains. Rothwell TJ.
Med Sci Law 10:230-4, Oct 70

Errors committed in the course of the identification of Gm factors in dry blood stains and their causes] Görtz R, et al. Arch Belg Med Soc 28:465-72, Jul 70 (Fre)

Adaptation of immunofluorescent methods to the direct determination of erythrocyte group factors in hemolyzed blood and blood stains. Medico-legal application] Pollet P.
Arch Belg Med Soc 27:447-65, Jul 69 (Fre)

Inhibitory capacity of a spot support on anti-Gm serum in medico-legal expertise] Blanc M, et al.
Med Leg Domm Corpor (Paris) 4:15-8, Jan-Mar 71 (Fre)

Problems encountered in blood group antigen determination in dry blood stains] Ren G de, et al.
Med Leg Domm Corpor (Paris) 3:71-3, Jan-Mar 70 (Fre)

The fluorescent antibody technique. Its application to the detection of blood group antigens in stains. Kind SS, et al. J Forensic Med 17:121-9, Jul-Sep 70

The value of Gm typing of determining the racial origin of blood stains. Blanc M, et al.
J Forensic Sci 16:176-82, Apr 71

An improved method for ABO and MN grouping of dried bloodstains using cellulose acetate sheets. Howard HD, et al. J Forensic Sci Soc 9:28-30, Jul 69

1341. On the biochemical and genetic basis of the human blood group MN specificities - Springer G.F. and Huprikar S.V. - Dept. Immunochem. Res., Evanston Hosp., Evanston, Ill. 60201 - HAEMATOLOGIA (Budap.) 1972 6/1-2 (81-92)

The authors observed that human blood group M and N specificities were destroyed by neuraminidase which also concomitantly destroyed the potent influenza virus receptor activity of these antigens. The authors have now been able to prove for the first time that a single

Use of Hp plasma groups in the solution of 2 cases of medico-legal identification of blood stains by means of polyacrylamide gel disk electrophoresis] Castilla Gonzalo J, et al.
Zacchia 7:502-15, Oct-Dec 71 (Eng. Abstr.) (Spa)

1297. Thin layer starch gel electrophoresis for determination of phosphoglucomutase types in blood traces - DUNNSCHICHT STARKEGEL ELEKTROPHORESE ZUR BESTIMMUNG DER PHOSPHOGLUCOMUTASE TYPEN AN BLUTSPUREN - Oepen I. - Inst. Rechtsmed., Univ., Marburg - Z.RECHTSMED. 1970 67/5 (309-312)

The thin layer starch gel method for phosphoglucomutase typing of very small bloodstains recommended by Wraxall and Culliford was found to be advantageous with some modifications. The phenotypes can be differentiated after storage of 8-10 wk, and occasionally after 5 mth. This is longer than is possible with Brinkmann's method.

Genetics and immunochemistry of blood group antigens. Pardoe GI, et al.
Med Lab Technol 28:1-18, Jan 71

Red cell enzyme polymorphisms in forensic serology] Brinkmann B.
Z Rechtsmed 69:83-117, 1971 (205 ref.) (Eng. Abstr.) (Ger)

Method of preservation and quantitative determination of enzyme activity in blood samples dried on paper] Levin FB, et al.
Lab Delo 3:145-8, 1972 (Rus)

Forensic blood group genetics. Critical historical review. Wiener AS. NY State J Med 72:810-5, 1 Apr 72

The effects of storage and heparin on the activity of serum complement, with particular reference to the detection of blood group antibodies. Garratty G.
Am J Clin Pathol 54:531-8, Oct 70

Some recent advances in forensic serology. Dodd BE.
Med Sci Law 12:195-9, Jul 72

On blood groups. Chown B.
Can Med Assoc J 103:888-90, 17 Oct 70

1357 Simultaneous gel electrophoresis of adenylate kinase and 6 phosphogluconate dehydrogenase - KOMBINIERTE ELEKTROPHORETISCHE DARSTELLUNG DER ADENYLATKINASE (AK) UND DER 6 PHOSPHOGLUCONAT DEHYDROGENASE (6 PGD) - Brinkmann B. and Thoma G. - Inst. Gerichtl. Med. Kriminalistik, Univ. Hamburg - HUMANGENETIK 1970 10/4 (358-361)

Following simultaneous gel electrophoresis isoenzyme patterns of adenylate kinase and 6 phosphogluconate dehydrogenase are stained. Differentiation of all phenotypes is possible. Results are comparable with those obtained by original methods.

376. **A methodological improvement of the mixed agglutination technique** - ÜBER EINE METHODISCHE VERBESSERUNG DER MISCHAGGLUTINATION - Schulz E. - Inst. Gerichtl. Med., Univ. Wurzburg - BEITRGERICHTLMED 1970 27 (320-321)

A modification of the mixed agglutination technique for demonstrating A and B blood group antigens is described. This method combines little effort with great reliability and a high degree of sensitivity. The red cells, which serve the demonstration of th fixed antibodies in the last phase of the tests are increased in their sensitivity. They are therefore suspended in a rather weak antibody milieu, i.e. in a dilution of

[Thin-layer starch gel electrophoresis for determination of phosphoglucomutase types in blood traces] Oepen I. Z Rechtsmed 67:309-12, 1970 (Ger) (Fre)

[The development of medico-legal immunology] Saint-Paul M. Med Leg Domm Corpor (Paris) 3:380-3, Oct-Dec 70 (Fre)

J Tokyo Med Coll 28:13-29, 1970 (Eng. Abstr.) (Jap)

Species identification of blood stains at the crime scene] Fukae T. Jap J Leg Med 25:361-5, Sep 71 (Eng. Abstr.) (Jap)

[Use of counter immunoelectrophoresis for determining species of blood in stains] Charnyf VI. Sud Med Ekspert 14:16-9, Jul-Sep 71 (Eng. Abstr.) (Rus)

[Medico-legal identification of bloodstains. VI. The dissolving out of bloodstain from material buried in soil] Hirose H. Jap J Leg Med 25:342-51, Jul 71 (Eng. Abstr.) (Jap)

[Medico-legal identification of bloodstains. 3. Extraction of blood from soil] Hirose H. Jap J Leg Med 25:325-41, Jul 71 (Eng. Abstr.) (Jap)

Adenylate kinase polymorphism (EC: 2.7.4.3.) gene frequencies and practicability in forensic serology] Brinkmann B, et al. Z Rechtsmed 68:73-8, 1971 (Ger)

Use of the absorption-elution method for detecting factor P in dried blood stains] Svirskif MS. Sud Med Ekspert 15:33-6, Apr-Jun 72 (Rus)

2559. **Reliable distinction of A_1B and A_2B** - ZUR ZUVERLASSIGEN DIFFERENZIERUNG VON A_1B UND A_2B - Uhlenbruck G., Prokop P. and Majsky A. - Med. Klin., Univ. Koln - KLIN.WSCHR. 1970 48/18 (1131-1132)

A new method is described which distinguishes clearly between A_1B and A_2B red cells, when using anti A agglutinin from snails (Helix pomatia). This test has not only forensic significance, but may also be performed in patients where change of blood group during cancer is suspected (leukemias).

791. **The automated screening of irregular blood group antibodies** - Myhre B.A. and Reilly C. - Los Angeles, Orange Counties Red Cross Blood Cent., Los Angeles, Calif. - VOX SANG (Basel) 1970 18/1 (1-11)

Automated antibody screening was performed on donor blood, using a filter paper model autoanalyzer and a specially built automatic pooler for the antiglobulin technique. This combined system screens donor blood for antibodies which react either by enzymes or by antihuman globulin methods. The method appeurs to be fast and sensitive and to be adaptable to the procedures at a large blood transfusion center.

1153. **Specific agglutinability of erythrocytes from whole blood stored at 4 C** - Rosenfield R.E., Berkman E.M., Nusbacher J. et al. - Div. Hematol., Dept. Med., Mt Sinai Sch. Med., City Univ., New York, N.Y. 10029 - TRANSFUSION (Philad.) 1971 11/4 (177-192)

Experiments were designed to evaluete by AutoAnalyzer the specific agglutinability of erythrocytes obtained from whole blood stored at 4 C. Seven normal volunteer donors of both sexes, aged between 22 and 31 yr, were chosen and bled periodically. Four kinds of citrate solution were used: ACD Formula A, CPD, ACD supplemented with adenine, and CPD supplemented with adenine. All clotted specimens were tested after 0, 1, 2, 3, 4, and 5 wk of storage, while all citrated specimens were tested after 0, 1, 2, 3, 4, 5, 6, 8, and 10 wk of storage. Six blood group systems were used for evaluation with the following reagents: anti A or anti B,

4414 **Determination of the phosphoglucomutase types from traces of blood** - BESTIMMUNG DER PHOSPHOGLUCOMUTASE-TYPEN AUS BLUTSPUREN - Brinkmann B. - Inst. Gerichtl. Mediz., Univ. Hamburg - DTSCH.Z.GES.GERICHTL.MED 1969 66/2 (31-34)

Blood traces were stored at room temperature. After 7 wk storage PGM typing was possible also from absorbent trace carriers (e.g. cotton). If blood traces can be scraped off, PGM types can be reliably differentiated after 3 mth storage.

877. **The activity of glucose 6 phosphate dehydrogenase in whole blood samples dried and stored on filter paper** - Penton E., Pascual C., Llanes A. and Thielmann K. - Dept. Bioquim. Clin., Cent. Nac. Invest. Ci., Univ. La Habana - ACTA BIOL.MED.GERM. 1972 28/1 (177-180)

Because of the good stability of dry enzymes on carriers, G6PD activity was tested in whole blood samples that had been dried on filter paper and stored for various lengths of time, with good results.

2448. **Starch gel electrophoresis of four enzymes from human red blood cells: Glyceraldehyde 3 phosphate dehydrogenase, fructoaldolase, glyoxalase II and sorbitol dehydrogenase** - Charlesworth D. - Dept. Med., Univ. Chicago, Ill. ANN.HUM.GENET 1972 35/4 (477-484)

New methods for starch gel electrophoresis of human red blood cell glyceralehyde 3 phosphate dehydrogenase, glyoxalase II, fructoaldolase, and sorbitol dehydrogenase are described. A series of blood samples were studied using these techniques, and inherited variants of glyceraldehyde 3 phosphate dehydrogenase, aldolase and sorbitol dehydrogenase were found. Pedigrees of the families are given. Combining these results with earlier data, a total of 6 out of 26 randomly selected loci in man were found to show polymorphisms.

1733. **GPT, 6 PGD, PGM and AK phenotyping in one starch gel** - Goedde H.W. and Benkmann H.G. - Inst. Humangenet., Univ. Hamburg - HUMANGENETIK 1972 15/3 (277-278)

A method is described for simultaneous electrophoretic separation of GPT (EC 2.6.1.2), 6-PGD (EC 1.1.1.44), PGM (EC 2.7.5.1) and AK (EC 2.7.4.3) enzyme variants.

136475. MAYR, W. R. (Inst. Blutgruppenserol., Univ., Wien, Vienna, Austr.) **Studies on the correlation between the secretor** system and the Gc serum system. HUM HERED 20(3): 287-289, 1970.--Nerell found in 160 men and 88 women a tendency for predominance of non-secretors in the male Gc 1-1 type and in the female Gc 2-2 type. A significant difference in the distribution of the Gc types between men and women was observed. Paternity cases consisting of 1257 unrelated Austrian individuals (682 men and 575 women were examined in this study in order to determine, if a relationship between the ability to secrete ABH substances in the saliva and the Gc system may exist. The results of the secretor and Gc determinations are given. The statistical comparison of the figures in men and women by means of the χ^2-test shows a good agreement. The distribution of the Gc types among secretors and non-secretors in men and women is given. There is also a good agreement between the observed figures and the expected values based on the gene frequencies The frequency of non-secreters seems to be higher in people being Gc 1-1 and 2-1 than in people being Gc 2-2. Nerell found the same tendency in men, but the opposite one in women. There is a discrepancy between these values and those found by Nerell, and these figures do not allow one to postulate a relation between the secretor system and the Gc serum system.--J. J. C.

