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Author
Miller, Cathleen Jackson

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JOINT PAIN

Arriving at a Diagnosis from the Clinical Evaluation

by

Cathleen Jackson Miller

THESIS

Submitted in partial satisfaction of the requirements for the degree of

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I. RATIONALE FOR THESIS/PROJECT

This thesis represents my involvement in the development of a total concept for a communication piece extending from concept to, but not including, actual production.

Of primary importance to my thesis experience was my "client" relationship with Dr. Kenneth E. Sack. The subject for the project is based on a lecture he frequently gives and for which he has developed a fairly fixed format. By being receptive to the analysis of the communication problem for this project and being open to the rearranging of information from his lecture into a new form appropriate to the print medium, Dr. Sack made it possible for us to work effectively as a team.

Our goal was to achieve maximum communication efficiency in a complicated subject by employing an optimum blend of verbal and visual elements.

Our approach made it impossible to write the manuscript without considering the illustrations and layout and impossible to design the layout without considering the manuscript.*

*To provide the reader with a sense of the information distribution, the amount of copy on one page of typed manuscript is limited to the same copy on the equivalent page of the printed book (compare page 23 with transparency 3, pages 38 and 39 with transparency 4). In some cases, the copy for one printed page includes up to one and one-half manuscript pages. These manuscript pages share one number; the number on the half page is followed by (a) (eg. 40, 40 (a)).

The task presented by the assumption of the interdependence of these elements necessarily left very little unconsidered.

The completed project presents a unique integration of subject matter and communication design. This integration is desirable in all book publications but is typically avoided for economic reasons.

*(Cont'd) Also included in the manuscript are the running heads and folios (page numbers different from those consistently typed in the upper right-hand corner). All folios are represented by "00". Drop folios are used on pages with display type (e.g., section openings). Recto running heads (on right-hand pages) are flush with the right margin; verso running heads (on left-hand margin) are flush with the left margins. Figure captions ending with periods, and headings, and subheads that are underlined will have features that distinguish them from the surrounding text (e.g., color, boldface, italics, display type). Words underlined within a sentence will be set in italics (compare page 40(a) with transparency 5). Please refer to the corresponding pages of the actual size semi-comprehensive and comprehensive layouts (35mm transparencies p.103) for the visual relationship of the manuscript and illustrative copy.

A. Manuscript for the Book:

JOINT PAIN

Arriving at a Diagnosis

from the Clinical Evaluation

Sack

Miller

JOINT PAIN

Published in the United States of America

JOINT PAIN

Arriving at a Diagnosis from the Clinical Evaluation

Kenneth E. Sack, M.D.
Assistant Professor of Medicine,
University of California, San Francisco
Director of Professional Education,
Rosalind Russell Arthritis Center

Cathleen J. Miller, M.A.
Designer of Instructional Communications
for the Health Sciences

Contents

Contents 00

Rationale

NEED Why is there a need for another book on arthritis? Most rheumatic diseases are discussed extensively in a wide selection of available texts, but while current textbooks describe individual diseases in great depth, they seldom emphasize the process of differential diagnosis. It is in response to this deficit that we present a short but comprehensive approach to the diagnosis of rheumatic diseases.

GOALS In emphasizing an orderly approach to evaluating patients and in describing the important clinical characteristics of common joint disorders, we hope not only to simplify the task of differential diagnosis but also to minimize mis-diagnosis and encourage more efficient use of the laboratory.

SCOPE This book is written for students, residents, practicing physicians, and other health care providers. We feel that persons reading it will have had previous exposure to pathology and differential diagnosis, but we assume that users may have had little experience with rheumatic disease. This is

not a definitive textbook in rheumatic disease but rather a guide to evaluating patients with joint pain. In the interest of practicality, we deal primarily with disorders likely to be encountered in everyday medical practice. Our concern is with the clinical evaluation of the patient; therefore we do not discuss either laboratory diagnosis or treatment.

USE By combining the abilities of a physician and a designer, we present a vast amount of practical information in a form which the clinician can easily assimilate.

The sequence of topics in this book attempts to reflect the intuitive mental process used in differential diagnosis. Some physicians may not wish to follow this sequence and for that reason each section is made as independent as possible.

A flow chart illustrates the concept of arriving at a differential diagnosis in a systematic manner.

00 RATIONALE

Illustrations isolate particular clinical points and are appropriately grouped to highlight important disease comparisons. Figure numbers correspond to numbers in the margins next to the material being illustrated.

Prose is limited to amplifying important concepts, but the majority of information is conveyed in tabular or list form. We intend the lists to facilitate location and cross-referencing of material--not memorization. Where appropriate, a numbered outline of subjects follows section titles for ready reference to the numbers in the margins.

Abbreviations for joints and diseases appear when first used and in the appendices at the end of the text along with a complete list of diseases dealt with in the book.

All information pertaining to any one subject is restricted to facing pages to aid comprehension.

Acknowledgements

We thank Eric Stoelting, Ruth Wakerlin, and Richard Beindorf, faculty of the Graduate Program in Medical and Biological Illustration, and Ephraim Engleman, clinical professor of medicine and director of the Rosalind Russell Arthritis Center, Univeristy of California, San Francisco, for their helpful comments.

Approach to Differential Diagnosis

The art and science of medicine combine in the process of differential diagnosis as the clinician attempts to extract relevant information from the patient and correlate it with previously acquired knowledge of disease manifestations. The clinician must sift through a plethora of potentially misleading facts as well as maintain a familiarity with vast amounts of clinical material. The possibility of misdiagnosis always looms large, even in seemingly straightforward cases.

Clearly, the complex process of differential diagnosis does not lend itself to a "cookbook" approach, and we do not intend this book for such use. We do, however, propose that the work-up of the patient with joint pain be a systematic and rigorous process. We divide this process into four parts, the first three being addressed in this book.

PART I COLLECTING THE DATA The sections in this portion of the book outline aspects of history-taking and physical examination important for evaluating patients with joint-related disorders.

00

We begin in a manner similar to that of a physician faced with a new patient with joint pain, considering a multitude of diagnostic possibilities before making a final analysis of the data.

A Systematic Approach to Differential Diagnosis

Diagnostic Possibilities

FIRST IMPRESSIONS

PROBABLE DIAGNOSIS

FINAL DIAGNOSIS

Essential Data

Collecting the Data	Evaluating the Data	Refining the Diagnosis	Laboratory

00 APPROACH TO DIFFERENTIAL DIAGNOSIS
We do not include topics regarding the severity of illness or its impact on the patient's life. These are obviously important considerations in the care of patients, but have little relevance in the immediate diagnostic process.

PART II EVALUATING THE DATA We separate data evaluation from data collection to emphasize an orderly approach to arriving at a diagnosis, but we realize that the experienced clinician frequently does both simultaneously. This portion of the book gives meaning to information gathered from Part I and highlights several important characteristics of rheumatic diseases. Following the initial process of data evaluation, the clinician is usually able to form preliminary diagnostic impressions.

PART III REFINING THE DIAGNOSIS First impressions are not always correct, and the clinician should always consider a number of other diagnostic possibilities. Part III addresses the differential diagnosis of common rheumatic disorders and includes a list of references for further reading.

Part I

Collecting the Data

1

History of Present Illness

The following key topics will provide the clinician with information essential to the differential diagnosis. In taking a history, the clinician should allow the patient considerable freedom in relating details of the illness. Gentle direction then helps the patient focus on the primary problem and ensures the inclusion of vital information into the history.

History of Present Illness 00

Which Joint(s) Involved

Distribution of Joint Involvement

Proximal vs. distal

Monoarticular vs. polyarticular

Symmetric vs. asymmetric

Swelling vs. Non-swelling

Date of Onset

Type of Onset

Sudden

Gradual

Circumstance of Onset

Systemic illness

Drugs/immunizations

Trauma

Occupation/hobbies

Morning Stiffness

Length of Flare

Self-limited

Continuous

2

Review of Systems

Noting disease in other organ systems frequently simplifies the differential diagnosis of a joint disorder. A disease which primarily involves the joints may also affect other organ systems in a characteristic pattern. Similarly, a disease which is primary to another organ system may secondarily affect the joints, and recognition of this association may resolve the diagnosis.

The following are associated complaints of potential importance in the diagnosis of a joint disorder.

Systemic	Fever
	Malaise
	Fatigue
Skin/Mucous Membrane	Rash
	Oral or genital ulcers
	Nodules
Eye	Photophobia
	Discharge
	Burning
	Redness

00

Review of Systems 00

Cardiopulmonary	Rhinorrhea
	Sore throat
	Cough
	Chest pain
	Shortness of breath
Gastrointestinal	Anorexia
	Weight loss
	Diarrhea
	Jaundice
Urogenital	Dysuria
	Urethral discharge
	Renal stones
	Menstrual irregularities
Neuromuscular	Paresthesia
	Weakness
	Tremor
Hematopoietic	Easy bruising
	Easy bleeding
	Frequent infections
Vascular	Raynaud's phenomenon

3

Additional Pertinent Data

The causes of joint pain are infinite, ranging from direct trauma to the joint to various inducers of inflammation to psychosocial disturbances. A thorough search into the patient's background frequently provides important clues to the diagnosis.

Additional Pertinent Data 00

Past History

Previous episode of arthritis, trauma, surgery

Other drugs

Other serious ailments, including
psychiatric distrubances

Social History

Ethanol use

Drug use

Occupational and domestic circumstances

Family History of Related Disease

Arthritis

Rheumatoid arthritis (RA)

Systemic lupus erythematosus (SLE)

Ankylosing spondylitis (AS)

Gout

Inflammatory bowel disease (IBD)

Psoriasis

Part II

Evaluating the Data

4

Diseases Affecting Joint Groups

Certain rheumatic diseases tend to affect specific joint groups. In some cases the distribution of joint involvement is so characteristic that it is virtually diagnostic of a particular disorder. The following tables of major joints and the diseases which characteristically affect them should be helpful in allowing the clinician to limit the diagnostic possibilities in an otherwise confusing case. Some diseases, such as SLE, have no characteristic pattern of joint involvement.