31369. HILGERMANN, REINHARD. (Inst. Rechtsmed., Univ., Emil Mannkopff-St. 2, D-3550 Marburg, W. Ger.) Vergleichende Untersuchungen zur Empfindlichkeit der Haptoglobintypenbestimmung in verschiedenen Medien unter besonderer Berucksichtigung gealterter Blutproben und von Blutspuren. [Investigations of haptoglobin typing sensitivity by comparison of starch, agar, and polyacrylamide gel electrophoresis with special regard to longer stored blood samples and to blood traces.] Z RECHTSMED 71(3): 222-234. Illus. 1972[recd. 1973]. [Engl. summ.]--In view of the well-known difficulties of determining the haptoglobin types in stored blood samples and blood traces by the usual starch gel technique, agar and PAA [polyacrylamide] gel were tested for their sensitivity and usefulness. PAA gel electrophoresis turned out to be unequivocally superior when dilutions of sera were typed. Experimental destruction of proteins by various proteases, especially by neuraminidase, caused alterations of electrophoretic mobility of proteins which affected diagnosis by agar gel much more than by starch or PAA gel electrophoresis, 95% of 436 blood samples stored up to 2 yr permitted undisputable Hp typing by PAA gel electrophoresis, while in agar gel typing became impossible after 1 yr of storage, and a few months were sufficient to cause diagnostic difficulties in starch gel. Blood traces could be typed up to 4 wk in PAA gel, to a maximum of 8-14 days in agar gel, and no longer than 2-3 days in starch gel. Here too, PAA gel offered the greatest sensitivity and lucidity in relation to quantity of blood stains.

131296. ROHLF, F. JAMES (Div. Biol. Sci., State Univ. N. Y., Stony Brook, N. Y., 11790, USA.), and GARY D. SCHNELL. An investigation of the isolation-by-distance model. AMER NATUR 105(944): 295-324. Illus. 1971.--Wright's isolation-by-distance model was investigated using techniques of simulation on a digital computer. The manner in which a population as a whole differentiated in time, as well as the distributional pattern of gene frequencies in the population were examined. Both the areal and the linear isolation-by-distance models were investigated. The observed rate of increase in the inbreeding coefficient did not agree well with that predicted by the results of Wright (although the differences may be due to changes which take place in only the 1st few generations). It was also found that the particular patterns of highs and lows of gene frequencies over a geographic area became established quickly and persisted for a large number of generations, particularly near the periphery of the population. Implications of our results for interpreting geographic variation analyses in terms of differential selection are discussed.--A. B. M.

† 66044. SCHWINGER, EBERHARD. (I st. Gerichtl. Med., Stiftspl. 12, D-5300 Bonn, West Ger.) Geschlechtsbestimmung aus Blutspuren. [Sex determination in blood traces.] Z RECHTSMED 70(3): 157-162. Illus. 1972. [Engl. summ.]--Sex determination is described by means of fluorescence microscopy in lymphocytes and leukocytes of dry small blood stains from various materials (cloth, glass, metal). Even in 30-day-old samples sex determiation is unequivocal.

GONZALO, JOSE CASTILLA, ENRIQUE VILLANEUVA CANADAS and JUAN ANTONIO GISBERT CALABUIG. (Catedra Med. Leg., Univ. Granada, Granada, Spain.) Aplicacion de los grupos plasmaticos Hp a la resolucion de dos casos de individualizacion medico-legal de manchas de sangre mediante electroforesis en gel de poliacrilamida "en disco": [Application of the Hp plasmatic groups for the solution of 2 cases of medico-legal individualization of blood stains by means of "disk" electrophoresis in polyacrylamide gel.] ZACCHIA (ROME) 7(4): 502-515. Illus. 1971[recd. 1972]. [Engl., Ital., Fr., Ger. and Engl. summ.]--In 2 cases in which the procedure was used, this method helped solve the problem. The technique can be modified by carrying out the determination directly from human blood crusts or by previously macerating the stain in saline solution. This alternative was subject to the possibility of having to research for other plasmatic systems. When sufficient material was available, it was preferable to incorporate it directly in the gel: the results, then were more conclusive and the determination of the haptoglobinic [Hp] type was made with absolute clearness. If the material available was scanty it was necessary to macerate the stain in saline solution and carry out the research on the eluate. If the result was not decisive, the research of the Hp was repeated and the groups (Gm, Inv, of the transferrins, etc.) were determined.

25571. KIND, S. S. (Home Off., North. Forensic Sci. Lab., Newcastle upon Tyne, Engl., UK.), DAVID PATTERSON and G. W. OWEN. Estimation of the age of dried blood stains by a spectrophotometric method. FORENSIC SCI 1(1): 27-54. Illus. 1972.--The visible absorption spectra of dried blood samples are examined and a time and temperature dependent quantity called the "α ratio" derived. This parameter is independent of the amount of blood present and its determined can provide useful assistance in estimating the age of a bloodstain. The nature of the pigments and changes involved are discussed.

2290. ASANO, MINORU, MASAKAZU OYA and MASAYOSHI HAYAKAWA. (Dep. Forensic Med., Nagoya Univ. Sch. Med., Nagoya Jap.) Identification of menstrual blood stains by the electrophoretic pattern of lactate dehydrogenase isozymes. FORENSIC SCI 1(3): 327-332. Illus. 1972[recd. 1973].--A new technique is described for the identification of menstrual blood stains by the electrophoretic separation and quantitation of lactate dehydrogenase (LDH) isozymes. In extracts from menstrual blood stains of up to 2-wk storage, the LDH-4 and LDH-5 fractions (especially the sum of these 2) were markedly elevated. No comparable increase was observed in blood stains from other origins. This method is applicable to the examination of blood stains in medicolegal practice.

37256. LEWIS, W. H. P. (Dep. Pathol., St. Heller Hosp., Carshalton, Surrey, Engl., UK.) Common polymorphism of peptidase A: Electrophoretic variants associated with quantitative variation of red cell levels. ANN HUM GENET 36(3): 267-271. Illus. 1972.--A method is described for the detection of new electrophoretic variants of peptidase A which are associated with low activity of this enzyme in human red blood cells. These variants are ascribed to the occurrence of an allele, Pep A^B, which has a frequency in the British population of 0.25 and in the Nigerian population of 0.088. Three new common phenotypes are described, Pep A 8, Pep A 8-1 and Pep A 8-2.
--P. L. W.

52598. GAJOS, E. (Inst. Med. Leg., Wroclaw, Pol.) Essais d'application des anticorps marqués par l'isothiocyanate de fluorescéine en médecine légale. [Attempts to use antibodies labeled with isothiocyanate of fluorescein in forensic medicine.] MED LEG DOMM CORPOR 1(1): 64-67. 1968[recd. 1969].--The methods for the analysis of small amounts of blood were studied. The method using immunofluorescence lacks specificity, and necessitates further research and adaptation to the specificity and reproducibility of the method. At present the method of precipitation, used with various modifications remains the method of choice. This is most suitable in the discipline of forensic medicine in the analysis of biological material.--A. C. S.

43573. LITWIN, S. D. and S. BALABAN. (Div. Hum. Genet., Dep. Med., Cornell Univ. Med. Coll., New York, N. Y. 10021.) A quantitative method for determining human γ G allotype antigens (Gm): II. Differences in Gm gene expression for γ G1 and γ G3 H chains in sera. J IMMUNOL 108(4): 991-999. Illus. 1972.--Quantitative measurements of human γ G allotype antigens (Gm) provided information on some of

† 13793. GUSSMANN, STEFFEN and KAMEL RAMES. (Inst. Anthropol., Humangenet., Univ., Richard-Wagner-St. 10/I, D-8000 Muenchen 2, West Ger.) Die Darstellung der Polymorphismen Glutamat-Pyruvat-Transaminase (GPT, E. C: 2.6.1.2) und Phosphoglucomutase (PGM_1, E. C: 2.7.5.1) mittels horizontaler Staerkegellektrophorese in einem Arbeitsgang. [Separating the polymorphous enzymes glutamate pyruvate transaminase [EC 2.6.1.2] and phosphoglucomutase [EC 2.7.5.1] by horizontal starch gel electrophoresis.] Z RECHTSMED 70(3): 148-149. Illus. 1972. [Engl. summ.]--A method of horizontal starch gel electrophoresis is described with which it is possible to separate the enzymes GPT [glutamate pyruvate transaminase] and PGM [phosphoglucomutase]. In a random sample of 289 persons, the gene frequencies are as follows: $GPT^1 = 0.512$; $GPT^2 = 0.488$.

MASIS, T. M., and V. P. OL'KHOVIK. (Res. Inst. Forensic Med., Min. Health USSR, Moscow, USSR.) Sudebno-meditsinskaya eksperitiza krovi s neobychnoi gruppovoi differentsirovkoi. [Medicolegal examination of a blood sample with an uncommon group characteristic.] SUDEBNOMED EKSPERT 13(2): 55-56. 1970. [Engl. summ.]--A blood sample with a rare group AB variant--a weak undetectable B and a supplementary beta--is described. In the secretions of the person the B substance was clearly marked.
--L. P. S.

† 20145. MAYR, W. R. (Inst. Blutgruppenserol., Univ. Wien, Vienna, Aust.), D. MICKERTS, V. PAUSCH, M. ILYÉS, and M. KOLTAY. Untersuchungen ueber das Auftreten von anti Gm und anti Inv Koerpern nach parenteraler Gammaglobulinapplikation bei Kindern. [An investigation of the occurrence of anti-Gm and anti-Inv after parenteral administration of gammaglobulin in children.] Z KINDERHEILK 108(4): 305-313. 1970. [Engl. sum.]--The occurrence of antibodies against gammaglobulin groups Gm (a,x,b,f) and Inv(1) was determined in children who were either born prematurely or suffered from nephrosis, hypo-or agammaglobulinemia and who were treated with gammaglobulin. Anti-Gm^a was produced in 5 out of 28 Gm^a negative children from Gm^a negative mothers. Two anti-Gm^a carriers were found among 9 Gm^a negative children from Gm^a positive mothers, which is the typical mother-child combination with regard to the Steinberg-Speiser phenomen. The reasons for the rarity of the formation of antibodies to gammaglobulin groups are discussed with special reference to the amount of gammaglobulin administered, and the transient nature of Gm antibodies.

30957d Electrophoresis in polyacrylamide gel. Practical aspects and improvements. Tiesler, E. (Inst. Hyg. Micribiol., Univ. Saarlandes, Homburg/Saar, Ger.). *Aerztl. Lab.* **1971**, 17(11), **406-10** (Ger). Certain problems encountered during the sepn. of ISOENZYMES in FORENSIC BLOOD GROUPING by using polyacrylamide gel may be minimized when: GEL INHOMOGENEITY caused by photopolymerization is avoided by using a polymerization system which is not dependent on light; the sensitivity of electrophoretic sepn. with respect to pH shifting of the electrode buffer is prevented by rotation of anodic and cathodic buffers; and

38773c Value and limits of current methods for the forensic identification of blood spots. Muller, P. H.; Tran Van Ky, Philippe; Lenoir, L.; Andre, A.; Brocteur, J.; Kornprobst, M. L. (Serv. Med. Leg., Univ. Lille, Lille, Fr.). *Med. Leg. Domm. Corpor.* 1972, 5(1), 3-35 (Fr). A review with 268 refs. of methods for examg. blood stains. Techniques for detg. such factors as the biol. origin of the blood, blood groups, and blood enzymes were covered.

38774d Recent developments in the examination of dried blood spots in England. Pereira, M. (Metrop. Police Forensic Sci., Holborn, Engl.). *Med. Leg. Domm. Corpor.* 1972, 5(1), 36-9 (Fr). A review of methods used in England for the detn. of antigens, proteins, and enzymes in dried blood stains.

14110. THORSBY, ERIK. Det molekylaere grunnlag for genetisk variasjon hos mennesket. [The molecular basis of genetic variation in man.] TIDSSDR NOR LAEGEFOREN 90(11): 1187-1191. Illus. 1970. [Engl. sum.]--A survey of the molecular basis of genetic polymorphism in man is given. The hemoglobin-variants, haptoglobin and ABO system are used as illustrations of the principles. Point-mutations and crossing over seem to be the most important mechanisms. It is stressed that while rather great differences between the phenotypes may be observed, the differences at the molecular level often are very small.--G. A. H.

38833x Study of haptoglobin types by vertical disc acrylamide gel electrophoresis. Application to the diagnosis of blood spots. Castilla, J.; Villanueva, E.; Gisbert-Calabuig, J. A. (Fac. Med., Granada, Spain). *Med. Leg. Domm. Corpor.* **1972**, 5(1), 52-4 (Fr). The characteristics and advantages of disc acrylamide gel electrophoresis in the detection of haptoglobin in blood stains were described. In blood stains older than 7 days, haptoglobin was detected in 33% of cases by the proposed method and in only 1.3% of the cases by disc starch gel electrophoresis.

67740v Study of human haptoglobins by continuous density gradient polyacrylamide gel electrophoresis. Villanueva, E.; Tran Van Ky, Philippe; Lenoir, L.; Demailly, A.; Muller, P. (Inst. Med. Leg. Med. Soc., Lille, Fr.). *Med. Leg. Domm. Corpor.* **1972**, 5(1), 48-51 (Fr). Haptoglobin-hemoglobin complexes, originating from human and animal blood, or from blood stains, were sepd. by continuous d. gradient polyacrylamide gel electrophoresis. Three types of human blood (1-1, 2-1, and 2-2) were identified. The 1-1 type was sepd. into 2 complexes, the 2-1 type into 5, and the 2-2 type into a variable no. of 3-15 complexes. The distribution of the 3 blood types was 13.8, 47.08, and 38.61%, resp. Animal blood belonged almost exclusively to the 1-1 group. All human blood types showed a common immunoprepn. line with a human α_2-haptoglobin antiserum, as shown by the Ouchterlony technique, and by immunoelectrophoresis. The animal serums presented a partial immunol. identity with the human serums.
P. J. Sicard

927p Glutamate-pyruvate transaminase in blood stains. Welch, S. G. (Dep. Biochem., London Hosp. Med. Coll., London, Engl.). *Forensic Sci. Soc., J.* 1972, 12(4), 605-7 (Eng). *Glutamate pyruvate transaminase* (GPT) [9000-86-6], a polymorphic human erythrocyte enzyme, was detected and reliably typed by horizontal starch gel electrophoresis in all of 54 stains ≤14 days old. After 22 days <1/2 of the stains could be typed, and by 30 days no GPT activity was detected in any of the stains. The relative usefulness of GPT and other red cell enzymes for bloodstain identification decreased in the order: *acid phosphatase* [9001-77-8] > GPT > *phosphoglucomutase* [9001-81-4] > *adenylate kinase* [9013-02-9] and *adenosine deaminase* [9026-93-1] > *6-phosphogluconate dehydrogenase* [9001-82-5] > *glucose-6-phosphate dehydrogenase* [9001-40-5].

652h Two-dimensional immunoelectrophoresis in legal medicine. Saint-Paul, M.; Rebeyrotte, P.; Derobert, L.; Peillet, J.; Labbe, J. P. (Unite Enseign. Rech. Med. Leg. Droit Med. Deontol., Univ. Rene-Descartes, Paris, Fr.). *Med. Leg. Domm. Corpor.* **1971**, 4(2), 126-9 (Fr). Using a modification of Laurell's 2-dimensional immunoelectrophoresis method, blood was identified and SERUM PROTEIN PUTREFACTIVE DEGRADATION was studied. Several days after death *transferrin* and *prealbumin* levels were significantly high and immunoglobulin level was particularly low. Three years after death the total protein level was decreased; *albumin*, a glycoprotein, *haptoglobin*, transferrin, and the immunoglobulins still existed. Five years after death albumin was practically the only protein left.

† 25851. PASTEWKA, J. V., R. A. REED, A. T. NESS and A. C. PEACOCK. (Chem. Branch, Natl. Cancer Inst., Natl. Inst. Health, Bethesda, Md. 20014, USA.) An improved haptoglobin subtyping procedure using polyacrylamide gel electrophoresis: Haptoglobin gene frequency distribution among a group of blood bank donors. ANAL BIOCHEM 51(1): 152-162. Illus. 1973.--The Smithies and Connell haptoglobin subtyping procedures were modified and a practical and reliable haptoglobin subtyping method was developed.--E. S.

62660. BODMER, W. F. (Genet. Lab., Dep. Biochem., Univ. Oxford, Oxford, Engl., UK.) Evolutionary significance of HL-A system. NATURE (LOND) 237(5351): 139-145. 1972.--It is still an open question how the genetic polymorphism represented by the principal human histocompatibility system is maintained. It may have evolved as a consequence of the necessity for cell to cell recognition during development and morphogenesis.--D. B.

† 66648. LOPATIN, DENNIS E., and EDWARD W. VOSS, Jr. (Dep. Microbiol., Univ. Ill., Urbana, Ill. 61801, USA.) Fluorescein. Hapten and antibody active-site probe. BIOCHEMISTRY 10(2): 208-213. Illus. 1970[recd. 1971].--Fluorescein groups conjugated to a gammaglobulin protein carrier elicit a strong antibody [Ab] response. Ab specific for the fluorescein group were purified by immunoadsorption and the immunoglobulin G Ab resolved. A fluorometric binding assay was developed based on the observation that the ligand, fluorescein disodium, is quenched when bound to the Ab's active sites. Results of the fluorescence ligand binding assay were compared with results obtained from equilibrium dialysis. This comparison indicated that the fluorometric assay accurately measured the average intrinsic association constant and heterogeneity index. Because the fluorescence ligand quenching assay depends on a reduction in the fluorescence of the ligand rather than a measurement of the fluorescent chromophores within the Ab protein the assay was applicable for use with immune sera [rabbit] to indicate the presence of Ab.

37076. MCALPINE, PHYLLIS J., D. A. HOPKINSON, and HARRY HARRIS. (Univ. Coll., London, Engl., UK.) The relative activities attributable to the three phosphoglucomutase loci (PGM_1, PGM_2, PGM_3) in human tissues. ANN HUM GENET 34(2): 169-175. 1970.--The isozymes attributable to the 3 phosphoglucomutase loci, PGM_1, PGM_2 and PGM_3, were separated by agarose-acrylamide gel electrophoresis and their relative activities were measured in a range of human tissues. In most tissues except red cells and fibroblasts, 85-95% of the total PGM activity is determined by the PGM_1 locus, 2-15% is contributed by the PGM_2 locus and 1-2% is determined by the 3rd locus PGM_3. In fibroblasts the PGM_3 isozymes are relatively much more active and account for nearly 7% of the total PGM activity. In red cells approximately equal amounts of the PGM_1 and PGM_2 isozymes occur but no PGM_3 isozymes are found. The atypical PGM isozyme pattern observed in red cells is probably a reflection of in vivo stability differences between the 3 forms of PGM. In other tissues the PGM isozyme patterns are probably consequent upon differences in rates of synthesis or differences in the specific activities of the gene products

40915. GAJOS, E., and K. BRZECKA. Identification de l'espèces des petites quantités de materiel biologique à l'aide de son incorporation dans la gélose. [Identification of the species of small amounts of biological material by its incorporation in agar.] MED LEG DOMM CORPOR 1(3): 290-293. Illus. 1968[recd. 1969].--A simple and fast method for determining the origin of very small blood stains (about 1-2 mm diameter) based on the incorporation of the material in agar, and precipitation by double diffusion, is proposed. The advantage is in avoiding the preparation of aqueous extracts of the blood stains examined.--A. B. C.

130288. BLANC, M. (Cent. Hemotypol., C. N. R. S., Toulouse, Fr.), R. GORTZ, and J. DUCOS. The value of Gm typing for determining the racial origin of blood strains. J FORENSIC SCI 16(2): 176-182. 1971.--Tests for Gm antigens in dried blood stains should be made part of the routine practice in forensic medicine. The identification of Gm antigens is as reliable as that of many erythrocytic antigens, and the tests can be carried out on smaller stains. The tests increase the number of detectable characteristics and thus increase the precision of individual identification, and at the same time add a new dimension, namely, the prediction of the racial origin of the individual from whom a blood stain is derived.--L. P. S.

† 2203. CHEN, SHI-HAN, JEANNE E. ANDERSON, and ELOISE R. GIBLETT. (King Cty. Cent. Blood Bank, Seattle, Wash., USA.) 2,3-Diphosphoglycerate mutase: Its demonstration by electrophoresis and the detection of a genetic variant. BIOCHEM GENET 5(5): 481-486. Illus. 1971.--A method is described for detecting the electrophoretic pattern of the enzyme 2,3-diphosphoglycerate mutase (2,3-DPGM) after starch gel electrophoresis. In addition, a genetic variant found in a Canadian Eskimo family is described. The pattern of this (presumably) heterozygous phenotype is consistent with a dimeric structure of the enzyme.

15299b Storage of capillary blood on paper for the determination of galactotransferase and glucose-6-phosphate dehydrogenase. Dorche, C.; Kissin, Christiane; Collombel, Christian; Mathieu, Monique; Rolland, Marcel; Cotte, Jean (Lab. Biochim., Hop. Enfants Debrousse, Lyons, Fr.). *Int. Congr. Clin. Chem., [Proc.], 7th* 1969 (Pub. 1970), 2, 82-8 (Fr). Edited by Roth, Marc. Karger: Basel, Switz. The activities of galactose-1-phosphate uridyl transferase, and glucose-6-phosphate dehydrogenase in capillary blood dried on filter paper were followed as a function of time. The activities decrease quickly for 1 week and more slowly over the next month.

2186 BECKMAN, G., L. BECKMAN, and A. TARNVIK. (Dep. Clin. Bacteriol., Univ., Umea, Swed.) A rare subunit variant shared by five acid phosphatase isozymes from human leukocytes and placentae. HUM HERED 20(1): 81-85. Illus. 1970.--Results are presented which suggest that 2 placental and 5 leukocyte acid phosphatases are sharing the same polypeptide subunit. The conclusions are based on the coincidence of a slow moving rare electrophoretic variant in the leukocytes of a father and in the placenta of his daughter.--G. A. H.

30292n Effect of storage upon the activity of phosphoglucomutase and adenylate kinase enzymes in blood samples and bloodstains. Rothwell, T. (Engl.). *Med., Sci. Law* 1970, 10(4), 230-4 (Eng). The ease of grouping bloodstains and blood lysates of various ages in the phosphoglucomutase (PGM) and adenylate kinase systems was studied. Neither enzyme remained groupable in bloodstains indefinitely. PGM was the less stable of the 2. Both enzymes remained groupable in deep frozen red cell lysates for much longer periods, although in these samples, also, PGM appeared to be the less stable enzyme.

38837b Identification of the chemical, serological, and immunological properties of human blood spots on clothes dry cleaned by standard techniques. Lenoir, L.; Tran Van Ky, Philippe; Muller, P. H.; Desfontaines, D. (Inst. Med. Leg., Lille, Fr.). *Med. Leg. Domm. Corpor.* 1972, 5(1), 71-3 (Fr). Human blood spots on clothes were still identifiable by the std. chem., serol., and immunol. methods when analyzed up to 6 years after subjecting the clothes to various dry cleaning methods. For spots 6-12 months old a 4-day elution was required instead of the normal 48-hr elution, and spots older than 1 year were eluted for 8 days.

777u Recent progress in the individualization of blood and the adaptation of the Hyland cross-over electrophoresis system in the identification of bloodstains. Grunbaum, Benjamin W. (Environ. Physiol. Lab., Univ. California, Berkeley, Calif.). *Forensic Sci. Soc., J.* 1972, 12(2), 421-3 (Eng). A review with 4 refs. The methods and equipment for the specific and sensitive identification of biol. materials, fresh or aged, are described.

18476. SACHS, V., J. DREWS, and B. WALDVOGEL. (Hyg.-Inst., Univ. Kiel, Kiel, West Ger.) Einbeziehung der Lewis-Blutgruppen in das Blutgruppengutachten. [Inclusion of the Lewis' blood groups in the blood-grouping expert's opinion.] BLUT 23(1): 20-24. Illus. 1971. [Engl. summ.]--Since it is now possible to determine exactly the Lewis [Le] blood groups because of the sufficient number of efficient anti-Le sera it is also justified to involve the Le blood groups in the paternity blood group opinion. A genetic hypothesis is presented explaining the Le groups by interaction of the independent heritable ABO and Le substance secretor status. From this hypothesis there are developed the process of paternity exclusion and the parameters of paternity presumption with the help of the likelihood ratio Y, X of Essen-Moller in the Lewis blood group system and the obtained data are tabulated.--L. P. S.

46900 DISSING, J., and J. B. KNUDSEN. (Univ. Inst. Forensic Med., Copenhagen, Den.) A new red cell adenosine deaminase phenotype in man. HUM HERED 19(4): 375-377. Illus. 1969.--A new rare adenosine deaminase phenotype in human erythrocytes is reported. The enzyme-pattern and the family study suggest that it may be heterozygous involving the common ADA^1 gene and a new rare ADA^3 gene.--S. A.