4.1 HAND

	Distal Interphalangeal (DIP) Joints	Proximal Interphalangeal (PIP) Joints	Metacarpo-Phalangeal (MCP) Joints	1st Carpo-Metacarpal (CMC) Joints
F4.1	Psoriatic arthritis	Occasionally psoriatic arthritis	Occasionally psoriatic arthritis	....
F4.2	....	RA	RA	....
F4.3	Primary osteoarthritis (OA)	OA	....	OA
	....	....	Occasionally gout	....
	....	....	Occasionally gout	....

00 DISEASES AFFECTING JOINT GROUPS

F4.1 Characteristic DIP Joint Involvement of Psoriatic Arthritis. Dystrophic nail changes or involvement of other characteristic joints help to distinguish the DIP involvement of psoriatic arthritis from that of OA.

F4.2 Swelling of PIP and MCP Joints and Wrist as Seen with RA.

F4.3 Involvement of OA in 1st CMC.

Joint. This gives the hand a "squared-off" appearance, but the wrist and MCPs are notably spared. Observe the bony enlargement of several DIP and PIP joints in a patchy distribution. The enlarged DIP joints are frequently called Heberden's nodes and the enlarged PIP joints, Bouchard's nodes.

4.2 WRIST

RA

Pseudogout

00 DISEASES AFFECTING JOINT GROUPS

4.3 ELBOW

RA

Occasionally

- psoriatic arthritis
- gout
- pseudogout

4.4 SHOULDER

RA

AS

Non-articular pain syndromes

Occasionally

- psoriatic arthritis
- gout
- pseudogout

4.5 STERNOCLAVICULAR (SC) JOINT

RA

AS

Occasionally

- infection with gram negative or anaerobic bacteria

4.6 TEMPOROMANDIBULAR (TM) JOINT

RA

Occasionally
psoriatic arthritis

4.7 SPINE

	Cervical	Thoracic	Lumbar
	RA	....	....
	JRA	....	....
	OA	OA	....
	Degenerative disc disease	....	Degenerative disc disease
F4.4	AS	AS	AS
	Occasionally psoriatic spondylitis	....	Psoriatic spondylitis
	....	....	IBD
	....	....	Reiter's syndrome

00 DISEASES AFFECTING JOINT GROUPS

F4.4 AS Affecting the Lumbar Spine. Note loss of normal lumbar curve as patient bends forward. This is not specific for an inflammatory disorder such as AS but may reflect a purely degenerative disorder of the lumbar spine.

4.8 SACROILIAC (SI) JOINT

Seronegative (spondylo)arthritides

Occasionally

infection with gram negative bacteria (particularly anaerobes)

4.9 HIP

OA

RA

Aseptic necrosis

Non-articular pain syndrome

AS

Occasionally

Reiter's syndrome

psoriatic arthritis

IBD

00 DISEASES AFFECTING JOINT GROUPS

4.10 KNEE

OA

RA

Reiter's syndrome

Gout

Pseudogout

IBD

Infectious arthritides

Occasionally

- psoriatic arthritis
- AS

4.11 ANKLE

Trauma

Reiter's syndrome

Gout

RA

Occasionally

- AS
- IBD
- psoriatic arthritis

Diseases Affecting Joint Groups 00

4.12 FOOT

1st Metatarso-phalangeal (MTP) Joint Alone	MTP Joints	Interphalangeal (IP) Joints*
F4.5 Gout	Gout	Gout
OA	....	....
....	RA	....
....	Reiter's syndrome	Occasionally Reiter's syndrome
....	Occasionally psoriatic arthritis	Psoriatic arthritis

*In general, it is not helpful clinically to differentiate DIP from PIP joints of the toes.

F4.5 Involvement of Gout in the 1st MTP Joint. The purplish discoloration and location are typical of acute gout. The involved joint is probably exquisitely sensitive to touch. Traumatic bursitis, cellulitis, and vascular insufficiency are all diagnostic possibilities.

5

Patterns of Joint Involvement

Involvement of joints in characteristic patterns often provides a key to the diagnosis of rheumatic disorders. While exceptions occur with embarrassing frequency, the following tables of peripheral joint disease distributions should prove useful for the clinician in formulating an initial differential diagnosis.

5.1

PROXIMAL[1]	DISTAL[2]
AS	OA
Occasionally polymyalgia rheumatica	RA
	Gout
	Reiter's syndrome[3]
	Psoriatic arthritis[3]

1. Shoulder or hip joints.
2. Joints of hands or feet.
3. Proximal joints are also frequently involved.

Patterns of Joint Involvement 00

5.2 MONOARTICULAR[1]	POLYARTICULAR[2]
Bacterial arthritis (non-gonococcal)	OA
Fungal arthritis	RA
JRA	SLE
Neoplasm	MCTD
Traumatic conditions	Reiter's syndrome
Gout	Psoriatic arthritis
Pseudogout	Viral arthritis
	Occasionally gout pseudogout gonococcal arthritis

1. Single joints.

2. Several joints. For simplicity, the category of of oligoarticular (1-4 joints) arthritis is not included.

5.3	SYMMETRIC*	ASYMMETRIC	
F5.1	RA	IBD	
	SLE	OA	F5.2
	AS	Reiter's syndrome	
		Gout	
		Pseudogout	
		Psoriatic arthritis	

*Involvement of similar joints on opposite sides of the body.

00 PATTERNS OF JOINT INVOLVEMENT

F5.1 Symmetric Joint Involvement of RA. Note soft swelling of the PIP and MCP joints as well as the wrist. The DIP joints are spared. This picture differs from that of OA in which the distal joints are characteristically involved in an asymmetric fashion and enlargement tends to be of a bony quality. Joints subject to heavy use (e.g. the dominant hand) may show more signs of inflammation or deformity than more protected joints.

Patterns of Joint Involvement 00

F5.2 Asymmetric Joint Involvement of OA.
Note bony enlargement of several DIP and PIP joints in a patchy distribution. Involvement of the 1st CMC joint gives the hand a "squared-off" appearance, but the wrist is notably spared. Asymmetry is a key factor to the diagnosis of OA.

6

Indicators of Inflammation

6.1 MORNING STIFFNESS

Stiffness in the joints for more than one hour upon rising in the morning usually indicates the presence of joint inflammation.

Indicators of Inflammation 00

6.2 SWELLING

Synovial swelling gives the joint a boggy consistency and is a fairly specific indicator of joint inflammation. Occasionally, swelling is not apparent at the onset of joint inflammation or in the presence of very mild disease.

Bony enlargement does not necessarily indicate the presence of active inflammation but may denote osteophyte formation, the hallmark of primary degenerative joint disease (DJD). Osteophytes may also form after cartilage damage from prior trauma or a longstanding inflammatory condition (such as RA).

6.3 Diseases Not Exhibiting Swelling. Once swelling is confirmed, the following disorders commonly found in clinical practice become less-likely diagnoses.

Non-swelling
Mechanical derangements*
Tendonitis*
Bursitis
"Fibrositis"
Aseptic necrosis
Localized osteomyelitis
Polymyalgia rheumatica

*May be associated with swelling.

00 INDICATORS OF INFLAMMATION

6.4 Diseases Exhibiting Swelling. It is important to distinguish soft swelling (synovial or soft tissue) from bony enlargement. Following is a list of diagnostic possibilities for patients with swollen joints.

	Soft swelling	Bony enlargement	
F6.1(a)	RA	OA	F6.1(b)
	SLE		
	Mixed connective-tissue disease (MCTD)		
F6.3(c)	Scleroderma		
	Reiter's syndrome		
	Psoriatic arthritis		
	AS		
	IBD		
	Gout		
	Pseudogout		
	Infectious arthritides		
	Sarcoidosis		
	Traumatic arthritis		
	OA*		

*OA occasionally causes a considerable degree of inflammation (and joint swelling).

F6.1 Types of Swelling (a) Soft swelling seen with RA of the PIP and MCP joints as well as the wrist. (b) Bony enlargement seen with OA of several DIP and PIP joints. (c) Sausage swelling seen with scleroderma.

Indicators of Inflammation 00

Diffuse subcutaneous edema may precede induration or atrophy of skin in scleroderma. Lack of definite synovitis makes conditions like RA less likely, but MCTD and reflex sympathetic dystrophy (shoulder-hand syndrome) may present a similar picture.

7

Interpreting the Onset

Date and Type of Onset 7.1

Common Diseases With a Sudden Onset 7.2

Circumstance of Onset 7.3

Systemic Illness 7.4

Immune mediated diseases 7.5

Infectious diseases 7.6

Drugs/Immunizations 7.7

Trauma 7.8

Social History 7.9

Occupation/hobbies 7.10

Psychosocial problems 7.11

Information pertaining to the onset of pain, associated complaints, and past and social history helps in the initial formulation of a differential diagnosis.

7.1 DATE AND TYPE OF ONSET

A patient can often relate the exact time at which joint pain or swelling began. This usually indicates an incident of direct trauma to the joint or the presence of a rapidly developing condition. The rapidity with which joint pain begins may provide a clue to its cause. We list here several conditions which characteristically have a sudden onset. However, not only may these disorders begin insidiously but some diseases of typical gradual onset (e.g., RA) may begin explosively.

7.2 Common Diseases With a Sudden Onset

Infectious arthritis

Crystal synovitis

Traumatic arthritis

00 INTERPRETING THE ONSET

7.3 CIRCUMSTANCE OF ONSET

Knowing the circumstances surrounding the onset of joint pain is crucial to formulating the initial differential diagnosis.

7.4 Systemic Illness

A patient who appears systemically ill is likely to have an inflammatory disease, either immunologically mediated or of an infectious nature.