19506. OKUTSU, MITSUHIRO. (Dep. Forensic Med., Tokyo Med. Coll., Tokyo, Jap.) [Fundamental studies on the difference of absorbing capacity in titer of various antisera in the group determinations of human blood and saliva stains, and on the differentiation to haptoglobin type of human bloodstains.] J TOKYO MED COLL 28(1): 13-29. Illus. 1970[recd. 1971]. [In Jap. with Engl. summ.]--Tests for the identification of blood or saliva are employed as a part of routine investigation in many cases of violent death. The specimen to be examined is fresh fluid blood, clotted blood or saliva stains collected at the scene of a crime. Specimens of blood and saliva-stained articles were examined as in forensic medicine. In bloodstain diluted with saline 1:128, it is possible to determine human blood groups. In the Elution Test, antiserum of high agglutinin titer showed good results. In saliva of group A secretor the group specific agglutination was demonstrated. The haptoglobin patterns by electrophoresis in a specimen left at room temperature for 20 days connot satisfactorily be carried out, but the determination can comfortably be carried out in an incubated specimen, even after 1 mo. The value of α_2-globulin decreases with time, and shows remarkable decrease in the course of 15 days. The hemoglobin (Hb) binding ability decreased with time.--E. G.

† 136626. SCHLESINGER, DANUTA. (Inst. Immunol. and Exp. Ther., Pol. Acad. Sci., Breslau, Pol.) Determination of Gc types by starch-gel electrophoresis. ARCH IMMUNOL THER EXP 19(2): 173-178. Illus. 1971.--A method of starch-gel electrophoresis for determining Gc types is described. Separation was obtained by the use of Tris-citric acid buffer of pH 4.8 for the gel, and borate buffer of pH 7.9 in the electrode vessels, in which Gc protein migrated toward the cathode faster than the remaining serum proteins, giving 1 zone each in different positions in the Gc_{1-1} and Gc_{2-2} types. In the Gc_{2-1} type, 2 zones were obtained in the same position as the zones in homozygotic types, but characterized by smaller protein concentration. Determination of Gc types in a population sample of 2287 persons by the electrophoretic and immunoelectrophoretic methods gave concordant results.

19475 BLANC, M. (Cent. Hemotyologie, CNRS, Toulouse, Fr.), and R. GORTZ. Identification of a new factor Gm "Bet" in blood stains: Application in forensic medicine. VOX SANG 20(3): 263-266. 1971. --The identification of the factor Gm (Bet) reported here for the 1st time, assures a greater accuracy in the identification of blood stains in forensic medicine because it introduces an extra character. But this factor is also of general interest, because factor (Bet) is part of the mosaic Gm (b), the racial variations of which are well known to be characteristic. In the stains studied no dissociation were observed between the results obtained by anti-Gm and anti-Gm (Bet) as is always the case for caucasoids and mongoloids. However, this may occasionally occur because in the negroid the 3 following phenotypes are found: Gm (-3,5,-10,11,-14,-Bet), Gm (-3,5,10,11,14,-Bet) and Gm (-3,5,10,11,14, Bet). Therefore, if a disagreement between the results of anti-Gm and anti-Gm (Bet) is observed in the blood groupings of stains, one may safely assume that the blood stain belongs to a negroid subject. It is evident that this can be of considerable importance in the identification and the apprehension of a suspect in forensic medicine cases. --L. P. S.

56362. KUWAHARA, HIDEYUKI. (Nagasaki Univ. Sch. Med., Nagasaki, Jap.) [Blood group determination by means of minute blood stains using agglutinin absorption test.] NAGASAKI IGAKKAI ZASSI 42(9): 767-788. Illus. 1967[recd. 1968]. [In Jap. with Engl. sum.] --The blood type test of a blood stain is a very important test in the practice of legal medicine. An accurate method of blood type determination was developed. It is a modification of the hole glass method elaborated by Professor Tomonaga, which can test the minute blood stain of 0.025mg. The test has the advantage of accuracy, but the procedure is complicated and requires technical skill and time. Therefore, a simple method using only one stage of test instead of 4 stages of dilution procedure was considered in order to remove the disadvantage. The result was available for application on the routine legal specimen because the time of examination was saved, and further, less than half of the originally required amount or 0.013mg of blood stain specimen was required.--Author.

† 60329. BRINKMANN, BERND, and JAN DIRKS. (Inst. Forensic Med., Univ. Hamb., Hamburg, West Ger.) Identification and demonstration of three enzyme polymorphisms from bloodstains by simultaneous electrophoresis: Adenylate kinase (AK), adenosine deaminase (ADA), 6-phosphogluconate dehydrogenase (PGD). Z RECHTSMED 69(3): 185-190. Illus. 1971[recd. 1972]. [Ger. summ.]--The demonstrability of isozyme polymorphisms adenylate kinase, adenosine deaminase and 6-phosphogluconate dehydrogenase from stored bloodstains was studied. Bloodstains from individuals with known and with unknown phenotypes were investigated. A special method for preparation is given. Samples were separated by a simultaneous electrophoretic method. Limits for identification were different and found 4 wk for PGD, 5 mo. for ADA and at least 11 mo. for AK. AK isozymes and sometimes ADA isozymes were detected in older bloodstains.

† 2056. SENSABAUGH, G. F., Jr. (Natl. Inst. Med. Res., London, Engl., UK.), A. C. WILSON, and P. L. KIRK. Protein stability in preserved biological remains: I. Survival of biologically active proteins in an 8-year-old sample of dried blood. INT J BIOCHEM 2(11): 545-557. Illus. 1971[recd. 1972].--A sample of whole human blood that had been stored in the dried state for 8 yr at room temperature was tested for the presence of 11 specific globular proteins. Eight of them survived, as judged by the criteria of enzymatic activity and reactivity with specific antisera. Some of the surviving proteins were further characterized by electrophoretic, spectral, and immunochemical techniques; there is evidence that they are modified despite the retention of enzymatic and antigenic activity.

† 122633. SUZUKI, TSUNEO. (Tohoku Univ. Sch. Med., Sendai, Miyagi, Jap.) Blood grouping of bloodstains by immuno-electron microscopy. TOHOKU J EXP MED 10(1): 1-7. Illus. 1970.--A new immunological method for blood grouping of human bloodstains was studied. In this method, anti-A or anti-B globulin conjugated with ferritin particles combines easily with the corresponding blood group antigen of bloodstains, and a direct observation of antigen-antibody reaction is possible. This method requires an electron microscope, but it brings about a better result than the other methods, especially when the bloodstain is very small. This method can be applied to the blood

61884. St. SCHNITZLER, G. MULLER, and O. PROKOP. (Inst. Gerichtl. Med., Humboldt-Univ., Berlin, West Ger.) Ein "neuer" Antikorper: Anti-P_{rut} aufgefunden im Rogen von Rutilus rutilus. [A "new" antibody: anti-P_{rut} found in the roe of Rutilus rutilus.] Z IMMUNITATSFORSCH ALLERGIE KLIN IMMUNOL 134(1): 45-53. 1967. [Ger., Engl., Fr., Span. and Russ. sum.]--An antibody found in saline extracts from the roe of R. rutilus was named anti-P_{rut}. The antibody reacts better in low temperature than at 37 centigrade and possesses a specificity anti-P_1 + B. It is impossible, by absorption or inhibition, to produce a P_1 antibody fully specific for all ABO blood groups. The new reagent is very suitable to determine the factor P_1 both in the A and O groups.--Authors.

† 76772. LALEZARI, P. (Montefiore Hosp. and Med. Cent., New York, N. Y., USA.) A new method for detection of red blood cell antibodies. TRANSFUSION (PHILADELPHIA) 8(6): 372-380. Illus. 1968.--A new method for the detection of [human] red blood cell antibodies was developed. Polybrene, a positively charged polymer, was utilized to produce agglutination of red blood cells. This agglutination could be reversed by the addition of hypertonic salt solution. However, red blood cells remained agglutinated in the presence of antibodies. This principle was applied to antibody detection automated by AutoAnalyzer. The method has proved to be highly sensitive and has a wide spectrum of usefulness for the detection of both "complete" and "incomplete" antibodies.

† 66276. NAGATA, T. (Sch. Med., Kyuschu Univ., Fukuoka, Jap.), and G. DOTZAUER. Nachweis und Typenbestimmbarkeit der sauren Erythrocytenphosphatase in Blutspuren. [The identification and typing of erythrocyte acid phosphatase [SEP] in blood stains.] Z RECHTSMED 67(6): 359-363. 1970[recd. 1971]. [Engl. sum.]--The limits of the SEP identification in the blood spots under various circumstances i.e. the dependence on blood quantity, temperature, and carrier were studied. Heidel's statement that she was able to identify SEP in 30 day old spots could not be confirmed. In the present experiments SEP was identified in 32 hr old blood stains using 20 mg of dry blood substance. The deep temperature (-40 C) gave better results, and from a forensic point of view the preservation of the specimens under such conditions is recommended.

37225. DAUSSET, J. (Inst. Rech. Mal. Sang., Lab. Immuno-Hematol., Hop. Saint Louis, 75 Paris, Fr.) Similarities between the HL-A system and other immunogenetic systems. VOX SANG 23(3): 153-164. Illus. 1972.--The genetic determinants of the HL-A and Rh systems are discussed, based on serological observations in humans. At the genetic level, it is impossible to extrapolate from the present serological or cellular data obtained in vitro and from the chemical data in which only the antigenic product is involved. The HL-A system appears to be different from the other immunogenetic systems because of its extreme polymorphism.--J. E. F.

56582. KISSMEYER-NIELSEN, F., A. SVEJGAARD, and M. HAUGE. (Municipal Hosp., Aarhus, Den.) Genetics of the human HL-A transplantation system. NATURE (LONDON) 219(5159): 1116-1119. 1968.--Genetic and statistical analyses indicate that the HL-A system contains 2 intimately related chromosome regions containing at least 7 and 8 alleles, respectively. The complex antibodies which these regions give rise to consist of a mixture of smaller components.--Authors.

† 84019. HILGERMANN, R. (Inst. Rechtsmed., Univ., Marburg, W. Ger.) Neue Untersuchungen zur A-Untergruppen-Differenzierung an Blutspuren. [New Investigations about sub-typing of group A blood traces.] Z RECHTSMED 68(2): 79-85. 1971. [Engl. summ.]--A modified absorption-elution technique as a method of sub-typing group A bloodstains and blood traces is described. The procedure is suitable for microanalysis even when only low tetred antisera and anti-A and anti-H lectins are available, if optimal performance conditions are employed.

5735. TOMITA, KOICHI. (Hiroshima Univ. Sch. Med., Hiroshima, Jap.) On the detection of blood groups from bloodstains containing detergent. HIROSHIMA J MED SCI 16(1): 67-80. 1967.--When the bloodstains washed with detergent are extracted with hot alcohol, the surface active agents contained in the detergent used interfere with the absorption test. The author has exploited the method of exclusion of these components from the bloodstains washed with detergents. Chloroform can be utilized for this purpose, and the surface active agents are excluded from the fixed bloodstains using water and chloroform. Other components of detergents left in the bloodstain are excluded by using petroleum benzine. The completed process of the method is as follows. Fixed bloodstains are washed in warm water twice, are rinsed in petroleum benzine after exsiccating, and are extracted with 75% (vol.) alcohol maintained at 70°C for 2 ~ 3 hr. The "extracted" supernatant layers are then evaporated by placing the contained in a hot watery trough. The components which are soluble in chloroform are excluded from these residua and are then exsiccated. These residua are examined by means of an absorption test. The attempt of absorption test after this process has been so successful as to be able to determinate the blood groups of washed bloodstain.--Author.

Bloodtype serological problems in forensic medicine] Henningsen K. Nord Med 85:705-6, 3 Jun 71 (Dan)

22809 METAXAS, M. N., M. METAXAS-BUHLER, and E. W. IKIN. (Swiss Red Cross Blood Transfus. Cent., Zurich, Switz.) Complexities of the MN locus. VOX SANG 15(2): 102-117. 1968.--Fifteen examples of rare alleles of M and N were found in serial tests on 3895 blood donors. They include: a 3rd example of M^C, which differs from the 2 previously known ones in that it is inherited as a M^CS (instead of M^CS) gene complex; an example each of 2 genes whose phenotypic expression consists of the antigens M, N and St^a (Stones), but which differ so markedly, particularly as to the 'amount' of N formed, that they have been given separate symbols, namely, M^Z and M^r; an example of N_2, a gene defined as giving rise to N, in a form weaker than 'normal', but not to any M antigen. The antigens arising from each of these 4 genes were studied in detail, by means of parallel tests with large panels of M and N reagents on blood samples from persons found in the 3895 series, selected members of their families, and unrelated carriers of M^C, M^r, and N_2. Also included in these studies were cell samples heterozygous for M^g and M^K, and 'special' sera such as anti-M^g, anti-M^K, anti-M', etc. Anti-M' subdivides groups M and MN in much the same way as anti-M1 does; in one respect at least, however, it differs clearly from the latter, namely, in its reactions with NM^C and NM^Z cells. The results of tests with anti-M^K on cells of all available MNSs genotypes suggest the possibility that M^K is a precursor substance of the MNSs system.--Authors.

† 20146. TERASKI, PAUL I. (Univ. Calif., Cent. Health Sci., Los Angeles, Calif., USA.), VILMA D. MOTTIRONI, and EUGENE V. BARNETT. Cytotoxins in disease. Autocytotoxins in lupus. N ENGL J MED 283(14): 724-728. Illus. 1970.--Lymphocytotoxic antibodies were found in 56 of 64 serum specimens from patients with systemic lupus erythematosus and 30 of 53 patients with rheumatoid arthritis. These cytotoxic antibodies characteristically reacted with a temperature optimum of 15C as was found earlier with serums from patients with infectious mononucleosis, rubella and rubeola. The lymphotoxin found in systemic lupus was cytotoxic to autologous lymphocytes in 24 of 32 specimens tested. No correlation was found to the antibodies detected by radioactive labeled DNA immunoelectrophoresis, antibodies against single-strand DNA and DNA. A definite association with antinuclear-factor activity and a weak association with latex-fixation tests were found. Association of specificity was tested against 18 different HL-A specificities, and antibodies against HL-A11, Te54, Te56 and Te59 were frequently observed.

71100. DONSKOV, S. I., R. M. URINSON, and E. A. ZOTIKOV. (Cent. Inst. Hematol. Blood Transfus., Moscow, USSR.) Ekspress-metod opredeleniya rezus-faktora. [Quick method of determining the Rh-factor.] LAB DELO 10. 607-611. Illus. 1968.--Determination of the [human] Rh factor is done on any flat unheated surface with the use of specially prepared test and control sera. The test serum for preparation requires serum of group AB(IV) with a titer of incomplete Rh antibodies not less than 1: 32, albumin, dextran and heparin. The control serum requires the same reagents, but isohemagglutinating serum of group AB(IV) is used in place of anti-Rh factor. One drop of anti-Rh factor serum is mixed on a surface with 1 drop of control serum agglutination indicating a positive reaction. The test takes about 10 min. The determination is carried out at 15-35° C. The shelf life of the sera is from 3-6 mo.--J. Slep.

95898. BUFARDECI, F., P. MARTINI, and V. QUERCI. (Ist. Med. Legale e Assicurazioni, Univ. Siena, Siena, Italy.) Possibilita e limiti di identificazione delle proprieta Gc: Nola preliminare. [The possibilities of identification and limits of identification of Gc properties: Preliminary note.] ATTI ACCAD FISIOCRIT SIENA SEZ MED FIS 14(2): 953-957. Illus. 1965[recd. 1967].--Blood samples were taken from 5 persons belonging to groups Gc 1-1, Gc 2-1 and Gc 2-2. Specimens were left at room temperature without any attempt to prevent bacterial contamination. Determinations of the Gc serum group were carried out by immunoelectrophoresis, using the Hirschfield technique. The method appears to have valid utility for medicolegal purposes. --From auth.

† 60327 ABE, K., and V. PAUSCH. (Inst. Blood Group Serol., Univ. Vienna, Vienna, Aust.) The Kell: Cellano blood group system in clinical and medico-legal practice: A survey covering a period of twenty years. HAEMATOLOGIA 5(3): 217-225. Illus. 1971[recd. 1972].--The practical application of the blood group system Kell is reviewed over a period of 20 yr (1950-1970). In half a million clinical blood samples, 53 Kell antibodies have been found. The characteristics of these antibodies, the cause of their production and their clinical significance are discussed. The usefulness of the Kell system and the experience with its application in cases of disputed paternity are described.

56624. MacDONALD, K. A., MARGARET E. NICHOLS, W. L. MARSH, and W. J. JENKINS. (Reg. Blood Transfus. Cent., Brentwood, Essex, Engl., UK.) The first example of anti-Henshaw in human serum. VOX SANG 13(4): 346-348. 1967.--Henshaw is a comparatively rare Negro antigen associated with the MNS system. The 1st example of an antibody to the Henshaw antigen in human serum is described; the discovery was a result of a routine inclusion of selected Negro red cells in an antibody screening procedure. --From auth.

56363. KUWAHARA, HIDEYUKI. (Nagasaki Univ. Sch. Med., Nagasaki, Jap.) [On the experiment of blood group determination by means of soiled blood stains.] NAGASAKI IGAKKAI ZASSI 42(10): 871-887. 1967[recd. 1968]. [In Jap. with Eng. sum.]--Medicolegal examination of the blood stain which is contaminated with the saliva, semen, sweat, grime or oil was greatly improved by pre-treatment as shown in the following way. The specimen contaminated with the sweat, grime or dye of the cloth was immersed in distilled water, and then was dried. Contamination with machinery oil, grease, heavy sweat or grime is immersed in distilled water and 80 % alcohol, and then rinsed with ether, acetone and dried before the test. The blood stain with the saliva or semen was immersed in distilled water or 80 % alcohol until the sediment was formed, and the sediment and the supernatant were dried separately. The same result was obtained by treatment with either distilled water or alcohol. After the specimens were treated as mentioned above, the blood type of small blood stain such as 1.0 to 1.2 mg was determined using hole glass method. In order to make the test more sensitive, mixed stains of the blood and saliva were examined by combined using elution and mixed agglutination tests. The saliva was removed, and the blood type was determined on 0.3 mg of the blood stain by elution test, and 0.2 mg by mixed agglutination test. As far as mixed agglutination test is concerned, it seems to be much more effective by improving fixation of the specimen. --Author.

56364. OYAMA, TAKASHI. (Nagasaki Univ. Sch. Med., Nagasaki, Jap.) [Blood group determination by means of mixed agglutination: Second report. Blood group determination of the saliva stains, seminal stains, soiled blood stains and the hair.] NAGASAKI IGAKKAI ZASSI 42(10): 888-898. 1967[recd. 1968]. [In Jap. with Engl. sum.]--Blood type determination is the most important test among the medicolegal examinations of the material. The most widely used and reliable method of blood type testing at present is to prove the blood type by absorbing the substance which inhibits agglutination. This method, however, is not successful all the time because there are occasions when only a minute specimen is used for the test. The method was applied to the saliva stain, semen stain, soiled blood stain and the hair, and the following results were obtained. The saliva stain revealed blood type by using this technique on both the secretory and non-secretory types except a small number of non-secretory types. The soiled blood stain was submerged in 75 % alcohol for 3 hr (alcohol method) or in distilled water which was renewed 2 or 3 times before keeping in the incubator over night, and then the sediment was tested for blood type. All secretory type of the hair specimens showed their own blood types when their lower ends were immersed in the solution over night but some of the non-secretory type of specimens failed to disclose their blood type. The blood, saliva and semen stains showed lower agglutination due to dissolution when they were kept in 50° C. for 10 min at the time of contact with the blood corpuscles. The hair revealed the most sensitive agglutination when left in 15° to 20° C. for 30 to 60 min after sensitizing for 3 hr as compared with the specimen left overnight in the room temperature. --From auth.

31856. VYAS, G. N., H. H. FUDENBERG, H. M. PRETTY, and E. R. GOLD. (Univ. Calif. Sch. Med., San Francisco, Calif., USA.) A new rapid method for genetic typing of human immunoglobulins. J IMMUNOL 100(2): 274-279. Illus. 1968.--A passive hemagglutination technique employing isolated gamma-globulins and myeloma proteins of known genetic types coated onto human group O cells by chromic chloride method was developed. Cells thus coated were successfully used for Gm and Inv typing of human sera. The degree of discrimination between inhibiting and non-inhibiting sera is as great as with the conventional method using cells coated with incomplete anti-Rh.

† 82502. MARSH, W. L., and W. J. JENKINS. (N. E. Metrop Reg. Blood Transfus, Cent., Brentwood, Essex, Engl., UK.) Automated detection of blood group antibodies. J MED LAB TECHNOL 25(4): 335-342. Illus. 1968.--A critical survey of automated [human] antibody screening was made and a procedure devised that will permit the detection of nearly all blood group antibodies. The presence of M antibodies can only be demonstrated by omitting the proteolytic enzyme from the system. Fresh red cells of comprehensive antigen structure are necessary, and for this reason the procedure is most suitable for larger reference laboratories.

26076. LAMBERT, R. M. (Blood Group Res. Unit, Dep. Microbiol., Sch. Med., State Univ. N. Y., Buffalo, N. Y., USA.), J. P. DOWNING and S. K. ZELENSKI. The stability of the I, II, and H blood group antigens during storage at 4°C. VOX SANG 24(4): 362-365. Illus. 1973.--In agglutination experiments using antisera of human origin, the I, II and H erythrocyte antigens were stable on red cells that were collected as clotted blood and in ACD[acid-citrate-dextrose]-B solution and maintained at 4°C for periods as long as 28 days. These blood group antigens were also well preserved on red cells that were frozen at -150 C in the vapor phase of liquid N and, after recovery from the frozen state, were maintained at 4°C in a dextrose-electrolyte solution for 7 days.

93407. TUROWSKA, BOŻENA. (Zakł. Med. Sądowej, Akad. Med., Cracow, Pol.) Grupowo swoiste układy białkowe i enzymatyczne w plamach krwi ludzkiej. [Group specific protein and enzyme systems in human blood stains.] FOLIA MED CRACOV 11(4): 411-445. Illus. 1969. [Russ. and Engl. sum.]--The role of the discovery of specificity of serum proteins and their genetically controlled polymorphism are discussed. The current state of studies, initiated in 1955 by Smithies, on serum protein group systems is described with regard to the haptoglobin Hp system, Gc group system, gamma globulin systems Gm and Inv, transferrin group system Tf, and lipoprotein systems Ag and Lp. The cholinesterase and alkaline phosphatase system is also discussed. Results of studies on identification of serum protein and enzyme systems in human blood stains are summarized. In 1962, the writer began studies on the determination of the group-specific Gm, Hp, Tf and Gc systems and serum cholinesterase and alkaline phosphatase with the purpose of applying the biologic individuality of human blood to the differentiation of dried blood stains for forensic-medical purposes. The introduction of new methods in forensic investigations depended on the performance of a large number of examinations and comparison of the results with those of other investigators.--L. P. S.

† 116869. CLEVE, HARTWIG, F. DAVID KITCHIN, G. KIRCHBERG, and G. GERHARD WENDT. (Cornell Univ. Med. Coll., New York, N. Y., USA.) A faster migrating Gc-variant: Gc Darmstadt. HUMANGENETIK 9(1): 26-33. Illus. 1970. [Engl. sum.]--In 3 members of a family from Darmstadt (Germany) a faster migrating Gc variant was observed. The variant phenotypes were examined by routine immunoelectrophoresis, by immunoelectrophoresis with prolonged separation times and with Gc-monospecific antisera, by polyacrylamide gel electrophoresis, and by antigen-antibody crossed electrophoresis. By antigen-antibody crossed electrophoresis the new Gc variant was clearly distinguishable from the Gc Aborigine and from the Gc Chippewa variant. The variant was named Gc Darmstadt (GcD). Gc Darmstadt has an electrophoretic migration rate intermediate between Gc Ab and Gc 1. In 2 sibs the type Gc D-2 was observed, the daughter of one of these sibs had the type Gc D-1. The analysis of several members of this family provided only limited information on the mode of inheritance of Gc Darmstadt. Gc Darmstadt appears to be determined by a gene Gc^D which may be allelic to Gc^1 and Gc^2.