7.5 Immune Mediated Diseases

RA

SLE

7.6 Infectious Diseases

Viral Arthritis	Hepatitis B.
	Rubella
Bacterial Arthritis	Gonococcal
	Staphylococcal
	Tuberculous
Fungal Arthritis	Coccidioidomycosis
	Blastomycosis

NOTE: Serious illness or underlying joint disease may compromise host defense mechanisms and predispose to infectious arthritis.

Interpreting the Onset 00

7.7 Drugs/Immunizations

The patient's past and social history often contain important diagnostic clues.

Thiazides	May elevate serum uric acid, contributing to the development of gout
Drug Abuse	Particularly by parenteral route, predisposes to infection with unusual organisms (e.g., anaerobes) in unusual locations (e.g., SC or SI joints)
Rubella Immunization	May cause transient arthritis
Steroids	May be associated with the occurrence of a vascular necrosis of bone, particularly in patients with SLE

00 INTERPRETING THE ONSET

7.8 Trauma

Joint pain due to trauma is usually sudden in onset. While the patient can often identify the precipitating event, this is not always the case.

Traumatic effusion

Biomechanical derangement

Torn cartilage

Degenerative arthritis secondary to previous joint trauma

NOTE: A traumatic event may also precipitate crystal synovitis (gout, pseudogout).

7.9 Social History

Important associations between occupation or hobby and joint pain may not be obvious to the patient and should be carefully sought by the clinician

7.10 Occupation/hobbies

Joint Trauma	Degenerative disease in knees of domestic workers, ankles and feet of ballet dancers, knuckles of boxers
	Raynaud's phenomenon in pneumatic drill operators
Toxin Exposure	Raynaud's phenomenon with polyvinyl chloride exposure
	"Saturnine gout" with lead exposure

7.11 Psychosocial problems

Possible Secondary Gain	Does the patient relate pain to occupation
	Is a disability claim or litigation involved
	Does the patient use pain as a means of relating to others

8

Usual Course

of Rheumatic Diseases

Self-limited 8.1

Continuous 8.2

The duration of each episode of joint pain is often a clue to its etiology. The following are the usual courses of several rheumatic conditions.

8.1 SELF-LIMITED*

Gout

Pseudogout

Viral arthritis

Sarcoidosis

*Disease eventually resolves with or without treatment.

Usual Course of Rheumatic Diseases 00

8.2 CONTINUOUS*

OA

RA

JRA

SLE

MCTD

Seronegative

(spondylo)arthritides

Bacterial arthritis

Fungal arthritis

Occasionally

gout

pseudogout

*Disease tends to persist.

9

Extra-articular Associations

Some rheumatic diseases leave their "calling cards" by involving areas of the body other than the joints. In addition, joint pain may signal a disorder that is primary to another organ system. Consider the following sample of extra-articular associations when evaluating patients with joint disorders.

Extra-articular Associations 00

9.1 SKIN/MUCOUS MEMBRANES

Alopecia	SLE	
Discoid Lesions	SLE	F9.1
Facial Erythema	SLE	F9.2
Petechial (or Purpuric) Lesions	SLE MCTD Scleroderma RA	
Nodules	RA Gout (tophus)	F9.3
F9.4 Erythema Nodosum	IBD Fungal diseases Sarcoidosis TB	
Papulosquamous Eruptions	Psoriasis Reiter's syndrome	F9.5 F9.6
Dystrophic Nails	Psoriasis Reiter's syndrome	F9.7
Oral ulcers	Reiter's syndrome SLE	F9.8

00 EXTRA-ARTICULAR ASSOCIATIONS

F9.1 Discoid lupus. Central atrophy, follicular plugging, and heaped-up erythematous margins are all features of discoid lupus. This lesion may be limited to the skin or may occur as part of the spectrum of SLE.

F9.2 Butterfly Eruption of SLE. Confluent, erythematous rash in "butterfly" distribution over the bridge of nose and cheeks is suggestive, but not diagnostic, of SLE. Acne rosacea and seborrheic dermatitis are other diagnostic considerations.

Extra-articular Associations 00

F9.3 Rheumatoid Nodule. A typical rheumatoid nodule occurs in an area subject to trauma. Similar appearing nodules may arise with gout, SLE, and hyperlipidemia.

F9.4 Erythema Nodosum. Erythematous (and probably tender) nodules along anterior surfaces of lower legs may occur in association with sarcoidosis, IBD, TB, fungal infections, and the use of a variety of drugs.

00 EXTRA-ARTICULAR ASSOCIATIONS

F9.5 Psoriasis. Plaque-like eruptions of psoriasis may be indistinguishable from the lesions seen in Reiter's Syndrome.

F9.6 Keratoderma Blenorrhagica of Reiter's Syndrome. Similar plaque-like lesions occur in patients with psoriasis or secondary syphilis.

Extra-articular Associations 00

F9.7 Dystrophic Nails of Psoriasis (a) Onycholysis (b) Nail pitting. Subungual accumulation of keratotic material is associated with distal separation of the nail from its bed. Similar lesions may occur in patients with Reiter's syndrome or fungal infection. Psoriasis of the nail matrix has resulted in characteristic pitting of the nail plate. This may be a clue to the cause of an otherwise obscure arthritis.

F9.8 Oral Ulcer of Reiter's Syndrome. A superficial (and probably painless) ulcer with an erythematous base may occur on the tongue or buccal mucosa of a patient with Reiter's syndrome.

00 EXTRA-ARTICULAR ASSOCIATIONS

9.2 EYE

F9.9	Uveitis	RA
		JRA
		Reiter's syndrome
		AS
		IBD
F9.10	Scleritis	RA
		SLE
	Conjunctivitis	Reiter's syndrome

F9.9 Uveitis. Injection of ciliary vessels and irregularity of pupil secondary to adhesions between iris and lens (synechiae) may occur in a variety of rheumatic conditions, including JRA, RA, and the seronegative (spondylo)arthritides.

Extra-articular Associations 00

F9.10 Scleritis. Probably an ocular form of a rheumatoid nodule, the bluish-red blush of scleral vessels is usually found in patients with severe RA. Posterior scleritis may lead to retinal detachment or choroiditis.

9.3 NEUROMUSCULAR

Peripheral Nerve Disorders	Central Nervous System Disorders	Muscular Disorders
RA	....	RA often involves muscle to a moderate extent
SLE	SLE	
....	....	Polymyositis
Occasionally sarcoidosis	....	....
....	Occasionally Reiter's Syndrome	....

00 EXTRA-ARTICULAR ASSOCIATIONS

9.4 GASTROINTESTINAL

Esophageal Disease	Small Bowel Disease	Large Bowel Disease
Scleroderma	Scleroderma	Scleroderma
MCTD	....	....
....	IBD	IBD

NOTE: Reiter's syndrome may be preceeded by a diarrheal illness.

9.5 UROGENITAL

Renal Disease	SLE
	MCTD
	Scleroderma
	Gout
Urethral Disease	Reiter's Syndrome
	Gonorrhea

Extra-articular Associations 00

9.6 CARDIAC

Myocardial Disease	Pericardial Disease	Valvular Disease
SLE	SLE	SLE
RA	RA	RA
MCTD	MCTD	....
Scleroderma	....	....
Sarcoidosis	....	....
....	....	AS
....	....	Reiter's syndrome

9.7 PULMONARY

Pleural Disease	Parenchymal Disease
SLE	SLE
RA	RA
MCTD	MCTD
....	Scleroderma
....	Sarcoidosis

00 EXTRA-ARTICULAR ASSOCIATIONS

9.8 VASCULAR

F9.11 Raynaud's Phenomenon

SLE
MCTD
Scleroderma
....

Vasculitis F9.12

SLE
MCTD
Scleroderma
RA

F9.11 Raynaud's Phenomenon. Well-demarcated blanching of several fingers may be followed by cyanosis and erythema. Frequently triggered by cold temperatures or by emotional upset, Raynaud's phenomenon may occur without obvious cause or in association with SLE, MCTD, or scleroderma.

F9.12 Vasculitis in Patient with RA.
Punctate hemorrhagic lesions often signify inflammation of small vessels. Similar lesions may be seen in a variety of conditions including SLE and scleroderma.

9.9 ENDOCRINE

Acromegaly

Myxedema

9.10 METABOLIC

Ochronosis

Hemochromatosis

Wilson's disease

Part III

Refining the Diagnosis

10

Final Comparisons

OA 10.1	Psoriatic Arthritis 10.5
RA 10.2	Septic Arthritis 10.6
AS 10.3	Gout 10.7
Reiter's Syndrome 10.4	Non-articular Pain Syndromes 10.8

Deciding on a final diagnosis is not always easy. Signs and symptoms may not be entirely clear-cut and many illnesses have overlapping characteristics. Therefore, we provide a list of representative rheumatic diseases, each with an outline of important alternative diagnoses and their distinguishing characteristics.

10.1 PRIMARY OSTEOARTHRITIS

Psoriatic Arthritis	Nail disease, scaley skin rash, possibile involvement of MCPs, wrist, or elbows.
Reiter's Syndrome	Urethral discharge, photophobia, oral ulcers, scaley rash (esp. palms and soles), heel involvement, usually in a young patient.
SLE	Sun-sensitive rash, oral ulcers, alopecia, Raynaud's phenomenon, other systemic complaints.

RA	MCP, wrist, elbow, or shoulder synovitis (usually symmetric), systemic manifestations, morning stiffness.
Polymyalgia Rheumatica	Proximal pain (shoulder or hip girdle, without swelling or distal pain), morning stiffness, fever, visual disturbances, headache, dramatic response to low-dose steroids.

NOTE: OA is a common disease and may be present along with another joint disorder.