228. **Group system Kell** - SKUPINOVY SYSTEM KELL. Vael J. - Ust. Krevni Trans. KUNZ, Brno - VNITRNI LEK. LEK. 1970 16/12 (1157-1163)

The Kell system has at present 8 antigenic types. Five specific antibodies have been proved and are now used for the preparation of diagnostic anti sera: anti K_1 (Kell), anti K_2 (Cellano), anti K_3 (Penney), anti K_4 (Rautenberg), anti K_5 (Peltz). The authors experience with 3 classical and K_1 antibodies which have been discovered in blood donors in the years 1967 1969 is reported. Their possible origin is discussed. Considering the fact that in the majority these immune antibodies were discovered after multiple and single transfusions, the author stresses the importance of the immunoreactive effect of the Kell system in repeated transfusions and points out a serious danger of inadequately performed compatibility examinations before a transfusion. Statistically usable data of incidence of the classical genetic allele Kell (K k) are given based on long term studies of Moravian populations.

39642. REED, T. EDWARD. (Dep. Zool., Univ., Toronto, Ont., Can.) Distributions and tests of independence of seven blood group systems in a large multiracial sample from California. AMER J HUM GENET 20(2): 142-150. 1968.--Phenotype distributions and estimated gene frequencies are presented for 7 blood group systems (A_1A_2BO, Rh, MNSs, Kell, Duffy, Lutheran, and P) in adults of 3 racial groups (8,962 Caucasians, including a separately analyzed subgroup of 5,056 predominantly of western European ancestry; 3,146 Negroes; 335 Americans of Mexican ancestry) from the eastern San Francisco Bay area of California. The frequencies agree quite well with published data. The ABO, Rh, and MNSs distributions agree well with Hardy-Weinberg expectations (except for Negro Rh and MNSs, due very probably to absence of data on Du and S-s-phenotypes). The phenotype distributions of all pairs of systems, in Caucasians (western European ancestry) and Negroes, were tested for independence. Of the 54 pairs of systems, 4 had contingency chi-square values significant at the .05 level. These could well be due to chance. Strong interactions between these 7 systems, detectable at the phenotypic level, seem to be absent.--Author.

19977. SANTACHIARA-BENERECETTI, S. A. (Lab. Genet. Biochem. Evol., Cons. Naz. Ric., Pavia, Italy.), A. CATTANEO and P. MEERA KHAN. Rare phenotypes of the PGM1 and PGM_2 loci and a new PGM_2 variant allele in the Indians. AM J HUM GENET 24(6 Part 1): 680-685. Illus. 1972.--One and possibly 2 new PGM_2 alleles were found in an Indian population. They were called PGM_2^6 and PGM_2^6 Ind, respectively. The PGM_2^6 was electrophoretically distinguishable from all the other PGM_2 alleles, while PGM_2^6 Ind produced a set of bands with the same electrophoretic mobility but stronger intensity than that of PGM_2^6 Pyg. Three new PGM_2 phenotypes (PGM_2 8-1, PGM_2 6 Ind-8, and PGM_2 6 Ind-1) were found as well as 3 already known PGM rare phenotypes (PGM_2 4-1 and PGM_1 7-1).--F. W.

95917. REED, T. EDWARD., WILLIAM N. KELLEY, FREDERICK M. ROSENBLOOM, J. EDWIN SEEGMILLER. (Dep. Zool., Univ., Toronto, Ont., Can.) Critical tests of hypotheses for race mixture using Gm data on American Caucasians and Negroes. AMER J HUM GENET 21(1): 71-83. 1969.--The Gm alleles Gm^1, $Gm^{1,2}$, and Gm^5 are believed to characterize unmixed Caucasians, while $Gm^{1,5}$ alone is believed present in unmixed west African Negroes [Steinberg, 1967, testing for Gm factors (1), (2), and (5) only.] Given these original gene distributions and the assumptions of no selective differences among the Gm genotypes in American Negroes, no Gm gene frequently changes in Caucasians, and negligible non-Caucasian contribution of genes, one can estimate the proportion M of Caucasian ancestry in American Negroes from the sum of the frequencies of the 3 "Caucasian" alleles. The above assumptions, however, also permit a further, strong inference: the frequencies of these 3 "Caucasian" alleles in U.S. Negroes should be proportional to the corresponding frequencies of the appropr-

103760. GROC, W. (Heinrich Pette Inst. Exp. Virol. and Immunol., Univ., Hamburg, W. Ger.), I. BESSERT, and HANS W. JURGENS. Individuality in some hypohaptoglobinemia sera of Sierra Leone African population. BLUT 22(3): 116-120. Illus. 1971. [Ger. summ.]--The special behavior of some hypohaptoglobinemia blood samples (African probationers of Freetown and its surroundings) tested by means of centripetal-radial immunodiffusion (C-RID) technique, using a mixed antiserum against all 3 principal Hp-types (1-1 + 2-1 + 2-2), is described. In the remaining cases a double C-RID precipitation ring was found. With the aid of the Ouchterlony test analogical results were obtained (doubled precipitation line). Only one of both (doubled) precipitin bands coalesces with those of standards of respective single Hp-types, tested under the same conditions. Correlations could not be ascertained between the abnormity and certain groups of population with regard to age, sex or family. Only an hypothesis for this finding is given.--L. P. S.

14304. KAHN, A. (Cent. Rech. Enzymopathies Assoc. Cl.-Bernard, Unite 24, Inst. Natl. Sante Rech. Med., Hop. Beaujon, 100 blvd. General-Leclerc, F. 92110-Clichy, Fr.), P. BOIVIN and J. LAGNEAU. Polymorphisme genetique de la 6-PGD erythrocytaire: Etude de 240 sujets de race noire, relation avec les hemoglobines anormales et description d'une nouvelle variante. [Genetic polymorphism of erythrocytic 6-phosphogluconat-dehydrogenase: Study in 240 negroes, relation with the abnormal haemoglobins, and report of a new variant.] NOUV REV FR HEMATOL 12(4): 397-408. Illus. 1972. [Engl. summ.]--The activity and electrophoretic mobility of the 6-phosphogluconate-dehydrogenase were studied in 240 hemolysates of Negroes living in France. The frequency of the PGD gene was 5, 625%, similar to results previously reported in African black populations but higher than those reported in black Americans. There is a significantly higher frequency of the PGD gene in subjects heterozygous for the sickle cell gene. A deficiency in enzymic activities was not found: its mean value was slightly higher than in European population. A new variant was found characterized by: abnormal or increased activity; an electrophoretic diagram in the hemolysate which is the same as the Richmond variant, but with the disappearance of the a band in the leukocyte homogenate; and an increased stability in the presence of 1.5 M urea. This variant is designated the Clichy variant.--J. L. S.

39641. REED, T. EDWARD. (Dep. Zool., Univ., Toronto, Ont., Can.) Research on blood groups and selection from the Child Health and Development Studies, Oakland, California. III. Couple mating type and reproductive performance. AMER J HUM GENET 20(2): 129-141. 1968.--The possible effects of parental blood groups (ABO, Rh, MNSs, Kell, P, Duffy, and Lutheran systems) on reproductive performance in 4,576 Caucasian couples and 1,571 Negro couples living in the eastern San Francisco Bay ares were studied. Eight reproductive indicators were studied. The possible associations of 63 mating types (in 7 blood group systems) with these indicators were examined by multiple regression analyses for each race separately. Other possible real associations, including P blood group and fertility, are discussed. Previously published associations comparable to those studied were, in general, not confirmed; a few were at least partially confirmed but not established. In spite of large samples, the sensitivity of some of the tests for blood group-indicator associations in the present study and other studies is rather poor. A mating type effect on number of pregnancies of as much as 5-10% of the mean might not have been recognized as a real effect. Strong, consistent effects of parental blood groups on reproductive performance have yet to be demonstrated. Studies to date have not tested adequately for the existence of weak effects (less than 5% of the mean).--From auth. sum.

60331. BRINKMANN, BREND (Inst. Forensic Med., Univ. Hamb., Hamburg, West Ger.), ERWIN KOOPS, and HANS HERMANN HOPPE. Disagreements between observed and expected data in erythrocyte acid phosphatase polymorphism: Reference laboratories for enzyme polymorphisms. Z RECHTSMED 69(3): 191-196. 1971[recd. 1972]. [Ger. summ.]--All Caucasian data available on acid phosphatase polymorphism were examined for whether there exist significant differences between observed and expected data. A decrease was found in the frequency of observed C-types in favor of the CB-group. The differences between observed and expected data are statistically significant. The phenomenon is still unexplained, but it is possibly due to errors in diagnosis.

† 39102. WIENER, A. S. (64 Rutland Road, Brooklyn, N. Y., 11225, USA.), W. W. SOCHA and E. B. GORDON. The relationship of the H specificity to the ABO blood group: II. Observations on Whites, Negroes and Chinese. VOX SANG 22(2): 97-106. 1972.--Racial differences are demonstrated in the reactions of human red cells of groups A1 and B with anti-H lectin. These and other findings argue against the concept that H is a precursor of A and B. A more likely hypothesis appears to be that there are individual, racial and species differences in the presursor substance which provides the chemical skeletons to which are added the determinant sugar groups responsible for specificities H, A and B. The differences in reactivity with anti-H

39643 SCHNEIDER, ROSE G. (Univ. Tex. Med. Br., Galveston, Tex., USA.), SATOSHI UEDA, JACK B. ALPERIN, BERNADINE BRIMHALL, and RICHARD T. JONES. Hemoglobin Sealy ($\alpha_2^{47His}\beta_2$): A new variant in a Jewish family. AMER J HUM GENET 20(2): 151-156. Illus. 1968.--A new variant, Hb Sealy, $\alpha_2^{47His}\beta_2$, was found in heterozygous combination with Hb A in 3 generations of an Ashkenazi family. It comprises only 14-18% of the total hemoglobin of the adult carriers and is not associated with any distinctive clinical or hematologic abnormalities.--Authors.

132736. BOTTINI, E., P. LUCARELLI, P. PIGRAM, R. PALMARINO, G. F. SPENNATI, and M. ORZALESI. (Cent. Genet. Evol. Cons., Naz. Rich., Rome, Italy.) Alkaline phosphatase polymorphism of the human placenta in people of Negro and European origins living in Connecticut. HUM BIOL 43(1): 1-6. 1971.--The placental alkaline phosphatase types of 578 subjects from various populations living in Connecticut were determined. The gene frequencies of British, Italian and Mixed European groups in the population did not differ significantly from those obtained in various populations living in Europe. The gene frequencies of American Negroes were intermediate between those of Nigerian Negroes and those of the White populations and significantly different from both of them. Assuming that the PI^{1}_{1} gene frequencies or all slaving areas of Africa are similar to those found in Nigeria, he study of placental alkaline phosphatase polymorphism in American Negroes may have advantages for an accurate estimate of the M index (intermixture) since the PI^{1}_{1} gene has a relatively high frequency in White subjects and a very low one in Nigerian Negroes. The calculated M index is 0.182 ±0.052; this value is in the range for urban, non-southern USA Negro populations.--L. P. S.

† 22810. MORTON, N. E., and CAROLINE MIKI. (Univ. Hawaii Med. Sch., Honolulu, Hawaii, USA.) Estimation of gene frequencies in the MN system. VOX SANG 15(1): 15-24. 1968.--Negro and Caucasian samples typed with anti-M, N, S, s, M_1, U^a, Hu, He, Sj, and Tm indicate at least 14 and perhaps more than 26 alleles at the MNS locus, for which a notation is proposed. Gene frequencies are estimated by maximum likelihood, using the Alltype computer program. The methodology, uses, and limitations of such estimates are discussed. There is a clear distinction between idiomorphs (with frequencies less than 0.01), many alternative sets of which can account for the rare phenotypes with or without typing errors, and polymorphs (alleles with frequencies between 0.01 and 0.99) which cannot fail to be recognized in a large sample. Idiomorphs require confirmatory family studies.--Authors.

5948. ROPARTZ, C., E. R. GOLD, L. RIVAT, and P. Y. ROUSSEAU. (Dep. Blood Transfus. Center, Bois-Guillaume, Fr.) Fréquence du facteur Gm(4) parmi quelques populations blanches, noires et jaunes. [Frequency of factor Gm(4) among some white, black and yellow populations.] TRANSFUSION (PARIS) 8(4): 293-301. Illus. 1966.--One hundred twenty-nine white individuals from French Normandy, 80 from Paris, 145 from Bari, Italy and 341 from Sardinia were investigated for the Gm (4) factor. Phenotypes were calculated for Japanese from Tokyo, Hawaii, San Francisco, and from a laboratory. Negroes from Ouloff, Senegal; Peuhl, Sangal; Capetown, Africa were studied in addition to American Parjuanos Indians and Australian Aborigines from the Kimberley region.--From auth.

† 19885. SONNEBORN, H.-H. (Biotest-Serum-Inst. GmbH, Frankfurt, W. Ger.) Genfrequenzuntersuchungen der Adenosindesaminase-Isoenzyme mit einer neuen Technik. [Determination of adenosine deaminase gene frequencies with a new technique.] HUMANGENETIK 10(2): 188-190. 1970. [Engl. sum.]--In a population sample of South-Germany red cell adenosine deaminase phenotype was determined. For the 1st time cellulose acetate membrane-electrophoresis was used instead of starch-gel-electrophoresis. The results show that there are no significant differences to other published gene frequencies.

† 31537. GRUNDBACHER, F. J., and D. C. SUMMERLIN. (Med. Coll. Va., Richmond, Va., USA.) Inherited differences in blood group A subtypes in Caucasians and Negroes. HUM HERED 21(1): 88-96. Illus. 1971.--The blood group A subtypes of a Caucasian and a Negro population of Virginia were investigated, utilizing a standardized immunohemolytic system and lectins for quantitation of antigenic reactivity. The frequencies of subtypes and antigenic reactivities differed significantly between the 2 populations; the most striking differences were the high frequency of A_1 (intermediate) in Negroes and high Ulex reactivities in all A subtypes and group O samples of Negroes. Family studies disclosed A_1 to be inherited by 1 or more alleles. The A_1 allele is fully dominant over A_2 and is strongly suppressed in A_1B individuals as A is suppressed in A_1B and A_2B individuals.

† 113522. BROCTEUR, J., MICHELINE GILISSEN-GOTTSCHALK, and A. ANDRÉ. (Lab. Groupes Sang. et Transfus., Univ., Liège, Belg.) Le polymorphisme de la phosphatase acide érythrocytaire. [Polymorphism of red cell acid phosphatase.] HAEMATOLOGIA 4(3/4): 279-286. Illus. 1970[recd. 1971]. [Engl. summ.]--Polymorphism of red cell acid phosphatase was studied by starch gel electrophoresis in 500 individuals taken at random, in Liège. In addition to the 5 current phenotypes A, AB, B, AC and BC, the rare C phenotype was found, twice. Gene frequencies calculated from the observed results are: $P^a = 0.349$, $P^b = 0.596$ and $P^c = 0.055$.

19612 GUSSMANN, S. (Inst. Anthropol., Humangenet., Univ., Richard Wagner-St. 10, D-8000 Munich, West Ger.) and F. SCHWARZFISCHER. Rare GPT-phenotypes in a random sample of southern Germany: Evidence for a third allel. Z RECHTSMED 70(4): 251-252. Illus. 1972. [Ger. summ.]--The inheritance of 2 rare variants in a random sample of 837 Bavarians is assumed to be an indication for a 3rd allele GPT^3 [glutamic pyruvic trans-

17724. WALTER, H., and HILDEGARD STEEGMULLER. (Anthropol. Inst., Univ., Mainz, West Ger.) Studies on the geographical and racial distribution of the Hp and Gc polymorphisms. HUM HERED 19(3): 209-221. Illus. 1969.--The geographical and racial distribution of phenotypes and alleles of the serum protein polymorphisms Hp and Gc are studied. Not only do obvious geographical differences exist in the distribution of Hp and Gc alleles, but also racial ones. Concerning the Gc^1 frequencies the following distribution order is to be set up: Negroids, Australian Aborigines, Lapps, Mongoloids, Caucasoids, Indians, Eskimos and Polynesians. Remarkable racial differences were also observed in the distribution of Hp phenotypes and alleles. The racial distribution of Hp^1 frequencies shows the following order: Australian Aborigines, Negroids, Polynesians, Indians, Caucasoids, Eskimos, Mongoloids and Lapps. Australian Aborigines, Negroids, Polynesians and Indians are characterized by almost equally high Hp^1 frequencies, whereas Caucasoids, Eskimos, Mongoloids and Lapps show obviously lower frequencies of this allele. At the moment an absolutely satisfying interpretation of these findings is not possible. It is to be assumed, however, that the geographical and racial distribution inhomogeneities are to a high degree caused by selective factors, which are not known. This knowledge will be helpful in understanding those factors which determine man's biological evolution.--B. H.

49106. JUBERG, RICHARD C. (Dep. Pediatr., La. State Univ. Sch. Med., Shreveport, La., 71130, USA.), WILLIAM J. SCHULL, HENRY GERSHOWITZ and LOUISE M. DAVIS. Blood group gene frequencies in an Amish deme of Northern Indiana: Comparison with other Amish demes. HUM BIOL 43(4): 477-485. 1971[recd. 1972].--Blood specimens were obtained from 158 of the 169 couples in which at least the wife and usually also the husband were in the 40-49 yr group. The observed genotype and phenotype frequencies for the ABO, Rhesus, and MNSs systems compared favorably with the expected values. The frequency of surnames of Amish in four different counties were compared and the only 2 with similarities have considerably different ABO phenotype frequencies.--J. J. C.

31041. SANTACHIARA-BENERECETTI, A. SILVANA (Lab. Genet. Biochim. Evoluzionistica, Cons. Naz. Ric., 27100 Pavia, Italy.), A. CATTANEO and P. MEERA KHAN. A new variant allele AK^5 of the red cell adenylatekinase polymorphism in a non-tribal Indian population. HUM HERED 22(2): 171-173. Illus. 1972.--The red cell adenylatekinase (AK) phenotype was determined in a sample of about 600 subjects from southern India. An abnormal electrophoretic pattern was described. Family data support the hypothesis of the existance of a new variant allele, AK^5 at the AK locus.

66687. LEWIS, MARION, H. KAITA and B. CHOWN. (Rh Lab., 735 Notre Dame, Winnipeg R3E OL8, Manit., Can.) The Duffy blood group system in Caucasians: A further population sample. VOX SANG 23(6): 523-527. 1972.--The Duffy blood group phenotypes of 554 random, unrelated, Caucasian families and 1492 of their children are reported. The gene frequencies calculated from the parental phenotypes are Fy^a 0.424, Fy^b 0.560, Fy^x 0.015, and Fy 0.001. A 2nd example of phenotype Fy^x (almost certainly Fy^xFy^x) is included.

2409. BRINKMANN, B. (Butenfeld 34, D-2000 Hamburg 54, West Ger.), P. KRUKENBERG and M. BRINKMANN. Gene frequencies of soluble glutamic-pyruvic-transaminase in a Northern German population (Hamburg). HUMANGENETIK 16(4): 355-356. 1972[recd. 1973]. [Ger. summ.]--A random population sample of Northern Germany (Hamburg), consisting of 2026 people, showed a GPT^1 [glutamic-pyruvic-transaminase-1] frequency of 0.53. Previous findings were supported.

2196 NANCE, WALTER E., MICHAEL CONNEALLY, KE WON KANG, PERRY REED, JANE SCHRODER, and SUSAN ROSE. (Indiana Univ. Sch. Med., Indianapolis, Indiana, USA.) Genetic linkage analysis of human hemoglobin variants. AMER J HUM GENET 22(4): 453-459. 1970.--Genetic linkage studies were performed on typing results from 117 2 generation families containing a total of 516 offspring, in which one or both parents were heterozygous for a genetic variant at the β or δ locus of human hemoglobin. No evidence for linkage to the Gm, Hp, Rh, ABO, P, E_1, Kidd, Kell, Catalase, or Diego loci was found, but positive z scores at large values of θ were obtained for the MNS, Inv, Sec, Le, Fy, PTC, and Tf loci. Of these, only the Duffy locus showed a significantly lower recombination frequency in males than females.--G. A. H.

31047. TILLS, D., J. L. VAN DEN BRANDEN, V. R. CLEMENTS and A. E. MOURANT. (Serol. Popul. Genet. Lab., London, Engl., UK.) The world distribution of electrophoretic variants of the red cell enzyme adenylate kinase. HUM HERED 21(3): 302-304. 1971[recd. 1972].--A distribution table of human red cell adenylate kinase which corrects previously published erroneous data is presented.--L. E.

31522. THOMPSON, ELIZABETH. (Dep. Pure Math., Stat., Univ. Camb., Cambridge, Engl., UK.) Rates of change of world ABO blood-group frequencies. ANN HUM GENET 35(3): 357-361. Illus. 1972.--The final world frequencies and rates of change in the ABO blood groups per yr -0.00028; B 0.1611, change per yr +0.00007; O 0.6242, changer per yr. +0.00021. If linear rate of change is assumed, then there will be a decrease in A of 0.7% in 25 yr. There is a change in the A frequency of the order of 0.5-1%, or 3% of the present frequency of the A gene in 1 generation. Changes in population can produce as large an effect as any normal selective force.—J. J. C.

Studies on genetic selection in a completely ascertained caucasian population. I. Frequencies, age and sex effects, and phenotype associations for 12 blood group systems. Shreffler DC, et al. Am J Hum Genet 23:150-63, Mar 71

3447. A contribution to the Ny(a) problem - Schimmack L., Muller I. and Kornstad L. - Blood Group Ref. Lab., Reg. Inst. Blood Donor Transf. Serv., Berlin - HUM.HERED. (Basel) 1971 21/4 (346-350)

In the present paper a review is given of the results of investigations on the occurrence and the serological behavior of the Ny(a) antigen and antibody. Contrary to the Norwegian population, the antigen was not found in the German population. The antibody occurs here as frequently as in the Norwegian population.

78. The distribution in man of genetic variants of 6 phosphogluconate dehydrogenase - Tills D., Van Den Branden J.L., Clements V.R. and Mourant A.E. - Serol. Pop. Genet. Lab. London - HUM.HERED. (Basel)·1970 20/5 (523-529)

For the enzyme 6 phosphogluconate dehydrogenase, a table is given of all available data on the distribution of isozyme phenotypes. The calculated frequencies of all but the commonest gene are also tabulated. The frequencies of the PGDc allele are plotted on a world map. Possible interpretations of the observations are discussed.

2553. Population studies on Southwestern Indian tribes. II. Local genetic differentiation in the Papago - Workman P.L. and Niswander J.D. - Hum. Genet. Branch, Nat. Inst. Dent. Res., NIH, Bethesda, Md. 20014 - AMER.J.HUM.GENET 1970 22/1 (24-49)

The Papago (n = 5000) appear to approximate a model of a population comprising a small number of partially isolated subpopulations. There are highly significant, essentially random genetic differences among these groups. By comparing genetic distances with geographic distances, it was found that a large proportion of the total variation could be attributed to isolation by distance affecting both the frequencies of intergroup matings

2556. Blood group gene frequencies in West Virginia - Juberg R.C. - Genet. Lab., Dept. Ped., West Virginia Univ., Morgantown, W.Va. 26506 - AMER.J.HUM.GENET. 1970 22/1 (96-99)

The incidence of the ABO, MNSs, Rhesus, Kell, Lutheran, Duffy, Lewis, P, and Kidd systems determined in 1,412 Caucasian and 133 Negro coal miners, residents of the central and southern regions of the state, are presented. There is no evidence that the relative isolation of the state has resulted in significant deviations from the general population of the United States.

4250. Caucasian genes in American Negroes. Measurement of non African ancestry is difficult, but it is worthwhile for several genetic reasons - Reed T.E. - Dept. of Zool., Univ. of Toronto - SCIENCE 1969 165/3895 (762-768)

2410. HELLENBROICH, H., B. G. POTRAFKI and G. PULVERER. (Hyg. Inst., Univ., Fuerst-Pueckler-St, 56, D-5000 Koeln 41, West Ger.) Zum Polymorphismus der Glutamat-Pyruvat-Transaminase (GPT) menschlicher Erythrocyten in Westdeutschland. [Polymorphism of human red cell glutamic-pyruvic-transaminase (GPT) in Western Germany.] HUMANGENETIK 16(4): 351-353. 1972[recd. 1973]. [Engl. summ.]--Red cell glutamic-pyruvic-transaminase [GPT] was established by horizontal starch-gel-electrophoresis. Germans (1148) from the Cologne area were examined: in only 397 cases were the results clearly interpretable. This was attributed to a decrease in GPT-activity in aged blood samples. No rare variants were detected. The gene-frequencies found were $GPT^1 = 0.5479$, $GPT^2 = 0.4521$.