00

Final Comparisons 00

10.2 RHEUMATOID ARTHRITIS

SLE	Sun-sensitive rash, oral ulcers, alopecia, Raynaud's phenomenon, possible renal involvement.
Psoriatic Arthritis	Scaley skin rash, nail disease, DIP involvement, asymmetric arthritis.
Reiter's Syndrome	Urethral discharge, photophobia, oral ulcers, scaley rash (esp. palms, soles or penis), asymmetric arthritis (esp. lower extremities with sparing of upper extremities).
Gout	Swelling of the 1st MTP, asymmetric arthritis (esp. with intermittent course).
MCTD	Raynaud's phenomenon, severe muscle weakness, thickened or bound-down skin.
OA	Dip involvement (esp. if MCPs and wrists are spared), bony enlargement.

NOTE: OA may occur in conjunction with RA.

10.3 ANKYLOSING SPONDYLITIS

OA	No morning stiffness, distal joint disease, onset usually after age 40.

Herniated Lumbar Disc	Positive straight leg raising maneuver, signs or symptoms of nerve root irritiation.
Reiter's Syndrome	Urethritis, distal arthritis (esp. lower extremity), scaley rash, balanitis, oral ulcers.
Psoriatic Spondylitis	Psoriatic rash.
IBD	History of diarrhea, weight loss, bloody bowel movements.

00 FINAL COMPARISONS

10.4 REITER'S SYNDROME

RA	Symmetric arthritis (esp. upper extremities), often in females, subcutaneous nodules.
Gout	1st MTP involvement, subcutaneous nodules (tophi), self-limited attacks.
AS	Frequently involves entire spine, urethritis absent, rash absent.
IBD	Weight loss, chronic diarrhea, bloody diarrhea.
Gonococcal Arthritis	Pustular skin rash, high fever, accompanying tenosynovitis.

10.5 PSORIATIC ARTHRITIS

RA	Symmetric arthritis, subcutaneous nodules, vasculitis, major organ involvement.
OA	DIP involvement without nail changes.
AS	Axial joints (hips, shoulders), rash absent.
Gout	1st MTP arthritis, subcutaneous nodules, intermittent attacks.

	Reiter's Syndrome	Urethritis, oral ulcers, upper extremity involvement rare.
10.6	SEPTIC ARTHRITIS	(bacterial e.g., gonococcal, TB, staphylococcal)
	Gout	1st MTP arthritis, intermittent attacks, subcutaneous nodules (tophi).
	Reiter's Syndrome	Heel involvement, eye involvement, persistent arthritis after antibiotic treatment (esp. lower extremity), scaley rash.

Final Comparisons 00

10.7 GOUT (self-limited or continuous)

RA	Symmetric involvement (esp. MCPs and PIPs of hands), may involve cervical spine (and occasionally SI joint), major organ involvement, vasculitis, usually in females.
Psoriatic Arthritis	Rash, nail disease, DIP involvement, may involve spine.
Reiter's Syndrome	Urethral discharge, eye inflammation, mouth ulcers, rash, may involve spine.
Pseudogout	Knee and wrist most common.

10.8 NON-ARTICULAR PAIN SYNDROMES (e.g., tendonitis, bursitis, "fibrositis")

Polymyalgia Rheumatic	Onset after age 50, fever, morning stiffness, headache, visual disturbances, jaw claudication, dramatic response to low-dose steroids.
OA	Bony swelling, joint crepitus.
Inflammatory Arthritis	Synovial swelling, systemic complaints, prolonged morning stiffness, major organ system involvement.

11

Further Reading

The following references contain more detailed clinical descriptions of diseases covered in the text.

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Schaller, J., "Diagnosis and Treatment of Arthritis in Children," Res. Staff Phys. p. 38, July 1978.

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Reichlin, M., "Problems in Differentiating SLE and Mixed Connective-Tissue Disease," NEJM 295:1194, 1976.

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Kinder, R. and Fleischmajer, R., "Systemic Scleroderma: A Review of Organ Systems," Int. J. Derm. 13:382, 1974.

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Hamilton, C., Shelley, W., and Tumulty, P., "Giant Cell Arteritis: Including Temporal Arteritis and Polymyalgia Rheumatica," Medicine 50:1, 1971.

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Shafer, N., "Why Reiter's Disease?" NY State J. Med. p. 1913, Oct. 1977.

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Zitnan, D. and Sitaj, S., "Natural Course of Articular Chondrocalcinosis," Arth. Rheum. 19:363, 1976.

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General

Ward, J. and Atcheson, S., "Infectious Arthritis," Med. Cl. N. Amer. 61:313, 1977.

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Goldenberg, D. and Cohen, A., "Acute Infectious Arthritis. A Review of Patients With Nongonococcal Joint Infections (With Emphasis on Therapy and Prognosis)," Am. J. Med. 60:369, 1976.

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11.23 ASEPTIC NECROSIS OF BONE

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Waldvogel, F., and Vaseg, H., "Osteomyelitis: The Past Decade," NEJM 303:360, 1980.

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James, D., Neville, E., and Carstairs, L., "Bone and Joint Sarcoidosis," Sem. Arth. Rheum. 6:53, 1976.

Essence of Differential Diagnosis

Knowledge of common disease manifestations and organizational skills will help solve even the most obscure clinical problems. Difficult cases require meticulous attention to historical details, a careful physical examination, and arrangement of salient features into a recognizable pattern. Choosing the most likely diagnosis is then easy.

Appendix One

Abbreviations

for Distal Joints

CMC	Carpometacarpal
DIP	Distal interphalangeal
IP	Interphalangeal
MCP	Metacarpophalangeal
MTP	Metatarsophalangeal
PIP	Proximal interphalangeal

Appendix Two

Disorders Frequently Encountered

in Clinical Practice

"RHEUMATIC" DISEASES

Rheumatoid arthritis (RA)

Juvenile rheumatoid arthritis (JRA)

Mixed connective-tissue disease (MCTD)

Systemic lupus erythematosis (SLE)

Scleroderma

Polymyalgia rheumatica

SERONEGATIVE (SPONDYLO)ARTHRITIDES

Reiter's syndrome

Psoriatic arthritis

Ankylosing spondylitis (AS)

Arthritis secondary to inflammatory bowel disease (IBD)

CHRYSTAL SYNOVITIDES

Gout

Pseudogout

INFECTIOUS ARTHRITIDES

Bacterial

Viral

Fungal

Appendix 00

PRIMARY DEGENERATIVE DISEASES

Primary osteoarthritis (OA)

Degenerative disc disease

TRAUMATIC CONDITIONS

Mechanical derangements

NON-ARTICULAR PAIN SYNDROMES

Tendonitis

Bursitis

"Fibrositis"

BONE DISEASE

Aseptic (ischemic) necrosis of bone

Localized osteomyelitis

IDIOPATHIC DISEASE

Sarcoidosis

Index to Figures

END OF MANUSCRIPT

B. Description of Proposed Illustrations

GENERAL

The pathological illustrations in JOINT PAIN will be full color photographs taken specifically for this book. The photographic environment must be kept as consistant as possible to allow optimum comparisons. All images should be photographed against a white background that when reproduced will essentially become the white of the page. Shadows (used minimally to suggest a surface) can either be reproduced photographically or mechanically (airbrush). Images grouped on a one or two page spread should have the same value relationships.

Important information must fall within the type-page margins (specified on page 89) and irrelevant anatomy will bleed* off the page at top, bottom, and inside edges only. The semi-comprehensive layouts can be used to determine the relative size and positioning of each figure; the configurations may vary according to the patient but details specified for each figure can not. Anatomy photographed should not be cluttered with jewelry, clothing, or cosmetics.

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*If the printed image extends to the trim edge of the page, it is called bleed.

SPECIFIC

NOTE: Rules group figures seen together on a two page spread.

F4.1 Characteristic DIP Joint Involvement of Psoriatic Arthritis. Dorsal surface of right hand including wrist. DIP involvement in two fingers, sausage appearance, fleshy, onycholysis. Wrist bleeds off top edge of page.

F4.2 Swelling of PIP and MCP Joints and Wrists Seen With RA. Dorsal surface of right hand. Must have wrist and affected joints. Wrist bleeds off bottom edge of page.

F4.3 Involvement of OA in 1st CMC Joint. Dorsal surface of right hand. Must have good portion of wrist to differentiate it from the 1st CMC. Square hand. Image bleeds off top edge of page.

F4.4 AS Affecting the Lumbar Spine. Nude male, approx. 33 yrs. of age, whole body profile facing right. Flat lumbar spine, protrusion of head, forward gaze, raised eybrows. No overemphasis of bent knees.

F4.5 Involvement of Gout in 1st MTP Joint.
Red-violet color, make it look like it hurts, a little shiny and swollen; crop above ankle, left foot, lower leg bleeding off inside edge of page.

F5.1 Symmetric Joint Involvement of RA.
Dorsal surface of left and right hands of same patient and whole wrists. Almost identical, dominant hand may be more affected, correct distribution of joint involvement. Inside bleed.

F5.2 Asymmetric Joint Involvement of OA.
Dorsal surfaces of left and right hands and wrists. Obvious asymmetry. Inside bleed.

F6.1 Types of Swelling. (a) Soft swelling seen with RA of PIP and MCP Joints as well as the wrist. Dorsal surface of left hand and wrist. Fleshy and swollen PIPs and MCPs. Valleys filled between MCPs, skinny hand best exemplifies.
(b) Bony enlargement seen with OA of several DIP and PIP joints. Bony look, less shiny than scleroderma; dorsal surface of left hand and wrist, asymmetry must be present with no MCP

involvement. Do not include swollen thumb. Fleshy, slender, any knuckle not involved has regular creases.

(c) Sausage swelling seen with scleroderma.

Sausage swelling, dorsal surface of left hand and wrist. Natural creases are barely evident. Whole hand is swollen, indurated, some smoothness and firmness.

All figures bleed off inside edge.

F9.1 Discoid Lupus

Could be black female, whole head, asymmetric distribution, off neck, on sun exposed area. Crop at neck, no bleed.

F9.2 Butterfly Eruption of SLE.

Symmetric and blending into normal skin. White female, whole head, crop at neck. No bleed.

F9.3 Rheumatoid Nodule.

In proximal ulna of left arm. Closed hand, bent elbow, bleed off top of page at mid-biceps.

F9.4 Erythema Nodosum.

Should look like you can run hand on skin

and feel the bumps. Reddish, raised, 1 inch in diameter, on anterior surface of lower leg. Could be either leg, from toes to upper border of knee. Top of leg bleeds off upper edge of page.

F9.5 Psoriasis

Erythematous area with white scales on dorsal surface of left hand, dystophic nails. Bleed off top of page at wrist.

F9.6 Keratoderma Blenorrhagica of Reiter's Syndrome.

Ventral surface (sole) of left foot; only upper half with toes is necessary. Plaques well circumscribed with scales (heaped up), red.

F9.7 Dystrophic Nails of Psoriasis (a) Onycholysis.

Foreshortened view of tip of one finger. Distal nail separating, whitish-yellow or normal nail. Base of finger bleeds off upper edge.

(b) Nail pitting.

One finger nail, dorsal view. Enough of finger to allow bleed off upper edge of page.

F9.8 Oral Ulcer of Reiter's Syndrome.

Dorsal tongue. Square format.

No bleed.

F9.9 Uveitis.

Enough information to relate that it is an eye. Bloodshot around whole eye. More intense toward iris and cornea. Irregular pupil. No need for tension on the eyelids. Rectangular format, no bleed.

F9.10 Scleritis.

Same amount of anatomy as in F9.9. Red-blue blush; show good deal of sclera. Rectangular format, no bleed.

F9.11 Raynaud's Phenomenon.

One hand, 1-3 fingers blanching, not hand. Wrist bleeds off bottom edge of page.

F9.12 Vasculitis in Patient with RA.

One finger, splinter hemorrages at finger tip. Middle of finger bleeds off upper edge of page.

C. Specifications for Production of the Book

The following are the proposed specifications for JOINT PAIN by K.E. Sack and C.J. Miller

BINDING/ SPECIAL FINISHES	
	Edition binding Round cornering on text and cover
Cover: (transparencies 1 and 2)	Smooth, dull, flexible case, color matching, 40% process black. Debossed image on front, spine and back. Die copy stamped in gold. Title: 36 pt. Palatino, all large cups. Subtitle: 12/13 Palatino, initial caps/lc as typed on manuscript. Authors: 12 pt. Palatino with one line space between them, flush right. Follow cover on dummy.
End leaves:	Textured, matching PMS 519U.*
PRINTING	
Type of Printing:	Offset
Paper:	Lustro Offset Enamel Dull, 70 lb.*
Inks:	Process black, PMS 315U (color)*

*Samples of colors and paper inserted in transparency jacket, page 103.

PAGING	
Trim Size:	4 3/4 x 6 1/4 inches
Type Page:	20 x 30 1/2 picas (not including drop folios)
Head Margin:	2 picas
Gutter Margin:	Minimum of 5 picas
Outside Margin:	3.5 picas (not including topic and figure numbers)
Foot Margin:	Minimum of 5 picas (not including drop folios)
	NOTE: All spaces indicated are from baseline to baseline (B/B) unless noted otherwise. All sinkage are to baselines.
Folios:*	10/11 Palatino, 100% color. Align to top and outside type-page margin.
Running Heads:	Align running head baselines with folio baseline and position 1 pica inside of folios (see layouts); 100% color. No running head on opening pages or when illustrations have priority for space. Recto running head is the section name, 10/11 Palatino small caps, regular letter spacing. Verso running head is the section name initial caps/lc, 10/11 Palatino Italic.
TEXT	
G	General: 10/11 Palatino, minus 1/2 letterspacing X 20 picas measure, flush left, ragged right. No initial paragraph indent for opening text and when spec'd with one line space between paragraphs. 1 em indent for all other paragraphs.

* Drop folios are used on opening pages. 9/10 Palatino. Sink 13 pts. from bottom of type-page margin and flush with outside margin. Not used on part openings.

DISPLAY

P (layout page 94)	Preliminaries: 24 pt. Palatino, 1/2 letterspacing, flush to outside and top type-page margins. Drop 30 pts. to begin text.
PO (transparency 3, layout pages 97, 101)	Part Opening: New recto page. Reverse out of 50% black background with 4 edge bleed. Set the word "Part" and number (roman) in Palatino u/lc, 24 pt. Align to top and right type-page margins. Drop 36 pts. below part number (B/B) for first word of part title, 24/24 Palatino, flush to right type-page margin. Remaining words of title are on following line, flush right.
SO (transparency 4, layout pages 98, 99)	Section Opening: New verso page, background: 30% black, 4 edge bleed. Set the number (arabic) in 18 pt. Palatino. Align to top and left type-page margins. Drop 24 pts. (B/B) for section title, initial caps/lc, 18/18 pt. Palatino, minus 1/2 letterspacing, maximum 20 pica length, do not divide words. Reverse out to white. Drop 16 points for outline: 8/9 Palatino, spec'd for one (20 picas) and two (9.5 picas) columns. OR drop 22 pts. for initial paragraph. If subject heading follows outline, drop 30 pts. (B/B). NOTE: All subject heads are types "as is" in manuscript.
A (transparency 4, layout page 99)	Main Head: 10/11 Palatino Bold, minus 1/2 letterspacing, all large caps, 100% color. Topic number extends into margin 1 pica from main head. Main head is flush to left-hand type-page margin. Drop 22 pts. (B/B) to general text.
B	Subhead: 10/11 Palatino Bold, minus 1/2 letterspacing, initial caps/lc, number 1 pica into margin, 100% color. 22 pts. (B/B) to general text.

C (transparency 4, 5) layout pages 99, 100)	Run-in Subhead: 10/11 Palatino Bold, minus 1/2 letterspacing, initial caps/lc, 100% color. Title flush to left-hand type-page margin. Subhead number (arabic) extends into left margin 1 pica from subhead. Begin run-in text (roman) after 1 em space. Allow 33 pts. (B/B) above this head.
F (transparency 5, layout page 100)	Figure Number: 9/10 pt. Palatino Bold, 100% color, flush left. Set the letter F and number (decimal, arabic) followed by a 1 em space and run-in figure title: 9/10 Palatino Roman, 20 and 10 pt. maximum pica lengths as spec'd, flush left. For figure numbers next to materal being illustrated, leave 1 pica space and place F and arabic decimal number in margin, same baseline. (a)'s, (b)'s, and (c)'s are 9/10 Palatino Bold, lc, 100% in title, 100% black next to illustration.
I (transparency 5, layout page 100)	Legends following figure titles are set 9/10 Palatino Italic, flush left, ragged right, 10 and 20 pica lengths as spec'd on manuscript.

LISTS/TABLES

NOTE: Lists and tables are printed on a 30% color block that is 1/2 pica larger than typed information on all sides, width is either 11 or 20 picas, flush with left type-page margin. Type is 100% black.

L (transparency 4, layout page 99)

List Titles: Are all set in 9/10 pt. Palatino Bold as typed in manuscript. Drop 6 pts. to rule: 2 1/2 pt. rules, 2 pts. apart, maximum length of 19 and 10 picas as spec'd on manuscript. Drop 20 picas (B/B) to body: 9/10 Palatino Roman, flush left to 1/2 pica inside type-page margin. Leave 22 pts. (B/B) above list title (inclusive of background).

T-1 (transparency 5, layout page 100)

Table Titles: Are all set in 9/10 Palatino Bold as typed in manuscript. Drop 6 pts. to rule: 2 1/2 pt. rules, 2 pt. apart, 20 pica length.

T-2

Table Subtitles: 8 pt. Bold Palatino Italic. Drop 6 pts. to single 1/2 pt. rule length of double rule.

T-3

Table Body: 9/10 Palatino Roman, minus 1/2 letterspacing up to 19 picas maximum. Allow 1 pica space between columns.

fn

Footnotes for Lists/Tables: 8/9 Palatino X maximum length corresponding to rule length. Drop 20 pts. (B/B) below last line. Extra space between notes.