KORNSTAD, L. (Natl. Blood Ref., Lab., Natl. Inst. Publ. Health, Oslo, Norway.), A. M. HEIER LARSEN, and O. WEISERT. Further observations on the frequency of the Ny^a blood-group antigen and its genetics. AM J HUM GENET 23(6): 612-613. 1971 [recd. 1972].--Among 3,746 Norwegians examined, 8 were Ny(a+). Pooling the present observations with the data previously published by Orjasaeter et al., a total of 17 unrelated Ny(a+) persons were found among 9,677 Norwegians, giving a Ny^a gene frequency of .00088. In all the 19 propositi so far studied, Ny^a was aligned with the Ns gene complex.--J. J. C.

95759. MAYR, W. R., and D. MICKERTS. (Inst. Blutgruppenserol., Univ., Vienna, Austr.) Der menschliche Gammaglobulinpolymorphismus: Berechnung seiner Verteilung in Wien und seiner Brauchbarkeit in Paternitaetssachen. [The human gamma-globulin polymorphism: Calculation of its distribution in Vienna and its suitability in paternity cases.] ACTA MED GER 20(3): 475-482. Illus. 1970[rec'd. 1971]. [Engl. and Russ. summ.]--The molecular structure of gamma-globulins is briefly outlined, the authors and the serologically detectable characteristics belonging either to the Gm or Inv system are discussed. The results of tests with anti Gm^a, anti Gm^x, anti Gm^f and anti Gm^b on 1,602 serum samples and with anti Inv^1 on 1,334 serum samples of unrelated persons were used to calculate gene frequencies. The 2 constellations permitting exclusion in paternity serology are explained and the suitability (chance of excluding paternity) was calculated to be about 20 % for the Gm(a, x, f) system, and about 6% for the Inv(1) system.--G. A. H.

37225 SORGO, G. and C. PISO. (Inst. Gerichtl. Med., Univ., Ignaz-Harrer-St. 79, 5020 Salzburg, Austria.) Das System Duffy: Genfrequenzen und Familienuntersuchung. [The Duffy-system: Gene frequency and family investigation.] BLUT Z GESAMTE BLUTFORSCH 24(2): 89-93. 1972. [Engl. summ.]--Unrelated Austrians (939) were tested, using the reagents Anti-Fy(a) and Anti-Fy(b). Gene frequencies were Fy^a = 0.04241, Fy^b = 0.05449 and Fy = 0.0310. Assuming the model, 3 alleles at an autosomal locus, expected and observed values showed good correspondence. Phenotyping 86 families with 177 children revealed no contradiction against the assumed "3 allele model." For computing the plausibility of paternity by the formula of Essen-Möller a table containing the log Y/X + 10 values was added.--J. J. C.

† 48952 BRINKMANN, B. (Inst. Gericht. Med., Kriminalist k, Univ. Hamb., Hamburg, West Ger.) Erythrocytaere Enzympolymorphismen in der forensischen Serologie. [Red cell enzyme polymorphisms in forensic serology.] Z RECHTSMED 69(2): 83-117. Illus. 1971. [Engl. summ.]--Use of 5 red cell enzyme polymorphisms in forensic serology is discussed. For acid phosphatase some electrophoretic methods are given, classifiable roughly into 3 categories of isozyme patterns. Available physico-chemical properties are reported. Recent data suggest that the 2 isozymes, produced by 1 allele are conformational isomers. Gene frequencies in European populations show certain north-to-south differences that should be accomodated on, if the probability of the paternity has to be calculated. From the present literautre 4151 mother/child pairs are summarized without exception of the postulated gene model. The constellation of exclusion "child-homozygous, accused man-oppositely homozygous," should be reinvestigated by quantitative gene dosage measurements to exclude the existence of the P^0 allele. Discrepant data are available on the literature about the use in identification cases of bloodstains and blood samples. For phosphoglucomutase electrophoretic methods and physicochemical properties are reported. Gene frequencies in several populations are given. Centain north-to-south differences between European populations should be considered. Some 4966 mother/child pairs were summarized from the literature without genetic incompatibility. The existence of the PGM_1^0 allele should be considered when an opinion is given on exclusion cases with opposite homozygosis. There is a good chance in bloodstain and blood sample identification cases to determine this enzyme after considerable

122800. SPITSYN, V. A. Geneticheski determinirovannye faktory immunoglobulinov (IgG) i ikh znachenie v antropologicheskikh issledovaniyakh. [Genetically determined factors of immunoglobulins (IgG) and their importance in anthropological research.] VOP ANTROPOL 33. 90-100. 1969. Translated from REF ZH BIOL, 1970, No. 4T420. A review. Consideration is given to data on the structure of immunoglobulin G and of the antigenic determinants of the systems Gm and Inv of heavy and light chains. There is a summary of the results of work on; the distribution of Gm factors in different ethnic groups of the world. There is a bibliography with 18 references.--S. T.

2. References with Short Abstract

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   Compares cellulose acetate to starch block technique for the rapid separation of hemoglobins, both qualitatively and quantitatively.

2. Blumberg, B. S., et al., "Gamma-Globulin, group specific, and lipoprotein groups in a U.S. White and Negro population," Nature, 202 (1964) 561-563.

   Examines Gm, Inv groups (δ globulins), and Gc (group specific component), and Ag (lipo protein) types in a U. S. population of Whites and Negroes selected at random.

3. Crozier, R. H., et al., "Population genetics of hemoglobins S.C. and A in Africa, equilibrium or replacement," Am. J. Hum. Gen., 24 (1972) 156-167.

   Discussion of Allison's hypothesis that Hemoglobins S + C are mutually exclusive, i.e. populations not being able to achieve high frequencies of both together, but that either S or C will predominate.

4. Giaever, Ivan., "The antibody-antigen reaction: A visual observation," J. of Immunology, 110 (1973) 1424-1426.

   Describes an optical instrument (ellipsometer) measuring the adsorption of polarized light in agglutination.

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   Adapts microelectrophoresis technique/equipment to use with cellulose acetate membrane in study of blood protein fractions. The membrane is favorable over gels while yielding same degree of distinguishability of immunological fractions.

6. Khalap, Suhas, "The Gm and Inv groups," NE.J Med., 283 (1970) 724.

   The Gm and Inv groups are blood groups present in the serum and determined by inhibition tests. Frequency distributions are given and preliminary studies of forensic significance are given.

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The basis for the difference between the subgroups A_1 and A_2 has been in controversy up to this day. Study results reported here clearly demonstrate a specificity difference between purified A_1 and A_2 glycoproteins.

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Discusses current methods of blood antigen grouping (ABO agglutinogens and agglutinins) (direct and indirect techniques), (other blood groups: MN, Rh, Kell, serum) and grouping of secretion stains.

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APPENDIX B. QUESTIONNAIRE

Section 1. Crime Laboratory

Name: _____

Organization: _____ Date: _____

Location: _____ Interviewer: _____

BLOOD AND BLOODSTAIN ANALYSIS QUESTIONNAIRE

A. Sample Collection, Preparation and Methodology

1. What are the common crime scene substrates on which stains are found. Approximate percentages.

2. What substrates would eliminate further analyses.

3. What is the bloodstain age (elapsed time) distribution found at the crime scene.

4. Is visual screening used to void further analyses. If yes, what condition.

5. When stain is to be removed for transport to lab., how is it removed.

6. If stains are not removed, how transported.

7. How is stain removed from substrate in lab if a different method from that of crime scene is used.

8. What screening is performed.

   a. Blood

   b. Human origin

9. Does sample treatment differ based on variations in sample removal and transport methods.

10. Does sample removal method void certain blood typing tests. If so, what.

B. Immunochemical Methods

1. General

   a. Which analyses are performed and on what % of blood cases.

   b. Why are these analyses selected.

   c. How is the sample divided for various analyses.

   d. Are there general problems associated with all of these analyses.

   e. How are samples treated before analyses.

   f. Is any work being done on the human leucocyte antigens (HLA). If so, what.

2. Antigen; _____ System

	Fresh Blood	Stains
a. What is treatment of specimen before analysis.		
b. Which sub-groups are analyzed.		
c. Are the analyses carried out		
(1) in tube		
(2) on tile		
(3) immunophoresis		
(4) immunodiffusion		
(5) other (specify)		
d. What preparation method is used.		
(1) absorption elution		
(2) absorption inhibition		
(3) others (specify)		
e. Up to what age of stain is the test successful.		
f. What specific problems have been encountered.		

	Fresh Blood	Stains
g. How much total time does it take.		
h. How much analyst time.		
i. What level of analyst proficiency is required.		
(1) What is opinion of ease of operation.		
(2) What should be improved.		
(3) Is manual of procedure used.		
(a) Can it be obtained.		
j. What commercial source of antisera is used.		
k. What other reagents are required.		
l. What special apparatus is required.		
(1) What supplier.		
(2) What is your experience with technical quality.		
(3) Service satisfactory.		

C. Electrophoretic Method

1. General

a. Which enzymes or proteins are determined.

b. Why are these particular constituents selected.

c. How is the sample divided for various analyses

d. Are there general problems associated with all of these analyses.

e. How are these sample treated before analyses.

2. Enzyme or Protein; _____ System

	Fresh Blood	Stains
a. Which isomorphs are identified.	_____	_____
b. What buffer is used.	_____	_____
c. What is the substrate.	_____	_____
d. What is the developing agent preferred for specificity.	_____	_____
e. What other reagents are required.	_____	_____
Suppliers.	_____	_____
f. Who is the commercial supplier for the control.	_____	_____
g. What equipment and Supplier.	_____	_____
(1) Electrophoresis	_____	_____
(2) Power supply	_____	_____
(3) Densitometer	_____	_____
(4) Other	_____	_____

	Fresh Blood	Stains
h. What is your experience with technical quality.		
(1) Durability		
(2) Reliability		
(3) Safety		
i. Manufacturer's service satisfactory.		
j. How much total time does it take.		
k. How much of actual analyst's time.		
l. What level of analyst proficiency is required.		
(1) What is opinion of ease of operation.		
(2) What should be improved.		
(3) Is manual of procedures used.		
(a) Can it be obtaind.		
m. Up to what age of stain is this analysis successful.		
n. What specific problems have been encountered.		

D. Opinions and Recommendations

1. For evidenciary use

a. What identification probabilities are required as a minimum.

b. Are racial, ethnic, geographic, correlations needed.

2. Analysis approaches

a. Would immunochemical procedures yield sufficient individualization potential.

(1) What groups are recommended.

b. If electrophoresis is required

(1) What constituents are preferred for ease of procedures.

(2) What are method or equipment problems that should be solved.

(3) What stain age prediction methods seem promising.

(4) What are maximum costs permissible for analysis equipment, if semi-automatic.

(5) What other new systems have potential for individualization.

(6) What other sources would you recommend for blood data.

E. Court Experience in Blood Individualization

1. What kind of cases have involved blood individualization.

2. Has blood data ever been used to identify suspect.

   a. What constituents were used in individualizing in these cases.

   b. What was data base for frequency of occurrence evidence.

3. What percentage of total blood analyses are used as court evidence. Why.

4. How is data presented in court.

   a. Similarity between samples

   b. Probable identity

   c. Positive identity

Section 2. Blood Bank

Name of Source: _____

Organization: _____ Date: _____

Location: _____ Interviewer: _____

BLOOD COMPOSITION DATA COLLECTION

A. General

1. What is reason of analysis: (Percent of total)
   a. Cross matching
   b. Research
      (1) Whole blood
      (2) Stains
   c. Forensic Investigation
      (1) Whole blood
      (2) Stains
2. On how many samples is blood composition record retained.
   a. For whole blood (No. and/or %)
   b. For stains (No. and/or %)
3. How old is data.
   a. Percent distribution.
      (1) Whole blood
      (2) Stains
   b. How many samples for each year in which collected.
      (1) Whole blood
      (2) Stains

4. Condition of Data.
   a. Raw (% of total)
   b. Analyzed (% of total)
      Is it correlated to:
      (1) Race or ethnic background
      (2) Geographic origin
   c. Form of data file.
      (1) Standard files
      (2) IBM Cards
      (3) Tape
          Computer System

          Language

      (4) Microfilm
          Reader Compatibility
5. Data Characteristics.
   a. What constituents are determined.
      (1) Whole blood
      (2) Stains
   b. For each constituent, what are methods of analysis.
      (1) Procedure

(2) Automatic or manual

(3) Equipment, reagents, sera used.
(Type and Manufacturer)

B. Opinions and Recommendations

1. What is required to expand data collection.

a. To increase number of constituents determined.

b. To increase data recording.

c. To increase data reduction.

2. What other sources for blood data should be contacted.

3. What is maximum geographic area for which frequency tables would apply.

END

7 Attachments