APPENDIX

A-1

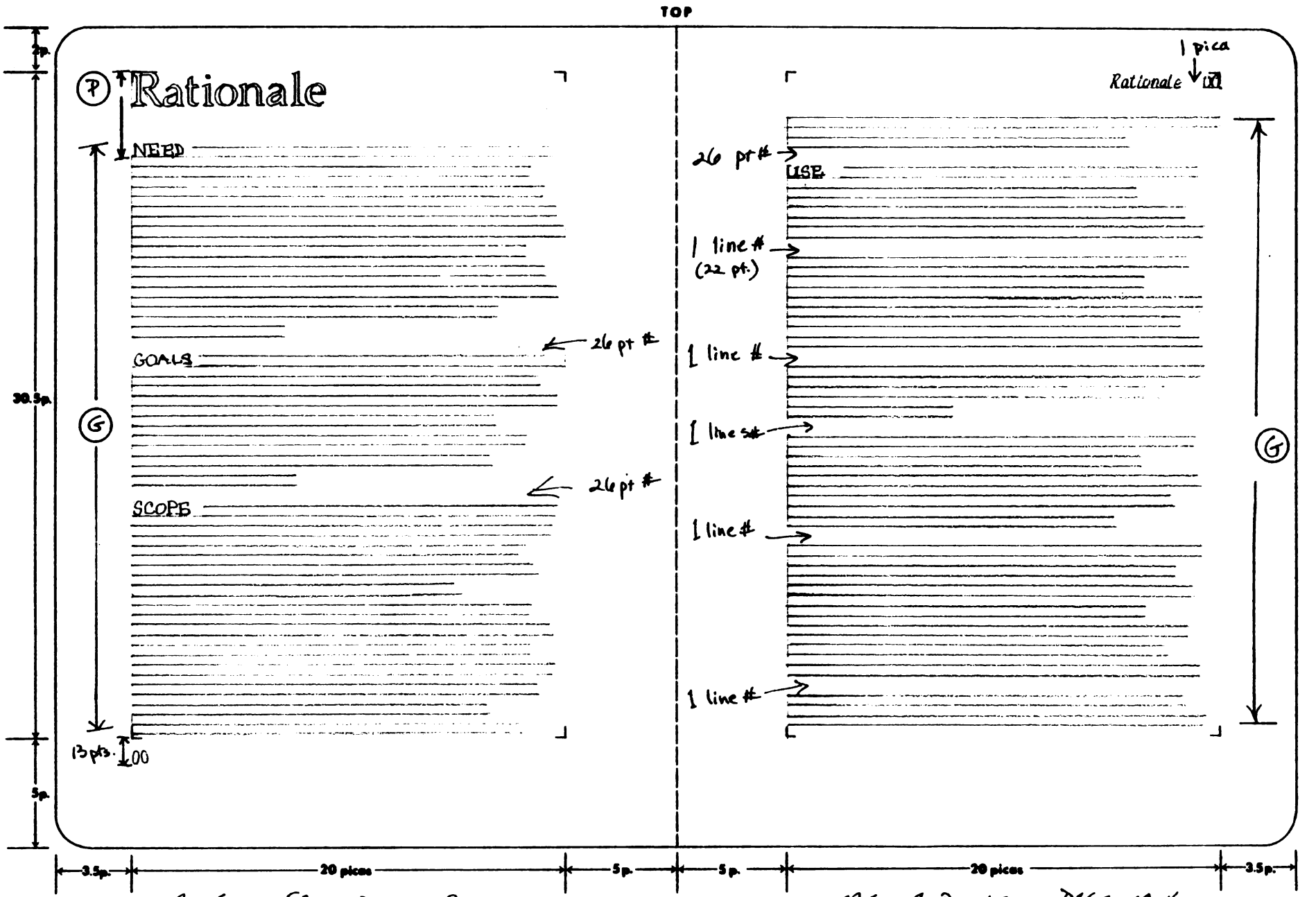
Appendix Opening: Set the word appendix and number (spelled out) in 10 pt. Palatino, regular spacing. Drop 22 pts. (B/3) to title: 18 pts. solid Palatino, minus 1/2 letterspacing. 20 picas maximum length, flush to outside margin. Drop 22 picas to 1st heading

A-2

Appendix Headings: UC 9/10 Bold Palatino

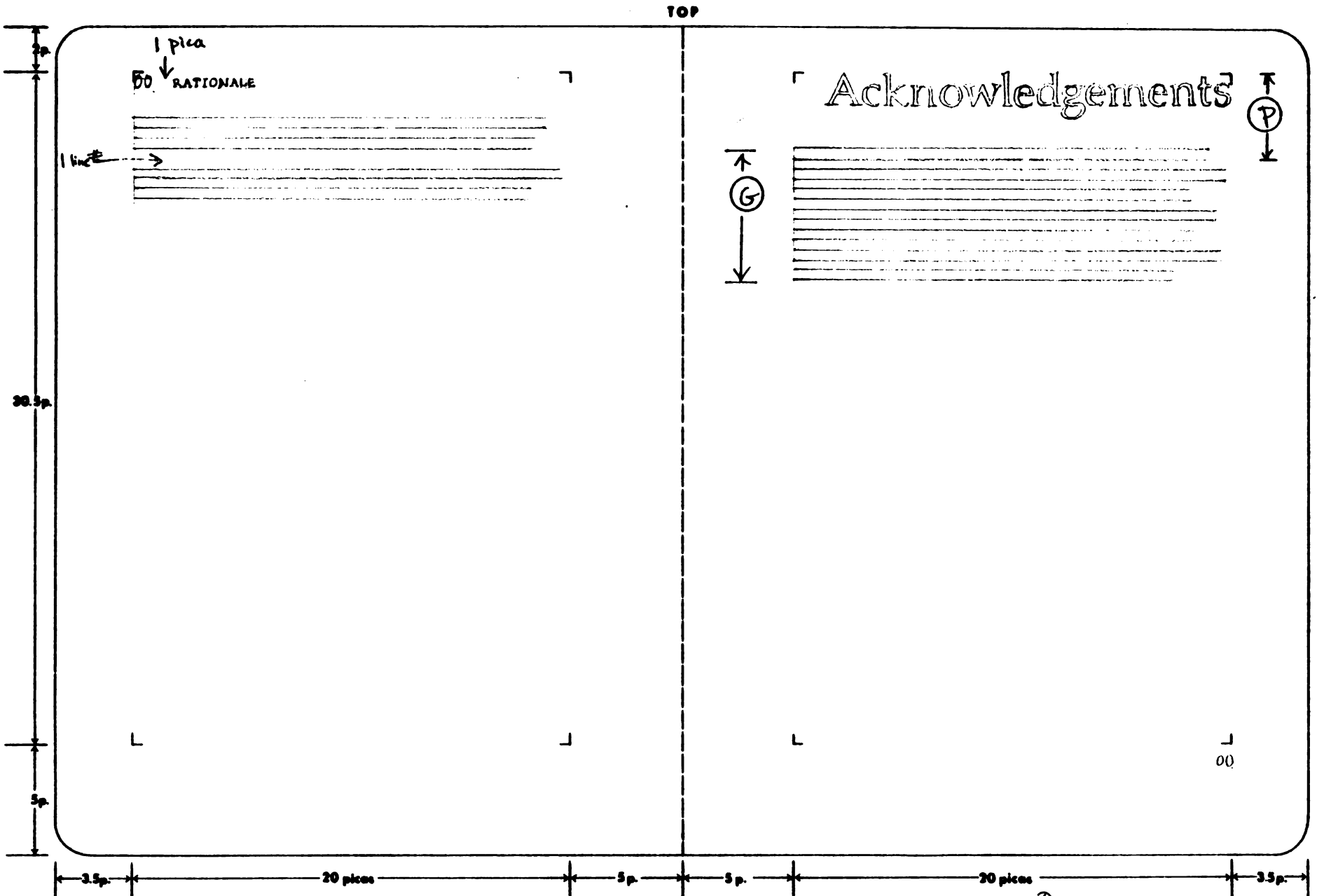
A-3

Body: u/lc 9/10 Palatino Roman



Ms. Copy from pages 9, 10

Ms. Copy from pages 10, 11



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Ms. COPY FROM PAGE 12

TOP

2p.

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P

G

30 pts

22 pts

28 pts

Approach to Differential Diagnosis

PART I COLLECTING THE DATA

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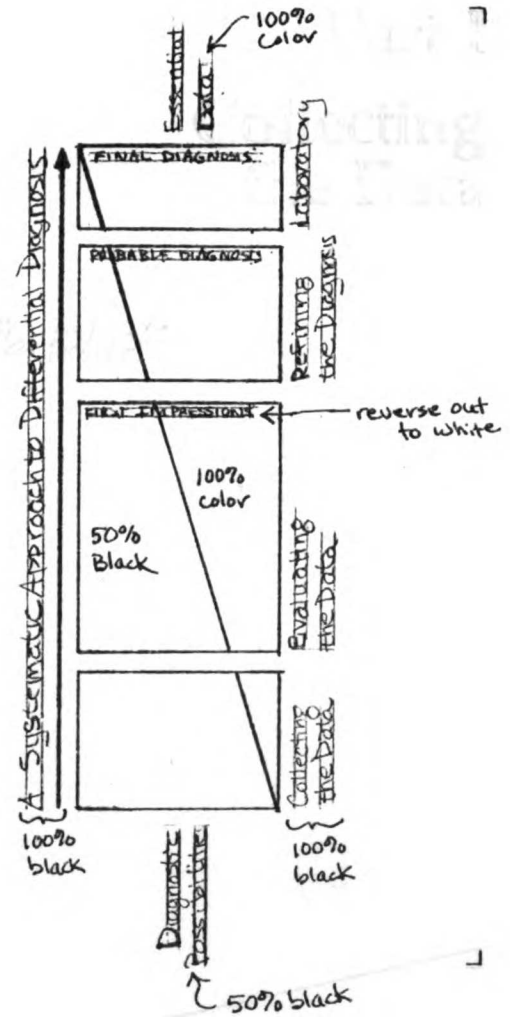
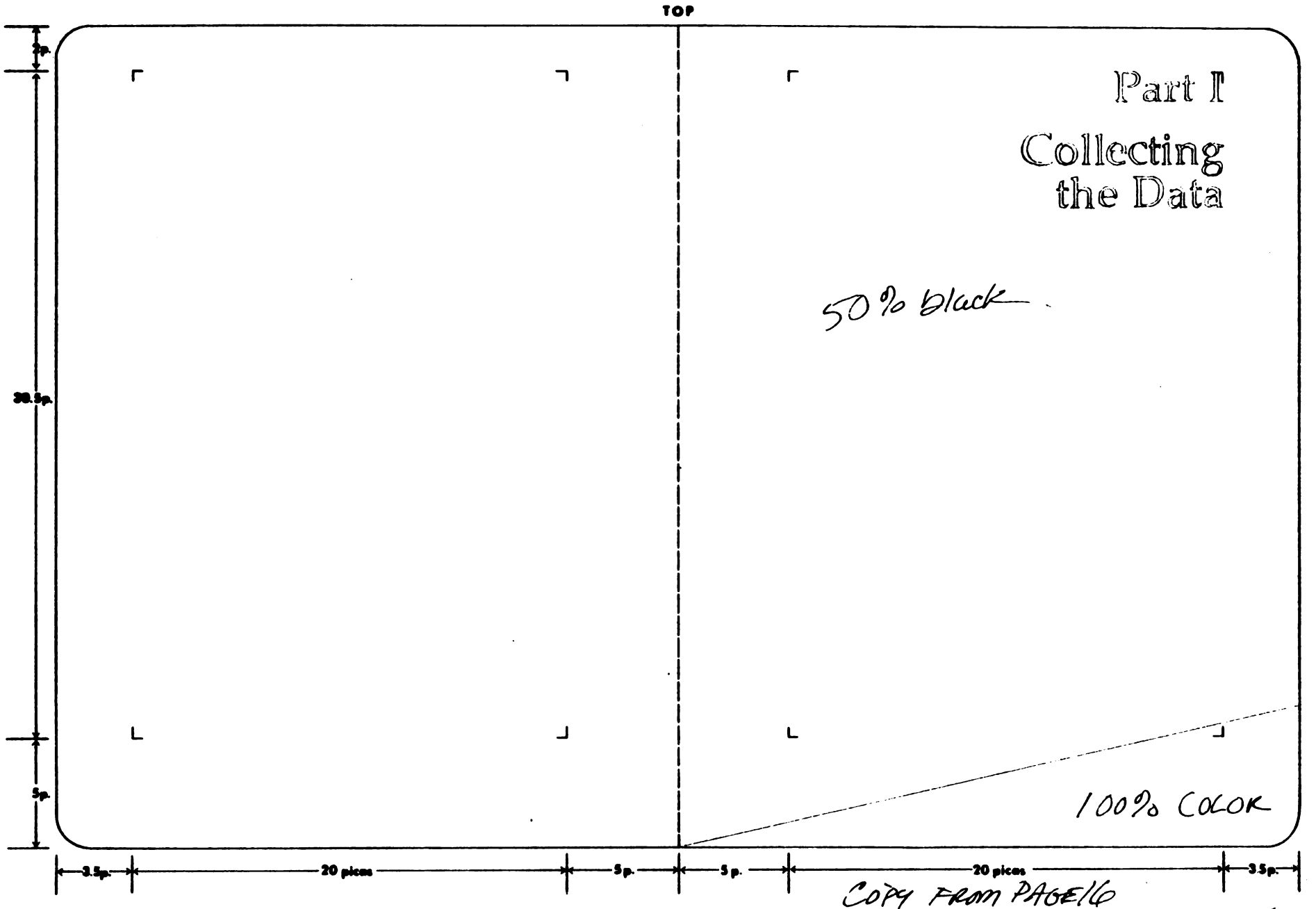


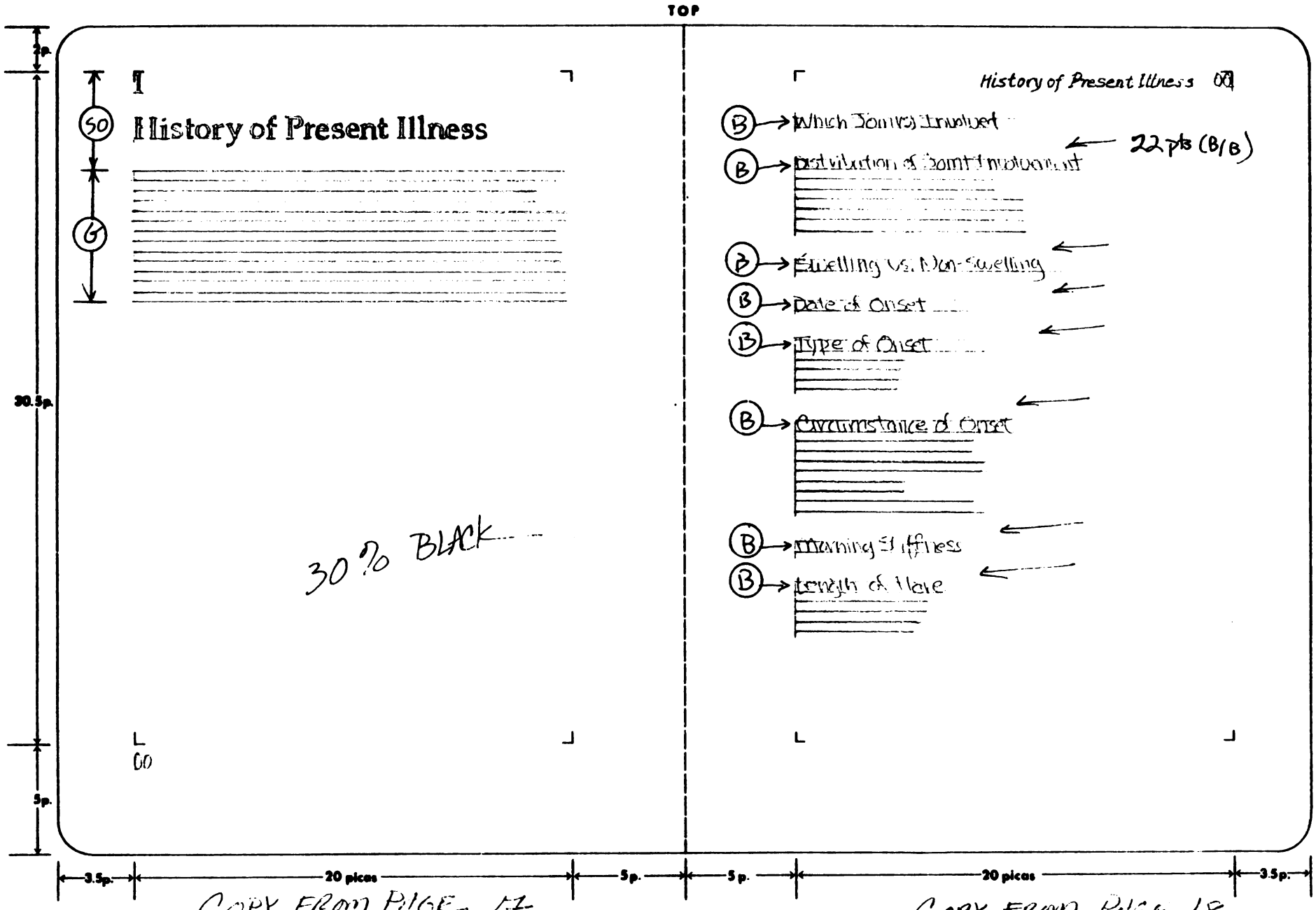
3.5p. | 20 picas | 5p. | 5p. | 20 picas | 3.5p.

Ms. Copy on PAGE 13

Ms. Copy on PAGE 14



COPY FROM PAGE 16
TRANSPARENCY 3 FOR COLOR COMP.


TOP
2p.
30.5p.
5p.
I
History of Present Illness
(50)
(6)
30% BLACK
00
History of Present Illness 00
(B) Which Joint(s) Involved
(B) Distribution of Joint Involvement
22 pts (B/B)
(B) Swelling vs. Non-Swelling
(B) Date of Onset
(B) Type of Onset
(B) Circumstance of Onset
(B) Morning Stiffness
(B) Length of Flare
3.5p.
20 picas
5p.
5p.
20 picas
3.5p.
COPY FROM PAGE 17
COPY FROM PAGE 18

TOP

2p.

30.5p.

5p.

6

Indicators of Inflammation

24 pt # (B/B)

16 pt # (B/B)

30 pt # (B/B)

6.1 MORNING STIFFNESS

Stiffness in the joints for more than one hour upon rising in the morning usually indicates the presence of joint inflammation.

30% Black

00

22 PT. # (B/B)

6.2 SWELLING

22 pt # (B/B)

Synovial swelling gives the joint a boggy consistency and is a fairly specific indicator of joint inflammation. Occasionally, swelling is not apparent at the onset of joint inflammation or in the presence of very mild disease.

Bony enlargement does not necessarily indicate the presence of active inflammation but may denote osteophyte formation, the hallmark of primary degenerative joint disease (DJD). Osteophytes may also form after cartilage damage from prior trauma or a longstanding inflammatory condition (such as RA).

33 pt # (B/B)

6.3 Diseases Not Exhibiting Swelling

Once swelling is confirmed, the following disorders commonly found in clinical practice become less-likely diagnoses.

22 pt # (B/B)

Non-swelling
Mechanical derangements*
Tendonitis*
Bursitis
"Fibrositis"
Aseptic necrosis
Localized osteomyelitis
Polymyalgia rheumatica

30% color

*May be associated with swelling.

20 pt # (B/B)

3.5p. | 20 picas | 5p. | 5p. | 20 picas | 3.5p.

COLOR COMP – TRANSPARENCY 3
MS COPY FROM PAGE 38

MS. COPY FROM PAGE 39

TOP

2p.

30.5p.

5p.

00 INDICATORS OF INFLAMMATION

C 6.4 G **Diseases Exhibiting Swelling** It is important to distinguish *soft* swelling (synovial or soft tissue) from *bony* enlargement. Following is a list of diagnostic possibilities for patients with swollen joints.

Soft swelling	Bony enlargement
RA	OA
SLE	
Mixed connective-tissue diseases (MCTD)	
Scleroderma	
Reiter's syndrome	
Psoriatic arthritis	
AS	
IBD	
Gout	
Pseudogout	
Infectious arthritides	
Sarcoidosis	
Traumatic arthritis	
OA*	

30% color

F6.1(a) F F6.3(c)

T-1

F6.1(b)

T-3

Fn *OA occasionally causes a considerable degree of inflammation (and joint swelling).

Full color photograph (a)

Full color photograph (b)

Full color photograph (c)

F **F6.1** Types of Swelling **(a)** *Soft* swelling seen with RA of the PIP and MCP joints as well as the wrist. **(b)** *Bony* enlargement seen with OA of several DIP and PIP joints. **(c)** *Sausage* swelling seen with scleroderma.

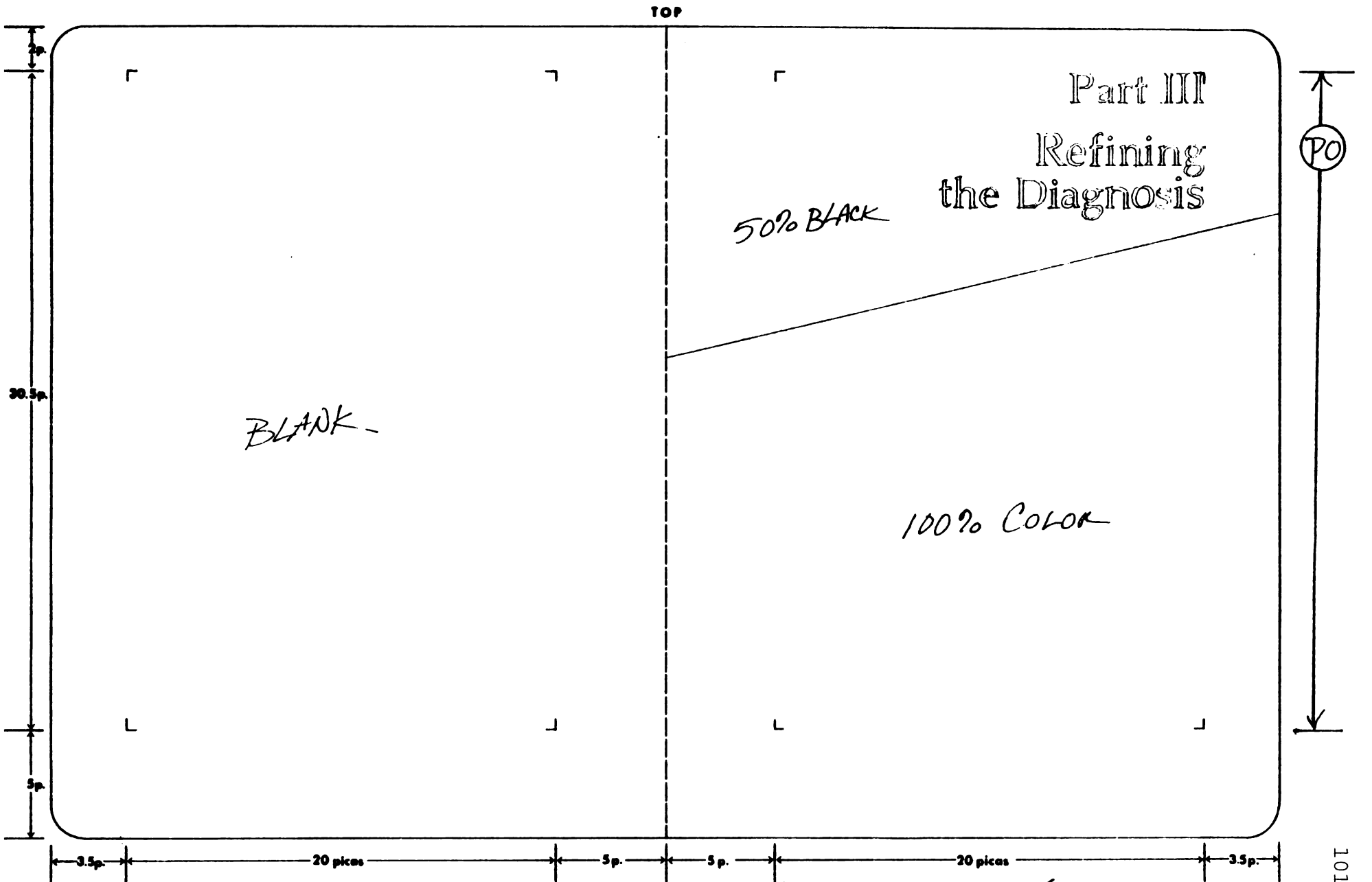
Diffuse subcutaneous edema may precede induration or atrophy of skin in scleroderma. Lack of definite synovitis makes conditions like RA less likely, but MCTD and reflex sympathetic dystrophy (shoulder-hand syndrome) may present a similar picture.

I

3.5p. | 20 picas | 5p. | 5p. | 20 picas | 3.5p.

MS COPY FROM PAGES 40, 40(a) TRANSPARENCY 5

MS COPY FROM PAGE 41 DESCRIPTION OF ILLUSTRATION ON PAGE 84



COPY FROM PAGE 602
TRANSPARENCY 3 FOR COLOR COMP.

SAMPLE COMPREHENSIVE LAYOUTS
(displayed in 35mm transparencies)

Transparency 1	FRONT OF COVER ON "DUMMY"* Production specifications for cover are on page 88. The lab coat behind the "dummy" show the size relationship of the lower pocket to the book.
Transparency 2	BACK OF BOOK COVER
Transparency 3	PART OPENING Two-page spread corresponds to page 23. Semi-comprehensive layouts for remaining part openings on pages 97 and 101 show the variation in the graphics. The white line around the spread indicates the extent of the book cover.
Transparency 4	SECTION OPENING Two-page spread corresponds to copy on pages 38 and 39. Semi-comprehensive layout on page 99 gives type and color specifications. Rules on left and bottom indicate the size of margins and type page.
Transparency 5	REMAINDER OF SECTION Two-page spread with space for illustration on right that is described on page 84. The semi-comprehensive layout on page 101 shows placement of figures. Corresponding copy is on pages 40, 40(a) and 41.

*A set of blank pages made up in advance to show the size, shape, and general style of a piece of printing.

L.O.E. dull 70

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PMS 518U

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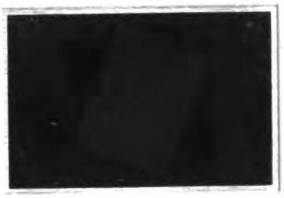

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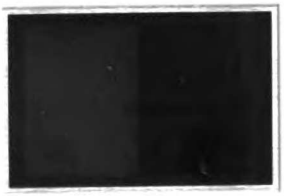

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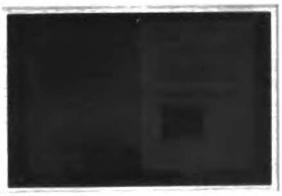

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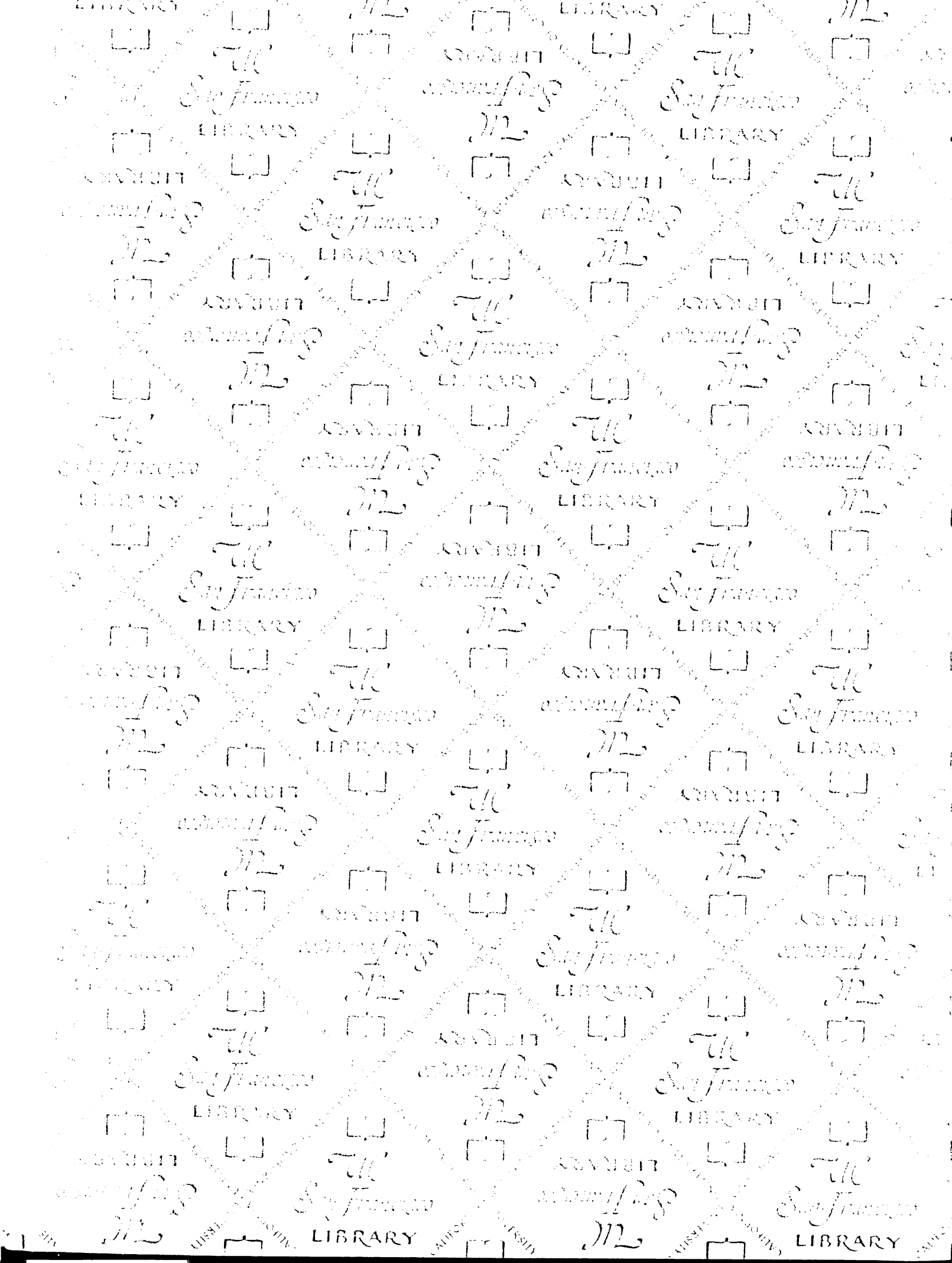
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